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Monitoring Snow and Land Ice Using Satellite data in the GMES Project CryoLand

Gabriele Bippus and Thomas Nagler
ENVEO IT GmbH, Innsbruck, Austria (gabriele.bippus@enveo.at)

The main objectives of the project "CryoLand – GMES Service Snow and Land Ice" are to develop, implement and validate services for snow, glaciers and lake and river ice products as a Downstream Service within the Global Monitoring for Environment and Security (GMES) program of the European Commission. CryoLand exploits Earth Observation data from current optical and microwave sensors and of the upcoming GMES Sentinel satellite family. The project prepares also the basis for the cryospheric component of the GMES Land Monitoring services. The CryoLand project team consists of 10 partner organisations from Austria, Finland, Norway, Sweden, Switzerland and Romania and is funded by the 7th Framework Program of the European Commission.
The CryoLand baseline products for snow include fractional snow extent from optical satellite data, the extent of melting snow from SAR data, and coarse resolution snow water equivalent maps from passive microwave data. Experimental products include maps of snow surface wetness and temperature. The products range from large scale coverage at medium resolution to regional products with high resolution, in order to address a wide user community. Medium resolution optical data (e.g. MODIS, in the near future Sentinel-3) and SAR (ENVISAT ASAR, in the near future Sentinel-1) are the main sources of EO data for generating large scale products in near real time. For generation of regional products high resolution satellite data are used. Glacier products are based on high resolution optical (e.g. SPOT-5, in the near future Sentinel-2) and SAR (TerraSAR-X, in the near future Sentinel-1) data and include glacier outlines, mapping of glacier facies, glacier lakes and ice velocity. The glacier products are generated on users demand. Current test areas are located in the Alps, Norway, Greenland and the Himalayan Mountains. The lake and river ice products include ice extent and its temporal changes and snow extent on ice. The algorithms for these products are in development. One major task of CryoLand is the performance assessment of the products, which is carried out in different environments, climate zones and land cover types, selected jointly with users. Accuracy assessment is done for test areas using in-situ data and very high resolution satellite data. This presentation gives an overview on the processing lines and demonstration products for snow, glacier and lake ice parameters including examples of the product accuracy assessment. An important point of the CryoLand project is the use of advanced information technology, which is applied to process and distribute snow and land ice products in near real time.