

**RESOLUTION**  
**of the V International Antarctic Conference**  
**ANTARCTICA AND EARTH GLOBAL SYSTEMS:**  
**NEW CHALLENGES AND OUTLOOKS**

In the period of May 17 – 19 2011 the National Antarctic Scientific Center of Ukraine supported by the State Agency on Science, Innovations and Informatization of Ukraine, the National Academy of Sciences of Ukraine and the National Technical University of Ukraine “Kyiv Polytechnic Institute” has conducted the V International Antarctic Conference (V IAC – 2011).

**122 abstracts** were received by the Conference Organizing Committee. **99 oral** and **19 poster presentations** from **336 authors** were submitted.

**110 scientists** from Ukraine, Russian Federation, Republic of Belarus, Poland, Bulgaria and Great Britain took part in the Conference. They presented researches carried out in the leading laboratories, academic institutions and organizations from **8 countries**, notably:

From Ukraine –

16 research institutions of the National Academy of Sciences, National Academy of Medical Sciences;

11 National Universities;

9 Industrial scientific production associations and corporations, design offices, private enterprises.

From Russian Federation –

Arctic and Antarctic Research Institute (St.-Petersburg);

Russian Federal Research Institute of Fisheries and Oceanography (Moscow);

Saint-Petersburg State University (St.-Petersburg);

Zoological Institute, Russian Academy of Sciences (St.-Petersburg);

Geophysical Observatory “Borok” IFZ RAS (Borok);

Institute of the Earth’s Crust SB RAS (Irkutsk);

Vernadsky Institute of Geochemistry and Analytical Chemistry, RAS (Moscow);

A.M. Obukhov Institute of Atmospheric Physics, RAS (Moscow);

Institute of Solar-Terrestrial Physics, SB RAS (Irkutsk);

The Central Geophysical Observatory (Dolgoprudniy).

From Republic of Belarus –

Belarusian State University (Minsk);

State Scientific and Production Amalgamation «The Scientific and Practical Centre for Bioresources of NAS of Belarus (Minsk).

From Bulgaria –

Institute of Biodiversity and Ecosystem Research, BAS (Sofia);

University of Architecture, Civil Engineering and Geodesy (Sofia);

University of Sofia (Sofia);

University of mining and geology (Sofia)

From Poland –

Polish Academy of Sciences, Department of Antarctic Biology (Warsaw);  
Institute of Geography, Nicolas Copernicus University (Toruń).

From Germany –

Alfred Wegener Institute of Polar and Marine Researches (Bremerhaven)

From Great Britain –

British Antarctic Survey (Cambridge).

From Australia –

Australian Antarctic Division, Hobart (Tasmania);

La Trobe University (Melbourne);

University of Melbourne (Melbourne).

All conference members have noted a wide range of scientific research areas presented at the conference, high level of scientific papers and activity of participants in discussion of presented results.

In the course of papers discussion the results of 15 years research in Antarctica were summarized and future prospects were outlined, in particular:

## 1. LIFE SCIENCES SECTION

The section was chaired by Dr. Aleksandr Tashyrev (D.K. Zabolotny Institute of microbiology and virology NAS of Ukraine, Kiev) and Dr. David A. Pearce (British Antarctic Survey, Cambridge, Great Britain).

There were heard and discussed 15 scientific papers and 6 poster papers presented by scientists from Ukraine, Russian Federation, Republic of Belarus, Great Britain and Bulgaria.

Special attention and interest was attracted to scientific presentation of Dr. David Pearce (Great Britain, BAS); E. Abakumov and I. Smirnov (Russian Federation); I. Dykyi, P. Rokitko, A. Tashyreva, E. Mas, I. Andreiev (Ukraine).

In whole it should be noted that the period of 2000 – 2010 was remarkable by forming approaches to integrated studies of Antarctic biota, as well as coordination of different biological studies.

A distinct tendency towards coordination and integration of biological research has been outlined for the past 10 years. Besides, recently a share of molecular-genetic research has been increased.

In-depth analysis and appreciation was given by Dr. David Pearce to the presented results. He has noted that the integrated character of research corresponds to the modern level and active international programs. In particular it concerns research of Antarctic ecosystems state. It is necessary to make an inventory of the existed data on ecosystems and move up to the level of molecular-biological and genetic research.

To protect the changeable Antarctic environment being under the stressed influence it is necessary:

1. To create Antarctic Specially Protected Areas
2. Training of specialists on environmental protection

3. To combine efforts of sciences of different specialities
4. To conduct long-term observations on ergonomics using mathematical model approach
5. All scientists should coordinate their actions.

To long-term plans of domestic biologists refer:

- 1) Creation of protected areas (bio geographic polygons) of standard Antarctic ecosystems.
- 2) Creation of generic geoinformation system (GIS)), integrating comprehensive analyses by structure and functions of ground and marine Antarctic ecosystems at all hierarchy levels of taxons organization (from viruses and bacteria to higher plants and vertebrates).
- 3) Construction of ecosystem correlation models.
- 4) Active usage of constantly updated website of the National Antarctic Scientific Centre. Up-to-the-minute research results and authors' contact details are published in Ukrainian, Russian and English.

The majority of papers of the section have attracted a considerable interest and a wide discussion. All section participants have taken an active part in the discussion.

## 2. EARTH SCIENCES SECTION

The section was chaired by Dr. Vladimir Bakhmutov (S.I. Subbotin Institute of Geophysics, NAS of Ukraine, Kiev) and Dr. Valery Lukin (Arctic and Antarctic Research Institute, St.-Petersburg, Russian Federation).

There were heard and discussed 16 scientific papers and 10 poster papers presented by scientists from Ukraine, Russian Federation, and Bulgaria.

All reports were mainly devoted to applied and basic research problem-solving. In spite of insufficiency of logistic support for geologic-geophysical research execution, a significant scientific breakthrough was achieved.

New technologies and methods of investigation of Earth interior inner structure, mineral deposits exploration and prospecting are elaborated and implemented by domestic sciences. This allowed discovering at the West Antarctic Shelf deep structures which are promising for hydrocarbon resources.

Atlas of the Deep Antarctic Structure is worked out and published; bathymetrical mapping has been started for the purpose of safety shipping in the region of West Antarctic shallow-water archipelagos.

Modern technologies of the Earth geomagnetic field state monitoring using the unique equipment developed by Ukrainian scientists are introduced; Vernadsky Station Magnetic observatory has been included into INTERMAGNET.

Meteorological and seismic observations are used by world data centres for scientific forecast on a regular basis.

## Earth Science section summary:

1. The purpose of advanced research is study of geological structure of the West Antarctica and estimation of its mineral and resource potential. To consider it to be reasonable the expansion of the geologic-geophysical research area to the continental part of the Antarctic Peninsula.

2. It is necessary to intensify the activity on expansion of international cooperation connected with logistic operations.

3. To solve a wide range of scientific tasks it is necessary to participate in joint projects.

4. To provide for widening of monitoring investigations at Vernadsky station at the cost of installation of geopotential sounding equipment.

5. To give a special attention to new technologies of electro-resonance sounding of the Drake Passage area and the Western part Antarctic Peninsula water area.

6. To support the National Antarctic Scientific Centre efforts in organization and development of ecologic-geophysical polygon at Vernadsky station area in order to study environmental dynamics as well as modern geodynamic and geophysical processes in the Earth crust of the region.

### 3. PHYSICAL SCIENCES SECTION

The section was chaired by the NAS of Ukraine Corresponding Member, Prof. Yurii Yampolsky (Institute of Radioastronomy, NAS of Ukraine, Kharkov, Ukraine) and Dr. Vazira Martazinova (Ukrainian Hydro Meteorological Research Institute of the Ministry of Emergencies and the NAS of Ukraine, Kiev, Ukraine).

There were heard and discussed 24 scientific papers from Ukraine, Russian Federation and Poland.

Ocean – atmosphere – geospace research was considered.

1. Oceanographic research was presented by modelling of Weddell Sea near-bottom waters and generalization of oceanographic measurements in different sectors of Antarctic waters.

2. Atmospheric research was presented by the analysis of modern atmospheric circulation above the Antarctica and by the state of temperature modern climatic regime at Vernadsky station, as well as by modern and future state of ozone layer and the ozone hole influence to the Antarctic climate; and by physical-chemical processes occurring in the atmosphere of polar regions.

3. Geospace research was presented by:

- Creation of method of world thundery centres renewal;
- Methods of ionosphere inhomogeneities diagnostics, based on application of global navigation satellite system technologies;
- Ionosphere critical frequency renewal by ionosphere Alfvén resonance observation data;

- Peculiarities of a long-distance and very long-distance short radio wave propagation under conditions of stationary ionosphere and in the presence of disturbances caused by solar eclipses;
- Theoretical model of atmospheric gravitation waves propagation over the Antarctic Peninsula;
- Analysis of Antarctic F-region anomalous diurnal variations.

Physical sciences section summary:

1. The main interest present interdisciplinary investigation of effects of weather disturbances transfer to different altitudes from troposphere to stratosphere, mesosphere, thermosphere up to the altitudes of geospace. Closer scientific cooperation between oceanology – meteorology – geospace areas is considered to be perspective.

2. It is suggested to conduct training of future winterers - ozonetrists on the basis of observing station of Taras Shevchenko Kiev National University and Principal astronomical observatory, NAS of Ukraine (Kiev – Goloseyevo).

3. The majority of reports attracted a significant interest and a wide discussion. All participants of the section have taken part in the discussion.

#### 4. MEDICAL – PHYSIOLOGICAL SCIENCES SECTION

The section was chaired by Dr. Eugenie Moiseyenko (A.A. Bogomoletz Institute of Physiology, NAS of Ukraine, Kiev) and Dr. Vyacheslav Kuzovik (National Aviation University, Kiev).

Scientists, doctors from Vernadsky station and representatives from leading scientific and scientific production institutions took part in the section. All they are engaged in preservation of health of specialists working under extreme conditions as well as in elaboration of new diagnostic-medical-prophylactic technologies.

There were heard and discussed 25 scientific papers. Three main areas were discussed:

- Achievements in studies of adaptation in extreme Antarctic conditions;
- Improvement of existing and development of new technologies concerning medical-physiological data acquisition, estimation of research results, treatment and preventive health care of expedition members;
- Problems and prospects of medical-physiological research in Antarctica and search of their solutions.

The particular interest was attracted to research results in the sphere of ecologic physiology as well as medical technologies, possibilities of application under Antarctic conditions (speaker – representative of “DETA ELIS” Company, (Moscow, Russia).

Medical-physiological estimation of results of executed works is given. These works were devoted to investigation of adaptation mechanisms of members of transcontinental passages. Prospects of further research in this area were outlined.

At the V IAC Closing Plenary the following **decisions** were adopted:

**1. To approve the work of the State Agency on Science, Innovations and Informatization of Ukraine, the National Academy of Sciences of Ukraine, the National Technical University of Ukraine “Kyiv Polytechnic, the National Antarctic Scientific Centre of Ukraine on organization of the V International Antarctic Conference “ANTARCTICA AND EARTH GLOBAL SYSTEMS: NEW CHALLENGES AND OUTLOOKS”.**

**2. To acknowledge availability of conducted studies and to approve reasonability of further development and extension of scientific elaborations on appropriate scientific areas, which are determined in the State goal-oriented scientific program of Antarctic research for 2011-2020.**

**3. To overcome the gap between leaving ahead fundamental studies in Antarctica and socio-economic interpretation of results with their further manufacturing application.**

**4. To brisk up the work on elaboration at a state level of the Strategy of activity of Ukraine in the Antarctic region for a long-term perspective.**

**5. Считать необходимым развивать и углублять сотрудничество с нашими зарубежными коллегами. В кратчайшие сроки представить вниманию Украинно-Российской межправительственной комиссии предложения по разработке двусторонней программы исследований в Антарктике.**

**6. To broaden the area of investigation deep into the mainland, using different international mechanisms:**

- organisation of an integrated observation network, installation of appropriate equipment at other stations;
- execution of joint expeditions, including complex marine expeditions, exchange of scientists;
- execution of joint logistic operations on the basis of corporate relationship between different countries.

**7. To consider it reasonable to make an inventory of available data on ecosystems and to pass on to the level of molecular-biological and genetic studies, to**

**construct models and install them to the international database concerning complex characteristics of Antarctic biota.**

**8. To ensure conduction of complex measures on Antarctic biota protection:**

- To create Antarctic Specially Protected Areas;**
- Training of specialists on Antarctic environment protection;**
- To combine efforts of sciences of different specialities on complex investigation of Antarctic ecosystems;**
- To conduct long-term observations on ergonomics using mathematical model approach;**
- To organize continuous coordination of actions of scientists from different scientific areas.**

**9. To concentrate on problems of separate ecological factors impact on winterers' organism, as well as, on problems of remote consequences of a stay under extreme conditions.**

**10. To complete the work on denomination of geographic objects in the region of Ukrainian scientific interests in Antarctica.**

**11. To recommend creation of scientific-educational centre at Vernadsky station, basic aims of which should be: organization of thematic workshops and field schools with involvement of domestic and foreign scientists.**

**12. To ensure the appropriate information exchange between scientists it is necessary to brisk up the work on creation of the National Antarctic Data Centre of Ukraine.**

**13. To consider it necessary to elaborate and to work it in practice the strategy of system-targeted administration of dissemination of scientific publications and bibliometric metadata through world scientific communication channels.**

**14. To consider it reasonable for Ukrainian historians to participate in the SCAR International Historic Antarctic Group (HAG) created in 2004.**

**15. To prepare the publication of scientific materials of the conference it is suggested to conference participants sending their scientific presentations to the official NASC address till June 30, 2011.**

**16. To publish plenary presentations in the “Ukrainian Antarctic Journal”. Chairmen of the sections should select presentations for publishing. Conference participants should properly get up the recommended presentations in accordance with established rules till August 1, 2011.**

**17. To approve the work of V IAC Scientific and Organization Committees.**

**18. The Conference organizers express gratitude to all participants of V IAC. They wish to everybody every success, new accomplishments, and new Antarctic ways.**

**Chairman  
of the Scientific Committee,  
Prof., NAS of Ukraine Full Member**

**Petro Gozhyk**

**Secretary  
of the Scientific Committee,  
PhD in Biology**

**Valentyna Malanchuk**