# CryoLand

GMES Service Snow and Land Ice

## BRIEFING NOTE FOR POLICY MAKERS

No. 2

### AT A GLANCE

**Title**: CryoLand - GMES Service Snow and Land Ice

**Grant Agreement** No. 262925

**Call:** FP7-SPACE-2010-1 Activity 9.1
**Theme:** SPA.2010.1.1-01 Stimulating Development of Downstream GMES Services

**INSTRUMENT:** Collaborative Project FP7
**TOTAL COSTS:** € 2.828.859
**EC CONTRIBUTION:** € 2.201.182
**PERIOD:** 1 Feb. 2011 – 31 Jan. 2015
**DURATION:** 48 Months

**CONSORTIUM:** 10 Partners from 6 European Countries

**PROJECT COORDINATOR:**
ENVEO Environmental Earth Observation IT GmbH
Innsbruck, Austria

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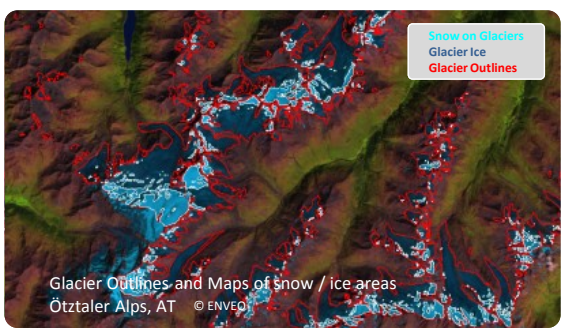
**PROJECT WEB SITE:** http://www.cryoland.eu



Glacier Outlines and Maps of snow / ice areas
Ötztaler Alps, AT © ENVEO

### OBJECTIVES

CryoLand develops and implements a fully integrated and stake-holder relevant snow, glacier and lake / river ice service, building upon Earth Observation data including the GMES Sentinel satellite family. Fully validated snow and land ice products, conforming to the INSPIRE/GEOSS standards, covering local to continental scales are delivered in near real time to users operating in various application fields. CryoLand has the potential to cover the cryosphere component of the GMES Land Core Service and has the potential for extension to global monitoring.

### BENEFITS TO CITIZENS

The CryoLand services on accurate and timely observations of snow and land ice by means of satellites support environmental and resource management activities in Europe. Seasonal snow cover and glaciers are important resources, supplying major parts of Europe with water for human consumption, agriculture, hydropower generation, and other economic activities. The presence of snow and ice affects the radiation and energy balance of the surface so that accurate characterisation of snow and ice properties is important for weather prediction and climate monitoring. Various natural hazards are directly or indirectly related to snow, glaciers and lake / river ice, including avalanches, flooding from intensive snow melt, water outbreak from glacier lakes, or ice jams on rivers. Snow load is also an important safety and operation issue concerning construction activities for buildings and power lines. The users of CryoLand services are organisations operating in the field of water resources management, hydropower production, energy trading, natural hazards mitigation, transportation and construction activities, climate monitoring and modelling, weather prediction, agriculture, and tourism.

Policy Brief No. 3 is planned for July 2014

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## CryoLand Products

Specifications and service implementation priorities for snow, glacier and lake / river ice products are defined together with the CryoLand User Group.

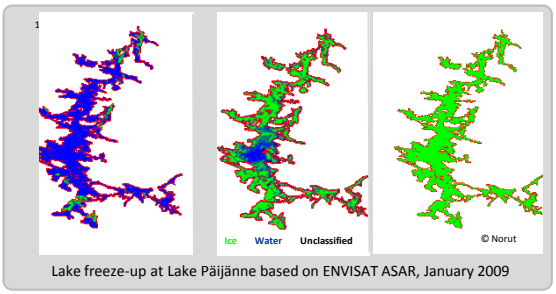
*SNOW SERVICE:* The primary snow products are pan-European and regional fractional snow extent from optical satellite data (MODIS, Sentinel-3), melting snow maps from SAR (Sentinel-1), and coarse resolution maps of snow water equivalent (from AMSR) and are provided in near real time.

*GLACIER SERVICE:* Glacier products are generated on user request and include glacier area and outlines, maps of snow/ice area, ice motion maps, and glacier lakes.

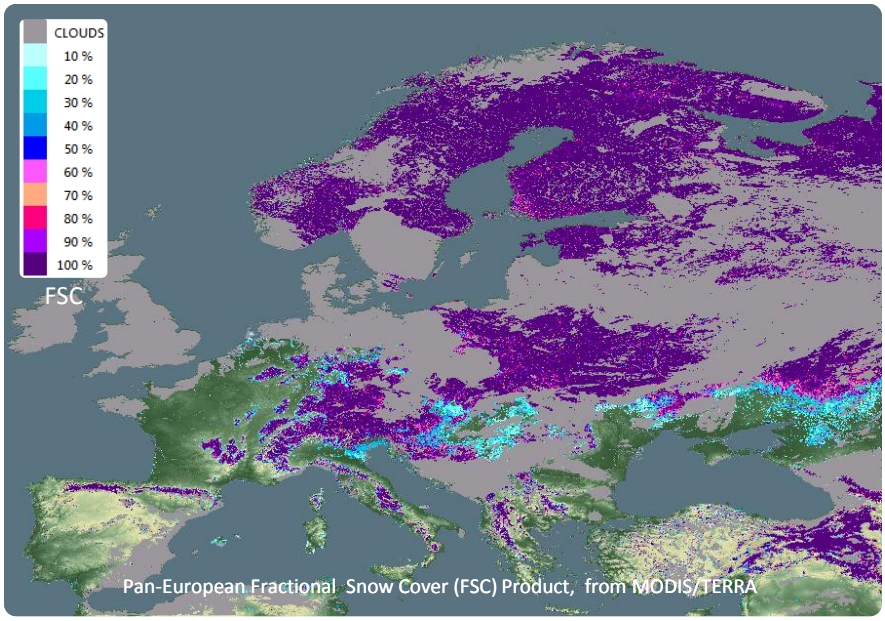
*LAKE/RIVER ICE SERVICE:* The extent and concentration of lake ice, its temporal changes and the snow cover on lake ice are the primary products.

## CryoLand Service Provision

In order to ensure timely and efficient delivery of CryoLand snow and land ice products a service infrastructure is developed and implemented based on interoperable and standardised Web services. The CryoLand service architecture follows the recommendations of GIGAS (GEOSS, INSPIRE and GMES an Action in Support) and builds upon the OGC (Open Geospatial Consortium) web service standards.



Lake freeze-up at Lake Päijänne based on ENVISAT ASAR, January 2009



Pan-European Fractional Snow Cover (FSC) Product, from MODIS/TERRA

## PROJECT PARTNERS

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|---|---|
| ENVEO IT GmbH (Project Coordinator), Innsbruck, AT | Norwegian Computing Center, Oslo, NO |
| EOX IT Services GmbH, Vienna, AT | Northern Research Institute AS, Tromsø, NO |
| Finnish Environmental Institute, Helsinki, FI | National Meteorological Administration, Bucharest, RO |
| Finnish Meteorological Institute, Sodankylä, FI | Gamma Remote Sensing AG, Gümligen, CH |
| Kongsberg Satellite Services AS, Tromsø, NO | Swedish Meteorological and Hydrological Institute, SE |

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