

Global Lab

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Four institutes of the Polish Academy of Sciences teamed up in 2009 to establish the "GeoPlanet Center" Earth and Planetary Research Center

Oculis plus vident quam oculus – several eyes see more than only one. This Latin phrase captures the inspiration behind the creation of the "GeoPlanet" Earth and Planetary Research Center, meant to serve as a nexus integrating Polish research in the Earth-related sciences. By pooling together the expertise of scientists from four different institutes studying different facets of the same natural phenomena, the Center is expected to generate considerable synergy. Geological, seismological, atmospheric, hydrological, polar, and space research all overlap and intertwine in significant and interesting ways. The initiative thus takes Polish research to a whole new level, boosting its international competitiveness while better harnessing existing research infrastructure.

Overlapping fields

The past two decades have witnessed the gradual disappearance of the traditional classification of scientific fields, giving way instead to new interdisciplinary fields of inquiry. Western European examples (like the GeoForschungsZentrum in Germany and IFREMER in France) illustrate how large, strong research centers are capable of broad-scale interdisciplinary work, stimulating industry with innovative ideas and furthering the advancement of a knowledge-based society.

The institutes comprising GeoPlanet work in the many of the same research fields, yet focus on different aspects thereof. For instance, each of the four Polish Academy of Sciences institutes engages in polar research, albeit each with a different profile: the Oceania research vessel owned by the Institute of Oceanology plies the waters of the Baltic and northern sea regions, the Institute of Geophysics maintains a research station on Spitsbergen (monitoring magnetic, seismic, and atmospheric changes in the polar regions), the Institute of Geological Sciences pursues gla-

cial/marine research aimed at retracing the evolution of the cryosphere, and the Space Research Center studies the ionosphere in polar regions.

Monitoring risks

One of GeoPlanet's fortes may become research on climate change, thanks to some of the existing specialties at the individual institutes (ozone studied at the Institute of Geophysics, space weather at the Space Research Center, and atmospheric aerosols at the Institute of Oceanology) plus their amassed experience at building complex models of intricate natural phenomena. Extreme occurrences like earthquakes, volcanic eruptions, floods, droughts, hurricanes, sea-storms, and tsunamis demand the constant refinement of methods for predicting, monitoring, and assessing risks. Poland is certainly not exempt from their potentially devastating impact, a fact that faces the GeoPlanet initiative with a great public obligation.

The management of water resources, the need to seek alternative sources of energy and deposits of natural fuels, and coping with ecological disasters are all issues where the Earth sciences can be crucially brought to bear in problem-solving. The Center thus aspires to make a valuable contribution to such research debates.

The institutes involved in the Center implement Poland's state policies concerning the registration of global geophysical data, forwarding the results to worldwide



The directors of four Institutes of the Polish Academy of Sciences signing a consortium agreement to establish the "GeoPlanet" Earth and Planetary Research Center (from left): Prof. Marek Lewandowski (Institute of Geological Sciences), Prof. Stanisław Massel (Institute of Oceanology), Prof. Paweł Rowiński (Institute of Geophysics), and Prof. Marek Banaszekiewicz (Space Research Centre)



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data centers. In view of the great demand for constant monitoring of the Earth in terms of potential dangers – stemming from both environmental dynamics and changes wrought by human civilization – the GeoPlanet institutes have long been successfully involved in the GMES (*Global Monitoring for Environment and Security*) and GEOSS (*Global Earth Observation System of Systems*) programs. GeoPlanet indeed stands chances of becoming one of Europe's leaders in the field of satellite monitoring.

Modeling natural phenomena

If we take a broad view, the Earth itself can be viewed as one big global lab. For instance, to be able to seek phenomena and geological structures analogous to those on other planets and smaller bodies in our Solar System, we need thorough knowledge of our own planet. This is inextricably linked to fundamental, unresolved questions about the origins of life and mankind.

The task of the GeoPlanet Center will be to forge unique research teams and pursue joint research work. This is of great significance given today's science-funding mechanisms, which chiefly prioritize contest-winning, contractually-funded projects (subsidies received by research units as their statutory sources of funding are growing less and less important).

The scientists of the GeoPlanet Center have for years been engaged in modeling natural phenomena. Trends in contemporary science indicate that aside from theory, experimentation, and applications, simulation work is now taking on increasing significance. Given the limited costs

involved, complex simulations of natural phenomena (especially catastrophes and natural threats) are now of colossal importance for science and the economy.

The GeoPlanet Center may also become a strategic partner for numerous commercial entities. The Institute of Geophysics and the Space Research Center are already involved in consortia bringing together both science and industry. This has a stimulating effect on how research work is done, facilitates the practical implementation of research findings, and reinforces Poland's economic potential on both local and cross-regional levels.

Another important part of the Center's activity involves education: it plans to establish new post-graduate programs in environmental geophysics and natural threats, specialist courses for a wide range of attendees, and interdisciplinary PhD studies in the Earth sciences.

Uniting four elements

Aristotle held that the world around us is comprised of four elements (water, fire, air, and earth), which can combine together only in specific combinations – only when they share at least one common trait. The aspiration of the four institutes forming GeoPlanet, bringing together diverse potential in terms of research profiles, infrastructure, and staff, is to join together in diverse configurations much like the four Aristotelian elements – yet here all combinations are possible and indeed desirable, even the most seemingly exotic. It is our hope and conviction that they will spawn new approaches and yield valuable advances in geosystem research. ■