

**DECISION**  
**VII International Antarctic Conference**  
**“Antarctic Research: new horizons and priorities”**

During the period of May 12 – 14, 2015 the 7<sup>th</sup> International Antarctic Conference (VII IAC 2015) dedicated to identifying the range of topical issues of the southern polar research for the nearest future and beyond, the development of mechanisms for protection of the environment in the Antarctic region was held.

*Organizers of the Conference:* Ministry of Education and Science of Ukraine, National Academy of Sciences of Ukraine, National Antarctic Scientific Center of Ukraine and National Technical University of Ukraine “Kyiv Polytechnic Institute”.

The conference was held in the mode of plenary sessions on four scientific areas:

1. Earth Sciences (Geologic-Geophysical and Geoecological research);
2. Life Sciences (Biological and Medical-Physiological research);
3. Physical Sciences (Hydrometeorology, Oceanography, and Geospace research);
4. New Technologies and Equipment (Automated Control Systems, Geoinformation Technologies and Telecommunication Systems).

The Organizing committee received **42 abstracts – 33 oral and 14 poster presentations** – from **204 authors**.

The conference was attended by **75** scientists from Ukraine and the Russian Federation. They presented the results of studies carried out in the leading laboratories, academic institutions and centers in **8 countries**. The papers were presented:

From Ukraine –

8 Research Institutes of the National Academy of Sciences and the National Academy of Medical Sciences;

9 National Universities and Institutes of the Ministry of Education and Science of Ukraine;

6 applied research and production institutions.

From Russian Federation –

Saint Petersburg State University, St. Petersburg;

Institute of Physical-Chemical and Biological Problems in Soil Science, Pushchino-on-Oka Moscow region;

Institute of Geography, Russian Academy of Sciences, Moscow;

V.L. Komarov Botanical Institute, Russian Academy of Sciences, St. Petersburg.

From Republic of Belarus –

State Scientific and Production Amalgamation "The Scientific and Practical Center for Bioresources", Minsk.

From Bulgaria –

Institute of Biodiversity and Ecosystem Research, Sofia.

From Poland –

Institute of Biochemistry and Biophysics of the Polish Academy of Sciences, Warsaw.

From USA –

Southwest Fisheries Science Center, NOAA, Santa Cruz, CA.

From Argentina –

Argentine Antarctic Institute, Buenos Aires.

From Australia –

Australian Antarctic Division, Hobart, Tasmania.

All participants noted the wide range of areas of presented research and a high level of activity during discussions.

During the discussion of plenary presentations on key research areas, including works conducted under the State Special-Purpose Research Program in Antarctica for 2011 – 2020, research in Antarctica for 20 years were summarized, and plans for the future were outlined.

**1. Life Sciences Plenary Session** was chaired by Viktor Kunakh – the Corresponding Member of the National Academy of Sciences of Ukraine (Institute of Molecular Biology and Genetics, National Academy of Sciences of Ukraine, Kyiv).

According to the conference program, there were scheduled 15 oral and two poster presentations. Of these, 12 oral presentations were heard and two poster presentations were discussed. All they were presented by scientists from Ukraine and Russian Federation.

One should note the relatively young age of speakers: approximately half of them – graduate students and researchers under the age of 40, as well as students.

Analysis of the reports revealed that a comprehensive approach was applied to the study of the structure and function of the Antarctic biota at all hierarchical levels of organization of living organisms.

The research both in fundamental and applied aspects covered all life forms - from viruses to mammals, at the level of introduction of new technologies for production of biologically active substances.

Modern methodological and technological approaches (molecular – genetic, biochemical, geoinformation and other) were applied to the solution of scientific problems.

The presented studies allow displaying a complete picture of the structural and functional interaction of terrestrial and marine ecosystems.

Future plans of domestic biologists include:

1) Creation of biogeographic polygons of standard Antarctic ecosystems and construction of their correlation models.

2) Study of the origin and evolution of the Antarctic biota in view of the development of the World Ocean and the continental drift.

3) Continuation of work on bioprospecting, search and creation of collections of producers of biologically active substances and technologically promising Antarctic organisms.

Most of the reports aroused considerable interest and broad discussion.

**2. Earth Sciences Plenary Session** was chaired by Valentyn Maksymchuk - Doctor of Physical and Mathematical Sciences (Carpathian branch of S.I. Subbotin Institute of Geophysics, National Academy of Sciences of Ukraine, Lviv).

Seven oral presentations and one poster (on geophysics, tectonics and glaciology) presentation were heard and discussed. All they were presented by scientists from Ukraine and Russian Federation.

Geophysical reports were devoted to the study of space-time structure of the geomagnetic field variations in Antarctica, as well as to topical problems of geophysical monitoring in the Antarctic Peninsula region. The results of the study of tectonics and geodynamics of the Scotia Sea are announced; issues of complex interpretation of physical properties of rocks and seismic and gravitational fields in some areas of Antarctica are reported. Three presentations concerned the study of emission of ozone-depleting compounds and mechanisms of ozone depletion in the Antarctic region. The actual problem of melting glaciers at Bellingshausen ice cap and at "Akademik Vernadsky" station was considered; new data on the dynamics of snow cover in the area of King George Island are given.

Conclusions of the session:

- in the light of performance of tasks of geological and geophysical research in the framework of the State Program of Research in Antarctica for 2011-2020 to recognize as necessary the continuing of a full-fledged season field works;

- to develop a strategy of expanding the study area, primarily due to the access to the Antarctica;

- to consider the continuation of construction of geodetic base of island archipelagos and adjacent to the UAS part of the Antarctic Peninsula coast as a primary task.

**3. Physical Sciences Plenary Session** was chaired by **Vazira** Martazinova – Doctor of Technical Sciences, Professor (Ukrainian Hydrometeorological Institute Kiev of the State Service of Ukraine for Emergencies and the National Academy of Sciences of Ukraine, Kyiv) and Oleksandr Koloskov – Candidate of Physical and Mathematical Sciences (Institute of Radio Astronomy, National Academy of Sciences of Ukraine, Kharkiv).

12 oral and one poster presentations were heard.

Main subject area of scientific reports – radiophysical, meteorological and oceanographic research at Vernadsky station. A distinctive feature of all the studies is the analysis of long (over 10 years) continuous series of observations made at the UAS "Akademik Vernadsky". These unique high-quality series of observations are obtained due to the efforts of wintering teams, Ukrainian developers of scientific equipment, NASC engineering and technical personnel. Long-term series

of observations allow not only to analyze daily and seasonal processes occurring in the atmosphere, in the ocean and geospace, but also to study the periodicity associated with the 11-year cycle of solar activity, revealing at the same time longer periods of changes in the atmosphere.

The high level of research and comprehensive approach to them should also be noted. The authors of most of the scientific reports had not limited themselves to decrypting of the observed effects, but had also explored their model interpretation, links of climate with microclimate parameters of the Antarctic ecosystem.

One should note the level of interdisciplinary research. They included methods of statistical data analysis, physical modeling, and radio physical methods of remote sensing, aeronomy, hydrodynamics, magnetism, climatology and others.

Most of the reports aroused a considerable interest and a broad discussion.

**4. New Technologies and Equipment Plenary Session** was chaired by Nadezhda Bourau – Doctor of Technical Sciences, Professor and Larysa Globa – Doctor of Technical Sciences, Professor and Larysa Globa (National Technical University of Ukraine “Kyiv Polytechnic Institute”, Kyiv).

Three oral and one poster presentations were heard.

The reports were focused primarily on solving application problems associated with the vital activity of Vernadsky station and modernization of the infrastructure with modern technologies.

To ensure the safe operation of station infrastructure objects new solutions are offered to reduce environmental pollution. Prospects for the development of functional diagnostics of engineering structures were outlined. The results of development of system infrastructure of the National Antarctic Data Centre and optimization of telecommunication systems at the station are presented.

Conclusions of the session:

- to integrate efforts to ensure the safe operation of the station infrastructure and information technologies;
- to strengthen international cooperation related to the introduction of new technologies;
- to participate in joint projects to solve a number of scientific tasks;
- to establish appropriate cooperation to support metrology and standardization of scientific equipment at Vernadsky station;
- in view of regular operational verification of integrity of fuel tanks and pipelines at Vernadsky station to pay particular attention to the use of non-destructive testing. Continue working on mathematical modeling of the reservoir's behavior.

**5. Medical and Physiological Plenary Session** was chaired by Evgeny Moiseenko – Doctor of Medical Sciences (A.A. Bogomoletz Institute of Physiology, National Academy of Sciences of Ukraine, Kyiv).

One oral and seven poster presentations were heard and discussed. Doctors and candidates of medical sciences took part in the discussion.

Conclusions of the session:

- to focus on improving the technology of professional selection of wintering candidates, creating innovative technologies of estimation of extent of psycho-physiological function violations of a human in Antarctica; development of innovative biomedical technologies of health preservation and functionality in extreme conditions, as well as rehabilitation;

- to continue conducting medical and physiological monitoring at Vernadsky station. To conduct operational control of the quality of wintering adaptation and responses to extreme environmental factors;

- to support innovative endeavor to attract young scientists and students of higher educational institutions to address the problems of Antarctic research;

- to approve works on popularization of the results of scientific research in Antarctica and use of medical and physiological information science information (textbooks, manuals, guidelines) as a teaching material for students of higher educational institutions;

- to award with special commemorative medals students of the Department of Biocybernetics and Aerospace Medicine, National Aviation University, presented the best poster presentations.

**At the Closing Plenary of the Conference it was decided:**

**1. To approve the work of the Ministry of Education and Science of Ukraine, the National Academy of Sciences of Ukraine, National Technical University of Ukraine “Kyiv Polytechnic Institute” and the National Antarctic Scientific Center on organization of VII International Antarctic Conference “Antarctic Research: new horizons and priorities”.**

**2. Based on the discussion of conference papers to recognize the urgency and availability of fundamental and applied research made in Antarctica, to approve the appropriateness of their further development and deepening with regard for trends of international Antarctic research set out in the latest materials of SCAR and COMNAP.**

**3. Identify for the next 20 years and beyond six scientific priorities:**

**1) definition of global interaction of Antarctic atmosphere with Southern Ocean;**

**2) study of the mechanism of Antarctic ice cover reduction;**

**3) reproduction of Antarctic geological history;**

**4) disclosure of processes of origin and evolution of life in Antarctica;**

**5) interaction of the Earth and the space Geospheres, space weather forecasting;**

**6) definition of human activities in Antarctica and mitigation of its effects.**

**4. As ways of implementing the above priorities to designate:**

- ensure continued and stable funding of National Antarctic Programs;**
- to ensure year-round access to the entire territory of Antarctica;**
- introduction of the latest scientific and environmental technologies;**
- development of an integrated approach to the study and protection of the Antarctic environment;**
- strengthening of international cooperation in the scientific, logistics and environmental fields;**
- improvement of cooperation between all concerned parties.**

**5. Among the priority tasks for the near future are the following:**

- establishment of the Interregional Association of polar explorers that will attract financial opportunities of other states for organization and conducting of Antarctic expeditions as well as solving of scientific problem at Vernadsky station;**

- adoption by the Verkhovna Rada of Ukraine the Law of Ukraine on ensuring of activities in Antarctica, which would define: the powers of executive bodies regulating relations in the field of exploration and use of Antarctica; issues of functioning of Antarctic "Akademik Vernadsky" station; guarantees of social protection of participants of Ukrainian Antarctic expeditions;**

- implementation of the Government of Ukraine of regulatory legal acts of the Consultative Meetings of the Antarctic Treaty adopted in previous years;**

- increase the presence of Ukrainian scientists in international Antarctic Committees and their active participation in inter-session contact groups of Antarctic Treaty Consultative Meetings to support national-established projects.**

**6. On the basis of science-based data on biodiversity to ensure the further expansion of the system of local (including marine) areas with special protection status around Vernadsky station and adjacent waters as one of the legitimate ways to consolidate Ukraine's presence in the region.**

**7. To develop and deepen scientific cooperation with foreign colleges, to expand research area, including inland, through various international mechanisms, such as:**

- development of joint scientific programs and projects;**
- organization of a unified network of observations, installation of appropriate equipment at another stations;**
- joint expeditions including complex marine expeditions, active exchange of scientists;**

**- joint logistic operations based on corporate relationship between different states.**

**8. To refer the evaluation of the West Antarctica resource potential to the foregrounds tasks. To consider it reasonable to expand the area of geological and geophysical studies to the mainland of the Antarctic Peninsula.**

**9. To continue molecular genetic studies on creation of a unique for Ukraine gene pool of Antarctic organisms that display their activity at low temperatures and can therefore be of positive biotechnological interest.**

**10. To bridge a gap between the latest fundamental research in Antarctica and socio-economic interpretation of results with their subsequent implementation into practice.**

**11. To facilitate the implementation of research results in the educational process of universities in Ukraine, that will contribute to the expansion of contacts at the level of the international student community.**

**12. To ensure the implementation of comprehensive measures to protect the Antarctic biota and for this:**

- to proceed with creation of Specially Protected land and marine areas;**
- to combine the efforts of scientists, representing different scientific areas, on the comprehensive study of Antarctic ecosystems;**
- to organize continuous coordination of actions of various scientific areas representatives.**

**13. Focus on the problem of preventing long-term effects of winterers' stay in extreme conditions. Consider it reasonable to establish a rehabilitation center for participants of Antarctic expeditions.**

**14. Engineering tasks of high priority for the near future are:**

- inclusion of the station research complex in the object register presenting the national heritage and development of appropriate measures for its preservation and proper functioning;**
- modernization of scientific equipment and engineering systems at Vernadsky station;**
- fulfillment of tasks associated with the standardization of processes and metrological support of the station scientific equipment work;**
- ensuring the safe operation of station infrastructure.**

**15. Consider it expedient to continue work on the establishment of the National Antarctic Data Centre, which in the nearest future will be integrated**

into the leading international databases (SCAR, NASA) and make every effort to ensure Vernadsky station employees with the effective Internet access.

16. Taking into account that the "Ukrainian Antarctic Journal" is a basic information resource for publications of domestic Antarctic researchers, it is considered to be necessary to ensure its integration into international bibliographic and scientometric databases.

17. In view of preparation of scientific materials for publication the conference participants are invited to send till August 1, 2015 their oral reports, drawn up in accordance with the requirements, to NASC official address ([uac@uac.gov.ua](mailto:uac@uac.gov.ua)). The scientific reports will be published in "Ukrainian Antarctic Journal", which is included in the List of specialized scientific publications in the field of geological, geographical and biological sciences.

18. To consider it to be reasonable to continue the work on promotion of research and conservation activities in Antarctica.

19. To approve the work of Scientific and Organizing Committees on preparation and holding of the VII IAC.

Conference organizers would like to thank all the participants of the Conference and wish them success and new achievements in the study of the Antarctic continent.

**Chair**  
**Conference Scientific Committee,**  
**Academician of the NAS of Ukraine**

**Petro Gozhik**

**Secretary**  
**Conference Scientific Committee,**  
**Candidate of Biological Sciences**

**Valentyna Malanchuk**