European Satellite Snow Monitoring Activities

Background material for participants to the Workshop on European Snow Monitoring Perspectives, Darmstadt, 4-5 December 2012.

Overview

Title	*Polar View*
Objective	*Polar View offers integrated monitoring and forecasting services in the Polar Regions and parts of the mid-latitudes with significant snow and ice cover using satellite Earth observation data.* *All services, including , sea ice-, iceberg-, ice egde-, river ice-, lake ice-, glacier- and snow monitoring, address operational users and science needs.* *Objectives:* • *Improved information for decision making and planning* • *Provide accurate, real-time information* • *Customization to meet users' needs* http://www.polarview.org *Polar View Snow Services are provided by three regional partners for the area of Central Europe, Scandinavia and the Baltic Area to serve the specific requirements of the users.* http://www.snowsense.de
Programme	*ESA - GMES Service Element (GSE)*
Sustainability	*ESA funding for 07/2005 to 01/2013.* *Sustainability by transition to GMES services (e.g. GMES Marine Service MyOcean) and user contributions, of single services partly achieved. Sustainability of parts of the Snow Services is pending.* *Polar View was formally incorporated under the name Polar View Earth Observation Ltd. in the UK in 2011, to carry on coordination, communication and promotion.*

Individual Snow Products – Polar View

Product Name	Pan-European Snow Map – 10 Day Situation
Description	Multiday composite product, using the input daily medium resolution products of each service provider and each service area. Multiday-Product (10 days mean of snow) Snow Cover Fraction, divided in 5 classes Spatial Resolution of 0.05 degree Geographic projection (Lat / Lon) Product is presented via online portal using Google Maps technology and can be displayed in Google Earth
Spatial Coverage	Central and Northern Europe, (Lat. 44 -73, Lon. 0 – 45) Subsets of Central Europe (Alps), Scandinavia and the Baltic Area
Temporal Coverage	10 day composites, with regular update during winter and spring months Area of Central Europe is updated from November onwards, Scandinavia and Baltic are updated from March / April onwards Products since winter 2009/2010 available
Producers	VISTA Remote Sensing in Geosciences GmbH By use of products of VISTA, Finnish Environment Institute (SYKE) and Kronsberg Satellite Services (KSAT)
Data Source(s)	Daily snow cover and fraction snow cover maps of the regional service providers from Envisat ASAR, Radarsat SAR, Terra MODIS and NOAA/MetOp-A AVHRR data
Data Policy	Free service within Polar View activities
Source	Polar View Snow Service Portal www.snowsense.de or via Polar View website www.polarview.org polarview@vista-geo.de

Product Name	Snow Cover, Snow Line and Wet Snow Mapping - Central Europe (VISTA)
Description	Service provides frequent updates on snow cover relating to relevant information for flood forecasting and early warning in Central Europe. The snow-monitoring service consists of two different processing chains for optical and microwave data. Snow cover information from SAR, especially wet snow detection, is limited to melting conditions Products are provided in user defined, individual format to achieve best possible integration in users operations. Snow classes: snow covered / snow free / snow line / clouds / unclassified + wet snow area (for SAR based products)
Spatial Coverage	Central Europe and the Alps Provided for catchments on users requests and users geometry (e.g. Rhine, Upper Danube, Moselle, Upper Rhine) The primary spatial resolution of products is 1 km.
Temporal Coverage	NRT service with daily updates between November and April Updates depending on cloud situation and SAR data availability Archive , depending on catchment, since 2005
Producers	VISTA Remote Sensing in Geosciences GmbH
Data Source(s)	NOAA and METOP-A AVHRR ENVISAT ASAR (interrupted since 2011)
Data Policy	Free access to FTP for users involved by Service Level Agreement
Source	VISTA Remote Sensing in Geosciences GmbH Gabelsberger Str. 51, D-80333 München www.vista-geo.de appel@vista-geo.de

Product Name	Snow Water Equivalent - Central Europe (VISTA)
Description	Provision of Snow Water Equivalent (SWE) using the physically based snow- and hydro-model PROMET. This requires meteorological station-data, land-use and topography as input. The spatial distribution of Snow Water Equivalent is calculated physically based, in hourly steps, regarding all components of mass and energy transfer. Observed snow cover information from EO is assimilated for improved results. Runoff and hydropower calculations available as add-on.
Spatial Coverage	Provided for catchments in Central Europe and the Alps on users request (e.g. Upper Danube, Rhone, Upper Rhine) The spatial resolution of products is 1 km.
Temporal Coverage	Daily information, e.g. each morning Forecasts (up to 10 days) on requests
Producers	VISTA Remote Sensing in Geosciences GmbH
Data Source(s)	Snow and hydro model (PROMET), meteorological station observations and forecasts. Snow cover maps derived from NOAA and METOP-A AVHRR for assimilation
Data Policy	Commercial service Access to secureFTP for users on contractual basis
Source	VISTA Remote Sensing in Geosciences GmbH Gabelsberger Str. 51, D-80333 München www.vista-geo.de appel@vista-geo.de

Product Name	Snow Monitoring Baltic Region (SYKE)
Description	The snow service provided by the Finnish Environment Institute (SYKE) comprises mapping of Fractional Snow Coverage (FSC) in the Baltic Sea drainage area and surroundings. This near-real-time service is based on daily Terra/MODIS imagery; an automated processing system is used to produce the FSC for 0.005° grid cells over the target area. The processing line includes radiometric and geometric corrections, cloud masking and the actual FSC estimation. The service production and further developments are currently taken place within FP7-project CryoLand which aims at sustained GMES Downstream Services on Cryosphere.
Spatial Coverage	Baltic Sea drainage area
Temporal Coverage	SYKE provides snow maps for the melting season (February-May) for the Baltic Sea area Archive since 2007
Producers	Finnish Environment Institute (SYKE)
Data Source(s)	daily Terra/MODIS imagery
Data Policy	Polar View Service, Access to GeoTiff Products via dedicated archive website
Source	Finnish Environment Institute (SYKE) sari.metsamaki@environment.fi

Product Name	Scandinavian Snow Cover Area Service (KSAT)
Description	Product provides a percentage of snow cover per pixel based on a multi-temporal mosaic of optical and SAR data, and is produced by KSAT after each data acquisition during the snowmelt season Each product is generated out of the data from the last 7 days, using optical and SAR coverage. 250m resolution
Spatial Coverage	Scandinavia (Norway and Sweden) 57.2 – 71.6 N / -0.9 – 32.0 E
Temporal Coverage	Daily Information (1 April - 1 July)
Producers	Kronsberg Satellite Services (KSAT)
Data Source(s)	Snow maps are derived from Envisat ASAR / Radarsat and Terra MODIS data combined to generate the multi-sensor and multi-temporal snow map.
Data Policy	Polar View Service, Access to GeoTiff Products via FTP and dedicated archive website
Source	Kronsberg Satellite Services (KSAT) richard.hall@ksat.no