

Achievements and overall concept of ESA DUE GlobSnow-2 project

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The efforts of the European Space Agency (ESA) Data User Element (DUE) funded GlobSnow project has resulted in two hemispherical-scale records of snow parameters intended for climate research purposes. The datasets contain satellite-retrieved information on snow extent (SE) and snow water equivalent (SWE) extending more than 15 and 30 years respectively. The dataset on snow extent is based on optical data of Envisat AATSR and ERS-2 ATSR-2 sensors covering Northern Hemisphere between years 1995 to 2012. The record on snow water equivalent is produced using a combination of passive microwave radiometer and ground-based weather station data. Recent efforts within the GlobSnow project include the further development of the optical SE retrieval methodology for NPP Suomi VIIRS data and preparation for Sentinel-3 OLCI & SLSTR utilization. Additionally, the combination of the optical SE and the passive microwave SWE products has been investigated.

The SE processing system applies optical measurements in the visual-to-thermal part of the electromagnetic spectrum acquired by the ERS-2 sensor ATSR-2 and the Envisat sensor AATSR, covering Northern Hemisphere in a latitude-longitude grid with a 0.01 degree spatial resolution (approximately 1 km).

The SWE retrieval is based on the time-series of measurements by two different space-borne passive radiometers (SMMR and SSM/I) combined with ground-based weather station observations

[1]. The time series spans from 1980 to present day at a spatial resolution of approximately 25 km.

The GlobSnow-2 project, initiated in May 2012, is a direct continuation to the GlobSnow-1 project that was active from 2008 to 2012. The objective of the GlobSnow-2 project is further enhancement of the retrieval methodologies for SE and SWE products and a re-processing of the long term datasets utilizing the improved retrieval algorithms of GlobSnow-2. In addition to the further development of methodologies for the legacy sensor families of GlobSnow-1, the consortium will investigate the utilization of AVHRR and NPP Suomi VIIRS data as gap fillers before the launch of the Sentinel-3 SLSTR-sensor. Also the development of a new product combining the high resolution SE data with the lower resolution SWE product will be a topic for GlobSnow-2.

The current GlobSnow SE and SWE data records have been released and are available through the GlobSnow web-pages (www.globsnow.info). The ESA GlobSnow project 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, Central Institute for Meteorology and Geodynamics Austria (ZAMG), GAMMA Remote Sensing AG, University of Bern, MeteoSwiss, Finnish Environment Institute (SYKE), Environment Canada (EC) and Northern Research Institute (Norut).