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Producing Snow Extent and Snow Water Equivalent Information for Climate Research Purposes – ESA DUE Globsnow Effort

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The European Space Agency (ESA) Data User Element (DUE) funded GlobSnow project aims at creating a global database of snow parameters for climate research purposes. The main objective is to create a long term dataset on two essential snow parameters. The project will provide information concerning the areal extent of snow (SE) on a global scale and snow water equivalent (SWE) for the Northern Hemisphere. Both products will include the end product derived from the satellite data along with accuracy information for each snow parameter. The temporal span of the SE product will be 15 years and the span for the SWE product will be 30 years. A key improvement of the snow products, when compared with the currently available data sets, will be the inclusion of a statistically derived accuracy estimate accompanying each SE or SWE estimate (on a pixel level).

In addition to the SE and SWE time-series, an operational near-real time (NRT) snow information service will be implemented. The service will provide daily snow maps for hydrological, meteorological, and climate research purposes. The snow products will be based on data acquired from optical and passive microwave-based spaceborne sensors combined with ground-based weather station observations. The work was initiated in November 2008, and is being coordinated by the Finnish Meteorological Institute (FMI). Other project partners involved are NR (Norwegian Computing Centre), ENVEO IT GmbH, GAMMA Remote Sensing AG, Finnish Environment Institute (SYKE), Environment Canada (EC) and Northern Research Institute (Norut).

Extensive algorithm evaluation efforts were carried out for the candidate SWE and SE algorithms during 2009 using ground truth data gathered from Canada, Scandinavia, Russia and the Alps. The acquired evaluation results have enabled the selection of the algorithms to be utilized for the GlobSnow SE and SWE products. The SWE product is derived using the FMI Algorithm and the SE product is a combination of NR and SYKE developed algorithms. Both algorithms showed enhanced estimation characteristics when compared with currently available existing products. Prototype SE and SWE products were released for user evaluation during November 2009 covering the years 2003-2008 for SWE and 2003-2006 for SE. The SWE product covers the Northern Hemisphere and the SE product is provided for Pan-European region.

The final long term dataset to be released later on 2010 will include SWE estimates starting from the year 1978 and SE estimates starting from 1995. The operational near-real time processing system should be producing snow maps for the snow season of 2010-2011 on Northern Hemisphere. The current data, including both the prototype products and the used validation data are available now for all interested parties through the GlobSnow webpages (http://globsnow.fmi.fi).