





Bulgarian Science in Antarctica

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Kiril Valchev, BTA Director General

The three times I participated in Bulgarian Antarctic expeditions, I loved the most to seclude myself in the chapels dedicated to the patron saint of the Bulgarian people, St. John of Rila - the old chapel from 2003, which I found just opened on my first trip to the Bulgarian base on Livingston Island in 2004, and the new one from 2012, which I visited in 2020 and 2024. I used to sit down on the doorstep so I could read from the Bible left by the altar, illumined by the light on those long white nights.

On one such night, I came across the Revelation of St. John the Divine, where chapter 21 reads: "Now I saw a new heaven and a new earth, for the first heaven and the first earth had passed away. Also there was no more sea".

I was gazing at the rocky landscape, the glaciers in the distance on the other side of the island's South Bay, the cloudridden skies after a sunny day and asked myself whether Antarctica might be this new heaven and new earth.

Another evening, I was reading through the chapter 13 of the Corinthians by Paul, which says " For we know in part and we prophesy in part, but when completeness comes, what is in part disappears."

And I was coming to understand what scientists were searching for in Antarctica – the complete knowledge of mankind's future.

been seeking this knowledge since 1988 over the course of 32 Antarctic expeditions to the Bulgarian Antarctic base St. Kliment Ohridski, which lies some 13,800 km away from the Support) mission with new re-Bulgarian capital of Sofia and is located near the shore of Emona Anchorage on Livingston Island in the South Shetland Islands. Bulgaria is among the 29 countries that, according to the Antarctic Treaty, participate in the governance of the continent, which could turn out to be the for humanity.

This issue of LIK magazine is dedicated to the scientific

research conducted during the latest 32nd Bulgarian Antarctic expedition. The expedition was joined for the second time by the Bulgarian naval research ship Sv. Sv. Kiril i Metodii, after its first roundtrip to Antarctica, which LIK covered in its Bulgarian and English-language special editions last June, after BTA was the only media outlet with a full-time correspond-The Bulgarian scientists have ent - Konstantin Karagyozov, who was onboard the whole 127 days-long journey, and covered the work of the researchers and crew. This time, the ship joined the ANTARSUP-23 (Antarctic search equipment, such as microscopes and oceanic sampling devices.

The big question, which Bulgarian scientists are also trying to answer, is whether mankind can prevent or postpone the need to search for a new land that would ensure its survival, new earth with the new heaven or Antarctica can be the lifesaving new land.

Bulgarian scientists are not alone in the quest for these an-





Bulgarian News Agency's Press Club on Livingston Island

swers, because as the head of the Bulgarian Antarctic expeditions, Prof. Christo Pimpirev puts it in his LIK interview, "no one in the world can do science alone". In this past Antarctic summer, the Bulgarians cooperated with scientists from Spain, Portugal, the UK, Turkiye, Argentina, Chile...

"I remember that in 2020 I was especially impressed by the research conducted by Tania Correia from Portugal, whom I met on the China's Great Wall Station, and who had worked prior to that on the Bulgarian St. Kliment Ohridski Base. She was growing plants in small greenhouses and was using the wastewater of different bases to find out whether it could replace the lack of soil on Antarctica. Back then, I was joking with [composer and famous kaval player] Theodosii Spassov, who had come to compose an album with Antarctic melodies, that we can pick Tania's "lettuce" during the night and make salad from it. However, Prof. Pimpirev seriously scolded us and told us that the success of this experiment

would allow mankind to live on Antarctica if the global warming renders our current habitats uninhabitable.

In fact, several research projects by Bulgarian scientists have been devoted to climate change, which is the subject of this issue of LIK. You will read how, according to speleologist and PhD student at the Institute of Space Research and Technology of the Bulgarian Academy of Sciences (BAS), aerospace engineer Tsvetan Parov, who is also a lecturer at the University of Architecture, Civil Engineering and Geodesy (UACG), observations on the progressive reduction of the Perunika glacier provide knowledge that will Sciences presents her research be a step forward in predicting the melting of glaciers. And electronics PhD student Peter Sapundzhiev explains how he has installed a new system with visual access to the glacier to learn more about the big picture of global climate change. He has also been an engineer at the Bulgarian base for five years and on the last expedition installed a re-

liable solar-powered instrument designed to monitor the amount of solar energy falling on a unit area at different angles and to work during the dark days of winter when there are only two or three hours of light a day - a solution sure to be of great use if more people were to populate Antarctica.

Another area of Bulgarian Antarctic research, which this issue of LIK examines, is the influence of mankind in the largest natural laboratory on Earth, as Prof. Pimpirev refers to this continent. Assoc. Prof. Raina Christova of the Prof. Fridtjof Nansen Institute of Oceanology - Bulgarian Academy of on the presence of heavy metals (arsenic, chromium, nickel, copper, lead, zinc and mercury) in seabed sediments. Ichthyologist and hydrobiologist Prof. Eliza Uzunova, from the Faculty of Biology at the St. Kliment Ohridski University in Sofia, notes the danger to the health of Antarctic fish posed by microplastics in the 5 to 12 million

tonnes of plastic waste dumped known to us. each year, which is currently estimated to be over 150 million tonnes in the world's oceans, and in 2050 there could be as much plastic in the ocean as there are Hydrobiologist Assoc. Prof. Lyubomir Kenderov, also from the Faculty of Biology at St. Kliment Ohridski University in Sofia, shows how organisms living on the seabed can be used as an early warning that humans are changing living conditions in Antarctica and action needs to be taken.

The research of Bulgarian scientists on how humans tolerate Antarctic conditions is also of great importance for future permanent human habitation in Antarctica. The health and mental state of the participants in the expeditions are in the focus of LIK's interviews of Prof. Dr Albena Aleksandrova from the Vassil Levski National Sports Academy and the Institute of Neurobiology of the Bulgarian Academy of Sciences, of one of the medics on the Bulgarian base Dr Atanas Peltekov, and of biologist Kiril Kandilarov from the medical diagnostic laboratory.

Of course, the practical benefits of Bulgaria's scientific presence in the shorter term are of greatest interest to those eager to see humanity "move" to the "new earth".

The research of fish, which are also valuable food for man not only in the distant future, is examined by ichthyologist Assoc. Prof. Tihomir Stefanov from the National Museum of Natural History at BAS, who says that today we have mapped the surface of Mars, but many things related to fish are un-

Thanks to him, the ichthyological collections of the National Museum of Natural History at BAS are enriched with subject of economic interests. eight new species of fish from the waters near Livingston Island, but he managed to catch a new species - Parachaenichthys charcoti. And from the ecosystems of the Southern Ocean, mankind can rely for sustenance on fish, crustaceans and mussels, the capture and recovery of which in artificial conditions are the subject of research also by Prof. Eliza Uzunova.

"Different metals were discovered in the vicinity of the Bulgarian base "St. Kliment Ohridski" on Livingston Island, such as lead, zinc, copper and one of the most important metals that mankind has been interested since its creation - gold," says in an interview for BTA in December 2023. Dr Ralitca Sabeva from Sofia University's Department of Mineralogy, Petrology and Economic Geology under the Faculty of Geology and Geography, who also participated in the 32nd Bulgarian Antarctic expedition. She told BTA correspondent on Livingston Island Emil Granicharov in January 2024 about two types of gold found in Antarctica - pure without impurities and the one containing traces of silver. The scientist recalls that Article 7 of the Madrid Protocol, which has been in force since 1998, prohibits all activities related to prospecting, exploration and extraction of minerals, but does not prohibit science, and the restriction applies until 2048, when this matter will be reviewed and it is possible that the rapid development of technology and

the world "hunger" for precious and critically important metals will lift this moratorium and Antarctica will also become the

LIK's story about the research

of microbiologist and biotechnologist Assoc. Prof. Snezhana Rusinova from the Cellular Biosystems Laboratory at the Stephan Angeloff Institute of Microbiology with BAS are dedicated to the potential of biologically active substances from Antarctic yeasts for cancer treatment. By the way, one of the most intriguing studies I learned about during the 2020 expedition was that of Assoc. Ivan Pandursky, who studied Boeckella poppei, the wiggling red living specs in Livingston's ponds - the only freshwater multicellular organism on the island that are at the beginning of the food chain, i.e. of life. My conversations with him were about the knowledge acquired from the research of these wiggling living specs about the risks to living organisms posed by changes in their environment, just in the early days of the recently emerged coronavirus that changed people's lives by "shutting down" the world because of the COVID-19 pandemic.

New opportunities for food, medicine, precious metals - obviously these are stronger arguments before preparing to "settle" a new land in order to encourage people, including Bulgarians, to invest in scientific research in Antarctica. But for the sake of the more distant or nearer future, such investments are of great benefit and Bulgaria is one of the world's good examples with the acquisition and use of a research vessel in the Southern Ocean, which we calculated with Bulgarian Antarctic scientists to be probably the sixth one in the Antarctic of a European Union country (Bulgaria has had permanent membership of the European Polar Board since its establishment 25 years ago). Just as Bulgaria is the sixth country to send a man in space - Georgi Ivanov, whose flight was exactly 45 years ago this April and to which LIK has specially dedicated an issue.

Mednikarov, head of the Varna Naval Academy, which together with Sofia University and the Bulgarian Antarctic Institute jointly manages the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii in a consortium, as well as its Commanding Officer Nikolay Danailov, also talk about the great sense for science in investing in the research vessel. This issue of LIK also focuses on the enthusiastic welcome the Bulgarian ship received in Commodoro Rivadavia in the Argentine province of Chubut in Patagonia, where some 2,000 descendants of Bulgarian emigrants from a century ago live and to whom Sv. Sv. Kiril i Metodii brought a new self-confidence when more than 5,000 inhabitants of the town came on board to see it during its open doors' day.

The challenge facing Bulgaria is to start planning the acquisition of a new ship, which can continue exploring and researching the world's oceans, including the Antarctic waters.

In fact, Bulgaria has already proven that it has visionary thinking for the benefit of global science with its new state-ofthe-art science laboratory, the main construction of which was completed this year with the help of the delivery of materials from the Bulgarian ship. Its construction is also the subject of a page in this issue of LIK, because of the challenges posed by the harsh Antarctic conditions.

Another challenge is the construction of the new water pipeline under the supervision of Assoc. Prof. Boris Tzankov, who is Chair of UACG's general assembly in Sofia. "For Fotilla Admiral Prof. Boyan the wastewater, both from the old buildings and from the new laboratory, there will be a treatment plant, which will be on a biological basis," the Base Commander, Kamen Nedkov, also notes in this issue of LIK.

"If we compare the logistics of the Base's operations, expressed in cubic meters and weight, for only two expeditions - the 31st and 32nd - the amount exceeds that of the previous thirty [expeditions] combined," one of the long-time commanders of the Bulgarian Base, Yordan Yordanov, tells LIK.

The new laboratory also proved to be a chance for BTA to open a National Press Club for Bulgaria's national news agency this February at the Bulgarian Base on Livingstone Island. It is housed in a room given to BTA free of charge by the Bulgarian Antarctic researchers - a blue metal container (matching BTA's signature colour) opposite the old one and next to the new workshop, also brought by the Bulgarian ship on its first voyage to Antarctica, which was previously used as a laboratory for ichthyologists and has now moved to the newly built modern laboratory block.

Bulgarian National News

Agency's National Press Club in the Bulgarian Antarctic base is not only symbolically important because it is another sign of the serious presence of the Bulgarian state in Antarctica, where the most developed nations of the world are. It will provide working conditions for journalists, whose important role in promoting Bulgarian science in Antarctica is mentioned in the chronology of the 32nd Bulgarian Antarctic expedition in this issue of LIK. "That is why, despite being on leave from BTA, I used my participation in a third expedition to set up and open a press club of Bulgaria's national news agency together with Prof. Pimpirev, in support of all media.

"I also took another opportunity - the fact that various coinciding with the expedition commitments took Sylvia and I to Antarctica together. She and I signed a civil marriage license in front of the Bulgarian ship's Commanding Officer, which according to our research with Prof. Pimpirev, made Bulgaria the first country in history with a legally recognized marriage between a man and a woman in Antarctica".

And this reminds me of another reading from the First Letter of St. Paul to the Corinthians, which I came across while reading the Bible in the chapel dedicated to St. John of Rila: "And if I have the gift of prophecy and comprehend all mysteries and all knowledge; if I have all faith so as to move mountains, but do not have love, I am nothing. If I give away everything I own, and if I hand my body over so that I may boast but do not have love, I gain nothing".

And about the call in the same message, "Strive for love", because without it there is no sense of mankind's future, for which scientists in Antarctica are gathering knowledge.



The St Kliment Ohridski Bulgarian Antarctic Base is located at 13,800 kilometres southwest of Bulgaria's capital Sofia, on Hurd Peninsula at Livingston Island's Bulgarian Beach, overlooking Emona Anchorage in South Bay. Most of the buildings of the base are clustered 130 metres from the shore, at an elevation of 12 to 15.5 metres above sea level, between Sinemorets Hill and Pesyakov Hill.

All buildings are metal-frame structures. The main building, the chapel and the church are constructed on the bedrock, whereas the rest stand on rock moraines. The foundations of the Lame Dog, Casa España and the building that previously housed the main laboratory consist of oil drums anchored into the moraine terrace and filled with concrete. Their external walls are made of composite panels with polyurethane core.

The main building dates from 1998. It is 11 metres long and 6.6 metres wide and consists of a living room, a kitchenette, three bedrooms, a utility room, and a pantry. A metal annex, added in 2005-2006, houses a garbage incinerator with a filtration system and a bathroom with two additional shower cubicles, a water heater and a laundry room. In 2020 the building was

extended with the addition of a more spacious kitchenette.

The Lame Dog Hut is the oldest preserved building on Livingston Island. It dates from 1988 and measures 6 by 3.5 metres. In 2012 it was declared a branch museum of the National Museum of History in Sofia, and in 2015 it was included in the List of Historic Sites and Monuments in Antarctica, drawn up by the Antarctic Treaty Consultative Meeting (HSM-91). The Hut hosts a post office of Bulgarian Posts with Postal Code 1090.

The Russian Hut was built of wood panels in 1988 and measured 4 by 2.5 metres. It contained a workshop and a storeroom. The structure was crushed by snow. Its site is now occupied by an igloo-type fibreglass residential building which accommodates the builders of the new laboratory.

Casa España went under construction in 2006-2007 and was ready in 2010, complete with wiring, plumbing and finishing work. It is a 3.6 by 7.2 metres, two-storey residential building with bedrooms, a bathroom, and working space for researchers.

The Old Laboratory, started in 2007-2008 and finally completed in 2011, is another two-storey building.



Measuring 9.7 by 7.2 metres, it consists of two lab rooms, amenity rooms, a doctor's surgery, and a bathroom.

The above-mentioned Old St John of Rila Chapel was built in 2003. It is a 3.5 by 3 metres tin shed with plywood-faced interior. The chapel is situated at 220 metres southeast of the Lame Dog Hut. This is the first Eastern Orthodox building in Antarctica and was also the world's southernmost one until 2011.

The New St John of Rila Chapel, built during the 2011-2012 season, is an arch-shaped tin structure. Its dimensions are 4 by 5.5 metres, and its interior is faced with plywood. The chapel is located on the slope of Pesyakov Hill, 60 metre south of the Lame Dog Hut. Inside the chapel, the iconostasis is made up of icons painted on site by iconographer Ganka Pavlova.

A tin power house, built in 1995 and measuring 6 by 4 metres, was crushed by snow in the winter of 2010. It was subsequently restored and reinforced.

The first Galpón (Spanish for 'storehouse'), built in 2006-2007, is an arch-shaped tin hangar for the Zodiac boats. Measuring 6 by 5.5 metres, it is located on the land-

ing site at the foot of the Hespérides Point and Hill. That structure was crushed by snow and has been dismantled.

The Old Galpón was built in 2016-2017 as a storehouse, workshop and protective clothing change room when Zodiac boats are launched.

The new Galpón (opposite the old one) was brought by the Bulgarian naval research and survey vessel Sv. Sv. Kiril i Metodii during her first voyage from Bulgaria to Antarctica in 2022-2023 and was placed opposite the old Galpón. It, too, serves as a storehouse and a workshop.

The National Press Club of the Bulgarian News Agency (BTA) was inaugurated on February 8, 2024 by the leader of the Bulgarian Antarctic expeditions, Prof. Christo Pimpirev, and BTA Director General Kiril Valchev (participant in three Bulgarian Antarctic expeditions). It is housed in a blue metal container, also brought by the Bulgarian ship during her first voyage to Antarctica, and is located opposite the old Galpón and next to the new one, which was previously used as a laboratory of ichthyology.

• The description of the existing buildings is based on the book Antarctica by Lyubomir Ivanov and Nusha Ivanova, published in 2014, and on information provided by Prof. Christo Pimpirev.

St. Kliment Ohridski Base Is the Bulgarian Home in Antarctica



Personal archive photo

Engineer Yordan Yordanov

My job and, specifically, two It's been over two decades since diesel generators took me to Ant-I've had a good look into the lives arctica. They were provided with of polar explorers, not only at the assistance of the company the Bulgarian base St. Kliment I worked for and were to be in-Ohridski, but at the other bases stalled at the base on Livingston I've visited. There are a few im-Island. The destination is so exmutable rules. Everything that traordinary and faraway that its is done in Antarctica must be as very name is exciting. The places environmentally friendly, as posuntouched by man are few and sible. Human presence should indeed inaccessible these days, leave little or no mark on the so the very thought of contribtopography, flora and fauna. All uting to their study excited me. activities are aimed at studying, I wanted to help, but it wouldn't exploring and describing nature in this giant planetary reserve. even occur to me to go there. I laughed when Christo Pimpirev The buildings, without which we said, as if it goes without saycould not survive there, must be ing: "What do you mean, who solid enough to endure the winds is going to install them? You, of and visible enough to stand out in course". And I went. the snow. They must be erected in

locations accessible from the sea, with the ability to provide drinking water and facilities for hygienic and energy efficient living. They must be in such a location that they are not overwhelmed by heavy winter snowfalls, nor float out to sea with an iceberg. To find a place providing these conditions was the task number one of the two landing parties of the First Bulgarian Antarctic Expedition. Borislav Kamenov and Christo Pimpirev, who were part of a British Antarctic Expedition to Alexander Island, choose the site. Assen Chakarov, Zlatil Vergilov, Nikolai Mihnevski and Stefan Kaloyanov with the Soviet ship Mikhail Somov deliver and

Bulgarian Antarctic Institute.

Yordan Yordanov was born on October 3, 1948, in Dupnitsa, Southwestern Bulgaria. He graduated in electricity supply from V.I. Lenin Higher Institute of Mechanical and Electrical Engineering, now Technical University of Sofia. Yordanov worked as a designer in IPA Transproekt, was Chief Energy Engineer in Knizhna Fabrika Iskar, as well as duty engineer in a radar complex and head of EMSTO department in BULATSA. Participant in 18 Bulgarian Antarctic expeditions, long-time commander of the base. Member of the Board of the



Kiril Kandilarov. Personal archive photo

from Bulgaria.

It is a beautiful and dynamic history of how the events played out in that distant 1988 year. Alexander Island proved inhospitable, but the efforts made by our Antarctic people were crowned with success. The beginning is a fact, the Bulgarians are on Livingston Island. Our flag flew over the base, consisting of one living van and a storage shed provided by the ship. These will always remain iconic: the Lame Dog and the Russian Shed.

There were many consequences of the 1989 collapse of totalitarianism in just about every sphere of life in Bulgaria. Antarctica

install the "building fund", a van was put on pause until 1993, when the base was named "St. Kliment Ohridski" by a decree of the President of the Republic of Bulgaria. In my opinion, it was the Second Bulgarian Antarctic Expedition that gave a future to the Bulgarian presence in Antarctica. That expedition's participants managed to cope with the consequences of the natural elements' impact of several years. They rebuilt the van, creating living conditions. And what's more, they built a home, our home in transport by land, air and water Antarctica.

> The list of future Antarctic explorers began from the participants in the Second Expedition: Borislav Kamenov, Iliya Ma-

slarov, Krum Velchev, Kuzman Tukhchiev, Nikola Vasilev and Christo Pimpirev. So far, more than 100 people have worked on the base for all the 32 expeditions. It is difficult to mention all the names, each has left something of himself for those after

There have been visible changes in the people's way of life in Antarctica over the years. Science and technology have progressed. Buildings and means of are now different, with new, more efficient materials and fundamentally different systems of construction and management.

The first building installed



Yordan Yordanov. Personal archive photo

on the base, the Lame Dog van, now the site of the National History Museum, was our home, furnished with beds, a table, and a cooking area. The main building was constructed between 1996 and 1998. It was prefabricated, purchased from South America and could accommodate 10 people. There was a separate kitchen, living room and bathroom.

The construction of two new buildings of alpine style followed in 2008-2009. The two houses had a total of 13 sleeping places, bathrooms and toilets, one had a doctor's office and laboratory. Necessary rooms and facilities were constructed to ensure normal living and working conditions for the staff.

Water is the source of life. Antarctica is the main source of drinking water on our mother Earth, just not in an aggregate state needed for the vital functions of human beings. The process of base's water supply includes melting snow, digging a hole under the melting snow and ice, gravity feeding the water to the base, pulling anti-freeze heat-

ing wires into some of the supply pipes, installing a hydrophore system. Moreover, for hot water there were installed a gas boiler for the kitchen, electric boilers for the bathrooms, assisted by vacuum solar panels.

The other "necessary evil" for the operation of the various facilities, scientific equipment and means of communication is electrical power. A museum treasure is the gasoline generator that provided power for the tools when the first van was installed. During the following expeditions, the biggest electricity consumer was the great Rahovets stove, which provided the Antarctic with their daily bread and hot meals. Of course, there was a power use schedule (we are a Bulgarian base, aren't we?), determining the successive operation of one stove, then oven upper and lower heaters, flex drill, and other tools.

The next generator was a Volvo-Penta installed in a special place, the doghouse. It should be noted here that Antarctica is a paradise for the realization of any technical ideas. In that case, the cooling system of the gasoline generator used the radiators in the main house. And there it got warmer, with a temperature higher than ambient and closer to that of a living human organism. The military contributed to the development of the electric power system on the base. A diesel generator ROBUR, nicknamed The Warsawian as a memento from the recent past, provided 40 KW of three-phase electric power, that allowed the heating of the space with electric radiators and fan heaters. The energy system of the base further expanded with two new units of 27 KW and 13 KW, which together with the gas kitchen equipment ensured normal living conditions.

The only necessary condition was to ensure enough fuel supplies to provide the necessary electricity, and that pollutes the environment, according to all the laws of science. Both the scientific and technical potential of the base reacted immediately. Photovoltaic plants were built, first one with a capacity of 1 KW and later two 5 KW units. Buffer batteries and inverters were provided. For experimental purposes, two wind generators of 0.5 KW each and a water turbine of 0.2 KW were installed on the stream next to the Lame Dog.

It is unacceptable to be some place and be totally cut off from the rest of the world. Especially in case of extreme situations or when you could help someone. There is a huge number of people in the world whose heart skips a beat when they hear of the Bulgarian radio call sign LZ0A.

The world owes to radio operators the overcoming of distances and time. The radio operators for the Bulgarian base were Miko Mikov, Yordan Yankov and Dimitar Raychev. Two points, the base and the radio club of the Technical University, thousands of kilometers apart, were filled with anticipation to hear the voice of the boss, the loved one, the child, the grandchild, the friend, to hear the world and for it to hear them.

Then came the satellite phone. There was a period when everyone had a certain phone time allotted to them based on the number of days they were on the base. One spoke on the phone and the other clocked their minutes.

Now there is virtually unlim-

ited internet access on the polar base, and the speed of the connection is more than good. What the radio operators used to provide with a lot of effort, everyone now has in hand: their mobile phone. A good definition of this progress was given by our colleague Dimo entering the common room, "It feels like going into the metro!"

The base with its structure and organization of operations for its normal functioning is just like a regular village. It is no coincidence that the base commander's title is Mayor. The first expeditions set in place all the systems for a settlement, including electricity supply, water supply, sewage, storage for household waste, later equipped with an incinerator, heating, transport by land and water. For the first expeditions, these were a portable generator, a water hose from the lake to the Lame Dog, an outdoor toilet named The Throne with the best view of the bay, several garbage barrels and a lot of Antarctic spirit. Today's base infrastructure surpasses a wellorganized Bulgarian settlement with electricity from generators and renewable sources, sewage system with a modern sewage treatment plant to be installed, a more efficient incinerator for waste incineration. The newly built water supply system at the base ensures uninterrupted water supply regardless of weather conditions for the entire season and has sufficient capacity for the future Laboratory Block as well.

In Antarctica, spirituality has always gone hand in hand with the spirit of adventure. In 2003, the Chapel of St. John of Rila was built and was recognized as one of the emblems of Antarctica. With donations, a new chapel building was erected in 2012. All the icons were painted on site by artist Ganka Pavlova.

Until recently, we have been entirely dependent on the logistical help of our friendly countries to carry out expeditions, even just to reach the icy continent.

Perhaps one of the most beautiful and inspiring things about Antarctica is that all the countries there are friendly. Christo Pimpirev explains it most accurately, "In Antarctica, Bulgaria is lucky with its neighbours!" In conditions that constantly threaten the lives of explorers, pure human solidarity, willingness to help, generosity, true brotherhood awakens in everyone. It is a matter of honour to be useful in whatever way you can and to be open to everyone. In any case, from the very beginning of our polar activity until today and forever, the proximity of the Spanish base has been a blessing for Bulgarian Antarctic people. We have always cooperated both for daily activities and for emergencies, and also for holidays that make life fuller and happier.

Logisticians are always in the first group to arrive on base each season. They are tasked with opening the buildings, starting the generators so there is electricity, providing drinking water, getting the boats and snowmobiles running, and beginning the routine repairs and improvements in the base. Even in our own home, each of us constantly has something to fix, replace and update. It's the same in Antarctica, with the slight difference that when we approach our home shore, and the excitement is as strong and real as com-



ing home to a place we love most in the world, we all line up on deck and gaze out at Livingston Island. We always try to guess how much snow fell during the past winter season, whether the rocks will be bare and black, or whether there will be colossal snowdrifts. Whether any of the buildings has been buried by the sliding snow and cracking like a walnut under its weight. Will we have to dig a tunnel under the snowdrifts to get to the door of our home? More than once we have had to dig our way down a few feet to get home. One time, we were unable to uncover a boat shed from the snow for more than eight years.

And so the base, marked on the map first by the Lame Dog, continues to grow so that scientists have ever greater comfort and

coziness and can develop ever wider scientific activity. The rule in the early years was that every Antarctic should be able to do everything. There was no specialization: there was not even a full-time cook. There was kitchen duty. The logisticians helped the scientists in every way. The geologists were also mountaineers, rescuers, and boatmen. The artist Ganka Pavlova, who painted the chapel, will remain in history with the most delicious and unforgettable dishes. The work was not just a job, but a common mission and everyone was happy to be useful. This was the basis of the friendship that bound people together forever. That's the way it was and that's the way it should be.

The specific conditions are challenging and for each problem

there, a specific solution must be sought on the spot. There are no hypermarkets in Antarctica. You can rely on materials and machinery that are brought from Bulgaria or South America in limited quantities and have to be calculated in advance. Now the possibilities are far greater, because we can rely on the Bulgarian research ship Sv. Sv. Kiril i Metodii. The ship is often described as "a dream come true". That is right, a ship could only be dreamt of or, even more, we did not allow it in our dreams. We never thought that this day was so close and would happen in our time. What has been done on the base in 30 expeditions is truly colossal, mostly because of the way it has been achieved. If we make a comparison of the logistics ensuring the operation of the base in

terms of cubic metres and weight, in just two expiditions, the 31st and the 32nd, the amount exceeds that of the previous thirty combined. It is difficult to find units of measurement for the possibilities that open to scientific projects.

First of all, the project for the Laboratory Block construction went through all stages from public procurement, design, securing funds to the selection of a contractor. With the extensive experience of organizing logistics in Antarctica, our eyes were set on Spanish, Argentinian, Chilean, Brazilian programmes. To the idiom "God is a Bulgarian" I would add "and Antarcticist"! The reality is most faithfully defined by "God helps those who help themselves". Immeasurable efforts were made

to overcome all the administrative requirements to purchase a vessel, which in an incredibly short time might be repaired and adapted for Antarctic mission. We have a ship, a Bulgarian research ship! Hundreds of tons of aggregates, metal structure and building elements were delivered on board the RSV 421. For three seasons, not to mention all the minor hiccups including weather and terrain conditions, the building of the new Laboratory Block became part of the Bulgarian base landscape.

With this ship in the Antarctic programme Bulgaria completely meets the concept of a full member of the Antarctic family. We are equal to others in technical and scientific potential. In spirit, emotion and stubbornness we

are unmatched!

Yet, heuristic thinking and the ability to quickly find solutions to unexpected problems will never lose their importance in the field conditions. On the base, skills and talents blossom where we never suspected to have them because we had never needed them before. Every logistician is required to be polished in their knowledge and secure in their experience, bringing out their best side as a professional and a person.

With each expedition, Bulgarian polar explorers get better at applying the advances in technology in order to be closer to nature and to live in Antarctica under its conditions. Respect for the planet is not just empty words.

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Prof. Christo Pimpirev:

No One in The World Does Science Alone



Photo: Milena Stoykova, BTA

"No one works alone.

There is no such thing

in the world as doing

science alone. It is virtu-

ally absurd for a single

country to do something

on its own without coop-

erating with other coun-

tries," the leader of the

32nd Bulgarian Antarctic

Expedition, Christo Pim-

pirev, said in an inter-

view with LIK magazine.

Yanitsa Christova

Christo Pimpirev was born on February 13, 1953. He earned a master's degree in Geology from the St Kliment Ohridski University of Sofia in 1978 and a PhD degree in 1987. He has been a geology professor at Sofia University since 2005. Pimpirev earned a Doctor of Science degree in 2017 after defending a thesis on Stratigraphy and Geological Evolution of Livingstone Island during the Cretaceous Period. A doyen of the Bulgarian Antarctic programme, he participated in Bulgaria's first National Antarctic Expedition in 1987-1988. In 1993, Pimpirev founded and became head of the Bulgarian Antarctic Institute. He has led the annual national scientific expeditions to Antarctica ever since. The polar explorer is an author of books, documentaries, and hundreds of articles in various Bulgarian and foreign publications.

Speaking to LIK, Prof. Pimpirev talked about the 32nd Bulgarian expedition to Antarctica carried out by the Sv. Sv. Kiril i Metodii naval research vessel, the role science played in it, and the motivation behind building a state-of-the-art laboratory on the Ice Continent. "There is a symbiosis between scientists and logisticians, which is crucial to the successful outcome of any Antarctic expedition," the scientist noted.

Here's what else he had to say:

Prof. Pimpirev, what were the objectives of the 32nd Antarctic expedition?

The objectives were of a logis-

tical nature, as is the case with every Bulgarian Antarctic expedition. It goes without saying that they were also of scientific nature because science is central to Antarctic research. But science cannot be done in Antarctica without logistical backing- that is, without a functioning polar base and people assisting the work of scientists on the tough icy terrain outside the base. So, there is a symbiosis between scientists and logisticians, which is crucial to the successful outcome of any Antarctic expedition. Just as scientists depend on logisticians, logisticians depend on scientists, because if there were no science, there would be no need for them. Besides the symbiosis between science and logistics in Antarctica, science and foreign policy go hand in hand because the continent has much to do with geopolitics. Covering a tenth of the Earth's surface, the continent is governed by the Consultative Parties to the Antarctic Treaty Consultative Meeting; there are just 29 permanent members from around the world. Bulgaria is among them, with rights equal to those of all the great powers that would naturally be members of this international

Let me give you an example. At the Consultative Meeting in Belin three years ago, Canada, a highly developed country with a very well-developed Arctic programme, applied for the status Bulgaria and the other 28 countries have. And it was denied. Some of the countries chose to veto it. So, it is very much a matter of geopolitics.

Antarctica is a very special place, a very special continent. It is the most remote continent on Earth. Surrounded by ice, cold and uninviting, it has the lowest temperatures on Earth. Minus 89 degrees Celsius is the lowest temperature measured there. Such are the temperatures on Mars. You don't need to go to Mars. It would suffice to visit Antarctica, except everything there is white instead of red as it is on Mars. To me, Antarctica is a white planet, very special and different from anything we have on the rest of the Earth.

Did the scientists manage to complete the planned programme?

Of course they did. The programme was 100% completed, even beyond 100%, because they did an excellent job. They worked very well with the logisticians outside the base and collected a lot of samples. Some of them are very valuable. Some of the greatest discoveries for the whole of mankind are made there.

Firstly, the melting of glaciers and climate changes can be observed there. This is crucial for the entire planet and every person on it because the melting of glaciers leads to a rise in sea levels. If the glaciers on Antarctica were to melt, global sea levels would rise by 60 metres. Huge areas along the coast will be inundated by sea water, and these are some of the most fertile lands that feed billions of people and are home to billions of people. Huge migrations will ensue, there will be famines, and humanity will decline dramatically...

So Antarctic research is important. The natural conditions there are very distinctive. The Ice Continent is home to organisms that you cannot find elsewhere. For instance, vertebrates such as the penguins that are a symbol of Antarctica and microorganisms that have adapted to living in these very extreme sub-zero degree con-

ditions.

Enzymes get extracted from these microorganisms, which live only in Antarctica and nowhere else. Many new medicines are made from them, including anticancer drugs. Millions of people have been cured of this scourge and have survived because scientists in Antarctica extracted enzymes and made a cure for cancer.

So, scientists don't go to the Ice Continent to simply satisfy their scientific curiosity. This is a very important task, and without scientific research in Antarctica, humanity would be at least a few centuries behind in its development.

What is more, the continent is very rich in precious metals. There is gold around the Bulgarian base, which is the most attractive but not the most significant. There are also precious metals, which are used for all the innovations that have become an integral part of modern life

That is why we explore Antarctica. We go there because it is part of our planet Earth, and we, Bulgarians, also belong to this planet's mankind, and we must not forget that. And we should stop complaining about living in a poor country in the south-eastern corner of Europe. We are not poor, but rather a very respected country that can launch a ship from Varna - for the first time in its maritime history, a research vessel has left the confines of our Black Sea coast to cross the world ocean and reach the Southern Ocean, which is fraught with icebergs, storms, and wind. And it has returned twice! It was not just a one-time occurrence you can put down to luck. It was not luck because it did it twice! So, we, Bulgarians, who used to build our houses facing away from the sea because we were afraid of it and did not have a single Bulgarian town on our Black Sea coast - and

all the towns were Greek colonies - we are now ahead of the Greeks in Antarctica as well with our research vessel, and we should be proud of that.

presence on the Ice Continent is one of the 15 greatest achievements of our country since 1989. This was proved by a Gallup poll in April ranking Bulgaria's ten greatest achievements, and our presence in Antarctica placed 13th along with the literary achievements of writer Georgi Gospodinov.

What does the National Polar Research Programme involve?

The National Polar Research Programme encompasses both poles. It is under the Ministry of Education and Science. The first programme has finished. This is the second one, which will run until 2025, when we will present a new programme, a follow-up to this one.

This is only natural because all the countries in the European Union that work in the polar regions are working on national programmes. The programme has a scientific section that involves scientists from all over the country whose projects are selected on a competitive basis. Of course, their foreign colleagues can also take part. There is a scientific committee made up of professors and associate professors who have worked in Antarctica. They evaluate the projects, and the best ones receive funding so they can be developed in Antarctica. In addition, there is separate funding for young scientists because this continent is for the young generations and without the youths, our country will be done away with.

There are also logistical sections, because doing science in Antarctica cannot happen without

the logistical support of scientific projects. This is under the national Roadmap for Research Infrastructure, part of the European Roadmap for Research Infrastructure. We should know that Bulgaria's This includes the Bulgarian Antarctic base St Kliment Ohridski. This is a complex programme coordinated by the European Polar Board and all European bodies. Part of its infrastructure is also our new research vessel, which is included in the European scientific fleet. With that, we are very actively involved, and our country, with its polar research, is highly valued in the European Union.

Are we able to do world-class science research in Antarctica with the resources and facilities available?

During this expedition, we completed the construction of a scientific laboratory there, which is crucial because in these harsh working conditions, the field samples collected are very valuable and need to be processed on site so that their qualities and properties are not lost. Their transfer to laboratories in the interior of the continents would lead to them partially or completely losing their properties, which must be studied and be useful in scientific discovery. This is the purpose of this laboratory, which is yet to be equipped.

Every scientific laboratory must have the appropriate equipment to examine the specimens and samples taken. There is another important task ahead of us. Besides the fact that it was very difficult to build in these harsh weather conditions, the laboratory now must also be equipped. This is the easier part, but providing it with state-ofthe-art equipment will require financial resources. Our enthusiasm will not be enough to equip the laboratory with modern scientific

infrastructure. We need financial resources, and we hope to obtain them through our international projects with the European Union, but the state must also help because we cannot keep relying on support from abroad.

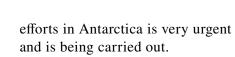
How did you come up with the idea to set up such a laboratory

It is simply an urgent necessity. If we work hard, as we do in Antarctica, we have a solid scientific programme, world-class and internationally recognized scientific results can only be achieved through advanced research done in scientific laboratories that are fit for purpose. So, there is a pressing need for this laboratory. Otherwise, we will be at the 19th century level. If we want to live back in the 19th century, we will not have state-of-the-art laboratories. They are simply imperative if we want to do science in the 21st century.

You say that Antarctica is a continent of reciprocal assistance. Who do we help, and who can we rely on for help and support?

All the countries there help each other. This is the continent of the future, where countries work together. There are no wars there, no quarrels, no hostages. It is all in the name of science, cooperation, and the coordination of scientific projects.

The European Polar Board coordinates scientific projects across the European Union, so we work together with our European colleagues. No one works alone. There is no such thing in the world as doing science alone. It is virtually absurd for a single country to do something on its own without cooperating with other countries. So, the coordination of scientific



But there also needs to be coordination in logistics. We are currently helping countries like Spain, Portugal, and Turkiye with our research vessel. There were many countries that explored the New World when our country did not exist on the map. For instance, when Spain discovered America via Columbus we were not on the world's map because we were part of the Ottoman Empire. And now we are helping Spain, with a vessel at that, and we cannot be anything but proud!

We are helping many countries, but prior to having a ship, which is just two years old and has two polar missions under its belt, we relied entirely on other countries' help. And we still rely on Spain, Argentina, Chile.

Are you already planning for the 33rd Antarctic expedition? What do you expect from it at this stage?

Of course it is planned, and we're already behind schedule. It is only natural. An expedition should be planned a year in advance, even earlier, but our ship, Sv. Sv. Kiril i Metodii, returned from Antarctica only a month ago. It is due for a planned refit, trials in the Black Sea, and some work under Black Sea projects concerning the environment in particular.

But we must first and foremost have scientific projects included in the National Polar Research Programme. We will launch a call for proposals that will be open to all scientists

across the country, regardless of the institution they work for. The best projects will be selected through a competitive process. That will determine their number, and they must be implemented during the upcoming expedition. Work will be done in the field of biological sciences, and microbiology in particular. On the enzymes and microorganisms, as I mentioned. The richness of the Southern Ocean will be studied - the fish, the penguins, the seals, the impact of climate change on organisms. Research into the mineral wealth around our base and beyond will continue. These are the main areas. There will also be research on glacier movement in relation to global climate change. We have a lot of work to do.



Commanding Officer Nikolay Danailov:

RSV 421 Crew Showed Creativity in Providing Active Support for All Scientific Projects



Photo: Emil Granicharov, BTA



"The crew showed creativity in providing active support for the scientific projects," Commander Nikolay Danailov, Commanding Officer of RSV 421, said in an interview for LIK magazine.

"With regard to the scientific projects, we definitely managed to apply our military creativity in supporting all of them. Of course, the scientific equipment available on board the ship did its part of the job. But being military people, the crew added creativity to the process as we helped improve various items, so that they could be exploited to the full," he added.

commanding officer of the first Bulgarian naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) during its historic voyages in support of the 31st and 32nd annual Bulgarian Antarctic expeditions to Livingston Island.

Danailov was born in 1977. In 1995, he graduated from the planning and conduct of the Sea and Ocean Fishing School in Burgas, and in 2000, he earned a degree in naval ship navigation from the Nikola Vaptsarov Naval Academy in Varna.

In 2004, Danailov became a Spanish yacht in distress on assistant commander of the tanker Balchik of the 18th Support Ships Division in Varna.

Nikolay Danailov was the In 2007, he was appointed assistant commander at Naval Base Headquarters in Varna. In 2012, he took the job of division steersman at the 1st Patrol Ships Division, and in 2018, he was placed in command of the rescue ship Proteo.

Danailov told LIK about the RSV 421 voyage to Antarctica and back during the 32nd Bulgarian Antarctic Expedition. He spoke about some offbeat moments such as the rescue of New Year's Night and the finding of debris of a 1976 airplane crash.



Livingston Island, February 10, 2024. Photo: Emil Granicharov, BTA

Commander Danailov, you have been back on solid ground for several weeks now. What were your emotions when you returned from the second successful voyage of RSV 421 to Antarctica?

It is a superb pleasure to sleep on Bulgarian soil again after successfully completing the tasks assigned.

The belief that the mission would be successful, and the will to make it successful, were far stronger than the first time.

We received a solemn welcome at the Passenger Terminal of the Port of Varna, and it was wonderful to see our families and friends again.

Pupils from St Cyril and St

Methodius Primary School, who had been there at the send-off, now came to welcome us back. I am glad that gradually, working with the kind of perseverance you would expect from the military, we lit a fire in the kids. Years from now, they may embrace these ideas, and God willing, some of them may make the steps to Antarctica more distinct.

How was your voyage? Did you find useful last year's experience of travelling along the same route?

Of course, we did. Sailing through the Aegean Sea, the Mediterranean and on through the Atlantic, the Drake Passage and the Southern Ocean, we benefited

from the experience of the previous expedition. But let me note that, although we did a similar job on every day of our voyage, it was not quite the same as before. The ocean is aways full of surprise, including the Drake Passage both ways. The time that we crossed the ocean was slightly different this time. We set sail earlier, on November 8, not in late December as in the previous expedition. This entailed some specific things, but I am glad that, thanks to our good planning - first, the good communication support we had on board, and also, the good weather forecasts we made on a daily basis - we had no trouble reaching Antarctica, doing our job and coming back home safe and sound. It is true that we had all kinds of storms, stronger winds,

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Varna, April 12, 2024. The head of the Bulgarian Memory Foundation, Dr Milen Vrabevski, is holding an official award ceremony at the Nikola Vaptsarov Naval Academy's Planetarium for the crew of the naval research vessel Sv. Sv. Kiril i Metodii (RSV 421). Photo: Danail Voykov, BTA

but they only served to season the crew and add more and more to our experience, which we can use in future expeditions.

How was this voyage different from the previous one? What surprised you?

Unlike the previous voyage, this time a larger part of the ship was used as research infrastructure. This gave our Bulgarian scientists more opportunities to carry out scientific projects, mainly targeting the water environment, and allowed us to support projects beyond the limits of our South Bay. We managed to provide support for the transfer of various groups of geologists to places that are away from our island and to assist the implementation of scientific projects by working from the ship to study the sea floor, take samples from various depths, and search for microplastics in and outside our South Bay. We carried on with our activities as we sailed

farther away from our Livingston Island. This was instrumental in broadening our scientists' field of vision and laying the foundation for more scientific projects beyond the limits of Livingston Island.

Were there any changes in the crew, any new members for whom this voyage to the icy continent was a new experience?

Yes, of course, there were changes in the crew, which is perfectly normal. Another recruitment procedure was conducted after the first expedition, and new members, men and women, joined the crew. There was a partial renewal, and I was very proud to see that the men and women who joined us on board fit perfectly into the general picture and lived up to the highest expectations. The crew members were bound together by a stronger sense of unity and began to perform more complex tasks more quickly.

Ten scientific projects were on the agenda of the expedition this year. What did you do to support them logistically, and how did the scientists work with the crew?

With regard to the scientific projects, we definitely managed to apply our military creativity in supporting all of them. Of course, the scientific equipment available on board the ship did its part of the job. But being military people, the crew added creativity to the process as we helped improve various items, so that they could be exploited to the full. I am talking about our Scottish colleague Mark Irvine, who had brought scientific equipment worth thousands of pounds sterling, but an important component was missing, and my crew made it for him. Our colleague Prof. Eliza Uzunova needed an additional contraption, which we happened to have on board, and it enabled her to scan the area for microplastics.

Some crew members helped collect biological species from the floor of the South Bay by laying fishing nets. In other words, the crew contributed actively to the scientific projects with their creativity. Every serviceperson who wants to work on board must have a special interview with me, in which I analyze their additional abilities in civilian life, which are important in ensuring greater creativity and implementing scientific projects. Concerning work with our colleagues on the shore, the Bulgarian Antarctic Base, our obligations this year consisted in unloading supplies close to the shoreline without using any onshore facilities. We were supposed to work all by ourselves when unloading the building materials for a new research laboratory without using any onshore facilities, and everything up to the shoreline was our responsibility. Beyond the shoreline and into the interior of the island, our colleagues, in the person of their leader Kamen Nedkov, took on the job of transporting the materials to the mound where the new research laboratory was eventually built.

As BTA reported earlier, RSV 421 helped a yacht in distress. What happened, and how did you organize the rescue operation?

It was definitely a great experience. Let me tell you that, as a ship commander, I hope I never get to hear that signal again. The

distress signal "Mayday" was received at 1:45 a.m. on January 1. Imagine the whole world celebrating the coming of the new year, and all of a sudden you get a distress call from a vessel about eight nautical miles from your ship approaching the Drake Passage. It happened at night, and it was dark. We immediately set out to help. Throughout our service in the Navy, we are trained all the time to respond to such situations, to help a vessel in distress at sea.

So, we sailed towards the distressed yacht. It turned out to be the Spanish yacht El Doblon with a 13-member crew. We got in contact with Chile's coastguard and, in accordance with the international regulations of the International Maritime Organization, we were assigned as commanders of

the event, that is to say, we took the whole initiative at the site to provide help and rescue to the distressed vessel. There was an Argentine Navy officer on board the yacht, so communication with the Chilean coastguard was conducted entirely in Spanish. This was very helpful in getting a clear idea about the situation very quickly. We and the yacht came about three cable lengths apart, and we shone a light on it. We realized that sea water had flown into the yacht and crew members were struggling with it. About 10 of them were waiting to be evacuated and transferred to our vessel. My crew managed to stay close to the yacht during the rescue operation. Part of my crew, including the senior assistant commanding officer, were in the rescue boat waiting to



Varna, November 8, 2023. Varna Port hosts a festive ceremony to see off Nikola Vaptsarov Naval Academy's Sv. Sv. Kiril i Metodii, the first Bulgarian naval research vessel. The ship is setting sail for Livingston Island in the Antarctic for the second time. Photo: Krassimir Krastev, BTA



Livingston Island, February 10, 2024. RSV 421's crew and passengers. Photo: Emil Granicharov, BTA

be lowered onto the stormy water of the Drake Passage and to take on board as many people as possible. Later, it turned out that the yacht crew were 17 people. You can imagine the drama, considering that we could take about seven or eight people, which meant we needed to do two or three runs to save them all.

I am glad and proud, first, that my crew responded in an absolutely adequate way. Second, the people who got in the rescue boat ready to provide help, were wearing thermal coveralls, fully equipped and about to do what they were trained to do, following the book 100% without any deviation. And finally, I am happy that the small crew of the Spanish yacht managed to stop the inflow of water and, using only their bow sail, began to move at a very

low speed of about 1.5 knots, or approximately 3 kilometres per hour, towards a nearby Chilean island which was 15 miles away. We escorted them all the way by sailing very close to them, so we would be able to take all of them at any point if the yacht began to sink. As we reached the approaches to the Beagle Channel, a Chilean ship took charge of them and escorted them to Puerto Williams, I think, and then on to Ushuaia in Argentina.

We did our job as Navy sailors: we helped a vessel in distress at sea. Let me note that, in the open sea, in the world's roughest waters in the Drake Passage, there can be nothing worse than losing propulsion and beginning to sink on a dark New Year's Night, with no one to come to your rescue.

Thank God we were there and

helped them. Two days later, the coastguard told me that there had been a man of Bulgarian descent on the yacht.

It was also on the news that your crew came upon wreckage of a crashed polar airplane. What did you do in that situation?

That was another portion of our extra work. An additional task to perform.

We were providing logistical support for a field camp of our polar geologists Kalin Naidenov, Kiril Doskov, Doichin Boyanov and Marcho Paunov at Barnard Point, a promontory of Livingston Island which is quite interesting from the point of view of geological study. It is at the entrance to False Bay, which is next to our South Bay. The geologists

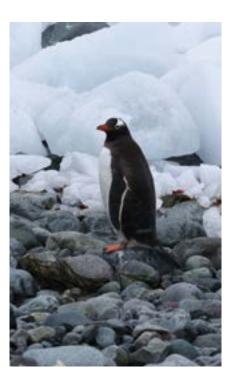
happened upon some metal scrap, and keen environmentalists that they were, they decided to take it on board the ship.

So, we took it on the ship, and we examined this piece of scrap metal found on the beach at Barnard Point. After a short consultation with the senior assistant commanding officer and the operations officer, we concluded that those were fragments of an airplane. We carried out an analysis, and the story grew bigger. We notified the Chilean Air Force first, and the Argentine Navy later, telling them that we had found aircraft fragments. Since Barnard Point is a good place for rock exploration, our geologists revisited the area and found more airplane fragments. The Argentina Sun was clearly visible on one of the pieces. It is a symbol of Argentina that appears on their national flag, and it confirmed the theory that it was a crashed Argentine aircraft. Later, we received confirmation from the Argentine Navy that it was an airplane which had crashed in 1976. It is a sad story about 11 military men who died for science as they studied the movement of glaciers and icebergs in the area of the South Shetland Islands. During an air maneuver, they crashed near Barnard Point. But what happened six months later? The scene of the accident was identified by the Argentine Navy and a helicopter was sent from the neighbouring Argentine base to help recover the bodies of at least some of the military who died there. Regrettably, the helicopter crashed too, and three more military men died. After this dark drama, Argentina called off the rescue operation, and those 14 members of the military remained forever at the foot of Barnard Point, where their bodies were even today. As the glacier slowly melted, it exposed parts of the crashed plane.

After we learned the story, we made a decision. Admiral Boyan Mednikarov, Rector of the Naval Academy in Varna, and Professor Christo Pimpirev, Founder and Director of the Bulgarian Antarctic Institute and leader of the annual Bulgarian Antarctic expeditions, were there with us, and we decided to pay tribute to the victims with a short ceremony, which, of course, was covered by BTA. I am glad we paid tribute to those members of the military, who died just for science. The aircraft fragments were handed over at an official ceremony in Mar del Plata. The Minister of Defence thanked us in a videoconference. Our Ambassador Stoyan Mihailov, who was on board, thanked us also, speaking on behalf of the President of Argentina Javier Milei as well as on his own behalf.

How do you approach a long mission psychologically? Are there any rituals that help you prepare for it? And what are your thoughts when you come home after such a voyage?

I always approach such missions with faith. Belief in success. The tasks are clear, we finish off our plans and tactical preparations, so we can fulfill all tasks assigned to us. When we plan an expedition, we try to make sure that it starts on some Christan saint's feast day, for one reason or another. The first expedition started on St Stephen's Day, and the second one, on the Day of St Michael the Archangel. Faith is always with us. In addi-



Livingston Island, January 28, 2024. Photo: Emil Granicharov, BTA

tion to our belief in success, our Christian beliefs always guide us along the way.

We also rely strongly on our experience, our ability to not hesitate. During such long expeditions, hesitation can lead to defiance, which can have fatal consequences. Any expression of hesitation is dampened as soon as it comes, in order to achieve success at the end. There can be no compromise about discipline or the protocols which must be observed during a voyage. We are a naval crew, after all, and strict discipline is always crucial for a good performance of the tasks assigned. Coming home, we are excited that we have fulfilled our tasks and are able to reunite with our families, who wait at the Varna Port Passenger Terminal to welcome us back with love. We often have videoconferencing sessions with our loved ones during a voyage but holding them physically in our arms is quite another thing!

Flotilla Admiral Boyan Mednikarov: RSV 421 Justified Financial Investment in Her Purchase Several-fold



Photo: R

Yanitsa Christova

"RSV 421 has justified several-fold the financial investment in her purchase three years ago," Flotilla Admiral Boyan Mednikarov, Rector of the Nikola Yonkov Vaptsarov Naval Academy in Varna, said in an interview for the LIK magazine. "According to me, she has repeatedly returned the resources planned for her repair, and this is truly an extremely appropriate investment done in a national scientific infrastructure," he added.

At the end of 2022 and the start of 2023, Boyan Mednikarov joined the 31st Bul-

garian Antarctic expedition, which took place thanks to RSV 421 Sv. Sv. Kiril i Metodii. For the first time, a naval research vessel sailing under the Bulgarian flag crossed the Drake Passage, sailed in the Southern Ocean and dropped anchor on Livingston Island. Flotilla Admiral Mednikarov was also part of the 32nd Antarctic expedition, which ended in April 2024.

Boyan Mednikarov was born in Varna on October 8, 1961. In 1979, he graduated with a gold medal from Dr Petar Beron 2nd High School of Mathematics. In 1984, he obtained a Master's degree in ship navigation for the Navy at the Varna Naval Academy and was the class of 1984's topperforming student. In 1992, he graduated with a gold medal from the Admiral Nikolai Kuznetsov Naval Academy in Saint Petersburg. He was the class' top-performing student in 2006 as well, when he obtained a Master's degree in strategic leadership of defence and armed forces from the G. S. Rakovski National Defence College in Sofia. Two years

later, in 2008, he became doctor of science and a year later, he was already a professor in military and political aspects of security.

In 2011, Boyan Mednikarov became head of the N. Y. Vaptsarov Naval Academy in Varna. In 2016, he was reappointed on the same position and was awarded the senior officer rank of commodore, later renamed flotilla admiral.

"The fact that the ship carried out the second voyage with significantly fewer technical problems and solved many more tasks during the 32nd expedition, is in fact proof of the high quality of preparation that was provided during the previous summer," Boyan Mednikarov told LIK. Speaking for BTA's magazine, he talked about the successfully completed expedition and RSV 421's role in it, shared about the cadets who joined the ship's crew for long-term or short-term practice, and commented on what is in store this summer for the naval research vessel Sv. Sv. Kiril i Metodii.

Flotilla Admiral Mednikarov, the second successful voyage of RSV 421 has ended. Has the ship justified the financial investment in which your education establishment participated when the vessel was being purchased three years ago?

Our assessment is that the in-

vestment has been justified several-fold, because the ship made possible the implementation of the tasks during the voyage for both the 31st and 32nd Bulgarian Antarctic Expedition. At the end of the day, we have a new lab built, and on an area of nearly 500 sq m. A uniquely complex technical facility that could not have been created without the supplies provided by the research ship Sv. Sv. Kiril i Metodii. Not only the transportation of these materials; perhaps the most difficult and most dramatic task was the unloading on an unequipped shore by the crew of the research vessel. In addition, the research ship carried a very large quantity of food, other supplies and scientific equipment for the benefit of the Bulgarian Antarctic base. Similar logistical and other issues were resolved in the interest of the Spanish polar programme. Let us not forget that for 30 years, the Bulgarian Antarcticians were comprehensively provided for by our Spanish colleagues. And we are now repaying this debt to some extent.

There was also a successful implementation in two consecutive years of the so-called environmental operation. The Bulgarian shore of Livingston Island was cleaned of a large amount of metal waste that had been polluting the shore and had been accumu-

lating during these 30 years. This was a real problem for the Bulgarian Antarctic base, because it violated the environmental standards established in Antarctica. After the two expeditions, the Bulgarian coast has been completely cleaned up. I would like to say that the cost of solving one such task alone is estimated at over 1 million US dollars. We have had similar enquiries from the polar programme of our partners from the Czechia.

Numerous scientific experiments have been carried out on the ship. In addition, the ship also provided transfers and logistics for Bulgarian polar researchers and logisticians. So, in my view, she has repaid many times over the funds that were earmarked for her refurbishment, and indeed this is a very appropriate investment made in a national scientific infrastructure.

What was the preliminary preparation of the vessel ahead of the 32nd Antarctic expedition?

In the summer of 2023, the ship underwent the so-called expanded navigation repairs. These are repairs limited in their scale but they saw the full recovery of the functionality of systems that experienced some technical issues during the first expedition. Completely new equipment was installed, for example pumps for the hydraulic systems for the functioning of the ship's main propellers. Also, after undergoing technical checkups, repairs and certification, which are obligatory for the security system's functioning, the ship underwent a cycle of combat preparation,

which is compulsory for naval vessels. Carried out were elements of two tasks: K1 and K2, which confirmed the crew's readiness to solve tasks at sea.

The ship was thus fully prepared for her participation in the 32nd expedition's provisioning voyage. The fact that the ship accomplished the second voyage with considerably fewer technical problems and solved many more tasks during the 32nd expedition, is in fact a testament to the high quality of preparation that was provided during the previous summer.

What post-voyage servicing will the ship need now? Have the climate conditions during the past voyage to Antarctica caused damage to her?

The ship has sustained no damage. During this year a dock refit is planned, i.e. cleaning of the hull, examination of her outboard devices and the propellers. Another element of the refit is the installation of a new radar system on the ship and the conversion of two of the unusable fuel tanks into cargo holds, because one of the ship's perceived deficits is that it needs to be able to carry an even greater amount of cargo, mostly packaged cargo. Such is the form of the cargoes related to the feeding of the polar explorers, scientific equipment and various consumables. The aim is for the ship to have an even greater cargo capacity.

This year there were again cadets of yours on board, students at your university. What were the criteria for their selection and what were their duties with-

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in the voyage?

The main criterion for the selection of our cadets for participation in the so-called long-term practice (four- or five-month sailing), as it was this year, is, first of all, their success. These must be cadets with excellent or very good grades, as they undergo individual training for the duration of this placement. They must have English 6001 certification as this is the working language in many cases during the expedition. They must be have good physical preparation and meet the standards for what is called seaworthiness - that is, to work on board a ship. Of course, added to all this is their motivation, their desire to be part of this expedition, because only volunteers take part in these practices. This is not a deployment under obligation of such practice.

Our cadets did their duties brilliantly. During this expedition, we had one cadet working on the bridge as a relief to the navigation officer. There were two cadets who worked in the technical section as relieves to the engineers on duty. And a lady who was studying in the military logistics programme at the Naval Academy. She acted as the logistics officer, specifically responsible for communication with the NATO Support and Procurement Agency, through which the ship was loaded, and also communicated with the agents at the ports and assisted in the process of planning the feeding of the crew and the accommodation of the so-called passengers - these are scientists, researchers, logisticians who are transferred through the ship.

cadets did their tasks brilliantly. And as the ship's commanding officer told me, in November three boys and one girl boarded the ship in Varna, and in the first days of April men and women came off the ship - grown-up, mature people, with proven professionalism and, most of all, with proven motivation.

Speaking of the success of these practices, we are already encountering a more lasting effect, because this summer the crew of our ship, in particular its technical sector, will be filled by a graduate of the school. This cadet had a four-month practice on board the ship during the previous expedition, and today he is first of all very motivated to continue his service already as an officer on board the Sv. Sv. Kiril i Metodii. Furthermore, we accept that his preparation for the new post is at an extremely high level, as he has already practised for four months.

Are the students excited by the opportunity to practice in a real environment thanks to RSV

Of course. Firstly, this is an opportunity and a challenge for them. And it's not just about the cadets who go on long-term practice. I would like to remind you that in the implementation of expeditions, the research vessel also provides so-called shortterm practices. These are practices lasting 10 to 14 days, which are on the Varna-Cartagena (Spain) route, in the process of deploying the ship, going to the area of operation. Then on the return to Varna, the ship picks up from

I would like to say that all our Cartagena our graduates and provides their sailing to Varna, and usually the return journey is connected with a visit to at least one more port of our NATO partners. During the first voyage that was Piraeus Port, and this year we visited the main naval base of the Italian Navy in Taranto. This is a very good opportunity for cooperation with our NATO partners. Both in Piraeus and in Taranto, there are education institutes of the navies of Greece and Italy, respectively. This allows for special contacts with colleagues and training of our cadets, contributing to their internationalisation.

> I would also add that during the summer campaign and the ship's summer training in the Black Sea, this is also combined with week-long practices for our cadets and students here in the Black Sea area.

The 33rd Antarctic expedition is underway. How will your university take part?

We do not yet have the specific tasks for the 33rd expedition. On May 10-12 in the town of Hisarya, a special forum will be held of the Bulgarian Antarctic Institute, which will report on the results of the 32nd expedition and set the goals and objectives for the 33rd.

However, we can make a credible forecast and are working to prepare the ship in that direction. Obviously, again, logistical tasks related to the transport of equipment will be addressed in the interest of the new laboratory under construction. We assume that this time we will have to carry more interior equipment, perhaps furniture and scientific



Varna, April 12, 2024. Head of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Prof. Boyan Mednikarov, presents Rositsa Vrabevska with a model of the RSV 421 during an official award ceremony hosted for the crew of the naval research vessel by the Bulgarian Memory Foundation. Photo: Danail Voykov, BTA

apparatus. So we are thinking of another loading scheme, using more containers on the deck of the research vessel. Obviously, there will be an increase in the volume of scientific tasks being solved by people on board the ship, which means adding new scientific equipment and expanding the possibilities of equipping scientists using different types of scientific equipment, such as a system for sampling the soil in the area, systems for collecting marine life, especially for collecting krill. We also anticipate that there will again be a lot of

tasks related to the transfer of scientists and the landing of our teams of Bulgarian researchers on different coasts, on different islands of the South Shetland is-

Thank you very much. These were our questions.

Speaking to an author from the Bulgarian News Agency, I would like to express my special gratitude to BTA for the information support of the 31st and 32nd expeditions. During the first expedition throughout the entire voyage

and during the second expedition at certain stages of the voyage in that most interesting part, when the ship was in the southern zone, there was a BTA correspondent on board, who made sure that the activities of the ship's crew and of the scientists were covered in an absolutely correct way. I would like to express my special gratitude for this to BTA Director General Kiril Valchev as well as to all colleagues who are involved in this information process.



Ten scientific projects, new opportunities for research with microscopes and ocean sampling equipment delivered on board the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii and plans to continue the construction of a new scientific laboratory unit at the St. Kliment Ohridski Bulgarian Antarctic Base on Livingston Island were presented at a three-day training camp of the 32nd Bulgarian Antarctic Expedition in the Marina Cape complex in Aheloy, Burgas Region, which ended on October 22, 2023. BTA reported on the story the same day.

Commanding Officer Nikolay Danailov told the scientists and logisticians in Aheloy that the voyage to Antarctica and the stay in the Bulgarian base of the Bulgarian naval research vessel will last about five months, from early November 2023 until early April 2024. The second expedition of the Bulgarian ship to Antarctica will be named ANTARSUP-23, from Antarctic Support, as its main mission is to support scientific research on the continent.

The research of scientists from the Bulgarian Antarctic Institute, the St. Kliment Ohridski University of Sofia, the Bulgarian Academy of Sciences

(BAS), the National Sports Academy (NSA) and the Naval Academy of Varna will focus on the natural resources of Livingston Island and the waters around its group of the South Shetland Islands, as well as on climate change in Antarctica.

Chief Asst Professor Ralica Sabeva from the Department of Mineralogy, Petrology and Mineral Resources of the Faculty of Geology and Geography of Sofia University will study ore deposits in the area of Hurd Peninsula on Livingston Island with an emphasis on their metallogenic potential and the genetic relationship between them. Professor Christo Pimpirev, leader of the 32nd Bulgarian Antarctic Expedition, told BTA this is about research of copper, gold and silver veins on the island.

Assoc. Prof. Tihomir Stefanov from the National Museum of Natural History at BAS will study the species composition and biological features of fish inhabiting the coastal marine waters in the area of the base.

Prof. Eliza Uzunova from Sofia University's Faculty of Biology will work on potential ichthyo pathogens in Antarctic fishes in the context of the changing climate.

Assoc. Prof. Lyubomir Kenderov

from Sofia University's Faculty of Biology and Assoc. Prof. Raina Christova from the Institute of Oceanology of BAS - Varna will continue integrated research of the sediment, biota and water components of the ocean ecosystem.

Engineer Petar Sapundzhiev from the National Institute of Geophysics, Geology and Geography of BAS will work on the optimization permanent solar-powered geophysical instrumentation for application in polar conditions. He will also investigate the movement of glacial structures using Particle Image Velocimetry.

Engineer Tsvetan Parov from the BAS Space Research and Technology Institute will work on the influence of surface meteorological parameters and solar activity on the variation of atmospheric processes in glacier drainage-crack systems.

Prof. Nesho Chipev from BAS, former director of the Central Laboratory of General Ecology and scientific secretary for biological sciences of BAS, will work on the opportunities for Bulgarian science diplomacy against the background of global climate change and the future of the Antarctic Peninsula.

Prof. Albena Alexandrova from the NSA and the Institute of

Neurology of BAS will conduct new functional research of scientific and applied significance as first steps in the One Health approach.

Marina Velikova, a musician and music editor, presented her project entitled The Sounds of Antarctica about recording the natural sounds of the continent and weaving them into original compositions.

Prof. Christo Pimpirev specified that these new projects will not be the only ones aboard the Sv. Sv. Kiril i Metodii and at the Bulgarian Antarctic base on Livingston Island, as work will continue on other scientific projects that had been already been launched.

Engineers Nevyan Simeonov and Kiril Zhechev from Simsta OODEngineering presented plans for the organization and implementation of the construction of the new laboratory unit at the Bulgarian Antarctic Base. Simeonov said the goal is to roughly complete the building designed by architect Penka Stancheva. On an area of 400 square metres, it will house three laboratories - geological, biological and general, a multifunctional hall with work space, a storage facility, a technical room and recreation rooms. "We hope to have the laboratory unit ready next year, but nothing can be planned in Antarctica," said Simeonov.

He said that during this expedition a metal structure will be laid on the foundations built during the previous expedition. The parts of the metal structure weigh about 50 tonnes, with the 10-metre one, which is the heaviest, weighing 450 kilograms. High-quality thermal panels weighing around 22 tonnes will also be installed. The building materials already loaded on the ship weigh more than 80 tonnes in total. A 15-metre boom crane will be used in the construction. The installations and minor finishing works will be left for next year. Solar panels on the

roof and two diesel generators will including bottom sampling, and supply power. The new laboratory complex will have a water tank and pumping stations. "This facility should enter the 22nd century," Prof. Pimpirev said.

Engineer Nevyan Simeonov said his company will design a project for reconstruction of the entire Bulgarian Antarctic Base for free. Base Commander Kamen Nedkov said that during this expedition, there are plans to install a new water treatment plant, to upgrade the water supply from the nearby glacier to the houses and to provide new power supply to some buildings.

He said the Bulgarian Antarctic base is scheduled to open at the end of December at the time of the arrival of the Bulgarian ship and to operate for about 90 days. The ship will initially take 24 scientists and logisticians to the base. More scientists will arrive by plane and aboard partner countries' ships in January and early February 2024. A total of 16 logisticians will support the scientists on two shifts, with two doctors, cooks, mechanics and electrical engineers rotating in January, as well as boat drivers for the Zodiac rubber boats used in research. In mid-February, after the departure of the Bulgarian ship, a group will remain at the base until mid-March to prepare it for the winter in the Southern Hemisphere.

There will be scientists from other countries at the base. Sometimes more than 30 people will gather there, not counting the crew of the Bulgarian ship. It will also transport containers of materials and food for the Spanish Antarctic expedition.

The Bulgarian ship will remain in the Southern Ocean for about 50 days. After unloading the materials for the new laboratory complex and for having the base operate for at least 40 days, the ship will facilitate research and project activities such as net launching, sampling,

more. There are plans for projects on the hard-to-reach Byers Peninsula on Livingston Island and on the unexplored neighbouring Smith Island, as well as a visit to the Spanish base on Deception Island.

Commanding Officer Danailov encouraged the Bulgarian scientists to undertake bolder projects, since thanks to Sv. Sv. Kiril i Metodii, Bulgaria is no longer an "island state" in Antarctica.

The scientists and logisticians on the 32nd Bulgarian Antarctic Expedition will undergo medical tests at the NSA, said Dr Atanas Peltekov, who will be the physician at the Bulgarian base. He will be replaced by Dr Sevdalina Mihailova when the teams rotate. Dr Maria Yakova will be the ship's doctor.

The Bulgarian News Agency (BTA) will present all scientific projects during the 32nd Bulgarian Antarctic Expedition with videos, photos and stories prepared with the scientists before they depart, said BTA Director General Kiril Valchev, who joined the Antarctic camp in Aheloy. He said BTA will again publish detailed coverage of the voyage in the Bulgaria-Antarctica BTA's Log as it did during the historic first voyage of the previous expedition between late 2022 and early 2023.

During the 32nd Bulgarian expedition to Antarctica, BTA published video interviews with Bulgarian Antarctic explorers every Tuesday and Thursday. BTA presented all scientific projects with video, photos and text prepared with the scientists before their departure. BTA's special correspondent Emil Granicharov interviewed some of the scientists in the field, during their Antarctic research. LIK magazine also spoke to some of them after their return to follow up on the results of their research on the Ice Continent.

Dr Snezhana Rusinova:



We Look for Bioactive Substances in Antarctic Yeast Samples and Study Their Potential for Cancer Treatment

Borislava Bibinovska

November 2023, Sofia

"The project I am working on aims to look for bioactive substances obtained from Antarctic yeasts and to investigate their potential for cancer treatment," Dr Snezhana Rusinova, Senior Assistant Professor at the Cellular Biosystems Laboratory of the Stephan Angeloff Institute of Microbiology with the Bulgarian Academy of Sciences, told BTA. She took part in the 31st Bulgarian expedition to Livingston Island and has continued her research on Antarctic yeasts since her return in March.

"We were lucky to be able to take enough samples. We now have a publication which summarizes the data from one of the studies. We managed to find an interesting specimen of these Antarctic yeasts which synthesizes a complex of molecules in its extract and is cytotoxic to bladder cancer," the scientist said.

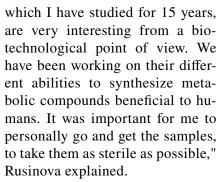
"Yeasts are eukaryotic microorganisms larger than bacteria. They are part of the fungi kingdom, but because they are unicellular, they are classified as microorganisms," Rusinova said. "It is an important fact that Antarctic yeasts are not pathogens, i.e. they can be easily handled in both laboratory and

industrial settings. Interestingly, they can maintain a sterile culture throughout the fermentation process," she said.

What do yeasts tell us?

The metabolism of Antarctic yeasts has adapted them to the local conditions. "Scientists are working to discover how yeasts manage to protect their molecules from extremely low temperatures. Perhaps they synthesize so far unknown substances," the microbiologist commented.

"Antarctic microorganisms,



Not all samples have been studied yet. Samples were taken from the soil, from the water of the glacial lakes, and even from the feathers of penguins on Livingston Island.

Antarctica and its secrets

"There is more to search for. There are probably many more diverse yeasts, and we may discover new ones that hold cures for various diseases," she said.

"Microbiology is a very slow science. In the process of work, we have long days when we wait to see if there are any yeasts in the samples at all. It takes at least twenty days to find out," the microbiologist added. "We take more samples so as to have a chance to find the microorganisms we are looking for."

Some of the credit for properly storing the samples goes to the naval research vessel Sv. Sv. Kiril i Metodii. "It is important that the sample in storage is authentic," the scientist said. The ship made it possible to transport the samples in a cooler to Bulgaria and Plovdiv, where Rusinova's laboratory is located.

According to the microbiologist, Antarctica hides secrets that will continue to fascinate scientists. She also said her trip to Livingston Island had left a lasting impression on her and inspired her to continue her research.



Biologist Kiril Kandilarov:



We Want to Track The Effects of Stress in **Bulgarian Antarctic Expedition Participants**

Martina Christova

February 2024, Sofia

"We want to monitor the stress levels of the participants in the Bulgarian Antarctic expedition. We are doing research which will become more in-depth every year," Kiril Kandilarov, co-founder of the Kandilarov Medical Diagnostic Laboratory, said in a BTA interview. He noted that the study will continue for several years and then, based on the data collected and the changes registered, the effects of the stressful environment on participants in the expedition will be analyzed.

Kiril Kandilarov is tracking the different levels of stress among the participants in the 32nd Bul-

garian expedition to Antarctica. He will compare the results of the research conducted before, during and after the stay of the Bulgarian Antarctic participants on the Ice Continent

Blood tests and stress levels

"We are creating a database for each of the participants in the expedition, and the results of the tests are uploaded to an online platform where the doctor at the
the Bulgarian naval research ves-Livingston Island base can track their physical state," said Kandilarov. He noted that results can be observed both by the laboratory

technicians at the medical centre in Bulgaria, and by the doctor at the Bulgarian Antarctic base.

Kandilarov explained that the participants' blood tests and stress levels are measured before and during the expedition to Antarctica. If some of the indicators need to be more thoroughly examined in Bulgaria, there was an option for the blood to be frozen in a special refrigerator at a temperature of -20C and transported back by sel Sv. Sv. Kiril i Metodii (RSV

All participants were tested in a similar way, with some additional



specific tests such as prostate-specific antigen (PSA) in men, and breast cancer testing in women, Kandilarov added.

RSV 421 officers and military commanders have highest level of stress

Military commanders and RSV 421 officers had the highest stress levels recorded. The long travel journey also affects stress indicators, said Kandilarov, commenting on the collected data.

"We have not yet done enough research to be able to draw conclusions and find a solution to create a more favourable environment for the participants of the expedition," he noted.

On-site laboratory and online Consultations with Dr Atanas Peltekov

"We equip our laboratory, which is located at the Bulgarian Arctic base, every year," Kandilarov pointed out. RSV 421 provides for the opportunity to send modern equipment which allows for more types of research. "During the years of cooperation with the Bulgarian Antarctic Institute, the devices were very difficult to transport to Antarctica. Now with the ship, the equipment can be delivered and then returned," he added.

Kandilarov pointed out that the Bulgarian Antarctic base on Livingston Island has a blood test apparatus, and biochemical and urine analyzer.

"The idea of the medical laboratory is to monitor the health status of the participants in the expedition and, if necessary, carry out additional tests. If any of the participants needs a medical examination, the necessary tests can be administered accordingly," said Kandilarov.

"Each research group has a doctor who has been trained to work with the equipment", he said and

32 LIK 2024 LIK 2024 added that the medical laboratory functions together with the doctors at the Bulgarian base. In this expedition the laboratory cooperates with Dr Atanas Peltekov. "He is fully trained to operate the equipment. If there are any issues, he is a doctor and can make a decision if some specific online consultation needs to be done in real time," added Kandilarov, noting that the base has a good internet connection and can provide constant contact with the participants.

Joint work with Prof. Dr Albena Alexandrova

Kandilarov explained that the

Kandilarov laboratory works together with Prof. Dr Albena Alexandrova in regards to the research on the Bulgarian expedition participants. She is tracking the multifactorial effect of the journey and stay in Antarctica on the participants and investigating their physiological status before and after the mission to Livingston Island.

He added that the pre-departure studies were conducted at the Centre for Research and Applied Activity in Sports (CRAAS) at the National Sports Academy (NSA), where Prof. Alexandrova works.

Participation in the 31st Bulgarian expedition to Antarctica

Krirl Kandilarov participated in the 31st Bulgarian expedition to Antarctica at the invitation of Prof. Christo Pimpirev, the Chairman of the Bulgarian Antarctic Institute (BAI), which is in partnership with the Kandilarov Laboratory. "We have been cooperating for 5-6 years carrying out the study of the expedition participants," Kandilarov specified.

He talked about the research process of the Bulgarian scientists conducted before the start, during and after the expedition in which he participated. "It was very interesting that we had a ship for the first time. We were able to examine the crew as well, do stress tests and other blood tests," he added.

"It has always been a dream of mine to visit Antarctica," he said and shared that some of his colleagues from the Faculty of Biology at Sofia University had taken part in Bulgarian expeditions to Antarctica.

Antarctica: The White Mistress

Kiril Kandilarov spoke about his impressions of his visit to Antarctica as part of the 31st Bulgarian expedition. "The nature is pristine, there is no sign of human influence. As Prof. Pimpirev says in his book: "Truly, Antarctica is like the white mistress - when you see it, you want to come back!"

"There are very strict prohibitions in Antarctica because of the rules and laws for the protection of the environment and animals. We are not allowed to get close to the animals, we completely preserve their peace," Kandilarov said and specified that any kind of fishing activity is prohibited. "All of this has remained intact and thus is truly impressive. I hope this lasts as long as possible".

He said that he would be most

happy to visit the Ice Continent again.

Kiril Kandilarov has more than 25 years of experience in business development in the healthcare industry. He is the co-founder and manager of Kandilarov Medical Diagnostic Laboratory, which he established in 1999 with his brother Dr Naiden Kandilarov. Kiril Kandilarov is also the founder of a platform for online medical consultation, the so-called telemedicine, Healthyco. He graduated from the Faculty of Biology at Sofia University. He has a master's degree in biotechnology.



Assist. Prof. Ralica Sabeva, PhD:



Valuable Metals: lead, Zinc, Copper, as well as Gold, Occur near the Bulgarian Base on Livingston Island

Dimitrina Vetova, Emil Granicharov

December 2023, Sofia

"A number of metals, like lead, zinc, copper, as well as gold - one of the most important metals that has been of interest to humankind from its very dawn, have been identified in the area of the Bulgarian base on Livingston Island," Assist. Prof. Ralica Sabeva, PhD, of the Department of Mineralogy, Petrology and Economic Geology at Sofia University's Faculty of Geology and Geography, who was part of the 32nd Bulgarian Antarctic Expedition, told BTA in an interview in December 2023.

At the Bulgarian Base on Livingston Island, Dr Sabeva worked on a project exploring natural resources in ore veins.

How many years has this project been going on, what minerals have been identified, and is gold the most valuable among them?

"This is a two-year research project, and it is in its second year of fieldwork. The project was launched last year, when samples were taken, and now we have to complement this research," Dr Sabeva explained. She specified that a number of metals, like lead, zinc, copper, as well as gold - one of the most important metals that has been of interest to human-kind from its very dawn, had been identified in the area of the Bulgarian base on Livingston Island.

"Silver usually goes together with gold, and we should not forget the so-called 'rare-earth elements', which are in hot demand at this point in time and are crucial for technological advances. Such elements have been detected, too, usually as admixtures in ore minerals. Examples include tellurium, selenium, manganese, cadmium and molybdenum, which are very important for technological advances and are among the essential elements for steel alloying," said Ralica Sabeva.

"This project logically follows up on a pervious one which involved me together with Assist. Prof. Stefan Velev, a colleague of mine, also from the Faculty of Geology and Geography. In the first tests that we carried out with him, we established an occurrence of gold, too, or the first evidence of gold. That is why we carrying on this research to find out its distribution and grade and, generally, to obtain more information," Sabeva explained.

"We should keep in mind that it was geology or geologists that built the base and made the Bulgarian Antarctic dream come true. These are the pioneers of geological research, of course, starting from Prof. Christo Pimpirev. I was honoured and privileged to have him as my tutor and mentor, and we are now working together." Dr Ralica Sabeva stated.

What is the amount and grade of the gold discovered at the Bulgarian polar base in Antarctica?

"First about the grade: the gold was detected by microscope and, accordingly, chemical analyses were performed afterwards to determine its grade. Two types of gold were identified: one is the so-called native or pure gold, without admixtures, and the other is electrum, which contains a high proportion of silver," Dr Sabeva explained.

She said that determining the amount of the gold discovered depends on the moratorium on prospecting for, exploration and exploitation of mineral resources in Antarctica which applies until 2048. "What will happen after that is definitely uncertain. Establishing the amount of a particular metal requires systematic research of a particular area and a definite scale. Drilling is one of the best methods for such study and explo-

ration, but it is prohibited at this stage. Therefore, it is way too early to talk about amounts," Ralica Sabeva explained.

The priority objectives of the 32nd Bulgarian Antarctic Expedition include building and completing a new research laboratory on Livingston Island. How will this lab facilitate the work of geologists?

"The setting up of this laboratory is invaluable for all researchers who will be working there, especially for the field processing of the samples themselves, which everybody is doing," said Dr Sabeva.

"Mounting objects on microscope slides or examining objects under a microscope is a waste of time for us geologists while we are there. The prime objective for us is to gather field data, samples and specimens on the ground. One of the important things that can be done at that laboratory is having a mechanical cutting tool so as to scale down the volume of samples because I came back from the previous expedition lugging two or three plastic drumfuls of stones. That's how we geologists call rock and ore samples. A lab will enable me to select what is interesting and significant and take it back to Bulgaria. Next, the microsections will be prepared here, which is not worth the waste of time there," the geologist said.

An exhibition of "The Rock and Mineral Diversity of Antarctica" opened at Sofia University's Museum of Mineralogy, Petrology and Mineral Resources in late May 2023. Part of the exhibits was contributed by Ralica Sabeva.

"We are now at the Museum of

Mineralogy, Petrology and Natural Resources at the Faculty of Geology and Geography, and together with my colleague, Assist. Prof. Stefan Velev, we arranged an Antarctic exhibition on the occasion of the Faculty's 60th birthday," said Dr Ralica Sabeva.

"We picked out some of the most interesting rock varieties and minerals and put together the Antarctic display as a permanent exhibit, enabling people to get familiar with this diversity of Antarctic rocks. There are ores, various types of ore minerals containing the metals I just mentioned: chalcopyrite, pyrite, galena, sphalerite. A sample in which gold was detected is on display, too: you can see it in a microscope slide, also known as a microsection, which is used to examine ore minerals under a microscope and which yielded gold. Generally, a large variety of rocks and minerals is exhibited and everybody is welcome to get familiar with Antarctica's rock diversity," the geologist explained.

A participant in two previous Antarctic expeditions, Ralica Sabeva also joined the 32nd Bulgarian Expedition to Livingston Island.

"This will be my third expedition, I was previously a member of the 28th Antarctic Expedition and in last year's 31st Expedition, which was also the first voyage of the Bulgarian naval research vessel to Antarctica," said Dr Ralica Sabeva.

She told about her daily routine in Antarctica, specifying that it is mostly work all day long. "Usually, a day's work is planned on the previous evening: where fieldwork will be done, and everyone's research and field assignments.

weather conditions. I work in several parts of the island, and there are also adjacent bays, where I work, too, and they can be reached by boat. The state of the sea is crucial, whether we can go out in the boat and whether there is an ice flow, and whether a particular study can be conducted on a particular day," Sabeva explained.

In her words, work is the main focus of Bulgarian researchers in Antarctica. "But there is also some basic housekeeping that is very important because we live there and we have to have breakfast, we have to have dinner, we have to do a wash. We all share in these domestic chores, and we help each other," the geologist noted.

What is the most important thing about Antarctica that Bulgarians should know?

"This has already become a cliché, but is a fact: Antarctica is the most pristine, preserved, clean and wonderful continent, the world's natural laboratory, where very important research can really be carried out about what is in store

All this heavily depends on the for us in the future, about what we took part in the 28th, 31st and 32nd are leaving the next generations. And it is definitely the right place for soul searching and for getting a perspective on global developments. This is the continent that enables us to take a different view of the world and life," Dr Sabeva emphasized.

> Dr Ralica Nikolaeva Sabeva teaches mineral resources at the Department of Mineralogy, Petrology and Economic Geography at the Faculty of Geology and Geography of the St Kliment Ohridski University of Sofia. She earned a bachelor's degree in Geology in 2008, a master's degree in Geochemistry in 2010, and a doctor's degree in Geology and Exploration of Minerals at the Department of Mineralogy, Petrology and Economic Geography of Sofia University's Faculty of Geology and Geography, where she became an assistant professor in 2016.

> Ralica Sabeva's research interests lie in economic geology (prospecting for and exploration of mineral resources), mineralogy, ore mineralogy, sulphides, epithermal deposits, ore genesis, the metallogenic potential of ore deposits, native metals, and polar research. She

Bulgarian Antarctic Expeditions. She has contributed to two Antarctic exhibitions, to two museum collections, and has organized and lectured at dozens of events, such as Antarctic conferences, the Sofia Science Festival, the European Researchers' Night, and school visits.

On her research and publications record, Ralica Sabeva has includes nine research projects (including two Antarctic projects and two she led), ten research papers in refereed scholarly journals, and some 20 participations in scientific confer-

She has lecture courses and fieldwork experience in prospecting for and exploration of mineral resources, occurrences of metallics and non-metallics, and mineralogy.

Assist. Prof. Ralica Sabeva, PhD, is Chair of the Association of Polar Early Career Scientists (APECS Bulgaria); founding member and Deputy Chair of the South Bay University Underwater Club; member of the Bulgarian Antarctic Institute; member of the Commission on Ore Mineralogy of the International Mineralogical Association; member of the Bulgarian Geological Society and of the Bulgarian Mineralogical Society.

January 2024, Livingston Island

During the National Antarctic Expedition to Livingston Island, the geologist Dr Ralica Sabeva collected field samples on Hurd Peninsula. "The research project on which I am working investigates

mineralizations on Hurd Peninsula, Livingston Island, Antarctica. Mineralization refers to ore minerals that contain useful and valuable elements, above all metals," she said in a BTA interview.

"The principal metals that are identified are lead, zinc, copper and, of course, one of the most important precious metals: gold," the geologist explained.

"This project logically follows

up on a previous one of 2022, when the first evidence of gold was established by microscopy. Two types of gold were identified then: pure gold, without admixtures, and gold with silver content, which is called electrum. Based on these findings, a new two-year project was prepared. Its implementation is now in its second year. Quite a few locations on the peninsula were visited last year. The locations that were visited this year are the so-called lodes which contain

ore minerals and metals like, for example, Sally Rocks, and above all the area of the Bulgarian base," Ralica Sabeva pointed out.

She added that ore veins were sampled during the day in typical Antarctic conditions and, accordingly, quite a few rock samples were collected. The idea is, basically, to harvest samples from many different lodes for processing later on at various laboratories in Sofia.

"The laboratories prepare micro-

sections, the ore minerals are scrutinized, then they undergo a number of analyses in order to identify characteristic chemical features of these materials and the presence of other metals or minerals and more peculiar chemical elements," Sabeva explained. She said further that usually the minerals are not monometallic, quite often they contain specific elements that recently have acquired great significance for technological advances.

April 2024, Sofia

"As a participant in the 32nd Bulgarian Antarctic Expedition, my prime objective was to carry out fieldwork under a two-year project financed by the 2022 National Polar Research Programme of the Ministry of Education and Science. The project is titled 'Investigations of mineralizations in the area of Hurd Peninsula on Livingston Island, Antarctica, with an emphasis on their metallogenic potential and the genetic link between them'. I am studying base metals and valuable metals, like copper, lead, zinc, gold and silver, as well as rare-earth metals that gain increasing popularity as critical: indium, gallium, cadmium, selenium, tellurium and others. Various microscope and laboratory methods are used to find which minerals contain them and the form of their presence," Assist. Prof. Ralica Sabeva, PhD, told BTA in an interview about her research work during the 32nd Bulgarian Expedition to the Icy Continent.

Using microscopy and analysis, Ralica Sabeva proved the presence of gold and its grade for the first time in the area of Livingston Island in Antarctica.

"Fieldwork is the foremost task of the research that I carry out in Antarctica. The important thing is to identify the rocks and minerals in which these metals occur. During the latest Antarctic expedition in January 2024, a large number of samples from numerous rocks and ores were mapped, documented and collected while going round the area of Hurd Peninsula on Livingston Island, where the St Kliment Ohridski Bulgarian Base is located," Sabeva said.

She noted that working outdoors in the Antarctica is a challenge because of the severe weather conditions. "Taking notes, taking pictures, dislodging rock samples by hammer and chisel and carrying them in a backpack (they usually weigh about 10 kg) in cold, rain, snow, wind and over a rugged terrain requires a strong will and above all strong motivation. The remotest locations can only be reached with the help of proper equipment, proper training, and various means of transport like sledge and boat," said Dr Ralica Sabeva.

She thanked the logistics team of the 32nd Bulgarian Antarctic Expedition and the crew of the research and survey vessel Sv. Sv. Kiril i Metodii without whom carrying out this research would have been impossible.

"From my point of view as a researcher interested in the study of minerals, all efforts are worth it. As a result, dozens of rock samples now await processing, examination under a microscope and analysis at the laboratory of the Sofia University Faculty of Geology and Geography," said Ralica Sabeva.

She specified that the principal subject of her research activity is gold, the occurrence of which on Livingston Island in the area of the base was proved for the first time within the framework of a previous project in 2020. Targeted studies of this valuable metal are also carried out on samples taken during the past Antarctic expedition, and a number of analyses have yet to be performed. At this stage, the

38 LIK 2024 LIK 2024 gold has been identified as pure (native) gold and as gold with silver admixtures (also known as electrum), Sabeva reported. She explained why this information is important and whether gold and other minerals can be extracted in Antarctica.

"We all want to preserve Antarctica unpolluted and untouched by human activity as much as possible. This is precisely why Article 7 of the Madrid Protocol, in force from 1998, prohibits any activity relating to prospecting for, exploration and extraction of, mineral resources. Notably, however, the Protocol does not prohibit scientific research. "Scientific investigations provide information that is unique to that place, and this information is key to mankind's development and progress. Geological studies in Antarctica produce new data on the presence of metals and, on this basis, the metallogenic potential can be assessed. Besides this, the restriction imposed by Article 7 of

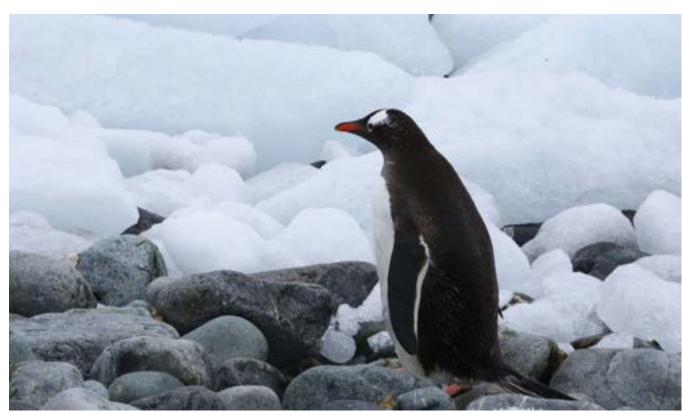
the Madrid Protocol applies until 2048, when this matter will be reviewed. The rapid development of technology on which we all depend and the enormous global demand for valuable and critical metals may lead to a lifting of this moratorium, and Antarctica, too, may become a target of prospecting and spark, in addition to scientific interest, business interest as well," Dr Ralica Sabeva said.

She explained that further analytical studies lie ahead. The geologist is positive that more discoveries related to metallic minerals in Antarctica should be expected.

"I am a Sofia University graduate in geology and for ten years now have been on the team of lecturers tutoring students in this field of study. Geology is my calling, and thanks to it I have come to meet interesting people and have visited incredible places. It is to geology that I owe my acquaintance with Prof. Christo Pimpirey, a geologist, traveller, dreamer and my tutor,

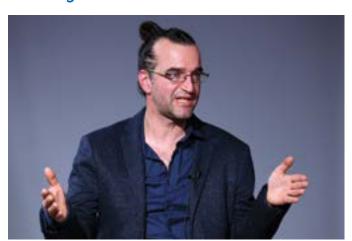
who ignited my interest in Antarctica by stories of adventure, white silence, genuine human relationships and, of course, lots of geology. He fought and earned a place for Bulgaria among the great powers that govern the White Continent and make world-class science. Leading by example is the best way to lead. No mission is more important than attracting young and ambitious followers. To me, Prof. Pimpirev is a role model and a mission. That is how Antarctica became my dream, too..." said Assist. Prof. Ralica Sabeva.

She also organizes and lectures at events in Sofia and the rest of the country raising awareness of Antarctic research. They include photo exhibitions, museum collections, the Sofia Science Festival, the European Researchers' Night, and school visits. She is Chair of the Bulgarian branch of the Association of Polar Early Career Scientists (APECS) and member of the Bulgarian Antarctic Institute.



Livingston Island, January 28, 2024. Photo: Emil Granicharov, BTA

Physicist Tsvetan Parov:



We Bulgarians Carried out Some Robust Research on Glacier near Our Base in Antarctica

Martina Christova, Emil Granicharov

November 2023, Sofia

"We Bulgarians have carried out some robust research on the glacier near our base in Antarctica. There is physics in Antarctica, and it has a future," physicist Tsvetan Parov said in a BTA interview. Parov is one of the scientists of the St Kliment Ohridski Bulgarian Antarctic Base on Livingston Island. His part of the research will centre on the glacier near the base.

He said in the interview: "Our glacier spreads in several directions, it is really vast. It has many crevasses. A large subsurface river is developing inside, flowing through large cavities."

To explore the glacier, the scientists will use data about the impact of solar activity on the atmospher-

ic processes in the deepest cave in Bulgaria, the Kolkina Dupka, which shows that underground exploration methods can be applied under ice as well.

"We will put sensors all over the glacier," Parov said. The sensors will be brought by the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii (RSV 421). They will be placed in crevasses, where the ice is melting, to measure the temperature, the humidity and the atmospheric pressure. "The data collected in this way will be processed statistically."

"We will descend into icy abysses together with mountaineers Doichin Boyanov and Kiril Doskov," the physicist went on to say. "We will thus be able to gather material from inside the glacier to carry out a comprehensive study of ongoing processes. We will see what the developments outside the glacier are causing inside it."

The survey is entirely financed under the Young Scientists and Post-Doctoral Fellows Programme of the Ministry of Education and Science.

The state of Antarctic glaciers

The Antarctic rim, where the St Kliment Ohridski Base stands, is the boundary separating the continent from the outside world, the explorer said. The rim is most vulnerable to changes occurring



Hurd Peninsula, January 28, 2024. Photo: Emil Granicharov, BTA

through the atmosphere. The Bulgarian project is aimed to assess the possibility of accumulation of additional ice.

Four years after Parov's first journey to Antarctica, there is no new ice accumulated in the vicinity of the Bulgarian base. The ice melts near the Bulgarian base but accumulates in the central part of the continent. Parov noted that Antarctica responds to the increased levels of carbon dioxide in the air and the greenhouse effect.

The achievements of the Bulgarian Antarctic team

"This is a chance for us, as Bulgarians going to Antarctica and seeing who our neighbours are, to take pride in being a part of this whole community," Parov said. According to him, Antarctica exists on the basis of well-built links and mutual assistance among the research teams. "Our place there as Bulgarians is among the leadership of 'the Antarctic parliament'. It is wonderful, a reason to be proud."

sail to other corners of Antarctica, not just in the area of our base," Parov said. According to him, this creates many multidisciplinary opportunities for research in all scientific fields. He congratulated Prof. Christo Pimlpirev, leader of the annual Bulgarian Antarctic expeditions and President of the Bulgarian Antarctic Institute, and his team on their achievements in Antarctica.

Describing his first voyage to Livingston Island during the 27th Bulgarian Antarctic Expedition, Parov said: "We put up a satellite dish and launched satellite communication, owing to which we now have a more real connection to the world." He joined the mission as a logistics officer after he missed the researcher recruitment competitions. "My job was to build a connection between our base and the world."

In his words, the 27th Expedition was the end of the "romantic era" of the Bulgarian Antarctic Base. "Until then, we relied on a satellite telephone to call our families at home, and now we can commu-"Our ship RSV 421 allows us to nicate with them more easily," he

The Bulgarian Base on Livingston Island is like a state. "It has its own power plants, a water supply system, there is a postman, a doctor. We have everything. It is all so tiny and cozy. It was built with much love, effort and perseverance," the explorer said.

"Antarctica is love"

"Antarctica is love. It can be violent, but it is very beautiful, at least the part where the Bulgarian Base stands on Livingston Island," Parov said.

According to him, the South Shetland Islands, which include Livingston Island, provide a fine field for research.

Tsvetan Parov is a physicist and speleologist who is working as a doctoral candidate at the Space Research and Technology Institute of the Bulgarian Academy of Sciences. He holds a master's degree in aerospace engineering. He teaches at the University of Architecture, Civil Engineering and Geodesy in Sofia.

January 2024, Livingston Island

In late January 2024, Bulgarian scientists explored the crevasses of the Perunika Glacier in the east of Livingston Island in Antarctica and took microplastic samples from the island's South Bay.

Physicist Tsvetan Parov measured the thermal interaction between the air in the Perunika's cracks and the air on the surface. "Throughout the glacier we have installed 15 sensors at various depths that measure temperature and humidity. These will give us information about the depth to which heat from the surface atmosphere penetrates the interior of the glacier, as well as about the rate of glacier melting," he explained. One sensor has been installed to read the direction and magnitude of air currents in the glacier's

crevasses."We are in the ablation zone of the glacier, which is 100 to 150 metres thick and reaches the ground surface beneath the ice. The ablation zone has influenced the appearance of a host of cracks, some of which are filled with snow right now. It is through the open cracks that thermal exchange with the external atmosphere occurs, and that is where we drop our sensors to detect what happens below the ice surface," the physicist told BTA.

Parov presented results obtained from the sensors. "The cracks at the edge of the glacier act as a low-frequency filter for external influences in temperature. At depth we detect only the strongest ones. This amplitude is increasing, with a low amplitude at the glacier periphery and a high amplitude at the glacier centre," he said. He noted that the movement of the air mass through the glacier and in its central part is more intense than in the periphery.

"I was here five years ago, and no new ice has accumulated since then, that is to say, it is a steady downward trend," the scientist

Parov described the research as multidisciplinary, with a focus on glaciology. "The data being collected is invaluable and can lead to many conclusions, can be subjected to analysis and correlational statistical testing," he commented. "All this knowledge will be a step forward in forecasting glacier melting, and in the near future we will be able to predict what will happen."

April 2024, Sofia

"We have a good thermodynamic picture of what is happening in the bowels of the glacier," physicist Tsvetan Parov told BTA about the results of his research activities in Antarctica. He measured the thermal interaction of air in the crevasses of the Perunika Glacier in the eastern part of Livingston Island. Temperatures of the deep zone of the glacier, the so-called zone of constant temperature, were measured. Air currents were detected and how the glacier reacted to them, Parov said.

A statistical correlation was made a few days ago, which shows that as solar activity increases, temperatures in the glacier drop slightly.

"The information was entirely field-collected from the 15 sensors that were installed in the glacier's crevasses," the physicist said. Data were also collected from four other sensors, two located respectively outside the glacier and in the St Kliment Ohridski Bulgarian Ant-

arctic Base. "We have two weather stations at the base that also record what's happening outside," he said.

"Bulgarians are among the first to have a chance to work inside the bowels of the Perunika Glacier," Parov said. "This year we were also the first to reach the bottom of the glacier. It is a polished rock surface," the physicist explained.

"The fact is that in the last five years the Perunika Glacier has progressively melted in its periphery. At the same time, satel-

lite observations indicate that the ice in Antarctica is increasing. In the South Shetland Islands, ice is melting and disappearing in the Southern Ocean, but in the central part of the continent new amounts of ice are accumulating," said Parov.

He said that five years ago in the area of the glacier he stood on ice, and today in the same place, on stone. According to him, the melting of ice has a good side because it gives more scientists a chance to explore the newly exposed territories of Antarctica.

years, we will be able to give a rience of going down the deepest forecast of the glaciers' condition and whether there is a change in the temperature balances that we have now established," Parov said.

The scientist also said that an article on his research in Antarcthe Journal of the Bulgarian Geographical Society. He has received an invitation from the Turkish Antarctic Base, which is located south of the Bulgarian station. "It will be interesting to compare their glaciers to ours," he said.

Parov likened his descent into "If we repeat this study in a few the Perunika Glacier to the expe-

cave in Bulgaria, the Kolkina Dupka. "It is brighter and more beautiful inside the glacier. Penetrating the crevasses was like descending into a kingdom of fine ice."

He summed up: "Antarctica is tica is about to be published in the most subtle zone on the planet. This zone responds first to global change. As a laboratory, Antarctica is a unique place to work and provides many opportunities for different types of sciences. All knowledge of the icy continent can give an accurate forecast of the future of both glaciers and the continent."



Deception Island, January 14, 2024. Photo: Emil Granicharov, BTA

Assoc. Prof. Tihomir Stefanov:



Aquatic Biodiversity Is in Dire Need of More Attention and Action to Protect It

Borislava Bibinovska, Emil Granicharov, Gergana Nikolova

December 2023, Sofia

Aquatic biodiversity is in desperate need of more attention and action for its conservation, says ichthyologist Tihomir Stefanov, an associate professor at the National Museum of Natural History in Sofia. He is about to join the 32nd Bulgarian expedition to Antarctica, where he will continue his work on studying the impact of melting glaciers on various species. Stefanov's work focuses on the impact of this process on fish feeding, reproduction and movement.

"Clearly, the glacial melt is accelerating. The site we have chosen for our studies is a closed bay, at the bottom of which there is a

large glacier," Stefanov explained. It is like a small, closed laboratory and from what we see there we can predict the processes that will be triggered by an accelerated global glacier melt, he added.

The flow of fresh glacial water is dramatically changing the habitat of marine fish. It changes not only the salinity of water but also its transparency. This leads to changes in the amount of photosynthesizing algae, hence oxygen. Any change of this kind in conditions also affects fish life, the scientist explained.

The upcoming voyage to Antarctica will be Stefanov's third. He has also been on an expedition to Greenland, where he joined a team of scientists studying the impact of glacial melt on fish there.

Looking deeper into Antarctic water

"I have always wanted to study the fish in the Southern Ocean. It is a very interesting group of endemic fish. These are species that are only found around Antarctica. And it's a real challenge to do research on very highly adapted organisms such as the fish there," said Stefanov.

He is attracted by the mystery of Antarctica's fish and their high adaptability to their environment.

44 LIK 2024 LIK 2024 Stefanov spoke with excitement about the Antarctic Convergence, the marine belt around Antarctica, where cold Antarctic waters meet the warmer waters of the sub-Antarctic. He says it is the boundary that isolates the southernmost part of the Southern Ocean and the fish that inhabit it develop additional adaptations that make them to stand out in the world's ocean ichthyofauna.

"The fish in the Southern Ocean are mainly of the so-called nototheniid fishes. They have additional adaptations for life in cold waters. They develop glycoprotein molecules in their bodies that prevent their body fluids from freezing at water temperatures below zero degrees, as is often found in Antarctica," the scientist explained.

Stefanov showed the ice fish to Bulgarians for the first time in 2021. The specimen was on display at the National Museum of Natural History and can still be seen today.

Icefish are another interesting group that have developed unique adaptation mechanisms for life in Antarctic conditions. Their blood is white as it contains no haemoglobin. Because of the low water temperatures, the solubility of oxygen is very high, and it reaches the body's tissues and cells by simple diffusion, without the help of a mediator molecule, Stefanov

In scientific work, optimal conditions for conducting research are very important. That is why Stefanov is pleased that the Bulgarian research base on Livingston Island has a functioning laboratory and a prepared logistics team to help the scientists. A brand-new laboratory is also under construction.

Field work involves catching fish, setting nets, going to different parts of the Southern Bay of the island. Samples are also being taken for genetic and isotopic studies, said Stefanov.

Antarctica plans

Stefanov and marine biologist Lyubomir Kenderov from the Faculty of Biology of Sofia University are planning this year to dive for the underwater research. "As we dive, we expect to get a very good idea of the diversity of species," he said.

It will be particularly interesting for the nutritional analysis for fish, Stefanov added. He believes that once the fish species in the area are known, the bottom invertebrates that the fish potentially feed on can be studied in detail.

The Bulgarian scientists have found that Antarctic fish inhabit different depths in the Southern Bay. An interesting detail they have found is that there is a pattern of larger fish inhabiting the shallower depths, with smaller species appearing as depth increases. They have identified seven different species of fish in the Southern Bay.

"We have done a lot of research on the food spectrum of two fish species, Notothenia coriiceps and Notothenia rossii," Stefanov said. And he noted that he has gained a very good insight into what exactly these fish feed on.

"What we need to research more this season is the differences in the feeding strategies of different species in areas of active melt and freshwater inflow with those in the open sea," said Stefanov.

Climate change and human activity

Looking at Antarctica, one can predict how far climate change might go, Stefanov says. "If the process of glacial meltwater deepens considerably, the level of the world's oceans will rise, but this won't be the only effect to be felt," he warned.

The additional "inflow" of cold fresh water will lead to a change in ocean currents, and this will bring about a dramatic climate change over a short period of time in certain areas, the biologist said.

Stefanov is also preoccupied with the human impact on the Earth's aquatic life. "I strongly hope that people will become increasingly aware of the impact they are having and of the need to take measures to reduce it," he

He uses as an example the fate of sturgeon fish in the Danube and the Black Sea. The last remaining sturgeon breeding habitats are shared between Bulgaria and Romania in the lower reaches of the Danube. These are large fish that take long to mature sexually. They don't breed every year. Overfishing for the valuable sturgeon roe could easily wipe out a population of this species. This, together with the construction of the Iron Gates dam, which blocks the migration route of sturgeon, has led to a dramatic reduction in the population.

"We see the last specimens that breed, which are on the verge of extinction and therefore urgent measures are needed for their conservation," Stefanov further

Stefanov hopes to pass on to the younger generations his enthusiasm to work for the protection of aquatic creates through his works with PhD students and assistants at the museum. Every year he also participates in research on fish in Bulgaria. One of the projects in which he is currently involved in for breeding and resettlement of Balkan trout.

January 2024, Livingston Island

Assoc. Prof. Tihomir Stefanov will expand the ichthyological collections of the National Museum of Natural History with the Bulgarian Academy of Sciences by bringing a total of eight fish species from the aquatic environment of Livingston Island. Stefanov also managed to capture a new species - Parachaenichthys charcoti.

"My project on Livingston Island is related to the biological and species diversity of fish in the area. So far - halfway through my stay, the project is extremely well underway. With the help of the logistics team at the base, we have managed to do several entries and a dozen surveys. The interesting data that I received completes very well the picture that I had from my previous visits," Stefanov said in a BTA interview. According to him, the spatial distribution of individual fish species can now be very well assessed. There is a very interesting distribution in relation to the depth at which they occur, he noted.

"The two main fish species accounting for over 90% of the biomass in the region are the two Notothenia species, the Notothenia coriiceps, and the Notothenia rossii. They inhabit a relatively wide range of depths, but their biomass is mainly concentrated in shallower areas. We even manage to see single specimens swimming almost to the shore - practically down to ten

centimetres deep," the scientist concluded that the bulk of the

It is the fact that the bulk of their populations are concentrated in the shallower areas of the shelf zone, and the shallow coastal zone of Livingston Island, that drives the other species, which are much smaller in size, such as the two Trematomus species, to be distributed in the slightly greater depths, where they avoid the competition on the one hand, and the predation of these two large dominant species on the other.

"The interesting addition we found had to do with the biology of so-called icefish. The icefish (Chaenocephalus aceratus) turned out to be much more widespread here than we first thought. It forms colonies which are of male and female specimens, with the male making a kind of nest on the seabed, where he invites the female and she spawns in this nest, which the male then guards," Stefanov said. He explained that these colonies on Livingston Island are located at greater depths - somewhere beyond 40, 50 to 60-65 metres. However, the species is also found at shallower depths, with one of the specimens caught over the years, was found at a depth of 12 metres. "We often catch fish at depths of 25-30 m, so their distribution also varies in depth," the researcher said. According to the data collected so far, it can be

colony is at a depth of 60m.

"During the research this year, within the framework of the current project, we managed to capture another species of this family - the so-called dragonfish (Parachaenichthys charcoti). This is a new species for the collections of the National Museum of Natural History. A big part of my project is about acquiring interesting specimens to enrich the collections of the Natural History Museum - there is a showcase dedicated to Antarctic biodiversity. Any new species would be a good catch and will find its place in the exhibition", Assoc. Prof. Tihomir Stefanov said.

Another interesting discovery during this year's research was related to the biology of the two dominant Notothenia species. "We were able to study specimens that occur in Johnsons Dock - a very enclosed place, a cove with a melting glacier at its bottom which drastically changes the hydrochemical conditions in there and therefore the habitat of these fish, Stefanov explained.

The high freshwater flow, along with particles entrained by the glacier, greatly increase turbidity in Johnsons Dock, which affects light transmission and thus the amounts of photosynthetic algae and oxygen in the water. The inflow of waters of different densities into this part

of Livingston's Island Southern Bay creates some sorts of vertical currents. Those currents displace the heavier and denser water which goes down into the bottom layers, with lighter fresh water coming up to take its place. It is these vertical currents that attract krill, which form a vital part of the diet for whales that are also found in Livingston's Island Southern Bay.

The vertical currents attract

of Johnsons Dock, and this causes these two dominant fish species to dramatically change their feeding strategy. The Notothenia species are Percidae-like, they do not have a swim bladder, they have a positive buoyancy that holds them to the bottom. To actively swim in the water colmovements. They try to spare themselves these movements

the krill that congregate in front and, feeding on the bottom, usually live where various algae are piled up. Their feeding strategy mainly involves algae, Stefanov explained. "The fish we studied in our near-bay section have switched entirely to active krill feeding. In this situation, some of the fish also catch various small fish. They abandon their umn, they need to make active natural way of feeding and start actively moving in the water column," he added.

February 2024, Livingston Island

Assoc. Prof. Tihomir Stefanov, an ichthyologist from the National Museum of Natural History in Sofia and a member of the ongoing 32nd Bulgarian Antarctic Expedition, told BTA about the foraging, reproduction and movement of the separate species of fish and crustaceans (isopods) near Livingston Island. He presented the individuals caught by the expedition and explained their characteristics to Nikola Vaptsarov Naval Academy head Boyan Mednikarov and BTA Director General Kiril Valchev, who arrived at the Bulgarian Antarctic base on Livingston Island on Monday.

The caught fish and isopods will be exhibited in the aquatory of the National Museum of Natural History in Sofia. "We won [funding for] a very big project for the museum. We will build an additional floor on the building where new exhibition space will be available. That is where the Arctica-Antarctica polar room will be. That is why one of my goals is to collect more materials that we can put there

He presented isopods from the Glyptonotus antarcticus and the Spinoseriolis trilobitoides species. The former species can be found only in Antarctica, the ichthyologist noted. The live individuals will be frozen and stored at minus 70C to be studied by Assoc. Prof. Lyubomir Kenderov, a marine biologist, within his project on the genome of Glyptonotus antarcticus.

Stefanov said his project looks into the special distribution of the separate species in Livingston Island's Southern Bay. "We mapped which species live where and at what depth," he specified. He showed individuals from three fish species.

The dusky rockcod (Trematoin the new exhibition," Stefanov mus newnesi), of which only one individual was caught, has proven the hypothesis on the habitat of small and big fish in the Livingston Island area. "Small species live at a very big depth, because the big species eat everything in the shallows, they are absolute predators. Smaller species hide in the deep where the main predators have a much smaller biomass," the ichthyologist explained. This year's studies have confirmed that.

An interesting discovery made produces in the South Georgia this year is related to the biology of the marbled rockcod (Notothenia rossii) and the black rockcod (Notothenia coriiceps). The dominant predator, he added. marbled rockcod does not reproduce in Southern Bay: once it reaches reproduction age (7 to 8 to be less rare than expected. It years), it migrates. Not a single lives in colonies, but the scienadult individual of this species, tists could not catch a specimen. which lives for some 30 years, has been found in the area. Ste- many interesting data on the

island area. The black rockcod is the main species reproducing near Livingson Island; it is the

The blackfin icefish (Chaenocephalus aceratus) turned out

This year, we have collected fanov believes the species re- fecundity of the three fish spe-

cies. In the blackfin icefish, the fecundity is low. The male cares for the nest, which he forms by digging with fins into the sea floor and placing stones around the nest. The male attracts the female, and she lays eggs in the nest, which is then guarded by the male. In the black rockcod, the female lays eggs in seaweed and abandons them, Stefanov ex-



May 2024, Sofia

Now, in the 21st century, we have mapped the entire surface of Mars, but many things related to fish are unknown to us, strange as that is, ichthyologist Assoc. Prof. Tihomir Stefanov told BTA's LIK magazine. A month ago, he returned from 32nd Bulgarian expedition to Antarctica, where he studied the impact of melting glaciers on fish feeding, reproduction and movement.

Stefanov's Antarctic project was two-year long, and this was the second year of it. "The expedition was a great success because we completed everything, I had identified in terms of field work, sampling locations, sites, number of samples and so forth," he said, admitting that the support of the logistics team has been essential to his work as marine biologist during the expedition. "They secured the boat for us, there was a boatman from the logistics team. In general, the whole support of our scientific work and its success are because the logistics team did their job well", he noted.

Antarctica's ichthyofauna lacks diversity but is highly specific

materials collected are now in the National Museum of Natural History. A total of eight species of fish from Livingston Island will be put on display at the museum. These are all the species of fish that Assoc. Prof. Stefanov has found in the Southern Bay area of Livingston Island during the expedition. "The ichthyofauna there is not rich, there are not many species. This is typical of the whole continent. In general, the ichthyofauna of Antarctica lacks diversity, but it is highly specific. Over 90% of the fish species that inhabit Antarctica are endemic, which means that cannot be found anywhere else," he explained.

One of the most abundant species found near the Bulgarian Antartic base is Notothenia rossii. However, the fish migrates when it reaches sexual maturity and does not breed in this area. It is very likely that Notothenia rossii migrates far away - there is not enough information on this. The species certainly breeds somewhere around South Georgia Island, which is much farther north than the South Shetland Islands. It is a fact that the species is extremely common around Livingston Island, but only spec-The ship has arrived and all the imens that are not sexually ma-

ture are found there. Stefanov underscored.

According to the scientist, it is difficult to answer the question of what necessitates this migration, as not much is known about the life cycle of this species. Its reproductive requirements are not studied in detail yet. It is most likely that the habitats around the South Shetland Islands are not suitable for Notothenia rossii and therefore the species must migrate to places where it can breed successfully, the ichthyologist explained.

Stefanov gave an example of another fish species that migrates far away to breed. Similarly, the European eel is found in the northern hemisphere and is distributed in freshwater pools throughout the continent but migrates to the deep parts of the Atlantic known as the Sargasso Sea to complete its breeding cycle. "Why does it do that? We still do not have an answer to that question. We do not even know exactly where it breeds," says the scientist.

Two large predators occupy the shallowest waters

As part of the 32nd Bulgarian expedition to Antarctica, Assoc. Prof. Tihomir Stefanov confirms the hypothesis that larger fish inhabit shallower waters while smaller species occur with increasing depth.

In his words, the shallowest waters are occupied by two large predators – Notothenia coriiceps and Notothenia rossii. "These are the large species in the area, the predators that are outcompeting the smaller fish species, and the latter are naturally pushed to greater depths, where the biomass of these two species decreases." Stefanov said.

Active glacier melting in the area changes feeding behaviour of fish

A long period of time is needed to properly describe the processes associated with the melting of Antarctic glaciers and their impact on the local ichthyofauna, the scientist commented. "We have not yet fully completed the analysis of the data collected. But what is apparent from the information obtained is that the active melting of freshwater in the Livingston Island area is changing the feeding behaviour of fish," he said.

Stefanov explained that fish which live in coves near which active glacier melting appears, change their hunting patterns. The melting process causes vertical currents that attract a very large number of invertebrates, including krill. Because of the presence of so much prey, groundfish begin to change their behavior. "From being typical bottom-dwelling fish that are only found and hunted on the

seabed, they are becoming fish that are actively swimming in the water column to be able to reach the krill and other similar crustacean invertebrates," he told BTA, adding that these are fish that do not have a swim bladder and have difficulty regulating their buoyancy. To be able to do something like this, they need to swim very actively and overcome their own weight. Apparently, an active diet is energetically advantageous for them because they start ignoring their passive bottom-feeding lifestyle, Stefanov concluded.

Field data to be summarized in scientific papers by end-2024

Following his return from the 32nd Bulgarian expedition to Antarctica, Assoc. Prof. Tihomir Stefanov will analyse all samples and process all the information collected during fieldwork. "I expect actual results around the end of this year, and I hope to be able to compile all the field data we have collected into at least two scientific papers by then," he voiced hope.

The National Museum of Natural History now has a permanent exhibition, a showcase dedicated to Antarctic biodiversity, where the eight species identified during work on Livingston Island will be put on display. "We also have an idea to expand the exhibition area. One of the ideas that we have always wanted to implement as soon as possible, is to dedicate an entire room to polar biodiversity, to the polar flora and fauna not only of Antarctica but of the Arctic, as well. It will be very interesting to combine

both in one common exhibition area," the ichthyologist said.

The museum has already won a project under which it has the opportunity to expand its exhibition areas, and work on implementing this initiative will begin as early as 2024, Stefanov explained.

Stefanov wishes to study migration of fish species near Livingston Island in the future

In the future, Assoc. Prof. Stefanov wishes to deepen his research on migration of fish species that live in the waters near Livingston Island. "We barely know anything about the actual movements of fish in this area," he said.

However, Stefanov's next expedition to Antarctica is likely to be in a year or two at the earliest, he said. "Plans are one thing, opportunities are quite another. Antarctica has been a dream for me from the very beginning, because it is a natural laboratory where one can really do fascinating and fundamental research," Stefanov admitted.

In his words, before the next trip, all the information that has been collected so far needs to be processed and published. Otherwise, I run the risk to pile up all the information I currently have with new information and not publish all of it. After all, we are not just there [Antarctical to make dreams come true, we are there to do a job. And our work as scientists is all about researching and publishing scientific information", the ichthyolo-

Marine Geologist Assoc. Prof. Dr Raina Christova:



Bulgarian Scientists Study the Impact of Climate Change on Ocean

Mila Edreva, Emil Granicharov

December 2024, Varna

During the 32nd Bulgarian Antarctic Expedition, the Bulgarian scientists will study the impact of climate change on the ocean floor. Marine geologist Assoc. Prof. Dr Raina Christova from the Institute of Oceanology at the Bulgarian Academy of Sciences (BAS) told BTA that this is an integrated project with the participation of experts in three fields. It was launched during the 31st Bulgarian Antarctic expedition, and now scientists will continue their work.

Christova is working on a project for integrated research of sediment, biota and waters in the marine ecosystem of the Bulgarian Antarctic base's littoral zone. She explained that on their previous visits, the scientists worked on

land, so the territorial waters have not been studied systematically. "Our project is the first of its kind, and my task is to study the seafloor sediments," she noted. These sediments are very complex systems and a key component of the ocean ecosystem, but the integrated approach will allow for more global conclusions on the state of the environment. In her words, the practice is for the scientists working in different fields to go out in a boat and collect biological, geological and oceanographic samples simultaneously from the same point of areas outlined in advance.

The seafloor sediments Christova works with can provide data on the speed of contemporary sedimentation, which she believes is

affected by climate change. "Everything there happens before our eyes: while working, we see how huge blocks of ice fall from a glacier and settle on the seafloor. The quick melting of a glacier causes rivers that too have an impact and add to the seafloor sediments," the marine geologist explained.

The sediments Christova studies can also be explained as contemporary marine silts that formed in the Holocene – the epoch when humans appeared. "We live in that epoch, its range is around 11,000 years, so being studied are the most contemporary geological formations that are yet to become rock samples," she explained. These contemporary silts can also be reviewed as a trap that will allow the



Hurd Peninsula, January 28, 2024. Photo: Emil Granicharov, BTA

scientists to determine whether there is anthropogenic pollution in this part of the planet.

The samples taken are subjected to complex analyses at the University of Sofia and the Institute of Oceanology at BAS. The first samples have been tested for heavy metals. If the results are positive, the scientists will know whether humans are responsible for their presence. The samples are tested for arsenic, copper, chrome, mercury, lead as well as for strategically important metals, such as selenium and molybdenum. The third focus in the studies are the so-called rock-forming elements.

"When we came back from our first trip [to Livingston Island], during the previous expedition, these analyses were started but progress is slow," Christova noted. That is because the samples need to dry naturally, and not in laboratory conditions, which takes a lot of time. At the end of the integrated project, when the results from all samples are taken into view,

a proto-ecological model will be made of the sediments in the bay.

During the 31st Bulgarian Antarctic Expedition, the working areas of the Bulgarian scientists were mostly along the coast at a working depth of 5-6 to 29-30 metres. The samples were taken by hand with the help of a device that was lowered to the seafloor. For the current expedition, the scientists hope to work at greater depths; to that end, a more special device will be used – a gravity tube – with the logistics assistance of the crew of the Bulgarian naval research ship Sv. Sv. Kiril i Metodii.

Asked if something managed to surprise her in the previous expedition, Christova said through a smile that she has sufficient experience as a marine geologist but in the Black Sea, not on Livingston Island in Antarctica. "Everything there is different, extreme, unfamiliar; you feel as though you are an astronaut, because you row and touch materials that no one has ever touched. That is both intoxi-

cating and responsible and makes you want to study more and more," she told BTA.

Of the human impact in this unexplored area of the planet, she points out that the aim of the Bulgarian expedition participants is to leave as small a footprint as possible. People try very hard to diminish or eliminate all the effects of their activities and presence, explained Christova and stresses that everyone from the Bulgarian expedition is working hard in this direction. According to her, a human imprint on the seafloor there could be found. Humans have been everywhere and, unfortunately, there are many fields in live that produce unreasonable amounts of waste, she argued.

On this expedition, the scientists plan to step on Smith Island. "It is terra incognita, even the mooring itself will be a challenge for the crew and captain of Sv. Sv. Kiril i Metodii," Christova pointed out and added that one of the tasks will be to map the sea floor.

January 2024, Livingston Island

"We are already getting information on the first results in one of the most important research directions - the presence of heavy metals in marine bottom sediments," marine geologist Assoc. Prof. Dr Raina Christova from the Institute of Oceanology at the Bulgarian Academy of Sciences (BAS) told BTA. She is taking part in the the 32st Bulgarian Antarctic expedition of the Bulgarian naval research ship Sv. Sv. Kiril i Metodii. The presence of elements such as arsenic, chromium, nickel, copper, lead, zinc and mercury would not bode well for the ocean ecosystem in Livingston Island's littoral, Christova pointed out.

X-ray diffractometry, X-ray fluorescence and ICP analyses were performed to provide a baseline elemental composition and refine the lithological determinations, the scientist explained. The modern slimes studied include analyses to search for such strategically important elements as lithium, germanium, indium, etc., which are of great importance for the industry as a whole, and for example for the production of electric cars. "The main rock-forming elements are also being studied, which will give us valuable information about the modern sedimentary process in the aquifer," Christova added.

Currently, the laboratory stage of the first year's samples is underway, which is being carried out in specialized laboratories of Sofia University and the Geological Institute at BAS, she explained.

Within the project, in which Assoc. Prof. Raina Christova works

together with Assoc. Prof. Lyubomir Kenderov, marine bottom sediments from the Southern Gulf of the Bulgarian Antarctic Base are being studied. The project is two years long and this year the researchers are continuing their work from aboard the Bulgarian naval research ship Sv. Sv. Kiril i Metodii.

"Our goal is to take additional samples of marine sediments, mostly from deeper water, and to revise some of the locations we worked on last year," Christova said. "We are using a bottom-dredger for the shallower water part of the basin and a gravity tube from the ship, and we aim to take a geological and a biological sample from the same point," she added.

Christova said that they are aiming to find a characteristic trace in the sedimentary record that will "capture" the rhythmicity in glacier melt in the deeper sediments through the gravity pipe.

In the considered littoral area of the Bulgarian Antarctic Base, in the conditions of active glacial melting and extreme climatic fluctuations, marine sediments have most

likely "sealed" traces of impact geological events or anthropogenic pollution, the scientist believes. The distribution range of seafloor sediments is discontinuous and variable, and any establishment of the position of the different lithofacies types indicates the role of various hydrodynamic factors in their formation, such as the influence of an active inshore zone, a river run-off, a glacial tongue, a glacial swamp, and, more generally, sedimentation conditions that are controlled by climatic fluctuations on a global scale, Christova explained.

"The results of our project will elucidate the links between sediment, biota and water components in the Antarctic ecosystem of Livingston Island and the role of substrate for benthic biota - bottom sediment types and their relationship to bottom biocenoses," the marine geologist said.

"Our team's work on board the ship is carried out with the help of the crew, who provide us with logistical support and suggest new solutions to technical problems," Christova added.



Livingston Island, January 20, 2024. Photo: Emil Granicharov, BTA

Assoc. Prof. Lyubomir Kenderov:



We Integrate Various Different Scientific Fields into a Holistic Approach to Understanding Nature

Joanna Lashkova, Emil Granicharov

Sofia 2023, December

Our project is dedicated to integrating different scientific fields into a single holistic approach to studying nature, Assoc. Prof. Lyubomir Kenderov, a hydrobiologist at Sofia University's Faculty of Biology, said in an interview with BTA. He has participated in the last four Bulgarian Antarctic expeditions and is part of the current 32nd expedition to the Bulgarian base on Livingston Island. Assoc. Prof. Kenderov is working on a project which focuses

on life in marine waters.

He is a specialist in benthic crustaceans but his project is interdisciplinary. The first group of scientists on the 32nd expedition also includes Assoc. Prof. Raina Christova, a marine geologist from the Institute of Oceanology of the Bulgarian Academy of Sciences (BAS). The two will work together, with Christova focusing on benthic sediments at the sites where Kenderov will study deep-sea life.

Benefits of the research project

"Bulgarian scientists have been crisscrossing the Ice Continent for over three decades and have achieved many interesting results in geology, glaciology, climatology and biology. This is the first time we have reached a more mature level of research that integrates different disciplines. In addition to marine biology, which is my specialty, we will

be studying two more components of the environment. The first component is the marine world of the Southern Ocean. We will also study the sediments which form the habitat, the water and its parameters. Our project is dedicated to integrating different scientific fields into a single holistic approach to the study of nature," said Kenderov.

The team

The hydrobiologist explained that in addition to Assoc. Prof. Raina Christova from the Institute of Oceanology, the 15-member team includes scientists from Spain, reputed polar researchers who have explored the waters around Livingston and Deception Islands and the South Shetland Islands in general for over 20 years. He said work on the project will involve specialists in benthic organisms, marine biologists and ice divers. "They will pass on to us their experience from diving in the icy waters of the Southern Ocean. Our project also includes scuba diving for live observation of the undisturbed ecosystems," the researcher said. When dredgers and probes collect samples from the bottom, the natural state of the sediments, habitats and the organisms themselves is disturbed and cannot be observed.

The international project also involves young doctoral students who will use the results for their first research.

"The idea for such an inter-

disciplinary project came from the doyen of Bulgarian polar research, Prof. Christo Pimpirev. On a beautiful summer day, he asked Raina Christova and me if we would bring biology and geology together in a common project. Prof. Christo Pimpirev is the ideologue behind the interdisciplinary study," said Assoc. Prof. Kenderov.

A few more countries working in biology and geology have arrived at this idea. "It has only started to develop in the water area of the South Shetland Islands, so we are among the first to engage in such multidisciplinary research. I am delighted that we will have the opportunity to share data and knowledge on taking a holistic view of the living and non-living world of this unique continent, alongside the major powers," the scientist added.

Difficulties in combining biology and geology

Assoc. Prof. Kenderov explained that the main difficulties start with the organization of the expedition and with the insufficient funding for science. There is a big difference between funding for logistics and construction and allocating money for science.

"Although our project is innovative, we had an extremely tight budget to cover the trip and some minimal analysis. For me, that was the worst difficulty. Our society does not seem to be mature enough to invest more in science. It is extremely important to em-

phasize the need to create new laboratory facilities. A new lab complex is under construction. Science needs long-term funding so that scientists like us can build a reputation as specialists in a field. This is a two-year project. There are also one-year projects and when they come to an end, we still need to continue developing in a certain field. If we are not given a chance, we lose the initiative to do this very complex research in Antarctica at all," he explained.

"Our two-year bio-geo project is in its second year now. The previous expedition was the first to use a Bulgarian ship. We did our first research on the project on board the naval research vessel Sv. Sv. Kiril i Metodii, but it was mostly done in the shallow areas between zero and about 20 m, mainly from a boat, as it is dangerous for the ship to approach the shallows. During the current expedition, as part of our two-year project, we have to work from the ship, at greater depths, and the South Bay, where the Bulgarian base is located, has depths of over 200 m. With the help of the ship's commanding officer and crew, we will try to launch scientific instruments - bottom-dredgers and probes which will allow us to work in the greater depths," said Lyubomir Kenderov.

Equipment

Since this is only the second Antarctic expedition for the Bulgarian research vessel,

it is not yet fully equipped for extensive biological and geological research, according to the hydrobiologist. "Of course, this is an extremely expensive and sometimes precise infrastructure that has been accumulated over the years, with the scientific projects that have been carried out. I am extremely pleased that Prof. Pimpirev and especially Dragomir Mateev, one of the people who organized the expedition, gave us a chance to purchase a bottom-dredger outside the project. This bottom-dredger, purchased by the Naval School and installed on board the ship, will be used for the first time in the framework of this project," said Lyubomir Kenderov. He also explained that this will be the first time that the great ocean depths will be reached, and that he and his team will see what animals and organisms inhabit the bottom. "Of course, we will also take out sediments for the geologists. So we are really opening a new page. We are penetrating where few have explored," he added.

Main problems

"The main pre-departure difficulties for any expedition have to do with the fact that there are no shops in Antarctica, either for personal or for scientific equipment. The tiniest details must be clear, if we forget to pack something, we may compromise both our research and our comfort. For instance, if we forget to pack

thermal underwear, we will be cold. The expedition has been months in the making. Having participated in four expeditions, I have a list of personal equipment, but the projects are new and we always run the risk of forgetting something. I am glad that we got some of the equipment on board the naval research vessel, which is already on its way, including diving cylinders and compressors. Still, we are going to a place where every detail matters. We are just like the mountaineers who scale the highest mountains and must go back, despite the risks, if they forget to take something. Like them, we go to a place where every detail must be taken care of," said Assoc. Prof. Kenderov.

He went on to explain that there are also serious emotional difficulties. "We part with family and friends, with our loved ones, for months on end, and this certainly affects us. Add to this the cold, the routine, living with other people in a small, cramped space for a long time - we must cope with these and many other difficulties. People who have travelled and encountered these difficulties, especially trained researchers, have no problems. Scientists have one very big advantage over the others - the technicians, I would even say the sailors - the crew, who are much more prepared than we are. Scientists are absorbed in their work and sometimes they forget about the difficult conditions. They are engrossed

in science as they analyse the samples, write labels, view specimens under a microscope, take pictures of creatures pulled out of the water as I do, and things can sometimes be very easy. One works all day and does not think about the adversities which are part of any remote expedition," said Kenderov.

The scientist and his team are leaving with the first group of the expedition and are expected to stay until February. He said they would have enough time to implement the last stage of the project's research - the collection of benthic samples from the South Bay and monitoring through ice-diving, photo and video recording of the underwater world. This will be done thanks to the great help provided by the Spanish scuba divers. "About two months are enough to realize all our ambitions to explore the South Bay area," he explained.

Transporting the equipment

Assoc. Prof. Lyubomir Kenderov said some of the light but very expensive equipment was not loaded on the ship which started for Livingston Island on November 8. "It will travel in our personal luggage so that we can use it while we are in Bulgaria. Some of the scientific instruments are being used for research in the Black Sea. We will take and bring back a lot of luggage with us on the planes and other transport," the hydrobiologist said.

January 2024, Livingston Island

"My task is to show how the organisms that inhabit the seafloor can be used as an early warning that humans are changing the living conditions in Antarctica and that certain measures need to be taken," the hydrobiologist, Assoc. Prof. Lyubomir Kenderov, said in an interview with BTA. During the 32nd Bulgarian Antarctic expedition on Livingston Island he examined the benthic sediments which form the habitat, the water and its parameters.

"Benthic organisms live under very extreme conditions. The water temperature is always close to freezing point. Those organisms are very often deprived of a food source because conditions are harsh," said Assoc. Prof. Kenderov. In his view, the organisms which inhabit the bottom of the Southern Ocean try to survive in polar night conditions that last for months. "During that polar night they have no source of food," he said.

Assoc. Prof. Kenderov specified that the primary process that creates matter on planet Earth is photosynthesis. "At night there are no photosynthesizing algae or planktonic-benthic algae. In these extreme conditions, organisms have adapted so well for 20 million years or more, that living in this unique place, they are very good indicators of the changes we humans are inevitably inflicting on our planet." Although there is no population in Antarctica, the global transport of pollutants by ocean currents is reaching the

Ice Continent, the hydrobiologist stressed.

"Crustaceans called amphipods (Amphipoda) are marine organisms which inhabit the bottom of the Southern Ocean. There are many species of them in these very cold waters," Lyubomir Kenderov said. "Usually, where the environmental factors are extreme, there is poor species diversity. This is not the case here for these amphipod species. This paradox is difficult to explain."

According to the scientist, amphipods are good indicators of changes in living conditions, both on the seafloor and throughout the ecosystem. "They have managed to enter the ecological niches, the 'homes' of the ecosystem of other organisms inhabiting the warmer oceans. These crustaceans are well suited as an object for monitoring these influences. Some of them are unknown to science, others are new species." In his words, a species of Amphipoda found at a depth of about 300 metres has been described. It was collected by a Spanish research team in 1989. Assoc. Prof. Kenderov said he hoped such a specimen would be found in the Bulgarian research material.

"The global warming of the climate of our planet is being felt in the Antarctic Peninsula where the Bulgarian base is located on Livingston Island. This is the fastest warming place on the planet," Kenderov said, noting the consequences for the marine ecosystem. "In polar summer conditions,

rapidly melting ice will make the water sweeter. The water becomes less salty than is typical of the Southern Ocean. As a result, many organisms will leave these habitats, and stationary organisms will die."

Assoc. Prof. Kenderov is working with Assoc. Prof. Raina Christova, a marine geologist from the Institute of Oceanology at the Bulgarian Academy of Sciences. Together, they are studying Antarctic benthic life in a multidisciplinary project.

Assoc. Prof. Christova studies the chemical composition, thickness and origin of the benthic sediments which are a substrate, i.e. a place where these unique organisms live, Kenderov explained. They also study the parameters of the water environment in the area of Livingston Island: its temperature, oxygen content, saturation, active water reaction, electrical conductivity and salinity. "Using the methods, the approaches, the scientific information from different geological and biological sciences, we are looking for the big picture of what is happening to Antarctica and how humans are influencing it," the hydrobiologist explained.

"We have studied the Moon. We could even say that the dark side of the Moon is better studied than the bottom of the Southern Ocean. We hope that these organisms, with their great diversity, will be the best group of marine organisms for monitoring environmental changes," Assoc. Prof. Lyubomir Kenderov said.

April 2024, Sofia

"As a result of our project work, we have collected valuable specimens of endemic marine life - species which inhabit only the Southern Ocean and cannot exist outside icecold waters. We found a large biodiversity of amphipod crabs - species that form the basis of benthic food chains in Antarctic waters. We also found various mussels, sea worms, sea urchins and sea spiders. Many of the species are good bioindicators and can be used as a 'live alarm' when living conditions deteriorate," Assoc. Prof. Lyubomir Kenderov said after the Antarctic expedition.

"This is the first time Bulgarian scientists have studied marine sediments in the area of the South Shetland Islands: King George, Deception, Half Moon and Livingston. The marine geologist, Assoc. Prof. Raina Christova from the Institute of Oceanology at the Bulgarian Academy of Sciences, drilled the sediments to a depth of 65 metres. The valuable results have revealed much about geological processes in the past and the influence of sediments as a non-living component of ecosystems now," he said.

"Bulgaria's presence in Antarctica is making a remarkable progress. The acquisition of a Bulgarian research vessel has ranked our country among the leaders making expeditions to the Ice Continent," the scien-

tist said.

Assoc. Prof. Kenderov noted that the budget of the project, on which he and his team worked for two consecutive years, barely covered the cost of the voyage and a small part of the analyses.

"We could not buy scientific equipment. In the first year we used old hand-held instruments in the field and worked from a boat only in the area of the Bulgarian Antarctic base on Livingston Island. In the second year, the research vessel was equipped with a bottom sampler and we used it in the South Shetland Islands area. This made our research much more valuable. For most of the expedition, the ship sailed to carry building materials for the new building and to provide transport for various Bulgarian and international teams of polar explorers, which, coupled with the short polar summer, prevented us from collecting sufficient research material. We scientists always wish we had more time to spend in Antarctica," he said.

The scientist noted that the research material collected during this year's expedition was left on board the research vessel, which travelled back to the Black Sea for two months. He and his team only received the material a few days ago and work is yet to begin.

Unfortunately, Assoc. Prof.

Kenderov and his team failed to capture underwater footage. Although they have been preparing actively for years to have scientist divers do some real underwater work, it did not happen during this expedition.

The hydrobiologist said he and his team had to seek additional financing for scuba diving because scientific projects are underfunded. Fortunately, they managed to secure funds and now have some of the best cold-water ice-diving scientific equipment, as well as trained scuba diving scientists.

"Hopefully, in the coming years we will receive support from the Bulgarian Antarctic Institute and the National Center for Polar Studies to have a scientific project approved, for which a team of three scientists will be sent to do professional photo and video documentation of underwater ecosystems in Antarctica," the scientist added.

Assoc. Prof. Lyubomir Kenderov is a hydrobiology specialist from the Faculty of Biology of the St Kliment Ohridski Sofia University. He has participated in five Bulgarian Antarctic expeditions and was part of the 32nd Bulgarian expedition to Livingston Island in 2024. Assoc. Prof. Kenderov is working on a research project on life in Antarctic marine waters.

Prof. Eliza Uzunova:



We Will Study Pathogens that May Endanger Fish Health in Antarctica

Borislava Bibinovska, Emil Granicharov, Martina Christova

December 2023, Sofia

"Our project is focused on fish health. The goal is to study all kinds of pathogenic agents (bacteria, viruses, parasites) that may endanger fish's health status. We will also do research on the presence of microplastics in the water that may have reached the shores of Antarctica and that fish mistakenly use for food," ichthyologist and hydrobiologist Prof.Eliza Uzunova told BTA in December. She is part of the 32nd Bulgarian Antarctic Expedition. In Antarctica, Prof.Uzunova will try to continue the work started by her

colleague, Assoc Prof.Petya Orozova, and catch fish to be studied within the scientific project.

To shed light on the importance of knowing how fish in Antarctica react to various factors, Prof.Uzunova welcomed the BTA team at the Faculty of Biology of the St Kliment Ohridski University of Sofia, where she teaches hydrobiology in Bachelor's programmes and ecology of fish and aquacultures in Master's programmes. We talked in one of the lecture rooms of the Department of General and Applied Hydrobiology by a col-

lection of fish, shellfish, snails and other organisms collected from around the world. Immersed in the atmosphere of the aquatic world, Prof.Uzunova opened the door to the world of science.

Importance of fish: fishing and restoration

The science of studying fish is extremely important, because it has a socio-economic significance. "The hydrobionts – the organisms that we can take from ecosystems to feed humanity apart

from fish, some crustaceans, and mussels – are not many," the ichthyologist commented.

"Therefore, we should not just take them from the world ocean, rivers, and lakes: we have the responsibility to restore them in some way. That can partially be done through their artificial breeding in the so-called aquacultures. That is exactly what I'm teaching students," Prof.Uzunova said.

In her words, she has dedicated over 25 years to the science about fish. She researches and studies various parts of Bulgaria to assess the state of fish species as well as their habitats. Her knowledge and interest have taken her to the project on the breeding and restoration of the freshwater species European bullhead (Cottus gobio).

Fish of Antartica: risks and research

One of the important characteristics of Antarctica's biota [the animals and plants living in a particular habitat] is that 90% of the species there are endemic, meaning they cannot be found anywhere else on Earth. Antarctica's fish species are endemic and thus have very unusual biological characteristics, the ichthyologist said. For example, their blood lacks haemoglobin, i.e. they lack a structure transferring oxygen in their organisms, and their skeletal system is poorly mineralized. They produce substances that prevent their tissues and the liquids inside from freezing, Prof. Uzunova explained.

However, these unusual characteristics make fish in Antarctica vulnerable to various stress factors. "Among the risks is climate change, which increases the temperature in the atmosphere and

water, makes glaciers melt and thus increases freshwater," Prof. Uzunova specified. Other risks include water pollution, overfishing for industrial purposes, and foreign species displacing local ones.

The dangers fish in Antarctica face have made Bulgarian scientists launch a project on fish health.

In the last years, there has been news like the one in 2022 about fish caught with severe skin tumors. Scientists have found that these are caused by X-cell parasites of the Notoxcellia genus, Prof.Uzunova commented. The scientific community believes that this large-scale occurrence of tumors is a consequence of climate change.

"That is why we have set ourselves the task of forecasting how climate change will affect fish microbiome – the millions of microorganisms that live on skin, in the digestive system and all internal organs. It is important to know what this microbiome's structure is, because its balance influences the overall health status of fish but also of humans, since we consume fish," Prof. Uzunova explained.

Many microorganisms do not generally cause diseases to their host, but changes in the environmental conditions can make them pathogenic and even result in an epidemic, she added.

Another problem the Bulgarian scientists are focusing on is antimicrobial resistance, which is the ability of microorganisms to become ever more resistant to antimicrobial remedies to which they were very sensitive until recently, Prof.Uzunova told BTA.

Her project also aims to find probiotic bacterial strands producing antimicrobial substances, which can be used to counteract antimicrobial resistance, the specialist added.

To that end, the most important thing for an ichthyologist is to obtain fish for research. Fortunately, during the 31st Bulgarian Antarctic Expedition Assoc Prof.Petya Orozova had the opportunity to rely on the crew of the Bulgarian naval research ship Sv. Sv. Kiril i Metodii. "Our ship does not yet have a special device for catching fish, which the other big research vessels are equipped with," Prof.Uzunova specified.

"We catch our fish for research with meshy devices we place in the water. My colleague Petya Orozova was the first Bulgarian researcher to make an improvised lab aboard the ship. Microbiological samples are taken from every fish on the ship to test them in the corresponding food environments," Uzunova specified.

When the samples collected by Assoc Prof.Orozova were brought back to Bulgaria, the research continued in several laboratories: at Sofia University's Faculty of Biology, at the National Diagnostic Research Veterinary Institute, and at the National Centre for Infectious and Parasitic Diseases.

"It would be nice to have enough fish – between 100 and 150 individuals - to guarantee that what is observed is not accidental but something typical for the fish fauna in the area of Antarctica," Prof.Uzunova commented.

"Due to the limited number of fish from last year, we have not produced a result that is complete and reportable," Uzunova also said.

During the 31st Antarctic Expedition, Assoc Prof.Orozova managed to catch 40 fish from

the species Notothenia coriiceps and Notothenia rossii. During her stay in Antarctica, Prof.Uzunova hopes to catch more fish with the necessary equipment she has prepared, including at a greater depth in order to diversify the species of fish the Bulgarian scientists will study.

Microplastics: a danger to marine life as well as humans

Microplastics have a long life; they often "live" for over 400 years in water ecosystems, becoming a part of the food chain. Some of them fall apart to nanoparticles, which can end up in fish's liver and damage it, Prof. Uzunova said. The plastics themselves become

carriers of bacteria that have genes for antimicrobial resistance, and some plastics contain substances such as Bisphenol A (BPA) and plastificators that can cause hormonal and reproductive damage, the ichthyologist said. Fish health being affected by the ingestion of microplastics harbours a risk to humans as end consumers, she underscored.

What is the most frightening is that the quantity of these plastics is huge. At present, between 5 and 12 million tonnes of plastic waste is dumped a year, and their quantity in the world ocean is estimated at over 150 million tonnes, Uzunova said. According to her, if the forecasts are correct and that quantity continues to be consist-

ently dumped in the ocean, by 2050 there will be as much plastics as fish in the ocean, Prof.Uzunova commented.

"That is why we are interested in what quantities of plastics reach Antarctica, and the hypothesis is that they are small, thanks to that continent being far away. However, there are recent research showing that the plastic is already there," the specialist warned.

Together with her colleagues Assoc Prof.Petya Orozova, Dr Borislava Margaritova, Dr Zornitsa Zaharieva, Dr Ekaterina Mileva, and Dr Dimitriy Dashinov, Prof.Uzunova will continue doing research on Antarctica in search of data on the human impact on fish as well as possible solutions to the situation.

January 2024, Livingston Island

Ichthyologist and hydrobiologist Prof.Eliza Uzunova continues work on collecting water samples from the area around Livingston Island to be tested for the presence of microplastics. She told BTA how the sampling is done and presented the functions of the specialized net for catching microplastics.

In her words, once the specialized net gets released into the ocean, it takes 35 to 40 minutes before it gets clogged with macroalgae. "For this reason, we lower the net for 10 to 15 minutes, so that the sample is not as clogged with organics," she specified. Prof.Uzunova said that was the second sam-

pling from South Bay; two more will be done. "We will pass along the same route to collect samples for microplastics," the ichthyologist added.

Prof.Uzunova is collecting samples for the presence of microplastics from the waters in the area of Media Luna Island.



Deception Island, January 14, 2024. Photo: Emil Granicharov, BTA

April 2024, Sofia

"After two expeditions and a year of experimental work in the lab, we know much more about the fish that inhabit the area around Livingstone Island," ichthyologist and hydrobiologist Prof. Eliza Uzunova said in an interview for BTA. During the 32nd Bulgarian Antarctic Expedition, she studied the health status of fish in the area. Also, Prof. Uzunova took samples from the waters of the icy continent to research the presence of microplastics.

What was planned as field work in the 32nd expedition was mostly completed, said Prof.Uzunova. Snow and seawater samples, as well as the fish caught, are being analysed for the presence of microplastics, she reported. Analyses require highly specialised equipment and tools. For this reason, results are expected at the end of the year, she

said. The ichthyologist noted that studies by other researchers have found microplastics in the Antarctic region in every component of the ecosystem. This increases the likelihood that our results will also be positive, Prof.Uzunova pointed out.

"We collect water samples with a special net, which we run along the sea surface so that at least several dozen cubic metres of water are 'filtered'," said Prof.Uzunova about the microplastics test. "We have the most samples from the area around Livingston Island, which would go some way to answering the question of whether the presence of humans has an impact on the accumulation of fine particles of plastic there," the ichthyologist also said. According to her, factors such as wind activity and overall ocean pollution

should not be overlooked. In her words, plastic particles are slowly degradable and will be present in the environment for many years to come.

"We look for the presence of various pathogenic and potentially pathogenic organisms such as viruses and bacteria, as well as various microorganisms in them," the ichthyologist pointed out. "We found a number of potentially pathogenic microorganisms, including those of the genera Aeromonas and Vibrio," she said. In her words, parasites have also been found. The presence of potentially pathogenic organisms in the fish is a risk factor that could endanger the health of the fish, Prof. Uzunova specified.

Changes in Antarctica's atmospheric conditions are threatening the biosystem, the ichthyologist

warned, pointing out that some fish cannot live in conditions different from those that prevailed 10-15 million years ago. These are mainly fish without blood, in which oxygen transport is not carried by erythrocytes but comes in through diffusion, she added. The life of bloodless fish is only possible in cold, oxygen-rich waters. As the temperature rises, the solubility of oxygen in water decreases and these 16 species of unique fish would be doomed to death by suffo-

cation, Prof.Uzunova also said. At the same time, the change in temperature can alter the pathogenicity of various microorganisms and this can increase the incidence of certain diseases. "So far, we have not identified any fish with such diseases," she specified.

Prof.Uzunova noted the inability to work in a sterile environment as a major difficulty. This is an important element in laboratory practice when using microbiological and DNA technologies, she said. The same applies to microplastics research, which requires samples to be processed under special conditions. The ichthyologist explained how microplastic samples are preserved. "We had a freezer available that maintained a temperature of -80°C, in which we stored most of the samples both during their collection and during the long journey back. The construction of new laboratory facilities will expand the possibilities to obtain results on site," Prof.Uzunova also said.



Antarctica, February 2, 2024. Photo: Emil Granicharov, BTA

Musicologist Marina Velikova:



The Aim of My Project is to Raise Public Awareness and Draw Attention to Endangered Asthetics and Beauty of Antarctica's Sounds and Sights

Martina Christova

December 2023, Sofia

"The aim of my project is to raise public awareness and draw attention to the endangered aesthetics and beauty of Antarctica's sounds and sights, which are currently under threat," shared musicologist Marina Velikova with BTA in December, before she participated in the 32nd Bulgarian expedition to Livingston Island. She embarked on three creative endeavors: "The Sounds of Antarctica" musical project, a photo exhibition on the Ice Continent, and a watercolor exhibition featuring works crafted with the glacial waters of Antarctica.

"I hope that all of these projects will resonate with the public, demonstrating the value of pursuing creative endeavours in such a remote and unique location on our planet," Velikova said.

The compositions of the creative projects

"My musical project, 'The Sounds of Antarctica,' is divided into two distinct parts. The first part will contain all the natural sounds I can record during my stay, including the roar of glaciers, the howling winds, and the blizzards," she explained. "I will also record the sounds of the local wildlife, such as penguins, and the gentle movements of small ice blocks, which the Bulgarian Antarctic team re-

fers to as 'soup.' Additionally, I aim to capture the profound silence of Antarctica," the musician noted. The second part of the project, which Velikova will develop upon her return from the 32nd Bulgarian expedition to Antarctica, will feature her original compositions. "In these compositions, I will sing in a language of my own creation, as Antarctica does not have its own indigenous language. This constructed language will amplify the sense of remoteness and mystery that defines this distant land."

"The purpose of art is to complement and bolster scientific research, making scientific facts more accessible and understandable to the

public," Velikova explained. She believes doing so will raise public awareness of the threats facing our planet. "Art can effectively communicate the urgent and critical state of our planet, making it easier for people to understand. This, in turn, can inspire them to educate future generations to respect and care for the Earth we inhabit."

Discussing her project, she said:
"My endeavour, which is divided into three primary phases, is expected to span one year". She says the first phase will begin with the watercolour exhibition, followed by the photography exhibition.
"Given that my music project requires the most extensive post-production work, it will be the last to come out. This project will be showcased through a concert and multimedia presentation," Velikova adds.

Implementation of the projects

"I have obtained high-quality sound-recording equipment and a professional camera", Velikova said. She mentioned that the watercolour paints have already been dispatched to the Bulgarian research science vessel (RSV) "Sv. Sv. Kiril i Metodii".

The projects are implemented with the financial backing of the Bulgarian Antarctic Institute, Sofiyska Voda, operated by Veolia, Strim-Co online shop for specialized equipment, and the East-West Indological Foundation. "For the post-production of the upcoming projects, I have applied for funding from the National Culture Fund (NCF) and Sofia Municipality. I am hopeful for their support, as such extensive projects require substantial material and public backing," Velikova said.

She indicated she will be involved in the research of water surrounding the Bulgarian Antarctic base "Sv. Sv. Kliment Ohridski". She explained that she will gather data on the water's condition, including electrical conductivity, acidity, and various chemical states. This information will contribute to future research efforts on the icy continent.

Preparation and expectations for Antarctica

"I immerse myself in a wide variety of music, listen to stories from those who have already visited, watch films, and read books that document other travels. My deepest desire is to genuinely experience the power of this remote and largely unknown land," Velikova shared.

"Iam well aware of the warning that discipline is of utmost importance in Antarctica. As a conscientious individual, I am confident in my ability to follow the rules and guidelines. I fully understand the level of responsibility involved," the musicologist added further.

Velikova extended her best wishes to all participants of the 32nd Bulgarian research expedition to Antarctica, expressing hope for their success in their scientific endeavours and personal messages to society. "These expeditions, beyond their scientific importance for Bulgaria and for science as a whole, convey a profound message to the public," Velikova added.

April 2024, Sofia

"During my expedition to Antarctica, I managed to collect enough material for all three major projects. I am currently doing incremental work on all of them, and some are already completed," shared musicologist Marina Velikova in an interview with BTA. She highlighted that the primary challenge in executing these projects is the instability of the weather.

The interactive exhibition "The Ice of Antarctica," which debuted on Earth Day, April 22, is show-

cased on the Lovers' Bridge at the National Palace of Culture in Sofia, features nearly 60 photos, Velikova highlighted. The exhibition captures the stunning beauty, immense power, and fragile vulnerability of Antarctica. It also provides a glimpse into the lives and work of Bulgarian scientists during the 32nd expedition of the Bulgarian Antarctic Institute.

Each photograph features a QR code that links visitors to a 6-minute audio recording of the sounds

of Antarctica. "The recording was made on February 6 in the Perunika Glacier area. It served as a pilot single for the upcoming music project, "The Sounds of Antarctica," Velikova explained. "When people view the photographs, they will be able to immerse themselves in the atmosphere of the Ice Continent."

Velikova also announced that the watercolour exhibition, created using glacial waters from Antarctica, is nearing completion. She revealed that the exhibition will be unveiled

on June 3 at a gallery in Sofia.

"The music project was the most challenging to implement in the field," Velikova noted. She elaborated that capturing the sound of the glaciers' roar required several hours of effort. "I received significant help from expedition members; they suggested building a small enclosure to house the recording device," she explained. This enclosure was placed in multiple locations, and the recordings were subsequently reviewed.

"I intend to present the music project on December 1, coinciding with the internationally celebrated Antarctica Day." As she details it, the project consists of two unique compositions. "The first part showcases the authentic sounds of Antarctica. In the second part, I will merge these natural sounds with a song in a created language that mimics the sounds of penguins,"

she explained.

Velikova is also engaged in another project: the column "Antarctica – Exploring Nature, Science, and Humanity" on the "Horizont" program of the Bulgarian National Radio (BNR). This segment features brief interviews that highlight the scientific endeavours and the individuals involved in the expedition.

My intention was to highlight our responsibility to safeguard the purity of nature and water on our planet, which are currently facing global threats," Velikova explains. "I witnessed glaciers melting and breaking apart, collapsing into the ocean. From a distance, we often focus solely on the beauty of nature and the charm of its inhabitants, embracing only the romantic aspect. Each of these places faces its own challenges, however. This is why I highlighted local Antarctica

issues, which represent worldwide concerns," she said. She believes that art serves as a powerful medium to raise important questions that may otherwise not garner widespread public interest.

Antarctica's glaciers contain 90% of the Earth's ice and more than 70% of its freshwater reserves. Velikova highlighted that the ice sheet holds the majority of this water in its various states.

"Antarctica may appear as a distant, frigid, and icy expanse, yet it teems with vibrant life and diverse inhabitants," Velikova explained. She attributes the profound sense of silence to the absence of human noise. "Within this silence, one can discern the songs and calls of the wildlife, the howling of fierce storms and winds, the roar of the waters, and the rumbling of the glaciers," she added.

Marina Velikova is a musician, performer, and music editor at BNR. She graduated from the National School of Arts in Varna and the National Academy of Music "Prof. Pancho Vladigerov" in Sofia. Inspired by an interview she did with Prof. Christo Pimpirev, in which he spoke of the beauty and power of Antarctica's sounds, she joined the 32nd expedition of the Bulgarian Antarctic Institute. During the expedition, she decided to record the sounds of glaciers, animals, and the ocean, create a watercolour exhibition using Antarctic waters, and take numerous photographs.



Deception Island, January 14, 2024. The Gabriel de Castilla Spanish Antarctic Station. Photo: Emil Granicharov, BTA

Dr Peter Sapundzhiev:



Studying Glaciers Informs us About the Overall Picture of Global Climate Changes

Yoanna Lashkova

December 2023, Sofia

Having worked as an engineer at the Bulgarian Antarctic Base for five years, Peter Sapundzhiev believes that one can learn more about the overall picture of global climate changes by studying glaciers. He will spend in our polar base some two months and hopes that this time will be enough to do the work planned for his scientific projects.

His projects for the upcoming expeditions

"During the upcoming expedition, I will be involved in two projects. One is related to providing a reliable infrastructure

for the operation of our scientific equipment at the polar base. That involves ensuring solar power for the equipment we leave running when we are not there," he said. Again, the project includes designing and installing a system that is specifically geared to the task of monitoring the amount of solar energy that hits a given area, at different angles. "We expect this system to work for years. We will get the first dataset a year from now. Once we get this dataset, we will analyze the amount of solar energy we have every hour. With this information, we can very precisely design our solar power sets. That is, when we

know how much energy our solar system receives, we can mathematically determine what its condition will be, and how we need to optimize it so that it works during the dark days, which get longer in winter. In the Antarctic winter there are only two - three hours of daylight. With accurate information about the distribution of this light over time, we can design and optimize our instruments," the scientist said.

About the Bulgarian polar base

Peter Sapundzhiev explained that the Bulgarian Antarctic base is seasonal. "It works only in the summer - the Antarctic summer. When it ends, the scientists leave and the Antarctic winter comes. Winter is extremely challenging for any electronics we leave running there and the equipment we use to do our research. Making sure our equipment runs reliably is very important for our base and for all bases," he explained. During their stay, which is usually in the order of weeks, to two months at the most, Sapundzhiev and his team can collect the necessary data. Then they leave the island and after a year they have a body of data that serves to confirm the reliable operation of the system.

The second project

The second project that Peter Sapundzhiev and his team will be working on is related to the study of glacier movement. "Glaciers are an extremely delicate ecosystem. The study of glaciers is a major interest and task for polar researchers because, as a delicate ecosystem, all kinds of global and local processes and changes affect their condition," the scientist explained. This project is supported by the America for Bulgaria Foundation and the Beautiful Science Foundation under the Science with a Future 2023 programme. "By studying glaciers, we can make assumptions about the much bigger picture of global climate change. The state of glaciers and their movement, their dynamics, are studied by multiple methods. What I will do is set up an automatic photo system that will work for years and take sequences of shots of certain structures in the glacier. These shots will then undergo all sorts of processing. By extracting information from them, we can make conclusions about movement speeds, about different zones - how they move relative to each other; inferences can be made about the topography under glaciers, and a host of other parameters," Sapundzhiev said. "Our main task is to develop this system, to have it ready and operable, to go to a chosen location near the base and set it up and start it so it can collect the datasets that we need for our research. It's a big challenge to build a system that will work reliably for years in the harsh conditions of Antarctica," the scientist said.

Method used for studying glacier movement

Sapundzhiev explained that he uses Particle Image Velocimetry. This method analyzes frame and is used for studying fluids. "This method pinpoints certain areas from the frames which are then compared by mathematical algorithms to determine the speed of movement in a plane, perpendicular to the camera axis," he added. Engineer Peter Sapundzhiev from the National Institute of Geophysics, Geology and Geography of BAS will work on the optimization of permanent solar-powered geophysical instrumentation for application in polar conditions. said. He will also investigate the movement of glacial structures using Particle Image Velocimetry.

The project teams

For both projects, Sapundzhiev works in teams. He is the project leader but for their project implementation he relies on fellow geophysicists and engineers. "In the base itself, we work together: engineers, mechanics. All tasks are performed by a team," he said.

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Expected challenges

He expects challenges from two directions. One is landscape. "If you have seen videos and pictures, the landscape there is snowy and rocky. First, we get to where we need to set up our equipment, by snowmobile or walking with skis. Everything is carried by hand, or rather on our backs - in backpacks we carry the equipment, the batteries, the tools we use. For everything we do, we have in mind the terrain. We prepare our structures as much as possible, the connections between the different systems, so that only the necessary field work remains. Then we load them into sleds and backpacks," he said. The second challenge is the weather. "There are often fierce winds. It is almost always raining, snowing or wet. We have learned to always take that into account, but the equipment has to be suited to those conditions as well. For example, if we set about installing some equipment and it starts snowing, and we have to open an air-tight box or a waterproof case to adjust the electronics, that would destroy it, because every time we open it, if it fills up with snow, then there's no way to dry it out. This requires very careful planning," Sapundzhiev

Necessary equipment

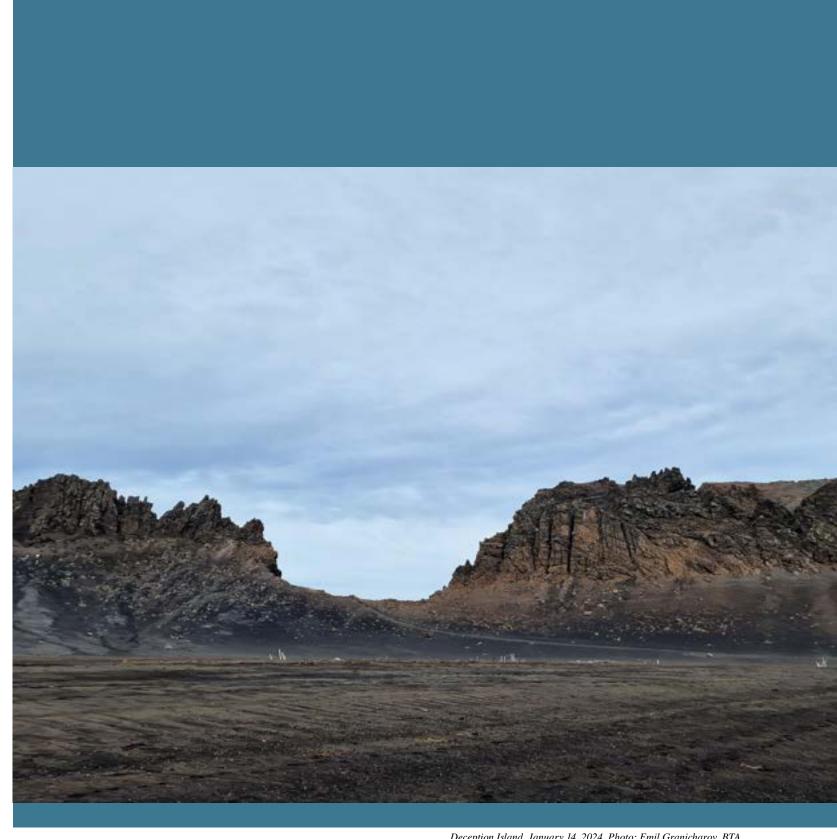
"Before each project, we discuss in detail with all members of the expedition's logistics staff what exactly we need - down to the last screwdriver and bolt. All of us and the rest of the expedition organizers do our best to provide the best conditions at the base to be able to carry out our work in the field," Sapundzhiev said.

April 2024, Sofia

"First, my team and I managed to install the new system, which I made in the past year. We installed it at a place, from where the Huntress Glacier can be seen, as it is a very interesting glacier to study and is among the most active glaciers in the region. We assembled everything solidly, we installed the camera and a few weeks later extracted the data to make sure that everything is working. However, two to three weeks' is too short a time in order to use the data for real analysis and studies," said Sapundzhiev. "At the moment I am processing the frames, obtained through the new system during the two-week trial period. They are subjected to various analyses in order to extract the real information," he added. The researcher believes that the initial findings have to be confirmed and a painstaking process is underway. "Work on the project to install a system, specifically aimed at monitoring the amount of solar energy falling on a unit of area, again started with the selection of a suitable location near our base. In this case, on a hill. We chose it, taking into account the terrain. We made a structure on which to install the data loggers and the sensors at pre-selected angles," explains the scientist. According to him, this is the way to work in the Antarctic - the system is installed, ad-

justed and then left for a certain period of time, while the research scientists are there to work in real conditions. Then the data is downloaded, which serves to verify the normal and reliable operation of the system. "Initially, there was a small problem with the power system, but this is quite normal when installing equipment in field conditions. Tests found that one of the settings needed to be changed. We changed it to ensure a more reliable and secure operation of the system, "said Dr Sapundzhiev. "We made a metal structure, equipped and installed the system and found that it was working. We left it in place to collect data for a period of one year. Next year, when we go, we will take the accumulated data and use it for future analysis of the solar power supplies of our equipment," said Sapundzhiev. He explains that their team they managed to accomplish what they set out to do before the expedition. "These technological research tasks are multifaceted. The moment we start working, implementing and completing one of the set goals, new ones appear. Projects and ideas develop naturally. While working on the initial tasks, many new ideas emerged, on which we also began to experiment and try initial steps to implement them, especially in the field of realtime data transmission from field

equipment. This is a very interesting and delicate problem, because Antarctica is a place where there is no mobile networks. Only satellite communication channels can be used there, and what is more important – this type of communication requires appropriate energy security," Sapundzhiev said. According to him, the transmission of real-time data from the field equipment is a very interesting technological problem, so he and his team will work on this aspect for the next expedition. They have already taken the first steps to implement such an addition to the apparatus, which is under development for the coming year. "So each completed stage lays a firm foundation for the next," he says. Sapundzhiev is a doctor of electronics who has been an engineer of the Bulgarian Antarctic Base for six years. During the 32nd expedition he spent about two months at the Bulgarian polar base, being involved in two scientific projects. One is related to the installation of a system that is specifically aimed at monitoring the amount of solar energy falling per unit area to ensure the reliable operation of the scientific equipment at the polar base. The second project on which Dr Peter Sapundzhiev and his team are working is related to the study of the movement of glaciers.



Deception Island, January 14, 2024. Photo: Emil Granicharov, BTA

Prof. Albena Alexandrova:



The Main Task is to Create Healthy Conditions for the Bulgarian Antarctic Researchers and to Support their Active Participation in the Expeditions

Martina Christova

December 2023, Sofia

"The main task is to create healthy conditions for the Bulgarian Antarctic researchers and to support their active participation in the expeditions to Antarctica. Our goal is to make people feel good, be active and functional," BTA learned from Biochemistry Professor Albena Alexandrova, DSc. She heads the Center for Research and Applied Activity in Sport (CRAAS) at the Vassil Levski National Sports Academy (NSA). She is working on the 32nd Bulgarian expedition to Livingston Island.

Prof.Alexandrova will be monitoring the multifactor effect of the

journey and the stay in Antarctica on the members of the expedition. She will examine their physiological status before and after the 32nd Bulgarian expedition to the Ice Continent.

To present the research process of studying the physiological status of the participants in the expedition, Prof.Alexandrova welcomed BTA's team in the building of the Center for Research and Applied Activity in Sport (at NSA where she teaches biochemistry and sport biochemistry to full-time and part-time students, as well as to students of rehabilitation

Conditions in Antarctica and their impact on man

"The project focuses on the effect of travel to, and stay in, Antarctica on the health of the participants in the expedition, and we will seek to investigate the multifactor effect of the different Antarctic conditions," Prof.Alexandrova said. These are all factors that can affect a person's physiological status.

"Before departure, we ran functional tests on the participants in the expedition here at CRAAS using an exercise bike and recorded the cardiopulmonary parameters, i.e. heart and lung function," Prof.Alexandrova said.

"We took blood samples for oxidative stress testing. Oxidative stress is a general reaction of the organism at the cellular level to factors affecting it. These factors are exogenous, i.e. influenced by the external environment, and endogenous, i.e. internal to the organism, which includes the psychological state of the individual," the biochemist said. According to Prof.Alexandrova, the long journey, time zone changes and being away from one's family can exert psychological pressure on the participants in the Antarctic expedition, which can affect the oxidative status of the blood.

The One Health approach

One Health is a term adopted in 2004 as an approach to health status research, said Prof.Alexandrova. This approach examines the multifactor pressure on a subject. "Human health is linked to the health of animals, plants and the ecosystem as a whole. We need to look at this health in an overall context, not in isolation," she explained.

Implementation, development and benefits of the project

"The research is conducted identically for men and women on the expedition. It is also conducted in an identical manner irrespective of the level of the physical fitness of the organism," said the head of the CRAAS. She added that the same tests, with the same indicators, were used, but the results are different. The results have yet to be pooled because, in addition to the study done before the participants' departure, there will be a second one after they return to assess the effect of staying on the Ice Continent. "We will compare these results and make a summary of how the conditions on Livingston Island are tolerated by the group as a whole, and then we can divide them by gender, age and level of fitness," she said.

According to Prof.Alexandrova, the research project will make a significant contribution to sports science because athletes are also subjected to similar strenuous regimes. "This would help to create adequate dietary regimes, to assist with various nutritional supplements, and use psychological approaches to improve athletes' performance," the biochemist said

She added that when the problem is studied in depth, one can understand the mechanisms of adaptation of the human organism to stress, be it physical stress or environmental pressure.

The longer medico-biological testing is done, the more data are accumulated, which are then used with statistically reliable correlations and differences to understand the subtle mechanisms of regulation of the human organism, Prof.Alexandrova said.

"Most probably, I will be an active participant on the ground in the next expedition - not just remotely, and my colleagues and I will do research on Livingston Island itself," said Prof.Alexandrova. She was referring to the mission of the 32nd expedition to build a research laboratory at the Bulgarian base in Antarctica.



Deception Island, January 14, 2024. Photo: Emil Granicharov, BTA

April 2024, Sofia

"We fully met the targets we had set for testing the maximum number of people," Biochemistry Professor Albena Alexandrova, DSc, said in an interview with BTA. She heads the Center for Research and Applied Activity in Sport at the Vassil Levski National Sports Academy (NSA). Prof.Alexandrova monitored the multifactor effect of the journey to, and the stay in, Antarctica on the members of the expedition. She examined their physiological status before and after the 32nd Bulgarian expedition to the Ice Continent.

"The secondary check-ups are done within a week of the return of the participants in the Antarctic expedition. Since they return home at different times, they come in groups to our centre (the Center for Research and Applied Activity in Sport at the Vassil Levski National Sports Academy (NSA) - editor's note)."

"We studied more than 20 indicators of the participants," Prof. Alexandrova said. She noted that correlations were sought between haematological and oxidative stress indicators, as well as between trace elements in the blood. Some indicators may have changed slightly from the initial tests, the biochemist said. The results are currently being processed and a general assessment will be made in comparison with the data obtained before departure. Once the process is completed, we will make statistical correlation analyses," she added.

Most members of the Bulgarian team gained weight - a finding

which is yet to be investigated, Prof. Alexandrova said, adding that this could be due to psychological or physiological stress. Overall, the physiological status of the participants in the expedition is very good, the biochemist said. Seasickness was among the participants' main complaints. This condition cannot be overcome, but the symptoms can be alleviated with various exercises and pharmaceutical preparations, she added. Prof.Alexandrova also said that the lipid profile will be monitored.

The longer medico-biological testing is done, the more data are accumulated, which can then be used with statistically reliable correlations and differences, Prof.Alexandrova recalled.

"We have planned a joint meeting with all the participants in the expedition and a presentation of the results of our research. The date of

the meeting is yet to be specified."

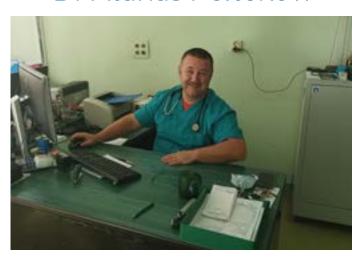
"Our task is to improve the living conditions of the Bulgarian Antarctic researchers," Prof.Alexandrova said. "We want to be as helpful as possible to the participants who go to work at the St Kliment Ohridski Bulgarian Antarctic Base on Livingston Island. The aim is to select the most informative criteria by which we can draw objective conclusions," Prof.Albena Alexandrova added. She hopes the research will continue for the next expeditions to Antarctica.

Prof.Albena Alexandrova, DSc, is a lecturer in Biochemistry and Sport Biochemistry at the Vassil Levski National Sports Academy (NSA). She is a scientist at the Institute of Neurobiology with the Bulgarian Academy of Sciences. She heads the Center for Research and Applied Activity in Sport at NSA.



King George Island, February 2, 2024. Photo: Emil Granicharov, BTA

Dr Atanas Peltekov:



Over the Years, We Have Made Progress on the Availability of Medicines at our Base in Antarctica

Borislava Babinovska, Martina Christova

November 2023, Sofia

"I put a lot of work into the availability of medicines in the Bulgarian Antarctic Base ahead of one of my departures. I divided medicines into groups according to different diseases - eye diseases, ENT, cardiology, allergology, gastroenterology. I sent the information to leading specialists in those fields, asking them for their opinion so that we could add to the list if necessary," Dr Atanas Peltekov, one of the physicians at Bulgaria's St Kliment Ohridski Antarctic Base, told BTA.

"I dare say I compiled a rather good list of medicines, from nose drops to intravenous antibiotics," he said.

The base is supplied with a good range of medicines to be used on an as-needed basis. Peltekov pointed out.

Dr Peltekov said there is a medical minimum for the trip to Antarctica, which ensures an adequate response to an emergency. In addition, those travelling to the base follow a recommendation on how to stock up on medication. The physicians ought to be informed about any specific healthcare needs of the participants in the expedition. That is why comprehensive tests and exams are done before departure.

A detailed medical questionnaire is completed, which is very useful for the medical staff at the base, Dr Peltekov said.

"The physical exam is relatively detailed, we focus on the heart. The blood work gives us a picture about the functioning of the different systems and organs," he also said.

Vaccination recommendations are made if necessary. There is a manual telling expedition members what clothes and medication to pack. Sunglasses and sun protection creams are a must.

Human health and emotions in Antarctica

Going to a different climate zone does not have much of an impact on the participants in the expedition, Dr Peltekov noted.

In practice, there is no drastic impact. "As we are on an island, the main problem is the wind. On Livingston Island it blows all the time," the expert explained.

A science-based approach is being used to the health and conditions

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of travellers to the Ice Continent thanks to some of the members of expeditions. The collected database has suggested guidelines for work in the future.

Physicians at the Bulgarian base monitor both the physical and mental condition of the members of the expedition. Away from home, people feel nostalgia, fatigue from the journey, and sometimes have symptoms of depression, Peltekov pointed out. If any of the above problems arises, the physician has a one-on-one talk with that person. It is important to catch the symptoms early and provide psychological sup

The environment and waste

As a general practitioner, Dr Peltekov knows that a better environment is essential to human health.

"Environmental protection is crucial to all of us. I have no recollection of having dumped garbage in an unregulated way, and I have participated in nature conservation projects whenever possible," he said.

Antarctica is not spared from the human impact on nature, but there is strict control. Dr Peltekov has seen scraps of plastic buoys and waste drums. Fortunately, there is not that much pollution in Antarctica for now, he believes.

There are inspectors in Antarctica who can assess the environmental impact at any time. Divers can even check the base's water area for possible waste dumping, Peltekov said.

The naval research vessel Sv. Sv. Kiril i Metodii has contributed much to waste reduction. "Last year

we disposed of almost 70% of the accumulated waste," he underlined.

New emotions and expectations

Dr Peltekov said each expedition aims to do better than the previous one in terms of research, the completion of the systems at the Antarctic base and task allocation to the participants. Each journey is different and comes with new surprises and memories, said Dr Peltekov. He is a quick packer. Although he will be away from home for a long time, he is not taking many things with him.

"Friends and relatives give me mascots, some give me icons, but I don't have a pre-departure ritual. My ritual is packing in half an hour," the physician said.

April 2024, Sofia

"The participants in the 32nd Bulgarian expedition to Antarctica were in good condition, health and mental state," Dr Atanas Peltekov, one of the physicians at Bulgaria's St Kliment Ohridski Antarctic Base, told BTA. Blood tests were done on all participants before and during the expedition. Physical examinations assessing cardiovascular system and general status were also carried out. The results showed that all were in generally good condition, he noted.

"Further blood tests were carried out after the participants' return and we expect to receive the results soon. We have yet to assess their overall health," explained Dr Peltekov.

"Being in Antarctica does not affect us much physically, because we are staying at the Bulgarian base in the conditions of a local Antarctic summer. Normal temperatures are around 0C," the physician said.

The day and night of. Livingston Island is mostly light. There is very little darkness during the day, which can cause sleep problems, Peltekov explained. There are mood swings in the participants as well as issues related to the digestive tract, he said.

"Some of the health problems at the base were due to the fact that the scientists were euphoric to do their tasks and slightly prone to forget some of the precautions," Dr Peltekov pointed out.

"We did not face any significant challenges to the health of the participants, the expedition went smoothly," said Dr Peltekov. "A colleague from the Bulgarian team had to assist the Spanish Antarctic team and everything ended with a good outcome for the patient. We have protocols in place at the base for dealing with different situations involving life-threatening or health-threatening cases," he added.

"I made a list of drugs and asked senior colleagues from different specialties to give an expert assessment and upgrade the list accordingly," Dr Peltekov noted. This ensures that adequate help is provided when an emergency arises. He said the list should be re-evaluated every three years. Next year will be its first reevaluation, the physician points out.

The list includes vaccines against tetanus and diphtheria. The participants of the expedition work with machinery and there is a risk of contracting tetanus. "One of our recommendations before departure is to get vaccinated against the disease," Peltekov said.

He gives recommendations for compliance, which are reminded to everyone on the expedition. They include use of appropriate sunscreen, covering the face and hands to prevent skin problems, as well as wearing special dark goggles to protect against eye strain and from being illuminated by the sun's rays reflected on the icy surfaces. In addition, there is a guide on what clothing and medication expedition participants should bring.

The physician pointed out that the base is in need of new medical equipment. According to him, a cardiology monitor with a built-in defibrillator, a combined physiotherapy machine with current and ultrasound, as well as a sterilizer and an autoclave to maintain the surgical instruments are needed.

Peltekov highlighted that the equipment is very expensive and sometimes the funding allocated by the State is insufficient. "We are looking for a way to raise funds to purchase the necessary equipment," he addeed.



Deception Island, January 16, 2024. Photo: Emil Granicharov, BTA

The Second Voyage of the Bulgarian Naval Research Ship Sv. Sv. Kiril i Metodii to Antarctica and Back - in the **BTA News Services**



During the 32nd Bulgarian expedition to Antarctica, the Bulgarian News Agency continued publishing stories in its section Bulgaria-Antarctica BTA's Log. The secion offers detailed information on the voyage of the Bulgarian ship Sv. Sv Kiril i Metodii to Antarctica and back and its stay there, as it did during the historic first voyage of the ship in late 2022 and early 2023. Back then, BTA's Konstantin Karagyozov was the only media correspondent on board the ship, who covered each of the 127 days of the voyage and 421. the expedition in text, videos and photos of and about the

research during the voyage (including the Atlantic Ocean in both directions) and through-June last year, BTA published an issue of LIK magazine in Bulgarian and English, 'To Antarctica and Back under the Bulgarian Flag'', dedicated entirely to the historic expedi-

BTA, cameraman Emil Granicharov, was part of the crew. Club at the Bulgarian Antarc-BTA published both his dispatches and press releases re-

All BTA information about second voyage of RSV 421.

the Bulgarian research in Antarctica and the support of the Bulgarian naval research ship out the stay in Antarctica. In RSV 421, as well as other activities on the Bulgarian Antarctic base, is now accessible for all media outlets in Bulgarian and English language, on the BTA website in the Bulgaria -Antarctica: BTA's log section.

BTA has a National Press This year, a journalist from Club on board the ship and this year opened a National Press tic base on Livingston Island.

This issue of LIK magazine lating to the voyage of RSV features highlights from the BTA stories that covered the

VARNA, ON THE BLACK SEA, 08.11.2023

The Sv. Sv. Kiril i Metodii set sail for the Bulgarian Antarctic Base on Livingston Island from the Black Sea port of Varna on Wednesday, starting the 32nd Bulgarian Antarctic Expedition and RSV 421's second mission to the frozen continent.

The ship's main task on this voyage is to transport the construction materials for the Bulgarian polar researchers' new modern laboratory, BTA learned from the head of the Naval Academy, Flotilla Admiral Boyan Mednikarov. Thanks to RSV 421, the researchers will have the opportunity to conduct studies not only on Livingston Island but also on Smith Island, which is also part of the South Shetland Islands archipelago.

Twenty-four cadets of the Nikola Vaptsarov Naval Academy in Varna are participating in the voyage. The plan is for the ship to stop for the first time in the southernmost city of the planet, Ushuaia. During the return voyage, it will have a stopover in Comodoro Rivadavia, Argentina.

Four of the cadets are members of the ship crew, which totals 34 servicepersons who will travel all the way to the icy continent and back. The four (three men and a woman) are in their fourth year of studies at the Naval Academy. They have



Varna, November 8, 2023. Varna Port hosts a festive ceremony to see off the naval research vessel Sv. Sv. Kiril i Metodii. The ship is setting sail for the Bulgarian base on Livingston Island in the Antarctic for the second time. Photo: Krassimir Krastev, BTA

the habits and the skills necessary to contribute actively to the work of the crew, said the vessel's Commanding Officer Nikolay Danailov.

Another 28 cadets of the Naval Academy are also on board. They will travel only to Cartagena, Spain. After they carry out their task there, a Bulgarian Air Force plane will fly them home.

The main criteria for the success of the 32nd Antarctic expedition are the safety of the crew, the safety of the ship and the successful implementation of the tasks related to logistics and research, Naval Academy Rector Adrmiral Boyan Mednikarov said in his address to

Among the guests at the departure ceremony were Varna Regional Governor Andrivana Andreeva, Prof. Christo Pimpirey, head of the Bulgarian Antarctic Institute, Bulgarian Navy Commander Rear Admiral Kiril Mihaylov, Bulgarian Antarctic Institute Director Prof. Christo Pimpirev, newlyelected Varna Mayor Blagomir Kotsev and Kotsev's predecessor Ivan Portnih. Among the farewell party were many officers, public figures, the families of the ship crew.

"You have already made the name of the naval research vessel Sv. Sv. Kiril i Metodii go down in history, but the second mission is just as important because now you have to consolidate the prestige, the reputation and the name you have built", Mihaylov said.

Mihaylov presented Pimpirev with a Bulgarian naval jack and voiced hope that it will find a place in the Bulgarian Antarctic base. The Bulgarian Navy Commander said that the gift is a sign that navy sailors are always ready to support the Antarctic explorers.

During the 32nd Antarctic



Varna, November 8, 2023. Varna Port hosts a festive ceremony to see off the naval research vessel Sv. Sv. Kiril i Metodii. The ship is setting sail for the Bulgarian base on Livingston Island in the Antarctic for the second time. Photo: Krassimir Krastev, BTA

chart for the first time the seabed around Smith Island, RSV 421 Commanding Officer Nikolay Danailov said.

"When we arrive, it is expected to take a maximum of six days to unload the supplies on Livingston Island, to get the logisticians to start the construction of the laboratory, for which the crew will probably help," Danailov points out. He says that once this task is completed, the ship's main activity will be to provide scientists with the opportunity to study not only Livingston Island but other parts of the South Shetland Islands group for 45 days. Danailov stressed that Smith Island is of greatest interest. He says it is about 8 hours' travel from Livingston. "We are going there to take geomorphological samples, to look at the terrain, to take samples from the seabed in the area as well," Danailov points out. According to him, the visit to Smith Island will be a kind

expedition, the members will of test for the crew, as there are no navigational charts for the seabed around the island. "We will have to go cautiously, first measuring the depths and then approaching with the ship," Danailov explained. And he proudly pointed out that the Bulgarian seamen will actually be mapping the seabed. There are still areas that are unexplored and it is not clear what is under the water, explained the ship's captain. He also pointed out that the navigation charts show the depths along the routes where the ships pass, but in the nearby areas it is not clear if there are underwater rocks and, if any, at what depths they are. "We are going to do such surveys now, and we plan to continue in the coming years," Danailov adds.

He also said that the crew's ambition is to go down to places farther south, where there is icefloe in the summer. He is adamant that the ship can handle such a task beautifully. "If we are talking about a frozen

sea with an ice thickness of 70-80 centimetres, the ship will have no problems, if the ice is over one metre, the situation be more delicate," Danailov said. He added that his other ambition is to approach the Czech base on the Antarctic Peninsula, which is 10 hours away from the Bulgarian one.

Talking about Antarctica with enthusiasm and respect, Danailov said that people avoid contact with the local inhabitants. The penguins are cautious, though sometimes they show curiosity. "In that case, we move back," Danailov said. The RSV 421 crew adhere to strict standards when they go on land. When disembarking and boarding, they first disinfect their boots. During last year's voyage to Livingston Island, Danailov saw many whales, some of which had offspring the size of half the ship.

Danailov described the scenery on Livingston Island as surrealistic. Words fall short of describing the views there, he added. On same parts, there are only lichens and mosses, probably carried there by seals, sea lions or penguins during their migrations. Crossing the Drake Passage is a success for any man, and these creatures do it twice a year, he noted.

"During this expedition, we will broaden the studies' range and work on greater depths," Danailov also said, specifying that seabed samples will be taken at a depth of up to 100 metres, with the ambition to reach 200 to 300 metres in the future.

Dives will be made to take samples from the seabed at smaller depths. The scientists will be accompanied by military divers, who will watch out for danger, mostly for the presence of leopard seals, who do not like it at all when someone encroaches on their territory.

When departing from Varna, RSV 421 took on board equipment of Belgian scientists that will collect samples during the voyage. The goal is to study the presence of microplastics in the ocean. "Our experts too have such a project, but they will study the presence of microplastics in the biological species on the continent," he explained.

Help in Antarctica is above all else, he noted. "There, you put aside all kinds of disputes and pettiness. Because, if you do not help, the price may be a person's life," he summarized.

VARNA, ON THE BLACK SEA, 14.11.2023

During the 32nd Bulgarian Antarctic Expedition, researchers of the Nikola Vaptsarov Naval Academy (NVNA) will do a series of experiments related to the use of various satellite systems, NVNA Rector, Flotilla Admiral Prof. Boyan Mednikarov, said in a BTA interview.

They will participate in two major initiatives that follow up on last year's projects. In his words, the possibility of using various modifications of the Starlink system in the South-

ern Ocean, from the 60th parallel south to Antarctica, will be explored. The researchers will also study probiotics, that are produced in Bulgaria, and their effect on the psychological state of the crew, Prof. Mednikarov explained. Last year, the focus was on probiotics' effect on the physiology of the crew.

The essence of the research activities on board the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii is synergy, interaction between the crew and the researchers who have won funding for their projects from the Bulgarian Antarctic Institute, Mednikarov said. This time, the projects of NVNA scientists are funded by the Naval Academy itself. "In other words, we are launching our own, somewhat of an independent Antarctic programme, and, of course, all [of its] research will be in the context and to the standards of the Bulgarian Antarctic Institute," Mednikarov stressed.

He also commented that NVNA is doing its best to make the RSV 421 as useful as possible to the Bulgarian polar explorers. According to the NVNA Rector, efforts are being made to increase the capacity of the ship to take samples from the bottoms of both the South Bay of Livingston Island and other islands in the expedition

Mednikarov said that Bulgarians are increasingly aware that Antarctica, and Livingston Island in particular, provide many opportunities for various scientific research and even for the possible extraction of mineral resources in the future. The Livingston Island is a part of an archipelago that is part of the Andes mountain range, which is extremely rich in minerals. Gold and stones with rich colours of copper oxides have been found on Livingston, Mednikarov said, adding that, according to geologists, these are

Varna, November 8, 2023. RSV 421 setting sail for the Antarctic Photo: Emil Granicharov, BTA





Varna, October 27, 2023. Commanding Officer Nikolay Danailov presents Prof. Zlatislav Stoyanov with a copy of LIK magazine dedicated to RSV 421's first voyage to the Antarctic. Photo: Valentina Dobrincheva, BTA

ores whose metal concentration is much higher than most found in Europe.

RSV 421's main mission during the 32nd Bulgarian Antarctic Expedition is to transport the construction of the new laboratory building for the Bulgarian base on Livingston Island, he also explained. "Our task is to transport the construction elements smoothly and, in parallel with it, to implement the scientific programme. I am optimistic about both. Moreover, last year we achieved quite a high degree of coordination with both the research and logistics teams. I am confident that all tasks will be completed in a high-quality and timely manner," Mednikarov said.

SOFIA, 16.11.2023

"During our 32nd Antarctic expedition, the Bulgarian naval

research vessel Sv. Sv. Kiril i Metodii will be carrying 80 tons of materials for the construction of a new laboratory of the Bulgarian base on Livingston Island. I have the vision and the desire for this to be a research base that will be used by scientists in the 22nd century," Prof. Christo Pimpirev said in a BTA interview. He heads the Bulgarian Antarctic expeditions and is chairman of the Bulgarian Antarctic Institute (BAI).

"We are building this for the next century, even though we are at the end of the first quarter of the 21st century. What is being built there is for the future, for our children and the children of our children. That is why we are working on the Ice Continent, and it is for a reason that research is the main focus of the expedition, and of all the expeditions so far," said Prof. Pimpirey.

During our 32nd Antarctic expedition, we will be working on ten research projects - very diverse, some continuing from the previous expedition, some new. These are research projects in the Earth sciences: geology and glaciology. We don't have glaciers in Bulgaria, but since we have a base in Antarctica and glaciers are the main geomorphological forms there, we are studying them, Prof. Pimpirev explained.

This is the second expedition with the participation of RSV 421, which will be a great help with the whole organization, said Prof. Pimpirev. "The good thing about this expedition is that the ship and the crew have gained experience, and it will not be like last year."

"That is why this expedition has an expanded program, thanks to the Bulgarian research ship, and we have now reached level playing field with the polar states. One of the main tasks, from a logistical point of view, is to build the new modern laboratory at the Bulgarian base. Last year the foundations were completed, with a special type of cement because the conditions there are very different from what we are used to, and it is very difficult to build," said Pimpirev.

"Expedition members often visit schools and they see how excited children are to hear about Antarctica," said the leader of Bulgarian Antarctic expeditions and President of the Bulgarian Antarctic Institute.

CARTAGENA, SPAIN, 18.11.2023

The Sv. Sv. Kiril i Metodii (RSV 421), from Varna to Cartagena, Spain, has been completed successfully. On Saturday at 1 pm RSV 421 docked at the Port of Cartagena, Spain.

The voyage lasted 10 days with a refuelling south of Istanbul.

SOFIA, 23.11.2023

The plan is to re-open the St. Kliment Ohridski Bulgarian Antarctic Base on Livingston Island around December 20 with the arrival of the Sv. Sv. Kiril i Metodii, which will take members of the 32nd Bulgarian Antarctic Expedition from Argentina three days previously, the commander of the base, Kamen Nedkov, said in an exclusive interview for BTA.

Nedkov explained that the logisticians will be the first to come to the base. They will turn on the machines and will start unloading the supplies off the ship. The supplies include food and special equipment, scientific devices and a huge amount of construction materials to build a new laboratory, the foundations for which were laid last year. The new building is to be finished this year. The building should be sealed so as to stand in the harsh winter weather, explained Nedkov.

The people who will board the ship in Argentina are 22 expedition members, including logisticians, scientists and builders, Nedkov said.

This year, the Bulgarian Antarctic scientists will work on 11 projects, including four projects of foreign countries. More research proposals are expected in the coming weeks. In some cases, the Bulgarians may work jointly with Spanish researchers, whose base is right next to the Bulgarian base.

The 32nd Bulgarian Antarctic Expedition is expected to last about 90 days, Nedkov said. All logistical and scientific tasks will have to be accomplished within that period.

Nedkov noted that in addition to building a lab, the crew will install a new wastewater treatment facility. They also plan to build a new water supply system in collaboration with Install Engineering and Hilti. Kaufland is the main sponsor providing the food for the voyage and for the base. Kaufland is the main sponsor providing the food for the voyage and for the base.

There are arrangements with Spain, Brazil and Turkey to transfer some of the scientists and logisticians to/from the Bulgarian Antarctic Base by plane or ship during the current season. "We already have six transfer arranges for this season," said Nedkov.

"The Bulgarian chapel on Livingston Island is functioning and every year we open it, we have several events in it. Our post office will be open again this year and we are expecting increased interest from the base in Bulgaria, but it is also possible to have mail in the opposite direction, from Bulgaria to the base. We have had Internet connection at the base for the last few years. It is, of course, not the fastest but it is sufficient to be able both to hear from and write to our loved ones, and for scientists to be able to make enquiries or carry out communication with colleagues in order to be more adequate to the specific projects they are carrying out," says Kamen Nedkov.

Each research project needs to be supported logistically, he said. Sometimes the researchers will need off-shore logistics using Zodiac boats, and sometimes the logisticians will be expected to use sleighs and touring skis to carry and install equipment on the glaciers around the Bulgarian base. Some projects require putting up tent camps far from the base. Reaching such remote spots may only be possible by using RSV 421. As usual, the winter clothing and gear is supplied by Diel Sport.

The programme of the expedition is funded entirely by the Ministry of Education and Science and by the National Roadmap for Research Infrastructure, which is part of the European Roadmap. This means that the Bulgarian Antarctic Base is integrated in the European infrastructure for exploring the polar regions, Nedkov said.

He noted that after the Bulgarian ship starts its return voyage from Antarctica to Bulgaria, the Kliment Ohridski

Base will continue to function for another month. It will be closed on March 20. The expedition members will be transported by the Spanish ship Hesperides to King George Island, from where they will be flown to Punta Arenas, Chile.

GIBRALTAR. 25.11.2023

The Sv. Sv. Kiril i Metodii has entered the Strait of Gibraltar, which connects the Atlantic Ocean to the Mediterranean Sea and separates Europe from Africa, Nikola Vaptsarov Naval Academy in Varna reported Saturday.

The ship has entered the Atlantic Ocean on November 24 and is on course to pass East of the Canary Islands.

The next port of call on RSV 421's voyage to the Bulgarian Antarctic base, where it will provide logistical and scientific support to the 32nd Bulgarian Antarctic Expedition, is the Argentinian Port of Mar del Plata.

SOFIA. 27.11.2023

Prof. Christo Pimpirev - Head of the 32nd Bulgarian Antarctic Expedition, Dragomir Mateev - Logistics Manager, and Kamen Nedkov - Commander of the Bulgarian Antarctic base, met at the National Centre for Polar Research with Sofia University, with logistics managers Özgün Oktar and pt. Doac Baybars of the Polar Re-

search Institute of Turkiye, the Bulgarian Antarctic Institute (BAI) reported.

scientific projects and cooperation in logistics for the upcoming polar campaign. A Turkish geologist will work at the Bulgarian base and a Bul-Turkish expedition.

"The Turkish colleagues will hire a plane to transport the participants in the expedition from Punta Arenas (Chile) to King George Island (Antarctica), where which the Bulgarian Antarctic researchers will be transported. They are also hiring a Chilean ship for one month to carry out their polar programme," the IBA informed.

Bulgaria and Israel will expand cooperation in science. One of the areas in which scientists from the two countries can partner is the study of Antarctica. The matter was discussed by the Minister of Education and Science, Prof. Galin Tsokov and the Ambassador of Israel in Bulgaria Yosef Levi Sfari, the Ministry of Education and Science (MES) reported.

Ambassador Sfari proposed to work towards a scientific cooperation agreement between the two countries. He said the matter was discussed a few days ago by Israel's Minister of Science and Technology Ofir Akunis with the Bulgarian Ambassador to Tel Aviv Slavena Gergova. The Israeli side is particularly interested in Antarctic research.

Bulgaria has experience in this field and currently the team of Prof. Christo Pimpi-The two sides discussed joint rev is preparing for another mission to the Ice Continent. Among other scientific fields in which the two countries can cooperate are ecology, water resources conservation, agrigarian physicist will join the culture, high technology and others.

SOFIA, 29.11.2023

Bulgaria and Israel will expand cooperation in science. One of the areas in which scientists from the two countries can partner is the study of Antarctica. The matter was discussed by the Minister of Education and Science, Prof. Galin Tsokov and the Ambassador of Israel in Bulgaria Yosef Levi Sfari, the Ministry of Education and Science (MES) reported.

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Sofia, December 29, 2023. The second group of participants in the 32nd national Antarctic expedition is getting ready to depart from Sofia Airport's Terminal 2. Photo: Minko Chernev, BTA

cooperate are ecology, water resources conservation, agriculture, high technology and others.

ATLANTIC OCEAN 30.11.2023

RSV 421 entered an area of increased risk of attacks by pirates, the Nikola Vaptsarov Naval Academy reported.

The ship entered the area on its way to the Argentinian port of Mar del Plata on Wednesday at 18:00 ship's time. The ship's crew was put on a higher state of readiness to counter potential attacks by fast craft and aircraft. On November 29, 2023, a firing exercise was conducted with the ship's weapons. The ship began exchanging daily reports with the Maritime Domain Awareness Trade - Gulf of Guinea cooperation centre. RSV 421 is expected to sail

in this area until December 2, 2023.

CABO VERDE, 01.12.2023

On Antarctica Day, December 1, the Sv. Sv. Kiril i Metodii is sailing south of the Cabo Verde archipelago during its voyage, part of 32nd Bulgarian expedition to Antarctica, Nikola Vaptsarov Naval Academy in Varna reported on Friday.

Antarctica Day has been marked internationally since 2010 to commemorate the signing of the Antarctic Treaty in Washington on December 1, 1959. Under the Treaty, Antarctica shall be used for peaceful purposes only, and freedom of scientific investigation there and cooperation toward that end shall continue. The total number of Parties to the Treaty is now 56, including

Bulgaria, which joined in 1998.

05.12.2023

The Sv. Sv. Kiril i Metodii, which is part of the 32nd Bulgarian Antarctic Expedition, crossed the zero parallel and entered the Southern Hemisphere on December 4, at 9:27 p.m. ship's time (10:27 p.m. UTC), the Nikola Vaptsarov Naval Academy said.

The ship is sailing at a speed of about 9 knots and is expected to reach Mar del Plata naval base in Argentina by December 17, the NVNA added. A visit to the port of Ushuaia is also planned before RSV 421 heads to the Bulgarian Antarctic Base on Livingston Island.

DUBAI, 09.12.2023

The Sv. Sv. Kiril i Metodii is sailing by the coast of Brazil en route to the next stop on its journey to Livingston Island, Argentina's Mar del Plata, the ship's commanding officer, Nikolay Danailov, said during a discussion on polar research at the Bulgarian pavilion for COP28 in Dubai. He took part in the event online.

He expects the ship to drop anchor at Mar del Plata on December 17. A Spanish research vessel en route to Antarctica is expected at the port at the same time. "We will get ready, we may play some football with the colleagues,"

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Kiril Kandilarov. Personal archive photo

Danailov jested.

DUBAI. 09.12.2023

Climate change most pronounced and visible in Antarctica, where there is virtually no human activity that directly provokes it. This view is shared by three polar researchers who lead the national Antarctic research programmes of Bulgaria, Spain and Portugal. At the invitation of the Ministry of Environment and Water and the Bulgarian Antarctic Institute, they are visiting Bulgaria's pavilion at COP 28 in Dubai to draw attention to the impact of climate change as they see it on the Ice Continent.

Prof. Christo Pimpirev, Chair of the Board of the Bulgarian Antarctic Institute, Prof. Antonio Quesada, head of the Spanish National Programme of Polar Research, and the Coordinator of the Portuguese Polar

Programme, Assoc. Prof. Goncalo Vieira. They share with a smile memories of the difficulties they have gone through together during the many Antarctic expeditions to the South Shetland Islands, where their countries have bases.

The three told BTA about their observations of climate change in Antarctica, why scientific research there is an important indicator of what is happening across the planet, whether there are errors in the computer models that predict the evolution of climate change, and the spirit of unity among researchers and polar explorers.

"The words of UN Secretary-General Antonio Guterres when he visited Antarctica in July this year are very important. He said that Antarctica is waking up and that it is time for the world to wake up too. Because the icy continent, where 90% of the surface is covered

in ice, is waking up, the ice is melting, the sea level is rising and this is very dangerous for all humanity," said Prof. Pimpirev. He also said, "The most important thing in Antarctica is this spirit of cooperation. At this conference we have friends from three countries from different parts of Europe. Spain and Portugal are in the southwestern part of Europe, and we are in the most south-eastern part of the continent, but we work together as friends, as brothers", he adds.

Asked whether he believes the results of Antarctic research so far could lead to solutions to the climate crisis, Prof. Pimpirev said, "Of course! Our joint project with Spain and Portugal to study permafrost is one such project. Permafrost is the most sensitive layer of the Earth's surface that depends globally on climate change, especially on the presence of carbon dioxide in the atmosphere, on greenhouse gases. Our research will be of great help for future important decisions related to climate change."

MAR DEL PLATA, 17.12.2023

The Sv. Sv. Kiril i Metodii docked at the naval base in Mar del Plata after a 25-day ocean crossing, the Varna Naval Avademy announced on its social media Monday.

Upon arrival, the ship was welcomed by Bulgarian Ambassador Stoyan Mihailov, Rear Admiral Marcelo Tarapow, Director General of Training and Preparation of the Argentine ian ship is at Mar del Plata en Navy, and officers from the Naval Base Command. A naval brass band with cheerleaders welcomed the crew.

The ship was also visited by the President of the Confederation of Bulgarian Societies in Argentina and President of the Argentine-Bulgarian Foundation in Buenos Aires Ruzhka Nikolova.

MAR DEL PLATA, 18.12.2023

RSV 421 commanding officer Nikolay Danailov was received by Rear Admiral Marcelo Luis Fernandez, Commander of the Naval Base in Mar del Plata.

The two sides discussed issues related to the ship's stay at the naval base, the crew's recreational opportunities in Mar del Plata, cooperation and the ship's upcoming tasks during the 32nd Bulgarian Antarctic expedition

In Mar del Plata, the RSV 421 crew accepted an invitation from Argentinian fellow seamen to join them in a football friendly.

MAR DEL PLATA, 19.12.2023

The Ambassador of Bulgaria to Argentina and the command of the Sv. Sv. Kiril i Metodii welcomed on board the ship the Mayor of the Agrentinian coastal town of Mar del Plata, Guillermo Montenegro and Rear Admiral Marcelo Tarapow. Director General of the Training and Preparation of Argentina's Navy. The Bulgar-

route to the Bulgarian Antarctic base on Livingston Island.

The two sides discussed cooperation opportunities between Varna and Mar del Plata in culture, education, tourism, trade and economy. The mayor pointed out the similarities between the two cities and was invited to visit Varna.

Mar del Plata's mayor was presented with the school's plaque by RSV 421 commanding officer Nikolay Danailov, as well as traditional Bulgarian gifts for him and the city administration. Guillermo Montenegro said that "it is an honour for him and the citizens of Mar del Plata to be visited by the ship and that it is always welcome".

22.12.2023

Sv. Sv. Kiril i Metodii left the Argentinean port of Mar del Plata on Thursday, the Varna Naval Avademy announced on Facebook.

It sailed off from the Mar del Plata naval base on a course to Ushuaia, and is expected to be there on December 26.

There, the crew will be joined by the first group of participants in the 32nd Bulgarian Antarctic expedition. They will be taken to Livingston to open the new season on the Bulgarian base of St. Kliment Ohridski.

The group includes scientists from the Bulgarian Antarctic Institute, from Sofia University, the Bulgarian Academy of Sciences, the National Sports Academy and the Varna Naval

Academy. Their research will focus on the natural resources of Livingston Island, the water around its South Shetland Islands group and climate change in Antarctica.

In Mar del Plata, Lieutenant Commander Lucas Alejandro Acosta Salcedo of the Argentine Navy boarded RSV 421. He will assist the crew as an experienced navigator in polar waters.

SOFIA. 26.12.2023

The first group of the 32nd Bulgarian Antarctic Expedition departs from Sofia Airport to Argentina's Ushuaia on Wednesday, Prof.Christo Pimpirev, Chairman of the Bulgarian Antarctic Institute, told BTA.

On the first group are Bulgarian Antarctic base commander Kamen Nedkov, Dr Atanas Peltekov, electrical engineer Rosen Stefanov, mechanics Konstantin Nedev and Vladimir Gigov, logisticians Damyan Paunov and Alexander Naydenov, boat guide Elka Vassileva, builder Marcho Paunov, cook Stanko Georgiev, hydrobiologist Eliza Uzunova, biologist Lyubomir Kenderov, marine geologist Raina Christova, and engineers Peter Sapundzhiev and Vahan Petev.

The group is expected to arrive at Ushuaia on December 28, when they will be joined by builders Kiril Zhechev, Nikolay Ivanov, Todor Todorov, Valentin Alexandrov, Damyan Morandov, Svetlin Nikolchev, and

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Ushuaia, December 29, 2023. The naval research vessel Sv. Sv. Kiril i Metodii arrives in Ushuaia, Argentina, on December 28, 3 a.m. local time

Nevyan Simeonov.

The ship is expected to reach Livingston Island around New Year.

The main task of the group after the opening of the base, in parallel with the implementation of the research projects, will be the construction of a new laboratory block, for which the groundwork was laid during the previous expedition, said Prof. Pimpirev.

USHUAIA, ARGENTINA, 28.12.2023.

RSV 421 arrived in Ushuaia, Argentina, on December 28, at 03:00 local time, the ship's commanding officer, Nikolay Danailov, told BTA.

After the arrival, an official meeting was held with Andres Dachary, Secretary for the

Malvinas Islands, Antarctica, the South Atlantic Islands and Foreign Affairs of the province of Tierra del Fuego. It was Commander of the RSV 421.

ture visits of the ship to Ush- said on Thursday. uaia, strengthening cooperation ties for official visits to the Ar- arctic researchers. gentine Antarctic bases in the

SOFIA, 28.12.2023.

The second group of the 32nd also attended by Nestor Rubens National Antarctic Expedition González, representative of departs on December 29, at the Joint Antarctic Command 4:30 p.m. from Sofia Airport of Argentina (COCOANTAR), Terminal 2, on ITA Airways Lieutenant-Commander Lu- flight AZ 621, on the route cas Acosta, representative of Sofia - Rome - Buenos Aires the Argentine Navy and Rad- - Rio Gayegos - Punta Arenas, ko Muevski, Senior Assistant Prof.Christo Pimpirev, head of the expedition and Chair of the Issues related to ensuring fu- Bulgarian Antarctic Institute,

Prof. Christo Pimpirev was at in the Antarctic and opportuni- the airport to send off the Ant-

On the second group of the South Shetland Islands, as well Bulgarian expedition are geolas the implementation of joint ogist Kalin Naydenov, electriscientific projects in the field of cal engineer Krasimir Krastev, polar research were discussed music editor Marina Velikova, at the meeting, Danailov noted. logistician Alexander Nedvalkov and two famous climbers eers will support, as field asand Mount Everest conquerors. Kiril Doskov and Associate

The climbers will support difficult geological studies focusing on yet-unchartered regions of the Antarctic. Some of these can be reached only by Alpine equipment. It will be the fifth Antarctic expedition of Doichin Boyanov," said Prof. Pimpirev.

The climbers will help the geologists collect samples from the area that is hard to reach for people lacking special training. It also takes special equipment, and the climbers will scale glaciers and rocks.

Only several expeditions have reached Smith Island so far by helicopter, The mountain-

sistants, the implementation of an ambitious scientific project Professor Dr Doichin Boyanov. to study the geological composition and history of the hardto-reach Smith Island, which is the highest in the South Shetland archipelago and neighbours on the Bulgarian base.

> "If the researchers reach Smith Island and do the planned studies, it will be a major success," said Prof. Pimpirev.

> From the Chilean port of Punta Arenas, the group will sail to the Bulgarian Antarctic station on Livingston Island on January 1, on the Brazilian Research ship Almirante Maximiano.

> The first group of Bulgarian Antarctic researchers who left for Ushuaia on December 27,

are now on board the Bulgarian naval research ship RSV 421. It is anchored in the town's port, Prof. Pimpirev told BTA. "Our polar researchers embarked the ship but weather in the Drake Passage is very bad, and the waves are huge, so the ship is in the Port of Ushuaia," he explained.

The professor himself plans to travel for Antarctica in late January.

DRAKE PASSAGE, 01.01.2024

On New Year's Eve, RSV 421 took part in an operation to assist the distressed yacht El Doblon near the Drake Passage, the Nikola Vaptsarov Naval Academy in Varna, on the Black Sea, said on its Facebook page on January 1.

The events took place as follows:

0145 hrs: A Mayday distress signal was received on the VHF emergency radio channel.

0150 hrs: The Chilean Coast Guard called the same channel to request assistance on behalf of a vessel in distress. RSV 421 was placed on a higher state of alert.

The coordinates of the vessel in distress were soon received about eight nautical miles away from the Bulgarian ship and 12 nautical miles south of Nueva Island near the Drake Passage.

RSV 421 immediately headed for El Doblon - a 25-metre yacht flying a Canadian flag with a 13-member crew.

Shortly after 2 a.m. RSV 421 was assigned as On Scene



Ushuaia, December 29, 2023

Commander by the Chilean Coast Guard in accordance with the International Aeronautical and Maritime Search and Rescue Manual.

0210 hrs: Communication with the vessel in distress was established. El Doblon reported that there was a breach in the forward keel section with incoming water.

0215 hrs: RSV 421 prepared a rescue speedboat with a crew of three, equipped with lifesaving gear and thermal suits, as well as mooring lines for towing the distressed vessel.

Meanwhile, arrangements had been made on board the RSV 421 to provide first aid to people in distress.

The weather conditions were adverse, with wind of 12-13 mps, force 8 waves on the Beaufort scale, and air and water temperature of 8 C.

At around 2.30 a.m. the Bulgarian ship began to converge with El Doblon, with the rescue speed boat ready to launch. At 2.50 a.m. RSV 421 was 0.4 nautical miles away from El Doblon, at which point El Doblon reported that the incoming water was stopped.

0258 hrs: The yacht was found to be listing hard to starboard and making 1.5 knots. The Bulgarian crew reported to the Chilean Coast Guard the condition of the yacht and commenced escorting her to the Beagle Channel and the port of Puerto Williams, Chile.

0405 hrs: The Bulgarian vessel was relieved of responsibility as On Scene Commander by the Chilean Coast Guard after



Ushuaia, December 29, 2023

entering calmer waters. RSV 421 proceeded to sail to Livingston Island as scheduled.

SOFIA, 02.01.2024

"Science should be linked to business. It should not be an end in itself. There should be a symbiosis between business and science," said Lachezar Glavinov, manager of DIEL Sport - Bulgaria in an interview with BTA.

Lachezar Glavinov is the manager and partner of DIEL Sport, a company that specializes in the production of winter sports and workwear. DIEL has been fighting the cold and damp for 31 years, and actively working and partnering with the Bulgarian Antarctic Institute for 21 years.

"In the beginning, we didn't have much experience. We started making cold-protection clothing, thinking that people who go to Antarctica have contact with cold and ice. It turned out that the chal-

lenges were more the humidity and the wind, because after all, they were going in the summer season to Antarctica and the temperatures were not as low as we imagined them to be," the owner of DIEL explained.

Glavinov said that in all the years so far, the active interaction with the Institute has helped to produce better and better quality clothing for the Bulgarian Antarctic researchers.

"We make each garment to individual measurements. It's not a concept that one can find in the store, but we have the individual size data of each participant and everything is made to order," he said.

The owner of DIEL commented that he and his company provide the necessary garments to the Bulgarian Antarctic researchers free of charge.

"The benefit of this for us is moral first. Bulgaria needs the support of scientific institutes - not only Antarctic ones, but also in general. Science should be linked to business. It should not be an end in itself. There must be a symbiosis between business and science. One cannot do without the other, so we need to move in the right direction together. The way we help them - to feel comfortable and to work, they have helped us to develop our products. That's the value of this collaboration. Yes, we've been giving it away for free for so many years, but we've learned a lot from them," Glavinov explained.

DRAKE PASSAGE, 03.01.2024

Sv. Sv. Kiril i Metodii entered the Drake Passage, according to the Facebook page of the Naval Academy.

Members of the 32nd Antarctic expedition underwent safety training and learnt to how to put on a safety immersion suit and how to use safety floats.

RSV 421 is on a course east of King George island and is expected to enter the Antarctic Treaty Area in the coming hours.

The vessel is expected to arrive in the South Bay of Livingston Island before the Bulgarian Antarctic base before noon on January 4.

The ship sailed on through the Drake Passage under favourable weather conditions but with a more visible presence of ice on the ocean surface. Isolated icebergs which had broken off the mainland Antarctic ice shelf drifted past the ship. The situation did not

be linked to business. It should differ from what the Argentine not be an end in itself. There must be a symbiosis between had forecast.

LIVINGSTON, 04.01.2024

Sv. Sv. Kiril i Metodii dropped anchor in Livingston Island's South Bay opposite the Bulgarian Antarctic Base at 7 am local time on Thursday, Nikola Vaptsarov Naval Academy Rector Flotilla Admiral Prof. Boyan Mednikarov told BTA.

Thus, another stage of the passage of RSV 421 as part of the 32nd Bulgarian Antarctic expedition was completed.

The logistical crew of the expedition started to unload the equipment and the supplies off the ship and will proceed to reopen the base. The Bulgarians will then unload food supplies for the Juan Carlos I Spanish Antarctic Base, which is on the island next to the Bulgarian base.

The Bulgarian Antarctic Base is expected to be put back in operation for the new Antarctic season within hours. In parallel, work has started on the implementation of the planned scientific projects.

SOFIA, 05.01.2024

The Bulgarian Antarctic base of St. Kliment Ohridski on Livingston Island has been put back into working order after its depreservation process was completed by the first group of the 32nd Na-

tional Antarctic Expedition, Prof. Christo Pimpirev, head of the expedition and Chairman of the Bulgarian Antarctic Institute said on Friday. In a conversation via satellite telephone, base commander Kamen Nedkov told Pimpirev that power supply to all buildings has been restored. St. Kliment Ohridski is a summer-only active station.

Pimpirev informed that apparently the base suffered no serious damage caused by adverse weather conditions during the past winter period in which it was uninhabitable.

All of the participants in the expedition are in good health after their long journey and are full of enthusiasm to implement their tasks, he added.

On the first group are Bulgarian Antarctic base commander Kamen Nedkov, Dr Atanas Peltekov, electrical engineer Rosen Stefanov, mechanics Konstantin Nedev and Vladimir Gigov, logisticians Damyan Paunov and Alexander Naydenov, boat guide Elka Vassileva, builder Marcho Paunov, cook Stanko Georgiev, hydrobiologist Eliza Uzunova, biologist Lyubomir Kenderov, marine geologist Raina Christova, and engineers Peter Sapundzhiev and Vahan Petev.

The second group consists of geologist Kalin Naydenov, electrical engineer Krasimir Krastev, Marina Velikova, a musician working on an acoustic project, logistician Alexander Nedyalkov and Mount Everest conquerors

Kiril Doskov and Assoc. Prof. Doychin Boyanov.

LIVINGSTON ISLAND. 06.01.2024

An Epiphany ritual for retrieving the cross from the icy Antarctic water was performed on January 6, the Naval Academy said in a post on social media.

Senior Lieutenant Stanislav Stefanov, maintenance officer in the crew of the Sv. Sv. Kiril i Metodii, took out the cross, observing a long Bulgarian tradition.

Traditionally, on Epiphany, a cross is thrown into the icy waters of a river or other body of water and young race to retrieve it because it is believed that whoever catches the cross will be healthy and happy throughout the year.

SOFIA. 07.01.2024

The third group of the 32nd aational Antarctic expedition took an ITA Airways flight on January 7 from Sofia Airport for Rome en route to Buenos Aires, Rio Gallegos, Punta Arenas, King George Island and Livingston Island.

The group consists of Assoc. Prof. Boris Tzankov, a consultant on a new water and sewerage line in the area of the Bulgarian Antarctic Base, logistician Oleg Vassilev, BTA journalist Emil Granicharov, cook Ivaylo Yankov, mechanic Milcho Dundakov, geologist Ralica Sabeva, marine biologist Tihomir Stefanov and the two islands, the group will physicist Tsvetan Parov. At Punta Arenas, the group will be joined by Mark Irvine from the expedition. the UK, who will work at the Bulgarian Base on a Silicones Europe project.

"When I received an offer to go, I immediately said 'yes'," said BTA's Emil Granicharov. "I have often imagined going there, maybe as a seaman, and now I had this chance via BTA and I didn't have to think long," he said. He will cover the voyage in videos and photos. "It will be a video log of the Antarctic studies, so that it is clear when the researchers do every day," said Grancharov.

From the Chilean port of Punta Arenas, located north of the Strait of Magellan, the King George Island, adjacent H41. to Livingston Island where the Bulgarian Antarctic Base is located. The aircraft is chartered by the Korea Polar Research Institute (KOPRI).

For the last stretch between

board the Sv. Sv. Kiril i Metodii, which is participating in

RESEARCH SHIP **ALMIRANTE** MAXIMIANO. 09.01.2024

The second group of scientists, researchers and scientific workers from the 32nd National Antarctic Expedition arrived with the Brazilian research ship Almirante Maximiano (H41) at the Bulgarian Antarctic base, the Nikola Vaptsarov Naval Academy in Varna said in a social media post.

During the Brazilian ship's brief stay, a bilateral friendly visit was held between the crews group will fly on January 11 to of Sv. Sv. Kiril i Metodii and

> Ten servicemen including two trainees from the Brazilian crew visited RSV 421, and a second boat with Brazilian sailors visited the Bulgarian Antarctic base.

RSV 421's commanding of-



Sofia, January 7, 2024. Yet another group of participants in the 32nd national Antarctic expedition departs from Sofia Airport's Terminal 2. The group includes Emil Granicharov who is a journalist for the Bulgarian News Agency, Photo: Vladimir Shokov, BTA

ficer, Captain Nikolay Danailov, together with the commander of the Bulgarian Antarctic base Kamen Nedkov and cadets-interns made a friendly visit on board H41 with commander Jefferson Ramos Pineiro. The capabilities, tasks and history of the Brazilian ship, which was launched in 1974 and joined the Brazilian Navy in 2012, were studied.

With a crew of seventy servicemen, the Brazilian ship Almirante Maximiano has actively participated for more than ten years in the polar campaigns of the Republic of Brazil and carries out the Brazilian polar programme PROANTAR. Both crews expressed readiness to support each other's various scientific and logistical activities.

The two commanders exchanged general impressions of the current campaign and upcoming tasks. The commander of the Bulgarian Antarctic base, Kamen Nedkov, thanked the Brazilian Navy for the transportation of personnel from Punta Arenas, Chile.

Cadets from the the Nikola Vaptsarov Naval Academy also got acquainted with the and capabilities of the Brazilian ship. The two sides actively discussed sending Bulgarian cadets within up to thirty days to conduct sailing practice on the Brazilian ship and vice versa.

LIVINGSTON ISLAND. 10.01.2024

The 143rd anniversary of the Nikola Vaptsarov Naval Acad-



Photo: RSV 421 / BTA

emy was marked on board the Sv. Sv. Kiril i Metodii (RSV 421), which is riding at anchor in Livingston Island's South Bay opposite the Bulgarian Antarctic Base, the Academy said on its Facebook page.

More supplies are being unloaded from RSV 421.

Samples are being taken from the South Bay in preparation for a multidisciplinary project - an integrated study of sediment, biota and water components of the ocean ecosystem in the littoral zone of Livingston Island. It will be implemented by marine biologist Lyubomir Kenderov from the Faculty of Biology of Sofia University and marine geologist Raina Christova from the Institute of Oceanology of the Bulgarian Academy of Sciences.

LIVINGSTON ISLAND. 13.01.2024

Sv. Sv. Kiril i Metodii reached Livingston Island in the South Shetlands.

The Sv. Sv. Kiri i Metodii brought part of the third group of Bulgaria's 32nd National Antarctic Expedition, who disembarked at the St Kliment Ohridski Bulgarian Base after the ship cast anchor in the Emona Anchorage of the island's South Bay. Shortly after that, RSV 421 proceeded to Deception Island to transport victuals and building materials for the Spanish Gabriel de Castilla Polar Base there.

After an overnight stay there, the Bulgarian ship will return to the Emona Anchorage and will be docked for the remainder of the expedition.

DECEPTION ISLAND, 13.01.2024

On January 13, a team of Bulgarian scientists, including Prof. Eliza Uzunova (ichthyologist and hydrobiologist), Assoc. Prof. Lyubomir Kenderov (hydrobiologist), Prof. Ralica Sabeva (geologist), and Assoc.



Livingston Island, January 16, 2024. The flag of the town of Chepelare flies from the eponymous peak in Tangra Mountains on Livingston Island in Antarctica. The peak was conquered by Marcho Paunov and one of Bulgaria's most famous mountaineers, Doychin Boyanov.

Marcho Paunov's personal archive photo

Prof. Raina Christova (marine geologist), managed to collect samples of volcanic ash and pumice on Deception Island. Field samples of snow and ice were also collected, which will be examined in Bulgaria for the presence of microplastics.

Unloading of equipment for the Spanish base on the island continued until the evening, after which the Bulgarian ship returned to Livingston island, where the Bulgarian base is located.

MADRID, 15.01.2024

The Spanish Polar Committee Chair Antonio Quesada sent a letter of gratitude to the Bulgarian Antarctic Institute Chair Prof. Christo Pimpirev in connection with the assistance provided to distressed yacht El Doblon on New Year's Eve by the Sv. Sv. Kiril i Metodii near the Drake Passage.

The 25-metre tourist yacht El Doblon is flying a Canadian flag with a 13-member crew.

Its activities in the Antarctic are authorized by Spain and part of the crew are Spaniards. "Although the incident took place outside the Antarctic Treaty area, the Bulgarian vessel came to our aid, for which we are very grateful. We hope that this distress call has not disrupted or delayed too much the planned activities of the research vessel," the letter says.

At around 2 am on January 1, El Doblon reported that there was a breach in the forward keel section with incoming water. RSV 421 prepared a rescue speedboat with a crew of three, equipped with life-saving gear and thermal suits, as well as mooring lines for towing the distressed vessel. Meanwhile, arrangements had been made on board the RSV 421 to provide first aid to people in distress

At 2.50 a.m. RSV 421 was 0.4 nautical miles away from El Doblon, at which point El Doblon reported that the incoming water was stopped.

The yacht was found to be listing hard to starboard and making 1.5 knots. The Bulgarian crew reported to the Chilean Coast Guard the condition of the yacht and commenced escorting her to the Beagle Channel and the port of Puerto Williams, Chile.

The letter of gratitude asks Prof. Pimpirev to convey the words of appreciation to the admiral who heads the Bulgarian Navy.

LIVINGSTON ISLAND, 16.01.2024

The naval research vessel Sv.Sv. Kiril i Metodii (RSV 421) dropped anchor in the bay of Livingston Island at 11.30 am local time.

Before setting course for the Bulgarian Antarctic Base St Kliment Ohridski, researchers on board the vessel took more samples from the bay at Deception Island.

ST. KLIMENT OHRIDSKI BASE, LIVINGSTON ISLAND, 17.01.2024

Two fish species which are new to the Bulgarian collection of Antarctic fish have been caught near Bulgaria's St Kliment Ohridski Antarctic Base. They are the dragonfish (Parachannichthys charcoti) and the Antarctic lanternfish (Electrona antarctica), a key element of the food chain of the Southern Ocean.

These small fish are the most numerous vertebrates on Earth.

They inhabit the depths of the ocean - the twilight zone, where light is scarce. Organs on the surface of their bodies produce light and through this phenomenon, called bioluminescence, the fish communicate with one another.

Lanternfish play an important role in transporting carbon from the atmosphere to the ocean depths as they feed on plankton from the surface layers. They head for the ocean depths and themselves serve as food to bottom-dwelling fish.

In addition to the new species, Bulgarian scientists have often caught Notothenia coriiceps and ice fish off Livingston Island.

The fish caught by the team of Prof.Eliza Uzunova, marine biologist and hydrobiologist, are held in containers of water on board the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) until they are studied.

Studies include analysis of the parasite fauna of the fish. The diversity of micro-organisms in the digestive tract of fish is also studied as the micro organisms affect their health status and overall condition. Scientists take into account the fact that it is currently the breeding season of most fish in the area. They only take the minimum number of fish required for the studies.

Boat guide Elka Vassileva and Alexander Nedyalkov, photographer and cameraman of the 32nd Bulgarian Antarctic expedition, fetched Bulgarian climbers Doychin Boyanov and



Livingston Island, January 17, 2024. Scenery from the island's bay.

Photo: Emil Granicharov, BTA

Marcho Paunov, who scaled Chepelare Peak in 10 hours. They did so together with geologist Kalin Naydenov, who took samples from Chepelare Peak on False Bay, and climber Kiril Doskov. Doskov and Boyanov are project assistants to the geologist.

For the first time in the history of the Bulgarian expeditions, a team of Bulgarian geologists and supporting mountaineers descended on the southern shore of False Bay to work on Kalin Naydenov's project. Mountaineer Doychin Boyanov and logistician Marcho Paunov made a successful first ascent of Chepelare Peak and took samples. The team also included Kiril Doskov, who was part of the 1984 Everest climbing team together with Christo Prodanov. Chepelare Peak is named after the southern Bulgarian town of that name. The great patriot and benefactor of the Bulgarian expeditions, Krastvo Vangelov, lives there. His help over the years and the equipment provided by the Orion ski maker have been essential to this climb and the expeditions so far.

Assoc. Prof. Lyubomir Kenderoy, a hydrobiologist, and Assoc. Prof. Raina Christova, a marine geologist, have managed to take water samples from the fifth location since they started work during the expedition. The water was measured for oxygen content and hydrogen concentration, which is an indicator of the processes of photosynthesis. If there is a plankton bloom, the oxygen content is higher. The decay of organic matter on the bottom, PH and salinity were also measured. As the ice melts in the Antarctic summer, salinity varies from site to site.

LIVINGSTON ISLAND, 18.01.2024

A team of Bulgarian scientists, that is part of the 32nd Antarctic Expedition, are detecting depths and geographical coordinates, thus determining where the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) will drop

anchor to collect samples with the probe and bottom sampler. The coordinates are being detected by Assoc. Prof. Lyubomir Kenderov (hydrobiologist) and Assoc. Prof. Raina Christova (marine geologist).

RSV 421's commanding officer Captain Nikolay Danailov, together with Kamen Nedkov, commander of the Bulgarian Antarctic Base (BAB), expedition member Elka Vassileva, geologist Kalin Naydenov, marine biology professor Mark Irvine, Assoc. Prof. Kenderov Prof. Eliza Uzunova (ichthyologist and hydro biologist) and Assoc. Prof. Raina Christova are planning the next points to be sampled.

EREBY POINT, LIVINGSTON ISLAND, 20.01.2024

A group of scientists, consisting of Prof, Eliza Uzunova (ichthyologist and hydrobiologist), Prof. Mark Irvine (marine biologist), Kalin Naydenov (geologist), Tihomir Stefanov (ichthyologist), as well as musician and music editor Marina Velikova, docked at Ereby Point, where they worked on their projects.

Elka Vassileva of the Bulgarian Antarctic Base, and Alexander Nedyalkov, cameraman and photographer of the 32nd Bulgarian Antarctic Expedition, transported the group from the BAB, located on Livingston Island. Within two hours the group was engaged in field work.

Fireworks were set off in the



Livingston Island, January 18, 2024. Photo: Emil Granicharov, BTA

evening on board the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) to celebrate the successful completion of the unloading of construction materials and provisions for BAB.

SOFIA, 20.01.2024.

On January 20, the Bulgarian Antarctic Institute celebrates Penguin Awareness Day, which aims to make the public more aware about the behaviour of those birds, their habitat, and the factors threatening them with extinction, the Institute said on Facebook.

"These are perhaps among the cutest, most interesting and curious non-flying birds on the planet, among which all of us polar explorers love to work," the Institute said.

The participants in the 32nd Bulgarian expedition to Antarctica also pay attention to the life of penguins. In a BTA interview, musician and music editor Marina Velikova, who is part of the expedition, said the focus of her work will be to record the sounds of Antarctica, including the sounds of penguins.

LIVERPOOL BEACH, ANTARCTICA, 21.01.2024.

Ichthyologists Eliza Uzunova and Tihomir Stefanov, marine biology professor Mark Irvine, geologist Kalin Naydenov and musician and music editor Marina Velikova arrived at Liverpool Beach, where they began to work on their projects. They were transported by the commander of the Bulgarian Antarctic Base, Kamen Nedkov.

Naydenov examined rock surfaces and recorded the resulting data. Uzunova collected snow from the surface layer to study the potential presence of microplastics in Antarctic waters. Stefanov and Prof. Irvine collected soil samples. Velikova recorded audio of the place. She noted: "Today is a difficult day to make recordings, because the wind is extremely strong." She said, however, that every second she spends working on the island is exciting, whether the recording turns out to be good or not in the end. Velikova shared that she can spend a long time in silence, waiting for a penguin to wake up and make a noise, or for a glacier to fall.

ANTARCTICA, 22.01.2024

The Sv. Sv. Kiril i Metodii has dropped anchor in the western bay of Half Moon Island in Antarctica.

Geologist Kalin Naydenov and mountaineers Doychin Boyanov and Kiril Doskov were able, with the help of the crew, to survey possible sites for work. Then they moored at the easternmost point of Livingston Island, where they acquired geological samples.

Prof. Eliza Uzunova sampled the area around Half Moon Island for the presence of microplastics.

Assoc. Prof. Lyubomir Kenderov and Assoc. Prof. Raina Christova, who managed to take samples from the bottom of the bay with a special tube, continued work on their projects on board the RSV 421.

LIVINGSTON ISLAND, 23.01.2024.

The Sv. Sv. Kiril i Metodii has found aircraft parts during the collection of geological samples in the area of Livingston Island's False Bay and Barnard Point, the Nikola Vaptsarov Naval Academy in Varna (on the Black Sea) reported on Tuesday.

The metal and composite fragments found on the shore have been taken aboard the ship together with the geological samples by 32nd Bulgarian Antarctic Expedition participants Doychin Boyanov, Kalin Naydenov, Kiril Doskov, and Marcho Paunov.

The wreckage is believed to belong to a military aircraft. A historical check into aircraft incidents shows that the Chilean Air Force lost a C-130 Hercules transport airplane in



Livingston Island, January 18, 2024. Commander Nikolay Danailov, Commanding Officer of the RSV 421, head of the Bulgarian Antarctic base Kamen Nedkov, Elka Vassileva (boat skipper at the Bulgarian Antarctic Base), geologist Kalin Naydenov, marine biologist Prof. Mark Irvine, hydrobiologist Assoc. Prof. Lyubomir Kenderov, ichthyologist and hydrobiologist Prof. Eliza Uzunova and marine geologist Assoc. Prof. Raina Christova plan the next locations from which to collect samples. Photo: Emil Granicharov, BTA



Livingston Island, January 20, 2024. Photo: Emil Granicharov, BTA

in 2019.

resentative of the Antarctic air command of the Chilean Air Force, who has requested the wreckage to be taken to Chile's Antarctic base on King George Island, if possible.

RSV 421 plans to hand over the plane parts along with the exact coordinates where they were found, when in the Maxwell Bay area (between January 31 and February 1).

HALF MOON ISLAND. ANTARCTICA, 23.01.2024

Scientists from the 32nd Bulgarian Antarctic Expedition delivered provisions to the Argentine naval base and collected samples of granite on Half Moon Island on Tuesday.

RSV 421's commanding officer Captain Nikolay Danailov, RSV 421's Senior Assistant Commander Radko also taken from a hidden small

the area of the Drake Passage Muevski, and Lieutenant Commander Lucas Alejandro Acos-RSV 421 has contacted a rep- ta Salcedo of the Argentine Navy, delivered provisions to the Argentine base, located on the Half Moon Island.

> Cadets from the the Nikola Vaptsarov Naval Academy in Varna also took part in the venture. Those include Chief Petty Officer Cadet Anna Stoyanova, Chief Petty Officer Cadet Georgi Georgiev, Chief Petty Officer Cadet Lyuboslav Lefterov and Chief Petty Officer Cadet Radoslav Radkov.

Geologist Kalin Naydenov and mountaineers Doichin Boyanov and Kiril Doskov managed to take geological samples from the area of the Half Moon Island.

"We managed to stop at two places where large outcrops were visible just under the ice. We took three samples from one place," Kalin Naydenov told about the mission. He pointed out that a sample was

beach. One of the samples was of granite (granodonite), the geologist specified.

SOFIA. 23.01.2024

"In Antarctica, it is rare to find metal fragments such as those found by the Sv. Sv. Kiril I Metodii," the vessel's commanding officer Nikolay Danailov told BTA as he commented the plane parts found by geologist Kalin Naydenov and mountaineers Doichin Boyanov, Kiril Doskov, and Marcho Paunov in the area of Livingston Island's False Bay...

Danailov said that while working on their project, the 32nd Bulgarian Antarctic Expedition participants found metal debris and took them aboard the ship. "Upon examining them, we found that they were most likely parts of a military aircraft," he added.

He said that the place where the parts were found was quite interesting because neither Bulgarian scientists nor their Spanish colleagues have ever set foot on this coast.

Looking into the matter, the crew found out that the Chilean Air Force had lost an aircraft in 2019. "That is why we decided to contact the Chilean Air Force's Antarctic air command," Danailov said, adding that they were interested in the discovered wreckage.

"We will head there around February 1 and the parts will be taken to their naval Antarctic base, Frey, on King George Island," he noted.

SOPOT ICE PIEDMONT. **ANTARCTIC** PENINSULA, 24.01.2024

Sv. Kiril i Metodii continue to work on their scientific projects on Wednesday.

Geologist Kalin Naydenov and mountaineers Doichin Boyanov and Kiril Doskov were able to take geological samples from rock outcrops in the Sopot Ice Piedmont, located near Half Moon Island.

Ichthyologist and hydrobiologist Prof. Eliza Uzunova collected a specialized microplastic trapping net that she had placed in the area around Half Moon Island. She explained the process of preserving the collected tics. material. "We'll wash everything out of the net, strain it through a very fine sieve, and use a steel funnel to cast it into jars of alcohol to preserve it," the ichthyologist said. He added that the collected ice and snow is stored in a special refrigerator at -20C. Uzunova also pointed out the method of water testing by filtration. "We cut the filter, put it in a medium for the bacteria to develop, and the bacteria themselves are seeded on Petri dishes," she explained.

Half Moon Island, which lies east of Livingston Island, is home to the research base of Argentina.

LIVINGSTON ISLAND. 25.01.2024

The Sv. Sv. Kiril i Metodii Scientists on board the Sv. returned to Livingston Island at sunset on Wednesday after a trip to Half Moon Island, where the Bulgarians delivered provisions to the Camara Argentine Naval Base and worked on their research pro-

Geologist Kalin Naydenov and mountaineers Doychin Boyanov and Kiril Doskov collected granite samples from the island. Prof. Eliza Uzunova, who is an ichthyologist and hydrobiologist, used a special net to sample Pimpirev said. the area around Half Moon for the presence of microplas-

SOFIA. 26.01.2024

The fourth group of the 32nd Bulgarian Antarctic Expedition departed from Sofia Airport on Friday, Bulgarian Antarctic Institute Chair and head of the expedition Prof. Christo Pimpirev told BTA.

The group includes Pimpirev; doctor Sevdalina Mihailova; geologists Docho Dochev and Lyubomir Metodiev, who will work on a paleontological project, Iglika Trifonova and Lyubov Kostova, who are a part of an educational project, and journalist Maria Cherneva, Prof.

"We have a comparatively longer way until we reach the Bulgarian Antarctic base of



Livingston Island, January 20, 2024. View of the St Kliment Ohridski base. Photo: Emil Granicharov, BTA





Livingston Island, January 30, 2024. Hydrobiologist Lyubomir Kenderov studying the bottom sediments that make up the habitat, the water and its parameters. Photo: Emil Granicharov, BTA

St. Kliment Ohridski because we will get from Punta Arenas to King George Island by plane which we will rent from the Portuguese Antarctic Programme. Before that, we will be in Buenos Aires for two days, and there we will meet the other participants in the expedition: Naval Academy Rector Fleet Admiral Prof. Dr Boyan Mednikarov, and Kiril Valchev, the BTA Director General, who are not travelling with us today", explained Prof. Pimpirev.

"When we arrive at the base, we are planning to make an unplanned voyage to Smith Island with the Bulgarian research vessel, but unfortunately we cannot reach it now because of the bad weather," said Prof. Pimpirev. He added that it is a ten-hour sail to this island, weather permitting, and if a suitable bay is found, the ship will dock and the climbers and geologists will be on it. They will take samples from Smith Island, but all will depend on the weather conditions," noted Prof. Pimpirev.

LIVINGSTON ISLAND, 29.01.2024

British scientist Prof. Mark Irvine took seawater samples during the 32nd Bulgarian expedition to Antarctica while on board the Sv. Sv. Kiril i Metodii. The scientist sailed to several destinations to fish krill with a net from a depth of 15 metres. The experiment's main objective was to estimate the level of sea pollution.

Lieutenant Commander Radko Muevski, RSV 421's Executive Officer, said that good weather would allow the mission to collect samples from three locations in the South Bay area and south of Hannah Point.

Bottom samples were also collected from six points in the Livingston Island water area by hydrobiologist Assoc. Prof. Lyubomir Kenderov and marine geologist Assoc. Prof. Raina Christova, who were assisted by the RSV 421 crew.

BUENOS AIRES, 30.01.2024

The Bulgarian Ambassador to Argentina Stoyan Mihailov and the Rector of the Nikola Vaptsarov Naval University, Fleet Admiral Boyan Mednikarov, met in Buenos Aires with the Commander of the Argentine Navy Fleet, Counter-Admiral Carlos Maria Allievi, the Naval University said. The two sides met before the departure of the Bulgarian representatives to the Bulgarian Antarctic base on Livingston Island as part of the last group of the 32nd Bulgarian Antarctic expedition.

The two sides noted the development of cooperation between the Bulgarian and Argentine naval forces thanks to the annual Bulgarian Antarctic expeditions and the additional opportunities for interaction after the inclusion in the expeditions of the Sv. Sv. Kiril i Metodii, which is

currently on a mission in Antarctica - for the second time.

Ambassador Mihailov and Fleet Admiral Mednikarov expressed gratitude for the valuable logistical support from Argentina for the Bulgarian polar explorers.

Ambassador Mihailov congratulated Counter-Admiral Allievi on his appointment at the head of the Argentinian Navy Fleet and pointed out that having this meeting so soon after the appointment is a clear sign of the special attitude to Bulgaria.

LIVINGSTON ISLAND, 31.01.2024

Ichthyologist and hydrobiologist Prof. Eliza Uzunova continued work on collecting water samples to be tested for the presence of microplastics. She told BTA that once the specialized net gets released into the ocean, it takes 35 to 40 minutes before it gets clogged with macroalgae. "For this reason, we lower the net for 10 to 15 minutes, so that the sample is not as clogged with organics," Uzunova said. It is the second time samples are being taken from the South Bay, and two more will be done.

The Sv. Sv. Kiril i Metodii crew and the logistics team at the Bulgarian Antarctic base cleaned the shore from some 20 tonnes of metal scrap that had accumulated near the base for over three decades, said Commander Nikolay Danailov, Commanding Officer of the RSV 421, for BTA.



Livingston Island, January 31, 2024. Photo: Emil Granicharov, BTA

PUNTA ARENAS, CHILE, 01.02.2024

He added: "My crew from Sv. Sv. Kiril i Metodii and the logisticians from the St. Kliment Ohridski base took on board the ship about 20 tons of scrap metal. We can say that we have completed the ecological operation of loading scrap from the Bulgarian coast, that has built up for more than 30 years. For the second year in a row, and hopefully the last, we are removing such a massive amount of scrap metal from the continent."

Prof.Christo Pimpirev, leader of the 32nd Bulgarian Antarctic Expedition, Bulgaria's Ambassador to Argentina, Stoyan Mihaylov, who is accredited to Chile, BTA Director General Kiril Valchev and Flotilla Admiral Boyan Mednikarov, head of the Nikola Vaptsarov Naval Academy, met with Claudio Andres Radonich Jimenez, Mayor of the southernmost Chilean city, Punta Arenas.



Livingston Island, January 31, 2024. View of Perunika Glacier. Photo: Emil Granicharov, BTA

100 LIK 2024 LIK 2024 101



Livingston Island, January 31, 2024. Engineer Tsvetan Parov collecting data from the sensors placed in the cracks of Perunika Glacier. Photo: Emil Granicharov, BTA

Punta Arenas is a special place not only for the Bulgarian expeditions, but also for the Antarctic expeditions from all over the world, Ambassador Mihaylov said. He stressed that the city had become even more important for the Bulgarian expeditions after the acquisition of the Sv. Sv. Kiril i Metodii, the Naval Academy said.

Prof.Pimpirev thanked the mayor for the long-standing support of Punta Arenas for the Bulgarian Antarctic expeditions and suggested that the local University of Magallanes and the St Kliment Ohridski University of Sofia start cooperating. Pimpirev and Radonich noted the contribution of local resident Ines Luna, who has given Bulgarian expeditions the use of her house on their way to Antarctica for over 20 years.

BTA Director General Kiril Valchev asked the mayor to provide information on Antarctic expeditions passing through the city, which BTA will provide to the Bulgarian media. This will make it possible to draw comparisons with the Bulgarian expeditions.

Punta Arenas has a popula-

tion of 145,000. The city has three regional television stations, seven regional radio stations, two dailies and several Internet sites, the mayor said. He arranged a meeting for Valchev and Mihaylov with Gerardo Perez, editor-in-chief of local media group El Pinguino. He promised to send BTA news of Antarctic expeditions from around the world passing through the city, as well as to publish regularly BTA stories on Bulgarian Antarctic expeditions, the Naval Academy said.

Admiral Mednikarov offered to share the experience of the Naval Academy in the possible creation of a naval school in Punta Arenas, stressing that the Academy in the Black Sea city of Varna is ranked second in the world. He said he would

propose to the new mayor of Varna, Blagomir Kotsev, to initiate partnership with Punta Arenas.

PUNTA ARENAS, CHILE, 01.02.2024

A Bulgarian delegation, led by the head of the country's annual Antarctic Expedition, Prof. Christo Pimpirev, visited the Ukrainian polar supply and research icebreaker Noosfera, which had docked at Punta Arenas, at the southern tip of Chile, Bulgaria's Nikola Vaptsarov Naval Academy reported on Thursday. The delegation included Bulgarian Ambassador to Argentina and Chile Stoyan Mihailov, Bulgarian News Agency (BTA) Director General Kiril Valchev and Naval Academy Rector Boyan Mednikarov.

They were welcomed by Noosfera Captain Pavlo Panasyuk. He presented the capacities of the vessel, which has been in Punta Arenas since early January. Before that, the ship reached Ukraine's Vernadsky Research Base on Galindez Island in the Wilhelm Archipelago at the end of 2023. Panasyuk noted that Ukrainian Antarctic expeditions have not been cancelled during the war in Ukraine. The country invested in repairs on the Noosfera in 2023.

The Noosfera is a former flagship of the British Antarctic Survey, then called RRS James Clark Ross. It was built

in 1990 and sold to Ukraine in 2021. A month from now the icebreaker will transport the new crew of Ukraine's Vernadsky Research Base and will carry cargo to the Henryk Arctowski Polish Antarctic Station.

Pimpirev noted the long-standing cooperation between the Antarctic institutions of Bulgaria and Ukraine, and proposed that cooperation be expanded through joint work of the Sv. Sv. Kiril i Metodii and the Noosfera, both of which were acquired only recently by the respective countries.

Mednikarov spoke about the current mission of RSV 421 and suggested collaboration with the Ukrainian ship in polar waters.

CARLINI BASE, 02.02.2024.

The head of the Bulgarian Antarctic expedition, Prof. Christo Pimpirev, Bulgarian Ambassador to Argentina and Chile Stoyan Bulgarian News Mihailov, Agency (BTA) Director General Kiril Valchev and Naval Academy Rector Boyan Mednikarov, as well as a large group of researchers and logistic workers visited the Argentinian base Carlini. The group embarked the Bulgarian naval research ship RSV 421 at the Chilean base Escudero. The Bulgarians are headed for the Bulgarian base on Livingston Island and the Spaniards for their bases on the islands of Livingston and Deception.

As Flotilla Admiral Mednikarov boarded the ship, Commanding Officer Nikolay Danailov reported that all tasks for transportation and delivery of supplies and providing logistical support for the research work on board the ship, have been successfully performed.

During the visit to the Argentine base it became clear that 11 projects are currently being implemented by nearly 40 scientists. There are also military personnel stationed at the base to help with organizational issues. Among them are the divers who take samples for various projects.

Prof. Pimpirev presented to his Argentinean colleagues his book Antarctic Diaries, in Spanish. The BTA Director General also had gifts: copies of the special edition of BTA's LIK magazine, dedicated to the first voyage of RSV 421 to Antarctica.

Danailov highlighted the good understanding between the Bulgarian and Argentine military and presented the Argentinians a





Antarctica, February 2, 2024. Head of the Bulgarian Antarctic expedition Prof. Pimpirev, Flotilla Admiral Boyan Mednikarov, Ambassador of Bulgaria to Argentina Stoyan Mihaylov, BTA Director General Kiril Valchev and a group of Bulgarian and Spanish scientists and logisticians visiting Carlini, the Argentinian polar base. Photos: Emil Granicharov, BTA









Livingston Island, January 31, 2024. Engineer Tsvetan Parov and view from Perunika Glacier. Photo: Emil Granicharov, BTA

coin, jokingly warning that if they lose it before the Bulgarians' next visit, should be ready to pay a friendly fine.

RSV 421's commanding officer reported that Dogac Isiler, the chief logistician of the Turkish Antarctic programme, with whom the Bulgarians have been working together for nearly a year and a half, had boarded the ship. The Bulgarian crew transferred Turkish cargo to Chilean vessel Betanzos, which is used by the Turkish programme. This is the second time the Bulgarians assist their Turkish counterparts.

LIVINGSTON ISLAND, 03.02.2024

Scientists from the Argentine Antarctic expedition considering the possibility of implementing some of their projects on board the Sv. Sv. Kiril i Metodii, the vessel's commander Nikolay Danailov, told BTA.

The Bulgarian crew invited the Argentine researchers on board RSV 421, which docked in front of the Carlini research station on King George Island.

Captain Nikolay Danailov briefed them on the opportunities for research activities the vessel offers. Shortly before he sent his guests off, he presented the Argentine group with a photo of RSV 421 and embroidery with the logo of the Bulgarian Antarctic Institute.

Danailov noted that the researchers were introduced to the capabilities of the ship not only as a vessel carrying out transport or cargo operations but also as serving as a good scientific infrastructure.

"This is the result of the good cooperation between Bulgaria and Argentina, in the person of our ambassador to the country, Stoyan Mihailov," Danailov said, noting that the cooperation between the two countries has been going on for more than 30 years.

Ambassador Mihaylov told BTA that the purpose of the visit to the Carlini Base, which operates all year round, is to establish direct contacts with its leadership, both civilian and military. "This will be beneficial for RSV 421 and

will lay a good foundation for cooperation between Bulgarian and Argentine scientists," he noted.

LIVINGSTON ISLAND, 03.02.2024

The first group of Spanish scientists and logisticians has left the Sv. Sv. Kiril i Metodii and headed to Juan Carlos I Spanish Antarctic Base of Livingston Island. The Spanish Antarctic scientists worked on their research activities together with the Bulgarian crew on board the ship.

Before the departure of the scientists, RSV 421 entered the South Bay of the Livingston Island. The Bulgarian ship returned from a brief visit to the Argentinean Carlini research station on King George Island.

The Bulgarian ship continued its voyage to the Deception Island, where the Spanish Gabriel de Castilla Polar Base is located, to leave the second team.

Earlier this year, RSV 421 made a voyage to Deception Island to unload provisions and construction materials for the Spanish polar base.

LIVINGSTON ISLAND. 04.02.2024

A commemorative ceremony was held aboard the Sv. Sv. Kiril i Metodii on Sunday for Argentine researchers who

group of the Spanish research

Mednikarov asked Lieutenant-Commander Lucas Acosta, representative of the Argentine Navy assisting the Bulgarian

waters, to brief the party about

in 1976. The researchers died in a plane crash, fragments of which were found by Bulgarian researchers at the end of January during the collection area of Livingston Island's False Bay and Barnard Point. Sunday's commemorative event took place in the same area, the Nikola Vaptsarov Naval

Academy reported Monday.

The first words are addressed by the Head of the Varna Naval Academy, Flotilla Admiral Boyan Mednikarov. "Today we are in this formation together servicemen and polar explorers from Argentina, Bulgaria and Spain. Three brotherly nations working together to explore the White Continent. Together we want to pay tribute to our Argentine colleagues who 48 years ago gave their lives in the three crew members died. name of Antarctic research."

Flotilla Admiral Boyan Acosta said that the crash of the ship's navigation in Antarctic

lost their lives in Antarctica the events of 1976-77.

Early on September 15, 1976, the aircraft took off from the Rio Grande Naval Base with a ten-member crew to research the state of the ice of geological samples in the in the Drake Passage and near the South Shetland Islands. The communication with the aircraft was lost, and a crash site was later established on one of the slopes of Bernard Mountain on Livingston Island. An icebreaker was sent to Antarctica to rescue possible survivors from the crash. As it arrived close to Livingston Island on October 4 the same year, it found debris from the crash but no survivors.

> In January 1977, during a search for the crew's bodies, a BELL 212 helicopter crashed as a result of a sudden worsening of weather conditions. All

> Lieutenant-Commander plane and the rescue helicopter has been the biggest disaster in the history of the Argentinian presence in Antarctica.

> Bulgarian Ambassador to Argentina Stoyan Mihaylov said that this tragedy is a valuable lesson for the immeasurable challenges, dangers, and risks that accompany man's strive to uncover Antarctica's secrets. "Today Bulgarian people mourn this loss together with the Argentinian people and it is an honour for us to be paying tribute to the Argentinian heroes," said the diplomat.

Prof. Pimpirev said it felt odd to be amidst all the beauty of Antarctica and Livingston



Antarctica, February 3, 2024. Scientists from Argentina's Antarctic Expedition considering the option to implement some of their projects aboard the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii.



Kiril Kandilarov. Personal archive photo

island where nature took the lives of 14 researchers. "The Argentinian researchers were on the Lockheed P-2 Neptune aircraft in the name of science, peace and the future of mankind. Sadly, they lost their lives but they flew to the Sun, which is depicted on the remains of the aircraft. Glory to the heroes!"

DECEPTION ISLAND. THE ANTARCTIC. 04.02.2024

The Sv. Sv. Kiril i Metodii assisted the Spanish Antarctic bases of Juan Carlos I on Livingston Island and Gabriel de Castilla on Deception Island by transporting the Spanish scientists and logisticians. On Sunday the ship took the second group of Spanish Antarctic scientists to the Gabriel de Castilla Base, located on Deception Island.

The Bulgarian team was welcomed by Angel Prado, commander of the Gabriel de Castilla Spanish base. He invited the Bulgarian researched at the base where the teams from both nationalities gathered.

Prado thanked the Bulgarian crew for the assistance provided on New Year's Eve to the distressed motorboat El Doblon and for the course made by RSV 421 to unload provisions and building materials for the Gabriel de Castilla Spanish polar base. He said that the support the ship has provided to the Spanish researchers in the past couple of years, has been invaluable. "I heard you are leaving a week from now and it is bad news for us because we need your help," he said.

"We hope our cooperation in Antarctica will continue for many years to come. The more people we have here together, the better," added Commander Angel Prado.

The Bulgarian officials left gifts for the Spanish researchres. Prof. Christo Pimpirev's gift was a plaquette of the Bulgarian Antarctic Institute and the Spanish translation of his book, Antarctic Diaries; the gift of Flotilla Admiral Boyan Mednikarov was a plaquette of the Bulgarian naval Academy; and of BTA Director General Kiril Valchev a copy of a special edition of BTA's LIK magazine dedicated to the first Antarctic voyage of RSV 421. The Spanish polar researchers have their Bulgarian collagues a plaquette with the logo of the Spanish polar base.

Later, a team from the Royal Geographical Society of Spain, led by Spanish physicist and researcher Prof. Javier Cacho, inspected the abandoned whaling base on the island. They were accompanied by Bulgarian Ambassador to Argentina Stoyan Mihaylov and Admiral Prof. Boyan Mednikarov.

After the visit to the Gabriel de Castilla base, RSV 421 headed to the St. Kliment Ohridski Bulgarian base.

LIVINGSTON ISLAND, 05.02.2024

The last group of the 32nd Bulgarian Antarctic Expedition arrived on Livingston Island on Monday. Among them were the head of the 32nd Bulgarian Antarctic Expedition, Prof. Christo Pimpirev, Bulgaria's Ambassador to Argentina, Stoyan Mihaylov, Nikola Vaptsarov Naval Academy (NVNA) Rector Flotilla Admiral Boyan Mednikarov, Dr Sevdalina Mihailova, Iglika Trifonova, Lyubov Kostova and journalist Maria Cherneva. Before that, they paid a short visit to the Spanish polar station Gabriel de Castilla, located on Deception Island.

The group was welcomed by their colleagues on the shore of Livingston island with a traditional spread of bread, salt and honey. Together they headed to the Bulgarian station.

Dr Sevdalina Mihailova told BTA that her first impressions were very nice and warm. "The house [Bulgarian base] is amazing, just like a cabin. This is how I imagined it to be." The boat trip was unique, she added.

LIVINGSTON ISLAND. 07.02.2024

The Sv. Sv. Kiril i Metodii is helping Spanish Antarctic explorers open a field camp on Byers Peninsula at the west end of Livingston Island. Late on February 6, the Bulgarian ship loaded materials from the Juan Carlos I Spanish Antarctic base, which are needed for research on the hard-to-reach, little explored peninsula.

Commanding Officer Nikolay Danailov talked to BTA about an ongoing operation in which RSV 421 is to transport and unload the materials on Byers Peninsula. "As part of the fine Bulgarian-Spanish cooperation on the Ice Continent, we continue to provide assistance to the Juan Carlos I Spanish

base. Last night we loaded 7 or 8 tonnes of materials, to be transported to Byers Peninsula at the west end of Livingston at the St Kliment Ohridski Bul-Island. We will be unloading for about 24 hours so that the Spanish colleagues can open their field camp there," Danailov said.

The commanding officer stressed that this year the Spanish scientists rely entirely on help from RSV 421 for setting up a field camp. "This used to be done by other Spanish ships," he said. This is the first time that more than 10 Antarctic scientists from the Spanish polar programme will stay at the field camp. They will be joined by two Bulgarian scientists, Assoc. Prof. Docho Dochev and Assoc. Prof. Lyubomir Metodiev, who will do paleontology research.

Danailov also said: "I am proud that the Bulgarian-Spanish cooperation in Antarctica

and the joint study of Livingston Island continues."

Dochev and Metodiev arrived garian Antarctic base with the fourth group of the 32nd national Antarctic expedition.

LIVINGSTON ISLAND, 08.02.2024

Paleontologists Assoc. Prof. Dr Docho Dochev and Assoc. Prof. Dr Lubomir Metodiev told BTA about their work in Antarctica. The aim of their project is to do paleontological and stratigraphic research in the westernmost part of the Bayes peninsula.

They will try to make a crosssection of the oldest rocks exposed in this area and describe the rock sequences layer by layer. The researchers plan to take samples from each layer. They will focus on collecting fossils that will reveal the age



Kiril Kandilarov. Personal archive photo



Antarctica, February 4, 2024. The Bulgarian naval research vessel supports the Spanish Antarctic stations Juan Carlos I on Livingston Island and Gabriel de Castilla on Deception Island by transporting Spanish scientists and logisticians. BTA Director General Kiril Valchev presents a special edition of LIK magazine dedicated to the Bulgarian ship's first voyage to Antarctica.

Photo: Emil Granicharov, BTA

of the rocks in which they were found.

"We will make geochemical studies of the collected samples, and we will try to make paleontological interpretations - what was the salinity of the sea, the temperature of the water, were there conditions for life of ancient organisms," Metodiev explained.

According to his colleague, the rocks on the Bayes peninsula are mainly sedimentary, i.e. they were formed in a water basin. "Parallel to their formation there was volcanic activity, which led to the formation of volcanic rocks. The whole island is made of sedimentary and volcanic rocks, which should be of the same age," Dochev added. The presence of this type of rock means that Antarctica was not always an ice desert. "When these rocks were formed and the corresponding volcanic eruptions occurred, whether underwater

or on the Earth's surface, the peninsula was the bottom of some warm basin," is the expert's opinion.

The Bulgarian scientists suggest that the warm pool was either marine or oceanic.

Metodiev said that the process of data collection is classical. "Building on a geological map already made and data from earlier publications, we will collect samples sequentially to make a larger geological section and then, at a later stage, make interpretations using laboratory methods. We assess what the rock is, take samples of about 100-150 grams, put them in special envelopes, describe from which section and at which metre they were found - that's how we go sequentially," the paleontologist said.

"When we know what climate changes were like in the geological past, we can predict what climate changes will be like in the future," the Bulgarian researchers said.

"There has been a periodisation done based on the evolution of living things 250 years ago. This is the best, simplest and cheapest method to date sedimentary rocks," Metodiev said. According to him, it is easier to find a fossil, but it is difficult to find a specialist to determine its age.

Dochev pointed out that the Bayes Peninsula is the westernmost part of Livingston Island, where the Bulgarian Antarctic base is located. "This is a peninsula that is very little occupied by ice and snow. All the islands, even the smallest ones, have an ice cap and the rocks are not visible. The Bayes Peninsula is the widest ice-free area, not only on the whole archipelago, which makes it possible to work," Metodiev said, adding that research will be successful if nature is kind.

The paleontologists tell of harsh weather conditions on Beyes. Metodiev says that research will be successful if nature is merciful.

"We don't have any facilities, we will sleep in tents for about ten days," Dochev said. According to him, the Spanish scientists have two temporary shelters on the field base, which the Bulgarian scientists will be using for communications and laboratory work.

He remembers that Prof. Pimpirev was the first to set foot on Beyes Pensinsula 30 years ago or so. "He spent here two months with the same mission

as we have now. He did geological charts and described rock sequences." That is the base that the researchers will be using now during the current expedition.

LIVINGSTON ISLAND, 09.02.2024

The Bulgarian News Agency (BTA) opened a national press club at the Bulgarian Antarctic base on Livingston Island. Attending the event were BTA Director General Kiril Valchev, Bulgarian Ambassador to Argentina Stoyan Mihaylov, the leader of the 32nd Bulgarian Antarctic Expedition, Prof. Christo Pimpirev, and the head of the Nikola Vaptsarov Naval Academy in Varna (on the Black Sea), Flotilla Admiral Boyan Mednikarov.

The BTA Director General said that he took advantage of his participation in the 32nd Bulgarian expedition, while

on a break from work, to open a National Press Club at the Bulgarian base on Livingston Island together with Prof. Pimpirev. Valchev, for whom this is the third Antarctic expedition, explained that BTA's press club is housed in a blue container (BTA's colour) provided free of charge by the Bulgarian Antarcticians.

The national press club of Bulgaria's news agency at the Bulgarian Antarctic base is yet another sign of the Bulgarian State's serious presence in Antarctica, he noted.

Prof. Pimpirev said that the presence of journalists, who have been on almost all Antarctic expeditions, always make him happy. Prof.Pimpirev said: "It is precisely journalists that will show Bulgarians, people from around the globe, that we are here, that we are working, that we are doing world science with our fellow scientists from Europe and the remain-

ing countries." He suggested that a journey be organized for the press with RSV 421 like the one on Esperides 15 years ago, when 35 journalists from all over Spain joined the Esperides crew and everybody was talking about the Spanish presence on Antarctica thanks to the stories of these journalists.

Ambassador Mihaylov said that the press club's opening is an achievement not only for Bulgarian journalism but also for all Bulgarians, who do not know what is happening over 20,000 km away from their country. This is a unique possibility to show what Bulgarians have achieved, how they have achieved it, at what cost and where Bulgaria is positioned among the other Antarctic nations. Journalists in Antarctica are researchers as well, he noted.

The press club will provide a comfortable workspace for



Antarctica, February 4, 2024. Photo: Emil Granicharov, BTA



Livingston Island, February 5, 2024. Prof. Christo Pimpirev arrives at the Bulgarian Antarctic Base St Kliment Ohridski. He is welcomed by the head of the base, Kamen Nedkov. Photo: Emil Granicharov, BTA

the media on Livingston Island. All Bulgarian and foreign journalists visiting the Bulgarian Antarctic base will be able to make interviews and news briefings with Bulgarian and foreign researchers in a warm room with tables and benches.

This practice was introduced by the Argentinian news agency TELAM, with which BTA signed an agreement and discussed partnership in Buenos Aires en route to Antarctica, said Valchev.

He noted that in February 2023, the then president of Argentina, Alberto Fernandez, personally announced the opening of a TELAM office at one of the country's 13 Antarctic bases "to give visibility to all the information related to the white continent".

BTA will follow this example, said the BTA Director General. "Because this is actually an example with a longer history - both in global and Bulgarian journalism. The diaries of sailors and explorers from the 17th, 18th, 19th and early

20th centuries in fact contain the first "reports" about Antarctica. But in the twentieth century it became clear how important the role of journalists was, because without them there would be no knowledge of the continent and no science here. The New York Times sent a special correspondent with the first US Antarctic expedition of Admiral Russell Owen in 1928-1930. To this day, the USA Antarctic Program maintains an official newspaper, The Antarctic Sun. The icebreaker Ob, which began construction of the first Soviet Antarctic bases in 1956, has a correspondent and cameraman.

During their visit to the Ukrainian research ship Noosphere, the group from the 32nd Bulgarian Antarctic expedition learned that there was a permanent photographer at the Ukrainian base. The position is currently filled by Sergei Glotov.

At a commemorative ceremony on the Bulgarian naval research ship RSV 421 in mem-



Livingston Island, February 5, 2024. Flotilla Admiral Prof. Doctor of Military Sciences Boyan Mednikarov in front of the Bulgarian laboratory under construction. Photo: Emil Granicharov, BTA

ory of the Argentine explorers who died in a plane crash in 1976 in the area of Bernard Point on Livingston Island, a tribute was also paid to Rodolfo Rivarola, a videographer for Channel 13 TV in the Argentine city of Ushuaia, who was travelling with the Neptune 2-P-103 aircraft of the Argentine naval research squadron.

The Bulgarian Antarctic expeditions have a long-standing tradition of participating journalists. During the 2nd Bulgarian Antarctic Expedition of 1993-1994, journalist Simeon Idakiev and cameraman Nikolay Yotov from Bulgarian National Television (BNT) reached King George Island. During the 3rd Bulgarian Antarctic Expedition of 1994-1995, Elena Yoncheva became the first journalist to reach the Bulgarian Antarctic base together with cameraman Nikolay Petrov of BNT. Over the year, more than 30 journalists, cameraman, photographers, and writers have participated in the expeditions.

expedition in 1995-1996, the explorers were accompanied by a Bulgarian National Television cameraman, Emilian Dinov, and the fifth expedition in 1996-1997 was accompanied by Kamelia Stancheva of Kontinent daily.

Participating in the expeditions during the years have been another 30 journalists, cameramen, photographers and writers (some of them more than once).

The journalists - after pioneers Simeon Idakiev, Elena Yoncheva and Kamelia Stancheva, included in the ex-

peditions are Albena Vodenicharova from BNT, Blagoy Tsitselkov from Nova TV, Georgi Toshev from bTV, Ekaterina Boncheva from Mediapool. bg, Zhivko Konstantinov from During the fourth antarctic Nova TV and Euronews Bulgaria, Kiril Valchev from Darik Radio and BTA, Konstantin Karagyozov from BTA, Marina Velikova from BNR, Maria Cherneva from BNT, Plamen Enchev from Trud daily, Tanya Sotirova from BNT, Tsvetelina Atanasova from BNT.

> The first cameramen who were on Antarctica were Nikolay Yotov and Nikolay Petrov, followed by Blagoy Momchilov for Nova TV, Emil Granicharov for BTA, Emilian Dinov for BNT, Nikolay Kanev for Nova TV, Rumen Vassilev, Velizar Milenkov for BNT, Rumen Kanchev for BNT, Anna

Andreeva for BNT, Elenko Kasaliysky.

The list of photographers on Antarctica includes Vanya Saralieva, Zafer Galibov, Iglika Trifonova, Milena Marincheva, Nedelcho Hazarbasanov, Niki Davidov, Svilen Panayotov, Yana Kiselova. The writers are Boyan Biolchev, Izabela Shopova and Lyudmila Filipova.

"What is needed from now on is for Bulgarian journalism to build on what their colleagues have achieved, largely thanks to with personal enthusiasm and own funding, than with systematic support from Bulgaria and its media," said BTA Director General Kiril Valchev.

Following the example of other news agencies such as AFP, Bulgaria's national news agency is already making a contribution thanks to the support



Photo: Emil Granicharov, BTA



Livingston Island, February 9, 2024 The Bulgarian News Agency unveils a national press club at the Bulgarian Antarctic Base St Kliment Ohridski on Livingston Island. The event is attended by Flotilla Admiral Prof. Doctor of Military Sciences Boyan Mednikarov, BTA Director General Kiril Valchev, head of the expedition Prof. Christo Pimpirev, Ambassador of Bulgaria to Argentina Stoyan Mihaylov. Photo. Emil Granicharov, BTA

of the Bulgarian research vessel RSV 421 and the Bulgarian base of St. Kliment Ohridski, which have provided at no cost facilities for press clubs. These press club now add to the 30 press clubs BTA has in Bulgaria and 6 in neighbouring countries, and countries with large Bulgarian communities.

BTA currently has a correspondent aboard RSV 421, Emil Granicharov, who sends videos freely accessible by all media both in Bulgaria and around the world through the Bulgaria-Antarctica BTA's Log. The latest example are detailed BTA reports that appeared in the Argentinian media after a ceremony paying tribute to the deceased Argentinian Antarctic explorers.

During the previous expedition from December 27, 2022 to May 2, 2023, BTA had a correspondent, Daily News Editor Konstantin Karagyozov, who covered the 127-day expedition with text, video and photos during the entire voyage (in-

cluding across the Atlantic in both directions) and throughout the stay in Antarctica.

in two consecutive Antarctic expeditions, BTA is atop the hits in a Google search for Pimpirev. "Antarctica correspondent".

In June 2023, BTA published in Bulgarian and in English an issue of its LIK magazine "To Antarctica and Back under the Bulgarian Flag" dedicated to isticians work here, said the historic expedition, Valchev added. He said that a new issue of LIK is being considered, this time in Bulgarian, English, and Spanish. It will be dedicated to the scientific projects of the current expedition, because in that way BTA carries out its mission to popularize Bulgaria by presenting one of its most beautiful faces it," noted Pimpirev. - that of Bulgarian science.

LIVINGSTON ISLAND, 09.02.2024

The Bulgarian base the Bulgarian Antarctic Base St. Kli-

ment Ohridski is probably one of the most environmentally friendly and clean bases Thanks to its correspondents in Antarctica, said the head of the Bulgarian Antarctic expedition, Prof. Christo

> The Bulgarian Antarctic base has existed for some 30 years. Every year Bulgarian polar explorers, scientists, builders and log-Pimpirey, adding that before the acquisition of the Sv. Sv. Kiril i Metodii, which is on its second Antarctic voyage, the base was "buried" in garbage. "I was ashamed of the inspectors from the Antarctic Treaty Consultative Meeting, who often came to see the barrels in which we stored

"We had collected 300 rusty barrels, and there was a risk of them breaking and contaminating this purest environment on Earth," he said, adding that with the ship, all these barrels went for scrap

in Bulgaria.

The management of the Nikola Vaptsarov Naval Academy in Varna (on the Black Sea), and the command of the research ship treat the issues of environmental protection with the utmost seriousness, said the head of the Naval Academy Flotilla Admiral Boyan Mednikarov. He added that the implementation of the requirements of the International Convention for the Prevention of Pollution from Ships (MARPOL) are a fundamental issue for seafaring and the maritime industry.

"We have already had requests from several bases in the area to take their waste with the Bulgarian ship," said Pimpirev. "Depending on the time we have left from assisting Bulgarian Antarctic research, we would also help the other bases," he added.

SOFIA. 09.02.2024

Students from a Sofia primary school were among the first allowed into the Bulgarian Antarctic base. The "visit" took place via a video link with scientists from the Bulgarian naval research ship RSV 421.

Commanding officer Nikolai Danailov explained that the ship is currently in front of the Bulgarian Antarctic base in the bay and will assist the expedition with various activities during some 40 days. He said that it has a crew of 34 servicemen. "I dare say that this is the first Bulgarian naval ship to reach Antarctica and the Antarctic, and I am very proud to be part of this crew," said the captain.

Prof. Pimpirev also welcomed the students. He studied at this school himself for seven

years. He told the students that the temperature there is currently minus 30 C. He showed them one of the main buildings of the Bulgarian base and noted that a new scientific laboratory is now being built, which "will house scientists who will reach world heights in science."

"Antarctica is the largest natural laboratory in the world that is outdoors. The greatest discoveries for mankind are made here. It is also here that evidence of the warming of our planet is found," says Prof. Pimpyrev.

SOFIA, 10.02.2024

The 40-day polar mission of the Sv. Sv. Kiril i Metodii is fully accomplished, said Prof. Christo Pimpirev, leader of the 32nd Bulgarian Antarctic Ex-

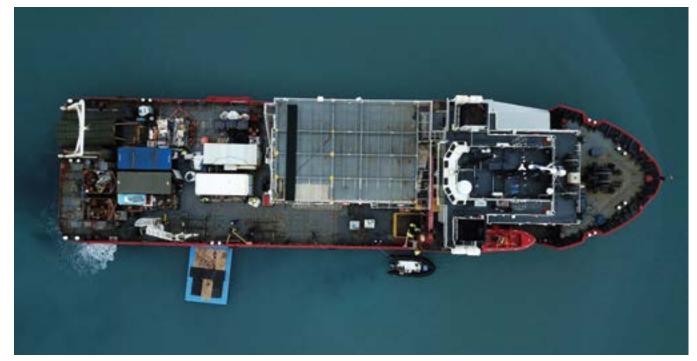


Photo: Emil Granicharov, BTA

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Livingston Island, February 11, 2024 Assoc. Prof. Boris Tzankov, consultant for the construction of the new water pipeline in the area of the Bulgarian Antarctic Base St Kliment Ohridski, Photo: Emil Granicharov, BTA

pedition.

He was speaking after a group of participants in the expedition embarked on board RSV 421, which has set sail from the Bulgarian base on Livingston Island. Pimpirev was quoted by the Nikola Vaptsarov Naval Academy in Varna on Friday. Basically, the scientific laboratory is complete. The ship brought 80 t of supplies for its construction.

The field work of almost all the 12 research projects being carried out under the national polar research programme has also been completed, Pimpirev noted.

Pimpirev stressed that the 32nd Bulgarian Antarctic Expedition supported many foreign expeditions..

As the ship sailed from Livingston Island to the Drake Passage, Commanding officer Nikolay Danailov thanked the crew for that dedication and team spirit.

LIVINGSTON ISLAND, 11.02.2024

A new water pipeline is being built in the area of the St. Kliment Ohridski Bulgarian Antarctic Base on Livingston Island. The first 150 meters of the new water pipeline were built and put into operation this year. The second half of the water pipeline is to be completed and put into operation by the end of the current 32nd Bulgarian Antarctic Expedition, Assoc. Prof. Boris Tsankov, consultant on the construction of the water pipeline, said.

"The main activities carried out at the Bulgarian Antarctic Base are scientific research. It is necessary to have a well-established and well-functioning scientific structure to be able to carry out these activities sustainably. Drinking water supply is one of the important parts of this infrastructure. The provision of drinking water at

the Base ensures peace of mind and comfort for those working and living there," Tsankov said.

"Since last year, I have been replacing the existing water pipeline, which was a rubber hose that stretches when the base is opened and retracts when it is closed, with a small diameter, with metal spigots, when the temperatures drop below zero degrees, the water freezes," the expert said.

He noted that the new water pipeline was laid over uneven and rocky terrain.

The water is drawn from a stream fed by a glacier. It is an inexhaustible source of water, as the past 32 Antarctic expeditions have not observed the glacier retreating upwards, which is a prerequisite for a sustainable water supply, Tsankov said.

He said the construction of the new water pipeline has both scientific and educational value. The scientific value is

mainly expressed in the way the reinforcement is done and in the way the pipes are laid. The terrain here is radically different from what we are used to seeing in Bulgaria. There we have the so-called "freezing point" - a depth below which we cannot expect the water to freeze. Here in Antarctica, at least to my knowledge, there is not. Even if we could excavate this rocky terrain, we would not find this "freezing point" and that is why in all bases, including ours, the water piping is laid on the ground, Tsankov noted.

LIVINGSTON ISLAND. 12.02.2024

Having worked as an engineer at the St. Kliment Ohridski Bulgarian Antarctic Base for five years, Peter Sapundzhiev presented a working frame-recording device and the process of creating a measurement system for recording the atmospheric parameters of glaciers. Speaking to BTA, Sapundzhiev shared that he dreams of "an infrastructure of measurement systems that cover as many parameters of our surroundings as possible and track the behaviour of glaciers".

The engineer presented the first installed prototype for collecting visual information through frames. In his words, he has designed the electronics that control the camera and make sure that it works autonomously throughout the year. "These electronics turn the camera on and off when it

has to take a shot." The device onds of footage of the glacier runs on solar power using a photovoltaic system. "The battery charges during the lighter months of the year. Everything has been calculated so that it can work during the long, dark months of winter," Sapundzhiev added.

is placed is made of aluminium and is hermetically sealed. "It is crucial that it is dry because if it is not, condensation forms on the glass when the temperatures are low and the footage gets distorted," the engineer noted. He added that there are two conditioning cables that the collected data is stored. "The next stage of the project is to obtain the footage remotely," Sapundzhiev said.

At the Bulgarian base, Sapundzhiev showed a few sec-

that had been collected over seven months. "With this research method, we see the glacier from a perspective that is inaccessible to us," he said, adding that the movements of specific points on the glacier can be quantified if the images' The box in which the camera scale factors are determined. He noted the camera is placed at a location where snow does not accumulate.

"The following version is made of specially selected stainless steel. The device has a hermetic housing where the camera is placed," the engineer said, commenting on the connect the camera to another second device he is working hermetically sealed box where on. "It is a measuring system for reading atmospheric parameters - atmospheric pressure, temperature, humidity, and lighting. Cables connect the electronics to the lens with a 'service box' that works on



Livingston Island, February 12, 2024. Peter Sapundzhiev, a PhD in electronics who has been working as an engineer at the Bulgarian Antarctic Base St Kliment Ohridski for five years, presents a working frame-recording device and the process of creating a measurement system for recording the atmospheric parameters of glaciers. Photo: Emil Granicharov, BTA

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Comodoro Rivadavia, February 16, 2024. Photo: BTA

ed data," Sapundzhiev further said.

The engineer said that when they open the Bulgarian Antarctic Base, the scientists place a wooden stand on the most dynamic and crevassed part of a nearby glacier. "We install a GPS on it and leave it to measure its location for weeks. This way, the movement of the glacier on which the stand is mounted can be determined," Sapundzhiev said, adding that this is the most accurate way to measure movement. He also pointed out some drawbacks, noting that the battery that powers the GPS has to be changed every few days and the device cannot be left running during the winter due to the poor weather conditions on Livingstone Island.

analyzing this data using a fluid motion analysis method.

solar power and stores collect- My ultimate goal is to create a more advanced and harshweather-resistant device that will be available all the time, and the footage taken can be used in the future. Seeing how the analysis methods are evolving, I believe that in ten years' time, the new generation of scientists will have an idea of what information to extract from this footage," Sapundzhiev said.

In his words, Antarctica is one of the most incredible research sites where the interconnection between different ecosystems is preserved. "We need to study each element of the whole separately to understand the overall processes. By combining the measurement systems and taking into account the data collected, we can better understand glaciers' behaviour and how "I am taking initial steps in it is changing," Sapundzhiev noted.

LIVINGSTON IS-LAND, ANTARCTICA, 13.02.2024

It is very important to have a common policy of the EU member states regarding the Polar Regions, because they are the future of humanity and our planet, said in an interview with BTA Prof. Christo Pimpirev from the Sv. Sv. Kiril i Metodii.

The European Union has a special body - the European Polar Board, of which Bulgaria has been a permanent member since its foundation 25 years ago. "I can boldly say that Bulgaria participates in the management and protection of European interests - of the European Union above all, on Antarctica and in the Polar Regions," the Professor said.

Asked what a future EU Antarctic policy document should contain, he pointed out that there could be even closer cooperation between EU countries in studying the Polar Regions, specifically Antarctica.

LIVINGSTON IS-LAND, ANTARCTICA, 13.02.2024

Work continues on the construction of a new scientific laboratory at the Bulgarian Antarctic Base of St. Kliment Ohridski, Base Commander Kamen Nedkov told BTA. He presented the process of building the foundations of the building, which began during the 31st Bulgarian expedition to Antarctica.

"The quantity of materials for the construction of the new laboratory block is about 80 tonnes," said Nedkov, explaining that the elements were loaded onto the naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) and traveled 50 days to Livingston Island, and were unloaded in a period of ten days.

Nedkov said that cement and cement additives were brought last year in order to cast the 32 foundations of the laboratory building. As part of the 2024 mission to Antarctica, the Bulgarian builders, with the help of a 4-tonne chain crane, assembled the elements of the building. "We are gradually uploading every single detail. This includes columns, windows, floor, wall and ceiling panels, external and internal walls, as well as two layers of plywood for the floor," the Base Commander pointed out, noting that air cushions have been placed between all columns and floors for the purpose of insolation.

The Base Commander said that the internal installation and furniture of the laboratory is expected to be built next year, and the laboratory the year after. "If we have the opportunity, we will start the equipment process as early as next year."

The next two years are decisive, and extremely important voyages for RSV 421, without which the new scientific laboratory, could not be built said Commander Nedkov.

At a video conference with the Sv. Sv. Kiril i Metodii, on behalf of President Javier Milei, Argentine Defence Minister Luis Petri expressed gratitude for the finding of the wreckage of a perished Argentine Antarctic explorers' aircraft.

Petri talked by video conference with Bulgaria's Ambassador in Buenos Aires Stoyan Mi-

haylov, the leader of the 32nd Bulgarian Antarctic Expedition, Prof. Christo Pimpirev, the Rector of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Boyan Mednikarov, and the Commanding Officequipment will be installed in er of RSV 421, Commander Nikolay Danailov, while the Sv. Sv. Kiril i Metodii was sailing off the coast of Argentina en route to Bulgaria, back from the St Kliment Ohridski Bulgarian Antarctic Base on Livingston Island.

> The Defence Minister stressed the exceptional importance of this discovery, made 48 years after the crash. "Indeed, checks have vet to be completed to confirm that this is indeed the Neptune aircraft. What happened now is important for us, and especially for the families of the 11 persons who died in the accident. Against this background, I acknowledge the close ties between our two countries. We are grateful for our cooperation and, in this



Livingston Island, January 25, 2024. Sunset as the naval research vessel Sv. Sv. Kiril i Metodii sets sail from Half Moon Island to Livingston Island in order to support the scientists at the Bulgarian polar base. Photo: Emil Granicharov, BTA

particular case, for the discovery of the Neptune wreckage. Once again, all those who made this discovery possible, please accept gratitude on my behalf and on the behalf of the President," said Petri.

Ambassador Mihaylov said that the recovery of the wreckage and the commemorative event for the victims provided an occasion to pay tribute and respect to the dead Argentine Antarctic explorers. "We indeed acknowledge Argentina's immense support for our efforts to explore the White Continent. On the other hand, when you are there you realize that if you are alone and without solidarity from partners of the rest of the countries, without that Antarctic family, each one may find themselves among the victims," the diplomat pointed out.

The Ambassador noted that even at this point, there is an Argentine officer on board the Bulgarian ship who shares his expertise of navigation in Antarctic waters. Mihaylov recalled that the Commanding Officer of RSV 421 and his two deputies have undergone an Antarctic navigation course in Argentina. "This ship is very important to us, it is the first Bulgarian research vessel to reach the Antarctic coast so as to share in and contribute to the exploration of the continent. As I have always said, Argentina, through its Navy, has a whole chapter of its own in the history of Bulgarian Antarctic shipping," the diplomat pointed out.

On behalf of the entire Antarctic community and of the Bulgarian people, Prof. Pimpirev thanked Defence Minister Petri for Argentina's yearslong support.

the traditional cooperation and solidarity between Argentina and Bulgaria.

LIVINGSTON ISLAND. 15.02.2024

The leadership of the Nikola Vaptsarov Naval Academy awarded a badge of honour Ocean" to three Bulgarian Antarctic explorers for their contribution to Antarctic expeditions. Those honoured are Prof. National Antarctic Expedition and Bulgarian Antarctic Institute Director, the Ambassador to Argentina, Stoyan Mihaylov, and Bulgarian News Agency (BTA) Director General Kiril Valchev. The badges were presented by the Naval Academy Rector, Flotilla Admiral Boyan Mednikarov. The formal event took place on board the Sv. Sv. Kiril i Metodii.

Prof.Mednikarov said: "Years ago, when the Bulgarian Navy participated in the joint Black Sea Fleet squadrons in the Mediterranean and Bulgarian ships sailed to Cape Matapan (the southernmost point of Greece's Mani Peninsula) and east of it, the officers, petty officers and seamen participating in those voyages wore a special badge 'For a Long Voyage'." "Last year, in con-

nection with the first successful mission of RSV 421 in the Atlantic Ocean, I had a similar badge instituted, 'For Sailing in the Southern Ocean'," said Mednikarov. An operational Defence Minister Petri noted badge is awarded to any member of the ship's crew who has sailed successfully through the Drake Passage and reached Antarctica. In other words, it is given to people who have proved they are true seafarers. As to the badge of honour, it is given for contribution to Antarctic research.

He went on to say that Bul-"For Sailing in the Southern garia reached Antarctica in a dignified manner: "Here we are an example that when Bulgarian Antarctic explorers set their heart on the mission, Bul-Christo Pimpirev, leader of the garia can be one of the world's most advanced nations in Antarctic exploration." He wished the RSV 421 crew to continue their Antarctic missions successfully.

> **COMMODORO** RIVADAVIA, ARGENTINA, 16.02.2024

Descendants of Bulgarians welcomed the Sv. Sv. Kiril i Metodii in Commodoro Rivadavia, Argentina, which is home to a large community with Bulgarian roots. They have established a society that bears the same name as the ship, Sts. Cyril and Methodius.

Among the welcoming party were Tsenka Genova, President of the local Bulgarian society, and Ruzhka Nikolova, President of the Argentine-Bulgarian Foundation in Buenos Aires, which also represents the Federation of Bulgarian Societies in Argentina, established in 2022.

The ship docked at 21:30 local time on February 15 on its return voyage from the Bulgarian Antarctic base on on Livingston Island.

On the morning of February 16, there will be an official welcoming ceremony with a cultural programme for the Bulgarian ship, where the city mayor, municipal council chairperson and regional governor will be among the guests. A meeting is planned on board the ship between scientists from the The National University of the Patagonia San Juan Bosco and Bulgarian Antarctic researchers. The Bulgarian scientists will also speak to the local press.

LIVINGSTON ISLAND, 16.02.2024

Admiral Boyan Mednikarov, head of the Nikola Vaptsarov Naval Academy in Varna, presented the Bulgarian News Agency (BTA) with an honorary plaque and a certificate on the occasion of its 126th anniversary. BTA Director General Kiril Valchev received the award on behalf of the Agency on board the Sv. Sv. Kiril i Metodii.

Mednikarov congratulated BTA on behalf of the Naval Academy and the RSV 421. "The honorary plaque is a symbolic gift for the news agency on the occasion of its 126th an-



Comodoro Rivadavia, February 18, 2024. Tsenka Genova, head of the Sts. Cyril and Methodius Bulgarian Society in Comodoro Rivadavia, BTA Director General Kiril Valchev and Ruzhka Nikolova, President of the Argentine-Bulgarian Foundation in Buenos Aires, who also represents the Federation of Bulgarian Societies in Argentina, established in 2022

niversary," he said.

In his speech, Valchev likened BTA to Anglo-Irish Antarctic explorer Ernest Shackleton, as both share a curiosity about the world and a desire for discovery and share the same birthday, February 16.

At an official ceremony on RSV 421, the leadership of the Nikola Vaptsarov Naval Academy awarded a badge of honour "For Sailing in the Southern Ocean" to three Bulgarian

Antarctic explorers for their contribution to Antarctic expeditions: Prof. Christo Pimpirev, the Ambassador to Argentina, Stoyan Mihaylov, and BTA Director General Kiril Valchev.

THE ATLANTIC OCEAN. 16.02.2024

Two combat drills were conducted on board the Sv. Sv. Kiril i Metodii before the ship entered the Argentine port of Commo-



Comodoro Rivadavia, February 17, 2024. An official welcoming ceremony is held in the Argentinian city for the docked naval research vessel Sv. Sv. Kiril i Metodii (RSV 421). Photo: Emil Granicharov, BTA







Comodoro Rivadavia, February 18, 2024. RSV 421 being welcome at the Argentinian city

doro Rivadavia in Chubut Province.

RSV 421 is sailing back home from Livingston Island, where the ship helped the members of the 32nd Bulgarian Antarctic Expedition in their research and construction at the St Kliment Ohridski Bulgarian Antarctic Base and assisted fellow polar researchers from Spain, Argentina, Chile and Britain.

In a man overboard drill, the crew practised rescuing a training mannequin suspended in the ocean. The drill involved manoevring, emergency lowering of a fast rescue boat and resuscitation.

In an on-board fire drill, the crew practised extinguishing a fire on the main deck and in the engine room. The firefighting was carried out by an emergency response party and an emergency response group. In a training simulation, a fire victim was given first aid.

The two drills were observed by the Rector of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Prof. Boyan Mednikarov.

COMMODORO RIVADAVIA, ARGENTINA, 16.02.2024

Bulgarian flags, anthem, bagpipe and costumes were involved in a ceremony in honor of the Sv. sv. Kiril i Metodii at the port of the Argentine town of Commodoro Rivadavia, which is home to many descendants of Bulgarians. In the evening, at a concert for the crew and the team of the 32nd Bulgarian Antarctic Expedition at the cultural centre in the town, local people performed Bulgarian folk songs and folk dances, as well as Argentine tango and milonga.

Returning from the Bulgar-

ian Antarctic base on Livingston Island, the ship cast anchor in Comodoro Rivadavia in the evening of February 15. The ceremony in the morning on February 16 is attended by members of the Bulgarian community, local government representatives of Chubot Province, where Comodoro Rivadavia is the largest town. According to Tsenka Genova, who chairs the local Bulgarian society, the first Bulgarian settlers here came about a century ago and their descendants now number some 2,000.

Speeches were made by the Secretary of the Comodoro Rivadavia Municipality Sergio Boyer, the Vice-Governor of Chubut Gustavo Mena and the Bulgarian Ambassador to Argentina Stoyan Mihaylov.

The Bulgarian ship's commanding officer Nikolay Danailov presented honorary plaquettes to the hosts. The in Patagonia on board the Sv. ceremony concluded with a dance show by a local folk group. After that the local dignitaries are the first to board the ship and ask lots of questions about the voyage.

Next is a concert in the brimming hall of the Comodoro cultural centre in honour of the ship and the Bulgarian expedition members. Performers sing Bulgarian folk songs, tango and milonga.

Two exhibitions opened in the cultural centre before the concert: History of Bulgaria through an Artist's Eyes and a photo exhibition entitled 32 Snapshots before the 32nd Bulgarian Antarctic Expedition: to Antarctica and Back with Love by Radka Danailova. Radka Danailova is the wife of the ship's commanding officer.

COMODORO RIVADAVIA, ARGENTINA, 18.02.2024

The leader of the 32nd Bulgarian Antarctic expedition, Prof. Christo Pimpirev, handed over letters from the Mayor of Burgas Dimitar Nikolov and the Rector of the St Kliment Ohridski University of Sofia Prof. Dr Georgi Valchev with proposals for partnership to the Argentine city of Comodoro Rivadavia, which is home to some 2,000 descendants of Bulgarians who immigrated there a century ago. Together with a group from the expedition, Pimpirev arrived in the largest city of the province of Chubut

Sv. Kiril i Metodii, which is returning to Bulgaria from the Bulgarian base on Livingstone Island in Antarctica.

Comodoro Rivadavia Mayor Othar Macharashvili returned a letter to the Mayor of Burgas accepting the proposal for partnership and for taking further steps for the twinning of the two cities.

The Rector of the National University of Patagonia San Juan Bosco, Prof. Lidia Blanco, also accepted the offer of partnership with Sofia University.

Part of the Bulgarian expedition held meetings with officials of City Hall and the Provincial Government of Chubut. The Ambassador of Bulgaria to Argentina Stoyan Mihaylov, the Rector of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Prof. Boyan Mednikarov

and BTA Director General Kiril Valchev, among others, also took part in the talks.

The talks were also attended by Tsenka Genova, leader of the Bulgarian society in Comodoro Rivadavia, and Ruzha Nikolova, chair of the Argentina - Bulgaria Foundation in Buenos Aires. They received from Kiril Valchev a medal issued by the Mint of the Bulgarian National Bank (BNB) on the occasion of the 125th anniversary of the BTA, celebrated last year. The two undertook to regularly send news from the Bulgarian community in Argentina, which BTA will publish in its BG World news section.

"We decided to come here because of the Bulgarian community in the city. But now we already have many friends here and we can have a very close



Comodoro Rivadavia, February 18, 2024. The Oil Museum in Comodoro Rivadavia shows the history of oil from its formation millions of years ago and its exploitation today with emphasis on discoveries having been made in the city. Photo: Emil Granicharov, BTA



Comodoro Rivadavia, February 18, 2024. Snapshot of the Oil Museum in Comodoro Rivadavia. Photo: Emil Granicharov, BTA

relationship with Commodoro Rivadavia. Just like Komodoro Rivadavia, Burgas is a port with an oil refinery, and it is also a university town, and there is a branch of Sofia University in Burgas," notes Prof. Christo Pimpirey.

"This visit shows the importance of the Bulgarian community in Comodoro Rivadavia, as well as the importance of the future twinning with Burgas," said the Vice-Governor of the Province of Chubut, Gustavo Mena, at a joint press conference with the Bulgarian representatives.

The President of the Knowledge Agency for Growth and Development of Commodoro Rivadavia, Ruben Sarate, says that this visit provides an opportunity not only for shared memories, but also for a future together with the local Bulgarian community in the city.

Bulgaria's Ambassador to Argentina Stoyan Mihaylov noted Bulgaria's strong desire

to deepen and expand ties with Commodoro Rivadavia. "The warm welcome we received is a sign of a strong desire to work together," he added.

The future Ambassador of Argentina to Bulgaria Alejandro Meyet expressed the desire of the Argentine Foreign Ministry to develop and deepen relations with Bulgaria in Antarctica, which in his words is one of the most important connections between the two countries. "I want to congratulate you for everything you are doing in Antarctica and for everything the Bulgarian community is doing in this city," Alejandro Meyet says.

Naval Academy Rector Flotilla Admiral Boyan Mednikarov thanked the people of Argentina. "In these two expeditions of the Bulgarian ship to Antarctica I had the opportunity to communicate with many of them and I would like to express our special and most sincere thanks to them. Spe-

cial thanks also to the Argentine Navy for their help and for their positive attitude. Thanks to this help, three of our officers received special training on sailing in Antarctic conditions and we have received many valuable lessons on how to cope in this new unknown sea. Today I saw that in Argentina we have another wonderful "Bulgarian" port besides Mar del Plata - Commodoro Rivadavia. I hope that this first visit of Sv. Sv. Kiril i Metodii to Commodoro Rivadavia is only the first step of our cooperation," said the flotilla admiral.

The commaning officer of RSV 421, Nikolay Danailov, described the welcome of the Bulgarian ship in Comodoro Rivadavia as "amazing". "This is the second time we are sailing in the Atlantic Ocean off the coast of Argentina and we are gradually exploring its ports. We visited Mar del Plata and Ushuaia, but here we felt the Bulgarian connection. It is an incredible feeling to sing the Bulgarian anthem on the pier in Commodoro Rivadavia, for which I am extremely grateful on behalf of my crew. I believe that Bulgaria will continue to have a presence in Antarctica and in Argentina," said Nikolay Danailov.

> COMODORO RIVADAVIA, ARGENTINA, 18.02.2024

The leader of the 32nd Bulgarian Antarctic expedition, Prof. Christo Pimpirey, handed over letters



from the Mayor of Burgas Dimitar Nikolov and the Rector of the St Kliment Ohridski University of Sofia Prof. Dr Georgi Valchev with proposals for partnership to the Argentine city of Comodoro Rivadavia, which is home to some 2,000 descendants of Bulgarians who immigrated there a century ago. Together with a group from the expedition, Pimpirev arrived in the largest city of the province of Chubut in Patagonia on board the Sv. Sv. Kiril i Metodii, which is returning to Bulgaria from the Bulgarian base on Livingstone Island in Antarctica.

Comodoro Rivadavia Mayor Othar Macharashvili returned a letter to the Mayor of Burgas accepting the proposal for partnership and for taking further steps for the twinning of the two cities.

The Rector of the National University of Patagonia San Juan Bosco, Prof. Lidia Blanco, also accepted the offer of partnership with Sofia University.

Part of the Bulgarian expedition held meetings with offi-

cials of City Hall and the Provincial Government of Chubut. The Ambassador of Bulgaria to Argentina Stoyan Mihaylov, the Rector of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Prof. Boyan Mednikarov and BTA Director General Kiril Valchev, among others, also took part in the talks.

The talks were also attended by Tsenka Genova, leader of the Bulgarian society in Comodoro Rivadavia, and Ruzha Nikolova, chair of the Argentina - Bulgaria Foundation in Buenos Aires. They received from Kiril Valchev a medal issued by the Mint of the Bulgarian National Bank (BNB) on the occasion of the 125th anniversary of the BTA, celebrated last year. The two undertook to regularly send news from the Bulgarian community in Argentina, which BTA will publish in its BG World news section.

"We decided to come here because of the Bulgarian community in the city. But now we already have many friends here and we can have a very close relationship with Commodoro Rivadavia. Just like Komodoro Rivadavia, Burgas is a port with an oil refinery, and it is also a university town, and there is a branch of Sofia University in Burgas," notes Prof. Christo Pimpirev.

"This visit shows the importance of the Bulgarian community in Comodoro Rivadavia, as well as the importance of the future twinning with Burgas," said the Vice-Governor of the Province of Chubut, Gustavo Mena, at a joint press conference with the Bulgarian representatives.

The President of the Knowledge Agency for Growth and Development of Commodoro Rivadavia, Ruben Sarate, says that this visit provides an opportunity not only for shared memories, but also for a future



Comodoro Rivadavia, February 18, 2024. Snapshot of the Oil Museum in Comodoro Rivadavia. Photo: Emil Granicharov, BTA

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Buenos Aires, February 20, 2024. Members of the Bulgarian community, representatives of the Argentine-Bulgarian Foundation in Buenos Aires, Ambassador of Bulgaria to Argentina Stoyan Mihaylov and Consul at the Embassy of the Republic of Bulgaria in Argentina Sofia Stoeva laying flowers at the Vasil Levski monument in Buenos Aires. Photo: Emil Granicharov, BTA

together with the local Bulgarian community in the city.

Bulgaria's Ambassador to Argentina Stoyan Mihaylov noted Bulgaria's strong desire to deepen and expand ties with Commodoro Rivadavia. "The warm welcome we received is a sign of a strong desire to work together," he added.

The future Ambassador of Argentina to Bulgaria Alejandro Meyet expressed the desire of the Argentine Foreign Ministry to develop and deepen relations with Bulgaria in Antarctica, which in his words is one of the most important connections between the two countries. "I want to congratulate you for everything you are doing in Antarctica and for everything the Bulgarian community is doing in this city," Alejandro Meyet says.

Naval Academy Rector Flotilla Admiral Boyan Mednikarov thanked the people of Argentina. "In these two expeditions of the Bulgarian ship to Antarctica I had the oppor-

many of them and I would like to express our special and most sincere thanks to them. Special thanks also to the Argentine Navy for their help and for to this help, three of our officers received special training on and we have received many valuable lessons on how to cope Danailov. in this new unknown sea. Today I saw that in Argentina we have another wonderful "Bulgarian" port besides Mar del Plata - Commodoro Rivadavia. I hope that this first visit of Sv. Sv. Kiril i Metodii to Commodoro Rivadavia is only the first step of our cooperation," said the flotilla admiral.

The commaning officer of RSV 421, Nikolay Danailov, described the welcome of the Bulgarian ship in Comodoro Rivadavia as "amazing". "This is the second time we are sailing in the Atlantic Ocean off the coast of Argentina and we are gradually exploring its

tunity to communicate with ports. We visited Mar del Plata and Ushuaia, but here we felt the Bulgarian connection. It is an incredible feeling to sing the Bulgarian anthem on the pier in Commodoro Rivadavia, for their positive attitude. Thanks which I am extremely grateful on behalf of my crew. I believe that Bulgaria will continue to sailing in Antarctic conditions have a presence in Antarctica and in Argentina," said Nikolay

> COMODORO RIVADAVIA, ARGENTINA, 18.02.2024

More than 5,000 residents of the Argentinian city of Comodoro Rivadavia, which is home to a significant community of descendants of Bulgarian immigrants from a century ago, toured the Sv. Sv. Kiril i Metodii, the Naval Academy in Varna (on the Black Sea) reported on Sunday.

The city of 180,000 people, which is the largest in the Argentine province of Chubut in Patagonia, is home to about 2,000 descendants of Bulgarian immigrants from a century ago. At a meeting in the Bulgarian community, the ship's Commanding Officer, Commander Nikolay Danailov, quoted figures from the port administration, according to which more than 5,000 visitors came on board RSV 421.

The Rector of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Prof. Boyan Mednikarov, quoted Deputy Prime Minister and Foreign Minister Mariya Gabriel as saying that this Bulgarian ship is one of the most effective Bulgarian diplomats. "We are fascinated by the love of the descendants of the Bulgarians in Comodoro Rivadavia for everything Bulgarian, including our ship, and by the unprecedented interest of the town residents," said Mednikarov.

"No politician can make such an advertisement for Bulgaria as the Bulgarian ship and the Antarctic expedition members," said the head of the 32nd Bulgarian Antarctic expedition Prof. Christo Pimpirev, who also arrived in Comodoro Rivadavia on board RSV 421 together with a group from the expedition.

The Bulgarian ship announced open its doors to the residents of Comodoro Rivadavia for two days on 16 and 17 February between 10 am and 8 pm. There were queues on the pier all the time, and there was also a queue to enter the harbour. Guests also queued for photos with the ship's Com-



Mar del Plata, February 21, 2024. The Bulgarian naval research vessel Sv. Sv. Kiril i Metodii arrives in Mar del Plata to return fragments of an Argentine Naval Research Squadron, which crashed in Antarctica in 1976. Photo: Nikola Vaptsarov Naval Academy/BTA

manding Officer and other crew members.

Port authorities provided buses for the visitors, and the Argentine Navy ensured order.

The ship set sail from Comodoro Rivadavia on Sunday morning to its next stop - the Argentinian port city of Mar del Plata.

COMODORO RIVADAVIA, ARGENTINA. 16.02.2024

On February 17, a film about the descendants of the Bulgarian immigrants in Argentina, Scattered in the lower land, by



Photo: Emil Granicharov, BTA

Bulgarian National Television journalist Maria Cherneva is screened at the Oil Museum in Commodoro Rivadavia.

"I am thankful to my protagonists for telling me their story. I want to tell you how your stories would become my personal stories. Before I came to you with my camera, I sat in the State Archives for about a month to see what they hold about the history of Bulgarian migration to Argentina. There I found that most of the Bulgarians who came here were from Byala Slatina, the villages around Pleven. A connection to Borovan got me quite excited. Borovan is the village next to Berkachevo, that's where my mother is from, and my greatgrandfather's fate is murky. I had asked before and I asked again my mother to tell me more about my great-grandfather. His identity is lost in the folds of time. But had he gone with the others to Argentina? No, was the answer I got from my mother, but it was not very convincing. I challenged my mother with my questions to dig deeper into the folds of her memory, and she wrote a book while I was making the film. It wasn't until the book came out that I asked her what the answer was," said Maria Cherneva.

"I listened to your stories, thinking they might be mine, my family's. My mother's final version was that my grandfather died in the First World War, in the Battle of Cherna. That's what they say, but you never know... What do I mean



Sofia, February 21, 2024. Some of the participants in the 32nd national Antarctic expedition having landed at Sofia Airport's Terminal 2. Photo: Christo Kasabov, BTA

by that? I mean to say that you should tell your stories, share them with your grandchildren and children, leave clues. Stories are what keep you firmly connected to the Land Up There," says Maria Cherneva.

The National Petroleum Museum of Commodoro Rivadavia shows the history of oil from its creation millions of years ago and its exploitation and industrialization now with of discovery in this city.

The exhibition consists of two parts that show internal sampling and external sampling.

In the indoor sampling exhibit, located in the main building, you can tour a "Time Tunnel" that describes the life of the garian community in Argenuniverse in chronological order. The sequences are from the Big Bang to the present.

The origin of life, the evolution of dinosaurs from which fossils can be observed - the formation of oil and the location of the different basins of

Argentina are the leitmotif of the exhibition. Documents and photos related to the discovery of oil in the Commodoro Rivadavia, the structure of the Oilfield Fiscales (YPF) and the stages in the processing, transportation and marketing of the products are then observed.

The National Petroleum Museum is believed to be the only one of its kind in Latin America. However, it has the same a special emphasis on the epic characteristics as museums in Russia, the United States and Canada and is therefore one of only four museums in the world dedicated to oil. Because of its specific subject, it is also a Museum of Science and Technology.

> Representatives of the Bultina, the Argentine-Bulgarian Foundation and Bulgarian diplomats honoured the memory of Vasil Levski by laying flowers at his monument in Buenos Aires on the 151st anniversary of his death.

Bulgarian Ambassador to



Commander Danailov at work

Argentina Stoyan Mihaylov said in his speech that since 2012 our compatriots in Buenos Aires have maintained the tradition of paying tribute to the Apostle of Freedom every year. "Levski is special to us for many reasons. He gave his life for a cause that benefits the entire Bulgarian nation - freedom. Levski is synonymous with freedom, the struggle for freedom, democratic values. That is why Levski deserves our respect. Wherever we have the image of Levski, we have

After his official speech, Ambassador Stoyan Mihailov presented a bouquet of flowers in front of the bust of Vasil Levski. "This monument is the work of the Bulgarian community, we have had it for years. Traditionally, every year we gather here to pay tribute to our national hero and to talk about who Levski is and why he is precious to us," Stoyan Mikhailov told BTA.

Bulgaria," the diplomat said.

The ceremony was also attended by the Bulgarian Con-

sul in the Republic of Argentina Sofia Stoeva.

The monument is located in Barrancas de Belgrano Square in the Belgrano district of Buenos Aires. It was established in 1998 on the initiative of the Vasil Levski General Committee and the Vasil Levski Foundation. The monument was created by the Bulgarian sculptor Mihail Shapkarev (1941-2007). It is located near the Embassy of the Republic of Bulgaria in the Argentine capital.

On February 18, the Bulgarian naval research ship Sv. Sv. Kiril i Metodii sailed from Commodoro Rivadavia, Chubut Province, the Argentine part of Patagonia. A 15-member group from the 32nd Bulgarian Antarctic Expedition headed by its leader Prof. Christo Pimpirev. From Buenos Aires they are to return to Bulgaria.

ATLANTIC OCEAN, 20.02.2024

On board the Sv. Sv. Kiril i Metodii in the Atlantic Ocean off the coast of Argentina, a ceremony was held to pay tribute to Bulgarian national hero Vasil Levski on the occasion of 151 years since his death on February 19, the Higher Naval School reported.

"We are here to pay tribute to the feat of the great revolutionary Vasil Levski," said the head of the Varna Naval Academy, Flotilla Admiral Boyan Mednikarov. The ceremony was also attended by Lieutenant-Commander Lucas Acosta, a representative of the Argentine Navy assisting the Bulgarian ship's navigation in Antarctic waters.

SOFIA, 20.02.2024

The largest group of the 32nd Bulgarian Antarctic Expedition, which will end at the end of March, landed in Sofia on Wednesday. The laboratory at the St Kliment Ohridski Bulgarian Antarctic Base on Livingston Island is being built and it is almost finished. Several other projects are in the pipeline for further research and the expedition is ongoing and very successful, Head of the expedition and director of the Bulgarian Antarctic Institute and the Bulgarian National Centre for Polar Research Prof. Christo Pimpirev told BTA.

In the group, which returned on Wednesday, are Pimpirev, marine geologist Assoc. Dr Raina Christova, geologist Assoc.Prof.Kalin Naydenov, electrical engineers Krassimir Krastev, Lyubov Kostova, jour-

nalists Maria Cherneva (Bulgarian National Television) and Marina Velikova (Bulgarian National Radio), cook Stanko Georgiev and the field assistants-alpinists Kiril Doskov and Assoc.Prof. Doychin Boyanov.

So far, excellent results have been achieved by the expedition and 12 scientific projects have been carried out, with the participation of many foreign colleagues - from Great Britain, from Portugal, we also had a scientist from Turkiye, Pimpirev said. He noted that the Bulgarian naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) had also fulfilled its polar mission very well, but the expedition continues without the ship too. "As before, we have been without the ship for 30 expeditions, and this is the second expedition with the ship, but it has already left the base on February 9, and on the way back it had quite successful results. For example, in Komodoro Rivadavia, where we were welcomed by the Bulgarians, who are 2000. We signed cooperation agreements and made the first steps for this with Burgas and Commodoro Rivadavia, and with Sofia University and the University of Patagonia. More than 5000 people visited the ship and for three days there was only talk about Bulgaria", Pimpirev said.

The new scientific findings of the latest Bulgarian expedition will be seen when the samples are processed, but projects were worked on the ship itself and in the high moun-

tain where the wreckage of the crashed plane was found, he said. He added that good results are expected related to global warming, which is obvious, but it will be supported by data from the ecological balance in the region, since the life of every living thing there depends on climate change. "We have also done very interesting biological research on fish diversity there, which is unique. Two fish are currently being transported to the aquarium in Plovdiv," said the head of the Bulgarian expeditions.

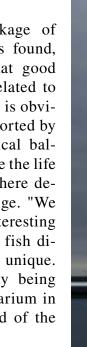
MAR DEL PLATA, ARGENTINA, 22.02.2024

On the way back from Livingston Island in Antarctica, the Sv. Sv. Kiril i Metodii docked at the naval base in Mar del Plata, Argentina, on February 21 at 0845 local time.

The ship was welcomed by the Commander of the Atlantic Naval Area, Marcelo Paternos-

The head of the Nikola Vaptsarov Naval Academy, Flotilla Admiral Boyan Mednikarov, and RSV 421 Commanding Officer Nikolay Danailov handed him fragments of a Neptune 2-P-103 of the Argentine Naval Research Squadron, which crashed into Bernard Mountain on Livingston Island nearly 50 years ago.

Fleet Admiral Mednikarov delivered a report on the discovery of the wreckage of the aircraft, as well as the commemorative ceremony of the

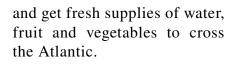


Bulgarian ship in memory of the fallen Argentine explorers of Antarctica, held on February 4, 2024 in the Bernard Point area of Livingston Island of the South Shetland Islands.

The Commander of the Atlantic Naval Area thanked the Bulgarian crew and Antarctic researchers for their efforts and for honouring the Argentinian heroes.

"For us, Mar del Plata now feels like home," says Flotilla Admiral Mednikarov, as on both voyages to Antarctica the ship Sv. Sv. Kiril i Metodii had stops there in both directions at this Argentine port. "Our cooperation is beneficial for both sides because we are learning important lessons,"he said. Comodoro Paternstro noted that it is also useful for the Argentine Navy to see other countries' ships and exchange experiences with counterparts.

In Mar del Plata, the Bulgarian research vessel will refuel



MAR DEL PLATA, ARGENTINA. 22.02.2024

RSV 421 was visited in Mar del Plata by five relatives of Lieutenant Claudio Maria Cabut, one of the victims of the plane crash in 1976 when a Neptune 2-P-103 of the Argentine Naval Research Squadron crashed into Bernard Mountain on Livingston Island nearly 50 years ago. During the 32nd Bulgarian Antarctic Expedition, a Bulgarian expedition found crash fragments during field studies and took them on board the RSV 421.

After the arrival of Sv. Sv. Kiril i Metodii at Mar del Plata the fragments of the aircraft were handed over by the Head of the Bulgarian naval Acad-

Mednikarov and RSV 421 Commanding Officer Nikolay Danailov to the Commander of the Argentine base Comodore Marcelo Paternostro. Commodore Paternostro thanked for the efforts of the Bulgarian crew and the Bulgarian Antarctic researchers for honouring the Argentine heroes.

The Naval Academy Rector and the ship's commanding officer shared details about the finding of the crash debris fragments with the sister and brother of Claudio Cabut, as well as his niece and her son. The Cabuts had with them a photo of the 25-year-old lieutenant, who left behind a daughter and a son.

At a video conference with RSV 421, on behalf of President Javier Milei, Argentine Defence Minister Luis Petri expressed gratitude for the finding of the wreckage of the perished Argentine Antarctic

emy, Flotilla Admiral Boyan explorers' aircraft. "Argentina is Bulgaria's friend and is infinitely grateful for the finding of the Neptune wreckage. This is very important news for all the families of the Neptune tragedy victims. Thank you for everything you have done and are doing for my country. Argentina is indebted to you," said Petri.

Half Moon Island, January 24, 2024. Photo: Emil Granicharov, BTA

MAR DEL PLATA, ARGENTINA, 22.02.2024

A bilateral meeting was held Thursday onboard the Sv. Sv. Kiril i Metodii between the head of the Nikola Vaptsarov Naval Academy in Varna, Flotilla Admiral Boyan Mednikarov, the ship's commanding staff and Florencia Ranellucci, international relations advisor to the Mayor of Mar del Plata, Guillermo Montenegro, the Bulgarian Naval Academy reported.



Sofia, March 27, 2024. The last group of participants in the 32nd national Antarctic expedition returns to Sofia Airport's Terminal 2 on a flight from Rome. Photo: Minko Chernev, BTA

During the meeting, Fleet Admiral Mednikarov expressed his sincere gratitude for the opportunity for RSV 421 to visit Mar del Plata annually and outlined the possibilities for establishing contacts between the Argentine city and the Bulgarian coastal city of Varna.

In connection with the development of relations and deepening of cooperation between Mar del Plata and Varna, Mednikarov presented Raneluzzi with an official invitation on behalf of the Mayor of Varna, Blagomir Kotsev, to Mar del Plata Mayor Montenegro to visit Varna.

For her part, Raneluzzi expressed her confidence that the relationship between the two cities has great potential for development, even confirming her and her team's readiness to actively participate in the twinning process.

By an old Bulgarian tradition,

the Bulgarian flag was flown tions to complete this project over the completed roof of the before the onset of polar winnew modern building in the ter. Bulgarian Antarctic base on Christo Pimpirev.

three laboratories - geological, biological and general, a multifunctional hall with workstaroom and rest rooms.

The construction of the highly complex structure is also challenging due to the harsh weather conditions at these latitudes. The building stands on COASTANTAR 2024 led by a special platform on columns Gonçalo Vieira, began this reaching up to nine metres.

is grateful to the architects, sistance from the Sv. Sv. Kiril designers, builders, logistics staff at the Bulgarian base, the sage back in January. RSV 421 crew and all the rest involved in the fieldwork for friends brought strong emotheir dedication and endurance in the harsh Antarctic condi- for many more joint activi-

Portuguese polar research-Livingston Island, said Prof. ers honoured the long-standing friendship and coop-With an area of 400 square eration with their Bulgarian meters, the building will house counterparts by visiting the Bulgarian Antarctic Base on Livingston Island. They reached the island by the tions, a warehouse, a technical yacht El Doblon, said Prof. Christo Pimpirev, head of the 32nd Bulgarian Antarctic Expedition.

Portugal's first scientific expedition by water, month. The expedition hired The Antarctic community El Doblon, which received asi Medotii near the Drake Pas-

> "The visit of our Portuguese tions to the base and wishes

ties," Prof. Pimpirev added.

RIO GRANDE. 26.02.2024

The Sv. Sv. Kiril i Metodii visited the port of Rio Grande in southern Brazil on February 25, the Bulgarian Naval Academy said. The visit was to establish cooperation in Antarctic exploration with the Brazilian Navy and to mark the 90th anniversary of the establishment of diplomatic relations between were discussed. Brazil and Bulgaria in 1934.

This was the first visit of a Bulgarian naval ship to Brazil. Head of the Bulgarian mission there Bojidara Sartchadjieva welcomed the ship with a ceremony, attended by representatives of the Brazilian Navy, port authorities and local cultural figures. The Rio Grande Military Brass Band performed the national anthems of both countries.

An official dinner was held on board the Bulgarian ship, organized by the Bulgarian Ambassador to Brazil to mark the 90th anniversary of the establishment of diplomatic relations. During the meeting, the good relations between the two countries were noted and opportunities for the development of contacts and cooperation in connection with the implementation of future RSV 421 expeditions to Antarctica

ATLANTIC OCEAN. 03.03.2024

The crew of the Sv.Sv Kiril i Metodii celebrated March 3 in the Atlantic Ocean, off the coast of Brazil, the Naval Academy said.

The ceremony took place on the deck of the ship at 10:00 local time. Observing a minute of silence the crew honoured all the heroes who gave their lives for the freedom of Bulgaria.

"March 3 is a sacred date," Commander Nikolay Danailov said. "This is a day of revival of our Bulgaria. March 3 is a symbol of freedom, of dawn, of hope, of Bulgaria. It takes strength to take your life in your own hands and face the difficulties of making important choices and to learn from your mistakes and move forward. Freedom is a right, but it is also a responsibility. We proudly declare that we are free Bulgarians," said Commander Danailov.

CAPE VERDE. 14.03.2024

The Sv. Sv. Kiril I Metodii is sailing about 180 nautical miles west of the coast of Africa along the Cape Verde archipelago, passing through an area designated as high-risk for pirate attacks, the Varna Naval Academy said.

Passage through this area requires reporting to the Coastal Navigation Control Centre under the joint command of the French and British naval forces.

Due to the risk of pirate attacks, RSV 421's readiness to reflect attacks by a surface enemy has been increased since March 12. and visual and technical monitoring has been enhanced.

On March 13, a training exercise was conducted on board the ship for eliminating attacks of a fast adversary using small arms fire.

THE MEDITERRANEAN SEA. 20.03.2024

The Sv. Sv. Kiril i Metodii passed through the Strait of Gibraltar and entered the Mediterranean Sea, the Nikola Vaptsarov Naval Academy in Varna reported on Wednesday. This marks the end of the vessel's transatlantic voyage.

RSV 421's next stop is the Royal Spanish Navy base in Cartagena.

Once there, the ship will be refuelled and loaded with provisions. Twenty-six cadets from the Naval Academy in Varna will join the crew for the last part of the voyage as part of their training.

SOFIA, 21.03.2024

Indian Ambassador to Bulgaria Sanjay Rana and Prof.

Christo Pimpirev - Director of the Center and Chairman of the Bulgarian Antarctic Institute (BAI) met at the National Centre for Polar Research (NCPR) at Sofia University on Thursday,

The two discussed issues related to an upcoming Consultative Meeting on the Antarctic Treaty, which India is hosting, and deepening cooperation lar Research works on joint in the polar regions between the two countries with the exchange of scientists and work on joint projects.

Research was established as an independent unit in 2007.

The NCPI works together with the Bulgarian Antarctic Institute (BAI), which is the national operator of Bulgaria's activities in Antarctica, organizing annual Antarctic expeditions and maintaining the Bulgarian scientific base. The Antarctic activities are supported by the European Antarctic Society and the Antarc-



Sofia, March 27, 2024. The last group of participants in the 32nd national Antarctic expedition returns to Sofia Airport's Terminal 2 on a flight from Rome. Photo: Minko Chernev, BTA

tic Research Centre.

Participating in the expeditions are researchers in various fields" geology, geo-chemistry, geo-physics, metereology, glaciology, biology, medicines and others. The results of the studies are published in many renowned Bulgarian and international publications.

The National Center for Poresearch projects with Spain, Great Britain, Russia, Germany, Turkiye, Argentina, Brazil, Chile, South Korea, Uruguay, The National Centre for Polar Portugal, Mongolia, USA and other countries.

SOFIA. 27.03.2024

The last group of researchers from the 32nd Bulgarian Antarctic expedition came home on Wednesday, arriving at Sofia Airport on a flight from Rome. They are returning after a successful expedition with some 16 implemented projects, including several international ones, said the head of the Bulgarian Antarctic base on Livingston island, Kamen Nedkov.

Apart from Nedkov, the group of returnees included National Center for Polar Research Deputy Director Dragomir Mateey, the boat skipper and field assistant Elka Vassileva and the builders of the laboratory, Kiril Zhechev, Nikolay Ivanov, Todor Todorov, Valentin Alexandrov and Damyan Morandov.



January 25, 2024. The naval research vessel Sv. Sv. Kiril i Metodii (RSV 421) sets sail from Half Moon Island. Photo: Emil Granicharov, BTA

Nedkov also said: "We managed to complete the big construction project [the base lab], to seal the building in preparation of the Antarctic winter." The "big project" is a new laboratory facility where lab equipment will be mounted in the next two years. "We also did various repairs and build a water pipe. Now the base is prepared for wintering and all equipment is turned off," he said.

The expedition will be officially over when RSV 421 arrives in Varna on April 3, 2024.

Participating in the 32nd expedition were the crew of the Sv. Sv. Kiril i Metodii and over 49 researchers and staff, including one Scottish, one Turkish, two Portuguese and 22 Bulgarian scholars, two doctors and six journalists.

CHUBUT, ARGENTINA, 29.03.2024

The Sv. Sv. Kiril i Metodii was presented with a distinction by the Parliament of Argentina's Chubut Province, the Nikola Vaptsarov Naval Academy in Varna (on the Black Sea) reported on Fri- RSV 421at the port of Var-

The distinction was handed to Bulgarian Ambassador to Argentina Stoyan Mihaylov by MPs Fabian Gandon and Maria Andrea Aguilera on behalf of Chubut's legislature. The official address to the crew says that Chubut Parliament head Gustavo Menna and the MPs distinguish the scientific work of the RSV 421 crew who managed to collect the aircraft's fragments 48 years after the crash.

VARNA, ON THE BLACK SEA. 03.04.2024

The Sv. Sv. Kiril i Metodii returned to Varna from the 32nd expedition to Antarctica on Wednesday.

Hours before the arrival of na, cadets conducted first aid training on board.

These are fifth-year cadets in the Medical Services in the Armed Forces programme of the Naval Academy.

The crew of RSV 421 "convincingly over-accomplished its tasks", Naval Academy Rector Prof. Boyan Mednikarov told BTA shortly before the ship cast anchor at Varna Port. "RSV 421 proved that Bulgaria has the capacity to perform scientific research in the Antarctic conditions. All pro-



Varna, April 3, 2024. The first Bulgarian naval research vessel Sv. Sv. Kiril i Metodii returning from the 32nd polar expedition. Photo: Danail Voykov, BTA

jects were completed successfully. In addition to the tasks that were assigned to the ship, it also provided support for a Spanish geographic expedition," Prof. Mednikarov said.

He said that on its current voyage the ship delivered materials for construction of a new research laboratory on Livingston Island. "Thanks to the synergy between the logisticians, builders and crew of RSV 421, we now have a laboratory that is unique in size and design," Mednikarov said. He added that the Bulgarian expedition also provided logistic support to three Spanish bases.

"The ship also completed a clean-up of the island's bay, so the Bulgarians are meeting the highest standards in the context of the Antarctic Treaty," Mednikarov said. During its voyage the Bulgarian vessel also assisted a distressed Canadianflagged yacht, he said.

"During the 32nd expedition, four high-performance research projects were carried out on the ship," Mednikarov added.

The Bulgarian researchers found debris from a plane crash on the shore, collected and sorted them, and the authorities of Chile and Argentina were notified, said Mednikarov. "We organized a ceremony to pay tribute to the victims and it was appreciated by the Argentine society, and of gratitude from the President and the Minister of Defence of Argentina, he added. According to him, this voyage has also become a part of Bulgarian naval diplomacy, because for the first time a Bulgarian naval ship visited Brazil.

"Sv. Sv. Kiril i Metodii showed that Bulgaria has the capacity to carry out effective scientific research in the Antarctic zone. All projects were completed, and in addition to that we provided support to a Spanish geographical expedition", Mednikarov.

The ship was welcomed with an official ceremony that was attended by Flotilla Admiral Boyan Mednikarov, the head of the Bulgarian Antarctic In-

stitute Prof. Christo Pimpirev, Varna Regional Governor Andriyana Andreeva, Varna Mayor Blagomir Kotsev, the President's Secretary for Culture, Education and Tourism Ilin Dimitrov, and BTA Director General Kiril Valchev.

New scientific projects will be launched during the next, earned the expeditions words 33rd Bulgarian Antarctic Expedition, which will hopefully start by the end of 2024, said Prof. Pimpirev.

It was the second voyage of RSV 421 and it was even more successful than the first one, said Pimpirev. "The first was historic because it was the first time that a Bulgarian naval research ship left the Black Sea and entered the World Ocean. There were issues, we were getting letters warning us that the ship would sink but the important thing is that we proved that Bulgarians are a sea-faring nation," said Prof. Pimpirev.

During the 32nd Bulgarian Antarctic Expedition, work was done on 12 projects, many of which with international participation. Within one of

the projects, Bulgarian scientists together with a British colleague researched the presence of microplastics in the organisms in Antarctica. The data indicate that there are microplastics even there, Prof. Pimpirev said. The researchers also worked on two projects on fish diversity. One of them, of the Plovdiv Museum of Natural History, has secured two Nototenia individuals to be displayed at the Plovdiv Museum, making it the first inland museum with Antarctic species in its collection.

RSV 421 Commanding Officer Nikolay Danailov told the press that the RSV 421 crew is coming home in very good condition.

The ship, too, is in good condition and inly needs minor repair which will be done in a local plant, he said. The expedition lasted 30 days longer than the previous one. "Work



Varna, April 3, 2024 Loved ones awaiting the return of the sailors at Varna Port. Photo: Danail Voykov, BTA

55th parallel also lasted longer but, most importantly, we delivered materials and supplies for the new lab of the Bulgarian base on Livingston Island," he said.

The ship accomplished all tasks, said Danailov. The only thing that remained unfulfilled was a plan to visit Smith Island but that was due to adverse weather. "The ship is a very good ambassador of Bulgaria," said Danailov.

During the 32nd Bulgarian polar expedition the naval research vessel RSV 421 sailed 20,054 nautical miles. The voyage lasted 149 days, said Commanding Officer Danailov.

A congratulatory address by President Rumen Radev was read out at the welcoming ceremony. "Today marks the achievements of the entire expedition team," it said. Radev pointed out that the latest mis-

in the operating zone below the sion of the Bulgarian polar explorers once again confirms the high importance and authority of Bulgarian scientific research worldwide and is an inspiring example of fruitful cooperation with foreign expeditions, a model of united efforts in the search for solutions to global problems. "The construction of a new modern laboratory in the Bulgarian Antarctic base is of great importance for the Bulgarian scientific infrastructure," the address further said and hailed the scientists for the dedication with which they worked in harsh weather conditions to successfully complete 12 scientific projects. Radev expressed firm confidence in the future success of the Bulgarian Antarctic scientists.

> On behalf of the Navy Command, Capt. Vanyo Musinski praised the flawless voyage of RSV 421, expressed his admiration for the solid training



Official ceremony to welcome the ship attended by the head of the Bulgarian Antarctic Institute, Prof. Christo Pimpirev, Varna Regional Governor Andriyana Andreeva, Varna Mayor Blagomir Kotsev and BTA Director General Kiril Valchev. Photo: Danail Voykov, BTA

at the Naval Academy and its partners and the excellent performance of the difficult tasks by the crew. According to him, that has proven wrong all sceptics and showed that it is possible for a Bulgarian ship to sail in the Southern Hemisphere.

During the ceremony, diplomas were presented to partners who have supported the second voyage of the Bulgarian naval research ship, among them Navy Commander Kiril Mihaylov, Air Force Commander Gen. Maj. Dimitar Petrov and Daniel Christov of the Consular Directorate of the Foreign Ministry.

VARNA. ON THE BLACK SEA. 12.04.2024

"It is very important that the resources of the Antarctica be adequately distributed in the future," Bulgarian Memory Foundation President Milen Vrabevski told BTA. His organization presented awards to the crew of the Sv. Sv. Kiril i Metodii.

Dr Vrabevski expressed hope that the scientific expeditions to Antarctica supported by a Bulgarian ship, will become a major State program, because, in his words, "the importance of the cause is very big and worth the effort".

He also said, "We are one of the 29 countries that own this continent, and it is extremely important that its resources are allocated adequately in the future". He believes that "this cannot happen without efforts

programmes that create conditions for the absorption of expeditions".

The awards for all 34 members of the ship's crew, which were presented today in Varna, consist of a diploma and cash award from Milen Vrabevski personally. "I am proud and creating a capacity for scientifhonoured to share what I have with these people," he said, the awards a tradition.

Milen Vrabevski received a gift from the Head of the Varna Mednikarov: a model of RSV 421. He says that the model will be exhibited in a private primary school run by the Bulgarian Memory Foundation. Sea." There is a special corner in the school dedicated to the Bulgarian polar expeditions. Among soil from Antarctica, brought by the commander of RSV 421 Nikolay Danailov last year, and other gifts.

Bulgarian Memory Foundation have had many years of cooperation, Naval Academy Rector Prof. Boyan Mednikarov said at the ceremony. He said that the two share common values and work "for the glorification, development and strengthening of our homeland". In his words, in recent years their cooperation has acquired a new dimension with the support the Foundation has provided to the RSV 421 voyages for support-

and concrete investments in ing the 31st and 32nd Bulgarian Antarctic expeditions.

"We appreciate much this these resources. This is also outstanding act of patriotism the reason why the Bulgarian of Dr Vrabevski to stand be-Memory Foundation helps the hind the ship's crew, to further motivate them to participate in the responsible, tough and long voyages," he said. "In this way, the Foundation is working to make Bulgaria a true conqueror of the Antarctic continent, ic research," said Mednikarov.

Nikolay Danailov, the crew's adding that he intends to make commanding officer, likewise thanked the Foundation for its trust and support. He said: "We reached places that none of us, Naval Academy, Prof. Boyan being in military service, ever dreamed of visiting. We honoured the legacy of our ancestors, who said that Bulgaria should go beyond the Black

Danailov recalled some dramatic moments on the way to the icy continent and back, such the exhibits is a container with as the urgent assistance which the crew provided to a yacht in distress on New Year's Night and the effort it took them to unload the huge amount of ma-The Naval Academy and the terials for a new laboratory at the Bulgarian Antarctic Base on Livingston Island. According to the crew leader, RSV 421 did a great job in supporting the taking of sediment samples from the ocean floor off the shoreline of Livingston Island, which was an unprecedented endeavour for Bulgarian explorers, and the reaching of the islands of King George, Deception and Half Moon, which are beginning to be discovered for Bulgarian science.



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