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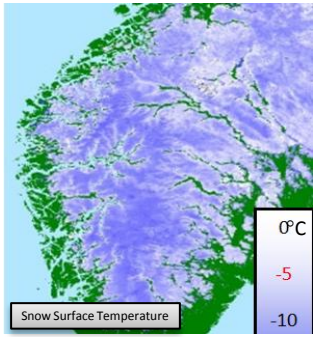
CryoLand

GMES Service Snow and Land Ice

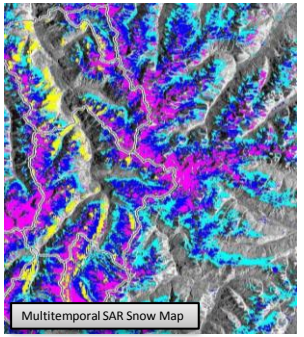
FP7 Project No. 262925 *2011 - 2015*

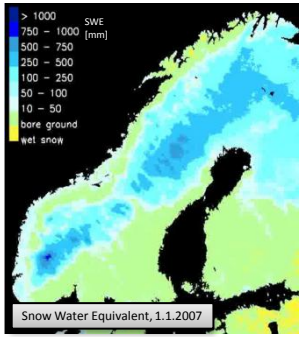
GMES Downstream Service in response to the Call FP7-SPACE-2010-1
Activity 9.1 Space-based applications at the service of European Society
SPA.2010.1.1-01 - Stimulating the development of downstream GMES services.

www.cryoland.eu



Snow Surface Temperature

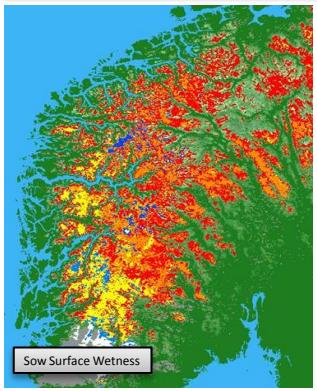

Multitemporal SAR Snow Map

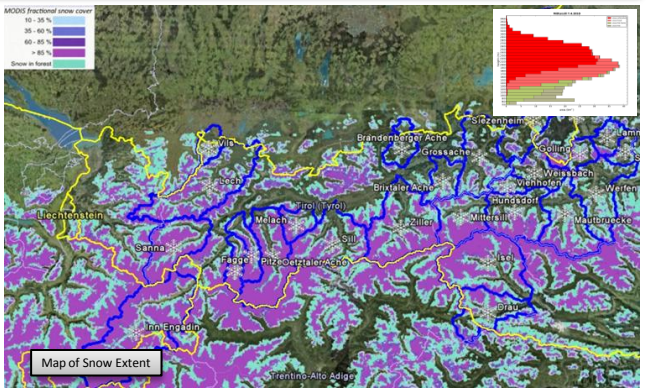


Snow Water Equivalent, 1.1.2007

Service Goals

- Develop and validate a pan-European satellite-based snow and land ice service delivering highly needed products to the user society.
- Integrate and operationalise existing snow and land ice services
- Prepare the tools for offering snow and ice services world-wide
- Perform full verification and real time demonstration of the services
- Prepare the basis for the Cryosphere Component of a GMES Global Land Monitoring Service
- Complement GeoLand Land Cover Products
- Conform to INSPIRE/GEOSS standards
- Make available products via state-of-the-art online services
- Issue guidelines for stakeholders and for service deployment operations


Sow Surface Wetness



CryoLand (2011-2015)

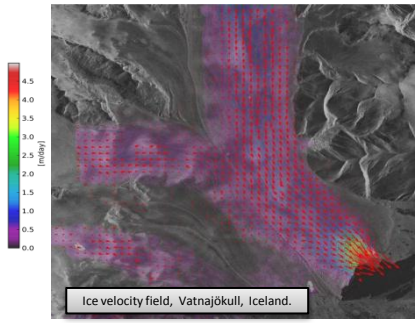
GMES Service Snow and Land Ice

Needs and Opportunities

Snow and ice play a key role for water cycle and ecology in high- and mid- latitudes as well as in many mountain regions. Accurate snow and ice observations are of great societal and economic value. They help to improve the management of water resources, hydro-power operations, irrigation, and flood prediction, and to preserve biodiversity.

Satellite instruments are essential for delivering sustained, accurate, spatially detailed observations of snow and ice. The basis for these observations is a fleet of European and international Earth observation satellites operating at optical and radar wavelengths. Even more advanced data will be provided by the upcoming GMES satellites of the Sentinel series, enabling to observe key parameters of the cryosphere in great detail at high temporal sequence.

This true multi-sensor imaging capability will be exploited by CryoLand, employing multi-sensor and multi-temporal techniques for generating advanced snow and ice products at regional, continental and global scales.

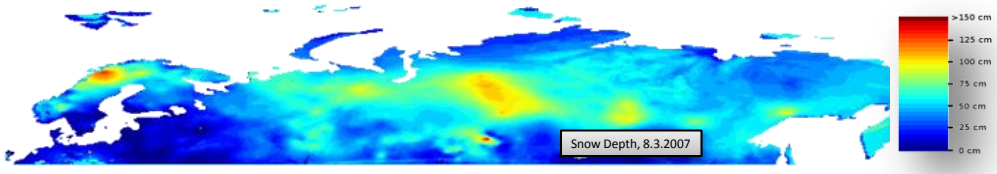


Ice velocity field, Vatnajökull, Iceland.

Expected Impacts and Results

The project will improve and validate methods and software systems for near-real-time monitoring of snow and land ice. The snow and ice product types and service elements will be customized to the needs of the users. Operational tests of the service will be performed over several winter seasons. This will enhance the European capability of utilising EO data in operational applications for sustainable management of the environment.

The standard snow and ice products will cover Europe on a daily, weekly, seasonal and annual basis depending on the user requirement. Special products will be generated on user demand. The products will be made available online using Internet-based data distribution techniques.



Snow Depth, 8.3.2007

Products

- Snow Cover Area Fraction
- Snow Water Equivalent
- Snow Wetness and Temperature
- Glacier Area Extent, Snow / Ice Area , and Ice Velocity fields
- Glacier lake extent
- Lake Ice and River Ice Extent
- Integrated products of conventional and satellite observation.

Satellites/Sensors

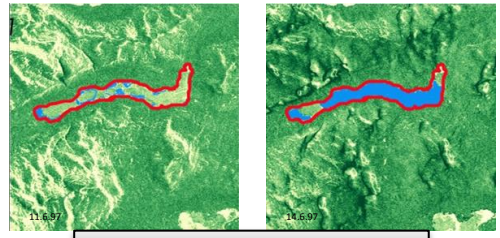
- Envisat ASAR, MERIS and AATSR
- Terra MODIS
- Aqua AMSR-E
- SeaWinds Quikscat
- Radarsat-2
- TerraSAR-X, Tandem-X
- Sentinel-1, -2, -3
- Cosmo Skymed

Users

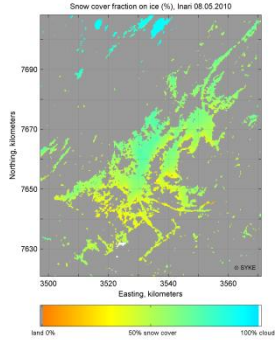
- Hydropower companies
- Energy traders
- Road, Railway and River Authorities
- Geotechnical and Construction companies
- Avalanche warning centres
- Ecologists
- Reindeer herders
- Hydrological services
- Meteorological services
- Climate monitoring institutions
- Environmental agencies

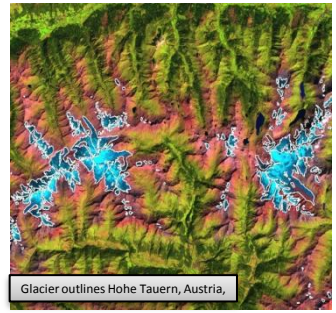
Infrastructure and Links

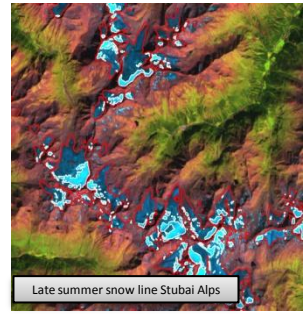
- GMES Land Monitoring Core Services
- Coordinated Data Access Service for GMES Satellites
- INSPIRE conformant in-situ data services
- Web-map service
- Spatial Data Infrastructure based on Service Oriented Architecture

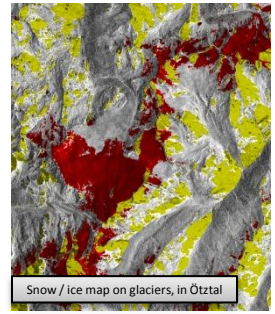


Break up of lake ice at the lake Nedre Heimdalsvatn, Norway




Glacier outlines Hohe Tauern, Austria,


Late summer snow line Stubai Alps


Snow / ice map on glaciers, in Ötztal