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The Polish Polar Station at Hornsund, Spitsbergen, has formed part of the Institute of Geophysics, Polish Academy of Sciences, since the 1970s.

Quality Above All

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The planet Earth can be best studied in a world without borders, through international efforts

The Institute of Geophysics, Polish Academy of Sciences, continues a long and illustrious tradition of geophysical research in Poland. The world's first geophysics department at a university was set up by Prof. Maurycy Pius Rudzki at Jagiellonian University in Kraków in 1895. There were Polish geophysical observatories operating in locations including Kraków, Lwów (now Lviv in Ukraine), Warsaw, and Świder, some of them set up nearly a century ago. The Department for Geophysics of the Polish Academy of Sciences was first established in 1953, embracing a seismological observatory in Warsaw, a geomagnetic observatory in Świder, and a geophysical observatory in Racibórz.

Alongside the pursuit of original scientific research, the main objectives of the Department included modernizing and expanding the system of continuous geophysical observations in Poland and incorporating Polish observatories into the worldwide measurement network then being pulled together. In the 1950s a seismological station was set up in Kraków and the Marine Station of the Polish Academy of Sciences in Sopot was added to the Department. In 1955 a decision was made to organize the International Geophysical Year 1957–1958, which mobi-

lized Polish state officials to earmark additional funding for geophysical research and for organizing expeditions to Vietnam and Spitsbergen. These projects gave a significant boost to the Department's research activity. In the 1960s a Central Geophysical Observatory was set up at Belsk, a magnetic observatory was established at Hel, and a Satellite Geodesy Section was formed.

The Department of Geophysics pursued cutting-edge research projects, becoming the most important Polish institution for geophysical research. In 1967 the Department was authorized to grant Ph.D. degrees in physics. In recognition of its rising significance this former Department was transformed into the "Institute of Geophysics" in 1970, a move which further facilitated its growth. The Institute's infrastructure was greatly expanded, the Marine Station and the Satellite Geodesy Section were themselves promoted to the status of research departments of the Polish Academy of Sciences, and the GEOPAN Experimental Department, producing geophysical equipment, was likewise established under the structure of the Institute of Geophysics.

The scope of the Institute's activities broadened over the 1970s, including the creation of a Hydrological Systems Laboratory and a Polar Research Department, the latter incorporating the geophysical station at Hornsund on Spitsbergen. Initially created for the purposes of the Geophysical Year 1957–1958, this station was thoroughly rebuilt in the summer of 1978, enabling it to pursue year-round geophysical observations.

Waves and fields

At present the Institute pursues fundamental research practically in all fields dealing with the physics of the planet Earth, with six departments: Seismology, Geomagnetism, Earth's Interior Dynamics, Atmospheric Physics, Water Resources, and Polar and Marine Research. At the same time the institute performs around-the-clock monitoring of global magnetic fields, seismic tremors, and selected parameters of the atmosphere.

Seismology research encompasses a broad spectrum of issues and is based on the analysis of earthquakes, especially seismic phenomena within Poland. Poland is at the forefront of such research in view of years of research findings compiled on the tremors caused by mining activity. The institute has also scored great successes in leading large-scale international seismic soundings aimed at identifying the structure and geodynamics of the Earth's crust and upper mantle in Europe as well as in the polar regions.

The Institute's geomagnetic research, in turn, concentrates on developing magnetotelluric methods and numerically modeling the processes of electromagnetic induction within the Earth. Regional studies of the structure of the Earth's crust are also performed, complimenting the findings obtained from deep seismic soundings. An important part of the Geomagnetism Department's activity involves paleomagnetic studies and researching the magnetic properties of intrusive and sedimentary rocks, carried out in a laboratory with top-notch equipment.

The main thrust of the Institute's interests also includes research on the dynamics of the Earth's interior, especially the physics of seismically active regions. Theoretical models are developed to explain how seismic waves are generated and propagated. The Earth is likewise studied from the standpoint of the evolution of the Sun and Solar System, harnessing the research methods of planetology and astrophysics.

Atmospheric research at the Institute likewise has a long history and broad scope. In recent years particular stress has been laid on analyzing ozone layer and solar radiation variability over various timescales. Significant achievements have also been made in LIDAR and atmospheric electricity studies.

The Institute's range of research interests also embraces the hydrosphere, especially the physical processes occurring within surface waters. Institute staff do both theoretical and experimental work on the transportation and mixing of pollutants in rivers, the transformation of flood waves, and identifying flood risks. They moreover analyze the impact of anticipated global change on water resources. Polar and marine research especially focuses on analyzing geophysical data and data on the natural environment gathered by the Polish Polar Station on Spitsbergen.

Impact factor

The second main focus of the Institute's activities is monitoring global geophysical phenomena, the results of which are submitted to world data centers. The Institute runs 11 observatories in Poland plus one on Spitsbergen, many of them highly renowned in the world. The quality of the data collected, already very good, is constantly being improved through new investments and the development of unique geophysical devices.

The Institute confers Ph.D. and D.Sc. (*habilitation*) degrees in geophysics and offers a 4-year doctorate program. Its monthly journal *Acta Geophysica* has gained wide international recognition and is indexed by the Institute for Scientific Information in Philadelphia. The Institute also issues *Publications of the Institute of Geophysics* – containing dissertations, monographs, and analyses of the geophysical data registered by its observatories.

The Institute is actively involved in many international research programs, including the EU Framework Programmes, NATO projects, USAID, and robust cooperation with foreign research centers. The caliber of research at the Institute has always been very highly esteemed: three successive evaluations by the Polish State Committee for Scientific Research and the Ministry of Science and Higher Education have rated the Institute in the top (first) category. ■