WORLD CLASS EARTH SCIENCES RESEARCH

UiO Department of Geosciences
University of Oslo
A significant player in international research.
The geosciences have a central position in modern society, bridging natural resources, energy, environment, climate and geohazards. Norway has a long and proud tradition in earth sciences, and the Department of Geosciences at the University of Oslo continues this tradition as it strives to combine stability and long-term fundamental research with the rapidly changing demands of modern society, and the imperative to be a significant player in the international research arena.

In 1917, prominent citizens of Bergen – with the assistance of Fridtjof Nansen – persuaded Professor Vilhelm Bjerknes to return to Norway to support the development of academia. Bjerknes, with his background in fluid dynamics and electromagnetism, had been called to Leipzig University in 1912 to establish a geophysics department but his resources, in particular his bright young colleagues, were being drained by World War I.

In Bergen, he established a small but highly efficient research group, and by responding to the Norwegian coastal population’s desperate need for reliable weather forecasts, he developed the foundations of modern meteorology, later labelled the Bergen School of Meteorology. There is an unbroken line from Bjerknes to present day research in meteorology, oceanography and climate in Norway.

But the Geophysical Institute and Bergen School do not represent the inception of modern earth sciences in Norway. The Mining Academy at Kongsberg, established in 1757, is one of the oldest of its kind. After ceding from Denmark in 1814, the young nation prioritised establishing an observatory at the Royal Fredericks University (now the University of Oslo) over finishing the construction of the Royal Palace. However, the Bergen School was probably the first de facto realisation of what we today would term a Centre of Excellence, and it highlights central qualities that hopefully still characterise Norwegian geosciences research: international linkages, interdisciplinary research, the fostering of bright young scientists, interaction between theoretical and applied research and the importance of leaders who focus on recruitment and growth.

Norway has an economy that is, and will continue to be, heavily based on natural resources – mineral and marine resources, petroleum, large wind and wave power potential and hydropower resources – that position it as a potential battery for the electricity system of Europe. Along with the geopolitical importance of its proximity and orientation to the Arctic, this naturally positions earth sciences at the crossroads of academic potential and society’s interests and demands.

Examples of how academia responds to new challenges include the refocusing of geology and geophysics in the Sixties and Seventies, when oil and gas were discovered on the Norwegian shelf; the contribution of Norwegian atmospheric chemistry researchers and meteorologists to the Montreal Protocol on ozone depletion and curbing sulphur emissions in the atmosphere; and the active participation by Norwegian climate researchers and glaciologists on the Intergovernmental Panel on Climate Change (IPCC) assessment reports.
The geosciences are part of an active and dynamic scene in Norway. The Research Council of Norway (RCN) has concluded an international evaluation, summarised on page 5.

The Department of Geosciences at the University of Oslo has a faculty of 38 professors and associate professors, 140 employees including PhD fellows and an annual turnover of €16m. It encompasses a wide range of disciplines, from atmospheric sciences to deep mantle research.

Like its sister departments around the globe, it is caught up in and struggles to reconcile a fix on the short- and medium-term strategic timescales and the drive for concentration and specialisation. The straightforward response to this is to focus on areas of internal strength and competitive advantage, and consequently scale-down the broad disciplinary coverage. In the long term, however, the challenges are found in responding to new demands from society and creating new and innovative areas of research. The ability to meet such challenges is to a large extent a product of profound disciplinary knowledge and strong interdisciplinary cross-fertilisation, abilities that are easily lost in the drive for specialisation.

In this context, there is a clear cut distinction between the missions and strategic horizons of universities and research institutes. A central task for universities is to maintain a broad disciplinary knowledge base, while the institute sector should be able to respond quickly and cost-efficiently to the rapidly changing needs of applied research. It is important to uphold a fundamental division of labour between the actors in this respect – recognition of such delineations is also the basis for fruitful cooperation between the sectors. The importance of this is not always clearly understood by funding agencies.
Another challenge related to funding for earth sciences, shared with many other natural sciences, is that much of the research is based on experimental and field related activities. This applies to both research and teaching. These are expensive activities, and in a situation characterised by funding squeezes it is easy to downscale field and experimental work and upscale theoretical work. In some areas, the traditional earth sciences were lagging behind in theoretical aspects and more emphasis on theory and modelling has boosted these disciplines. In the long run, however, downscaling experimental and field-based work deteriorates the common knowledge base, weakens the scientific basis for theory verification and produces candidates that lack the practical insight and hands-on expertise gained through experimental work and field activities.

This said, the prospects and the future outlook for earth sciences are excellent. They are centrally positioned in the ‘big triangle’ of energy, natural resources and environment that drives modern society and sets the agenda for vital issues. There is a continuing shift in society, from considering these issues to be mainly ‘hard’ or technology-driven issues, to being ‘soft’ or social science related. This calls for new constellations across traditional disciplinary boundaries in problem description, research management and outreach to decision-makers and the general public. New alliances and networks across disciplinary boundaries are necessary instruments for academia today, to challenge and enrich our work methods and communication skills.

Excerpt from ‘Earth Sciences in Norway’, an evaluation by the Research Council of Norway (RCN), 2011:
‘The Evaluation Committee, comprising leading international experts in a range of earth science disciplines, is pleased to report to the RCN that earth science research in Norway is generally in a state of good health. Very few truly weak research areas were observed, and in a number of fields, e.g. climate science, meteorology and atmospheric science, marine science, hydrology, physics of geological processes and sedimentary basin development in the context of petroleum systems, Norway can be considered to be internationally leading. Norway can be proud of its many strengths in the field of earth sciences, which have been built from a strong physical and natural science base and are of critical national importance. Maintaining these strengths is likely to serve Norway very well in the future.’
Facets of geoscience

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