



## European Plate Observing System – the Arctic dimension and the Nordic collaboration

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Within the framework of the EPOS project, Nordic interests are significant, not only in fundamental scientific issues related to geodynamic processes, but also in terms of the application of these to several central problems such as, hydrocarbon exploration and production including the related environmental issues, CO<sub>2</sub> storage (or other toxic waste repositories) in geological formations, geothermal energy (natural and hot-dry rock) utilization and mining, geohazards (earthquakes, landslides and volcanic eruptions) and their consequences to the society. The Arctic dimension including Fennoscandia, the northern North Atlantic and the Arctic Sea constitutes an area of considerable geographical extent within the European plate. The region also contains a significant part of the European plate boundary submerged under the North Atlantic and the Arctic sea, where geodynamic processes such as rifting and fracturing are especially energetic. In particular, where the plate boundary is exposed on land in the South Iceland seismic zone, large earthquakes are frequently observed including two Mw6.5 events in 2000 and one Mw6.3 event in 2008. But, seismic hazard is not confined to the plate boundary. Significant intra-plate earthquakes have recently occurred in the region (Mw6.1 in the continental shelf near Spitsbergen in 2008, Mw5.0 in Southern Sweden in 2008, Mw5.2 near Kaliningrad in 2004) showing that there is considerable seismic hazard in the region. In addition, submarine landslide earthquakes are always of concern due to possible tsunami generation. Volcanic activity occurs on the plate boundary and is particularly strong in the rift zones of Iceland, where on average two volcanic eruptions occur per decade. subaerial volcanic eruptions also occur on Jan Mayen island, farther north on the Mid Atlantic ridge. Together, the Danish seismic network in Greenland, the Norwegian seismic arrays and national network traversing the length of Norway and the Icelandic seismic and strong motion networks monitor seismic activity and hazard in the North Atlantic. Vigorous volcanic activity along the plate boundary in Iceland and associated hazards are monitored by the Icelandic, seismic, geodetic, meteorological and hydrological networks. Recent eruptions, like the 2010 Eyjafjallajökull eruptions have demonstrated the far-reaching hazard to aviation caused by volcanic eruptions in Iceland. The high-sensitivity seismic and geodetic networks of Sweden monitor isostatic rebound of Fennoscandia. In this context, the varied Nordic monitoring networks provide a significant contribution to the main objectives of EPOS. There are already existing links with the other ESFRI initiatives where strong Nordic participation is established, such as SIOS and EMSO. As such EPOS provides the necessary platform to collaborate and develop an important Nordic dimension in the European Research Area.

There is a long tradition of collaboration at the governmental level between the Nordic countries, Norway, Sweden, Denmark, Finland and Iceland. Within the fields of research and education, the Nordic Ministries have a dedicated program, where research networks are being promoted. Recently a Nordic collaborative network in seismology, “NordQuake” (coordinated by Denmark) was established within this program. This collaboration which is now formalized and supported by the Nordic Ministries is based on a cooperation which was initiated more than 40 years ago, where annual Nordic Seminars in seismology (previously on detection seismology) was the central element. EPOS Nordic collaboration, building upon a long lasting history, has a significant potential for synergy effects in the region and therefore represents an important dimension within EPOS.

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