

ESA STSE Northern Hydrology – Project for Building a Portfolio of Lake and River Ice Earth Observation Products for Numerical Weather Prediction and Climate Modeling

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Lake and river ice play a key role in the physical, biological, and chemical processes of cold region freshwater. The presence of freshwater ice also has several economic implications ranging from transportation (ice-road duration, open-water shipping season) to the occurrence and severity of ice-jam flooding which often causes serious damage to infrastructure and property.

In response to the increasing recognition of the importance of freshwater ice, European Space Agency is funding through the STSE- (Support to Science Element) program an international consortium of research agencies to gathering a portfolio of novel multi-mission geo-information products. The portfolio is built to improve the current characterization of river and lake ice dynamics in numerical weather prediction and climate models.

The work of Northern Hydrology- project supports the efforts coordinated by the CliC- (Climate and Cryosphere) of the WCRP (World Climate Research Program) to exploit the use of EO technology, models and in-situ data to improve the characterization of river and lake ice processes and their contribution to the Northern hydrology system.

SYKE and FMI contribute in the project by providing modeling frameworks for the Earth Observation data (WSFS – Hydrological model of SYKE and HIRLAM weather prediction model used at FMI). The large in-situ and weather station networks of the two institutions are also available for the consortium partners. Additionally SYKE provides the snow cover on lake ice with the algorithm used in the operational mapping of snow cover in Finland and Northern Europe [1].

Project partners:

University of Waterloo, Interdisciplinary Centre on Climate Change
Environment Canada at University of Victoria
Environmental Earth Observation IT GmbH (ENVEO)
Finnish Environment Institute, Geoinformatics
Finnish Meteorological Institute, Arctic Research
INRS – Centre Eau Terre Environnement, University of Quebec
Northern Research Institute, Tromsø
Norsk Regnesentral
Swedish Meteorological and Hydrological Institute

[1] S. Metsämäki, S. Anttila, M. Huttunen, and J. Vepsäläinen, "A feasible method for fractional snow cover mapping in boreal zone based on a reflectance model", *Remote Sens. Environ.*, vol. 95, pp. 77-95, 2005.