Natural Hazards

State-of-the-art and challenges: Observation of natural hazards needs to consider two different aspects, namely the direct observation of the hazardous event, for example as seismometer recordings of earthquake ground motion or tide gauge recording of a tsunami wave, and the observation of parameters needed for assessing the likelihood of future hazardous events. Assessing the likelihood of a future natural hazard event usually requires interdisciplinary data. For example, snow avalanche potential will be affected by precipitation, temperature and the current snow conditions, and the evaluation of global sea level rise potential require input and integration of e.g. ice sheet mass loss estimates, *in situ* observations, remote sensing, meteorological and oceanographic modelling. Many datasets are available through national or international monitoring networks or data repositories, but much data still remain unavailable to the scientific community, and there has been little effort to integrate interdisciplinary data. The European Plate Observing System (EPOS), a pan-European ESFRI project that aims to integrate the European research infrastructures for solid earth science through an interdisciplinary approach. EPOS will help understanding natural hazards related to ground deformation (from e.g. earthquakes), but there is a large observational gap offshore and especially in ice covered areas. Technologies exist, for example for climate observatories on the Greenland ice sheet or for ocean bottom seismometer (OBS) observations, but installations are expensive and logistically challenging, especially in ice covered areas where the sea bottom cannot be accessed. This leads to a large monitoring gap in the Arctic region and especially in the Arctic Ocean and thus limited understanding of the processes controlling natural hazards and the potential warning of future events.

Expected progress beyond state-of-the-art:

- Provide input to climate change impact assessments on the contribution of the Greenland ice sheet to global sea level rise.
- Utilize in situ snow and meteorological data to develop a post-processing method that will improve the extreme precipitation forecasts and provide better forcing for avalanche forecast models.

Provide input from ocean bottom seismometer observation to earthquake hazard assessment in the Arctic continental shelf regions.