

A Presentation System for Flood Forecasting Products

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Flood forecasting can be improved by applying satellite observations, weather radars and in situ measurements from automatic monitoring stations. The developed integrated system provides information applicable as input to the Watershed Simulation and Forecasting System (WSFS) of SYKE and to similar hydrological forecasting systems.

The challenge on the end user side is how to present the products derived from the remote sensing data in an interactive way to the user. The products used as input to the forecasting model were snow water equivalent (SWE), fraction of snow covered area (FSC) and cumulative amount of precipitation (CP). Also processed polarimetric SAR images were included as an experimental option [1].

The first prototype of the demonstration system was implemented based on Google Earth, providing simple viewing functions like panning and zooming and selection of layers over a base map. This simple approach was also used as one of the tools when gathering user requirements during a workshop. As a result of the user requirements study and the workshop, a set of functions were decided to be implemented in the demonstration system.

The presentation system contains a set of functions selected during the User workshop. The most important ones are:

- display of **numerical values** of the products at a point currently visible on the map
- display of **time series** of values as a graph at an interactively given point on the map for different products
- display of **values as a graph** along an interactively drawn **line**

To study how the satellite observations of snow cover area (SCA) and snow water equivalent (SWE) affect the accuracy of hydrological forecast in the hydrological model of Watershed and Forecasting System (WFSF), set of tests were conducted for Kemijoki river basin in the Northern Finland.

It was observed that discharge forecast can be improved using satellite SWE measurements, although the effect is rather small when snow line measurements and precipitation measurements are available. However, satellite observations could be used to improve forecasts in the areas where direct ground measurements are not available.

References

- [1] J.P. Kärnä, M. Huttunen, S. Metsämäki, B. Vehviläinen, V. Podsechin, J. Pulliainen, J. Lemmetyinen, T. Kuitunen, Y. Rauste, and R. Berglund, "Improving hydrological forecasting using multi-source remote sensing data together with in situ measurements" *Proceedings of the International Geoscience and Remote Sensing Symposium, IGARSS 2010*. Honolulu, Hawaii, USA, 25 - 30 July 2010, pp. 1749 – 1752.