MEMBER COUNTRY: **UKRAINE**
National Report to SCAR For year : 2014/2015

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Activity	Contact Name	Address	Telephone	Fax	Email	web site
Scientific Research Program						
AAA						
1)						
2)						
AntEco						
1)						
2)						
AnT-ERA						
1)						
2)						
AntClim21						
1)						
2)						
PAIS						
1)						
2)						
SERCE						
1)						
2)						
Standing Committees						
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SCAGI						
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Other Groups (optional)						
SOOS						

Biological Research

New data on diversity and distribution of invertebrates within the Argentine islands archipelago and adjacent areas were obtained by scientists of Taras Shevchenko National University of Kyiv. Atlas and collection of micro slides of certain types of invertebrates of central islands of Argentine islands archipelago and Kruls and Lipman Islands were created for the first time.

Of the samples (mosses, soil) scientists isolated a number of pure cultures of microscopic fungi and bacteria cultures and characterized their cultural-morphological and physiological features. It has been shown that a significant number of isolated microorganisms is of interest as producers of bioactive compounds for use in biotechnology, medicine, etc. Particularly, scientists have isolated cultures characterized by hyperactivity to synthesize and accumulate biologically active lipids and fatty acids. Besides, fungicidal and bactericidal action of previously known producer of melanin and bacteria cultures against phytopathogenic fungi and bacteria is found. The collection of technologically advanced microbial strains is supplemented with two new species of microscopic fungi and 4 species of bacteria - potential producers of biologically active compounds.

The scientists of the Institute of Molecular Biology and Genetics, National Academy of Sciences of Ukraine, continued the monitoring of climate change on the basis of indicators of terrestrial vegetation by studying the interdependence of success rates of populations of Antarctic vascular plants. The data for the evaluation of biometric (capacity of generative individuals), cytology (DNA content in the leaf cell nuclei) and environmental (population coverage area) adaptability indicators of populations of vascular plants and correlations between them were obtained.

Work on creation of bio-geographical grounds in the waters of UAS "Akademik Vernadsky" with its subsequent transformation to the marine protected area (MPA) Penguin Point is going on. Scientists of Kharkiv V.N. Karazin National University have processed results of acoustic research of the bottom and biodiversity in of Penguin Point area during the 20th UAE season and have created 3D-model, bathymetric map and the area management plan.

Scientists from Kharkiv University fulfilled the work on creation of database of benthic invertebrates' genes, which were collected during the season in the 19-20th UAE, for further study of their evolution and mechanisms of adaptation to extreme factors. Gene sequences of a number of Antarctic organisms are obtained; matrices of molecular data are created in Fasta format for phylogenetic analysis and transmission to the International genetic bank (GenBank). Phylogenetic trees were constructed and new to science species of Antarctic organisms are identified.

Geological and Geophysical Research

The work was directed to determination of georesource potential of the West Antarctica using results of terrestrial and marine research conducted during season expeditions and satellite data received by European Space Agency grant.

Researches from the Institute of Geological Sciences NAS of Ukraine received new data of sea bottom relief and topography of the Antarctic Peninsula. They created gravimetric 3D model of a shelf area with the possible presence of hydrocarbon deposits.

Scientists of the National University "Lvivska Polytekhnika" developed a scheme of spatial movements of the Argentine Islands Earth crust and constructed vector maps of tectonic plate's shifts. For the first time in the world they revealed a relationship between the change in rotational parameters of tectonic plates and the irregularity of the Earth rotational motion.

Ukrainian scientists developed procedure and programming algorithm for processing of monitoring results of seismic parameters for creation of a deep structure model of forecasting of mineral and oil-and-gas bearing resources.

Scientists of the Carpathian Branch of S.I. Subbotin Institute of Geophysics NAS of Ukraine carried out analysis and interpretation of field research of anomalous magnetic field in Vernadsky station area and constructed magnetic models of the Earth crust along separate profiles.

Scientists from S.I. Subbotin Institute of Geophysics developed and renewed existing algorithms and created new software for processing of AIA geomagnetic observatory data at Vernadsky station. They created and analyzed a map of geomagnetic field and its secular variations changes for the period of 1960 – 2015. For the first time the maps of the geomagnetic field secular variation were compared to temperature anomalies in Antarctica.

The received results provide monitoring of geophysical factors that affect environmental changes and became the basis for creating a model of the magnetic field affect on climate change in the Southern Hemisphere.

Hydro-meteorological Research

Scientists from Hydro-meteorological Institute NAS of Ukraine researched peculiarities of changes in the atmospheric circulation and its affect on meteorological conditions at Vernadsky station and Antarctic Peninsula the past decades. Catalog of extreme weather synoptic situations at Vernadsky station for the period of 19th and 20th UAE is supplemented.

Geospace Research

Scientists from the Institute of Radio Astronomy NAS of Ukraine have studied the possibility of using of ultra low-frequency – super low frequency data obtained at Vernadsky station and SOUSY Observatory (Spitsbergen island, Norway) for interferometer observations. It should be noted, that execution of the program is based on a close cooperation with scientists from Europe and USA.

The scientists have revealed signals generated by global electromagnetic resonators, with solar and geomagnetic activity as well as have determined parameters of the ionosphere and the resonators which in future will be used for space weather monitoring and forecasting.

Medical and Physiological Research

Scientists from Bogomoletz Institute of Physiology have analyzed and processed monitoring data of psycho physiological functions of members of 17th – 20th Ukrainian Antarctic Expeditions at the stages of applicants selection, long stay in Antarctica and upon completion of expedition using psycho physiological and statistical methods. According to the research results recommendations were worked out designed to optimize the psycho-physiological testing and examination of candidates for the wintering using modern methods of examination taking into account specific features of operator's activity and thorough assessment of individual characteristics.

Development and adoption of new technologies

Scientists from the National Technical University of Ukraine “Kyiv Polytechnic Institute” continued research on creation of the National Antarctic Data Centre (NADC). They developed and tested the first model of NADC portal with an integrated interface for accumulation data by NASA pattern.

Algorithm of automated transmission service of Antarctic research results from NASC Portal to NASA portal is proposed and approaches and programming language for its implementation are analyzed.

Work continued on the creation of an automated system to prevent fuel leaks at Vernadsky station. The research is aimed at establishing the impact of changes in the functional state of the fuel tank on the characteristics of the measuring systems.

The received results: simulation and physical models of the reservoir; laboratory prototype of monitoring system with a wireless data transmission device; methods of simulation and physical modeling; methods of investigation of impact of changes in the functional state of the diagnosis object models on the measured signals; algorithmic support and software for processing of measured signals – are the basis for creating of an early warning system of a fuel leak possibility and its placement directly on the tank at Vernadsky station for experimental operation.