

THORPEX-IPY: Improved forecasting of adverse weather in the Arctic region – present and future

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Project summary

In the Arctic region of the North Atlantic, an array of adverse weather phenomena takes place exposing the expanding human activities - such as oil and gas exploration and marine transport - and the region's vulnerable environment to high risks. There is a need for improving the understanding and forecasting of adverse weather in the region. During winter, advection of extremely cold and stable air from the sea-ice/land over the open ocean can lead to intense weather features such as Arctic fronts, polar lows and terrain-induced disturbances. A major impediment for forecasting these features is the sparse network of conventional observations. Polar orbiting satellites cover high latitudes well, and new instrumentation on meteorological satellites provides new and promising sources of information for the Arctic atmosphere. However, satellite observations need to be co-located with other independent observations. The extensive international observational activity planned during IPY offers an unequalled opportunity to address this problem and to conduct intensive research for enhanced understanding and forecasting of Arctic weather extremes.

We propose a Norwegian co-ordination of and contribution to the International Polar Year (IPY) project THORPEX-IPY. THORPEX-IPY is the Arctic component of the international program THORPEX (The Observing System Research and Predictability Program) under the WMO World Weather Research Program. The main objective of THORPEX is to “Accelerate improvements in the accuracy of one-day to two-week high impact weather forecasts for the benefit of society, the economy and the environment” (<http://www.wmo.int/thorpex/>). This is also one of the nine societal themes in Global Earth Observation System of Systems (GEOSS). In the Norwegian THORPEX-IPY proposal we aim to significantly improve forecasts of high-impact weather events in the Arctic. This will be done by designated observations including campaigns integrated with the IPY international logistics, exploitation of data and efforts by international collaborators, and by modelling and data assimilation activities, integrated with the international activity in THORPEX and the rest of IPY. Furthermore, we propose to study how climate change may influence the frequency and character of adverse weather events. The Norwegian THORPEX-IPY will leave a legacy in terms of an improved and extended observational network in the Arctic, enhanced exploitation of data from polar orbiting satellites, and improved numerical weather prediction.