The Nordkalotten Satellite Validation Network (NorSatVal)

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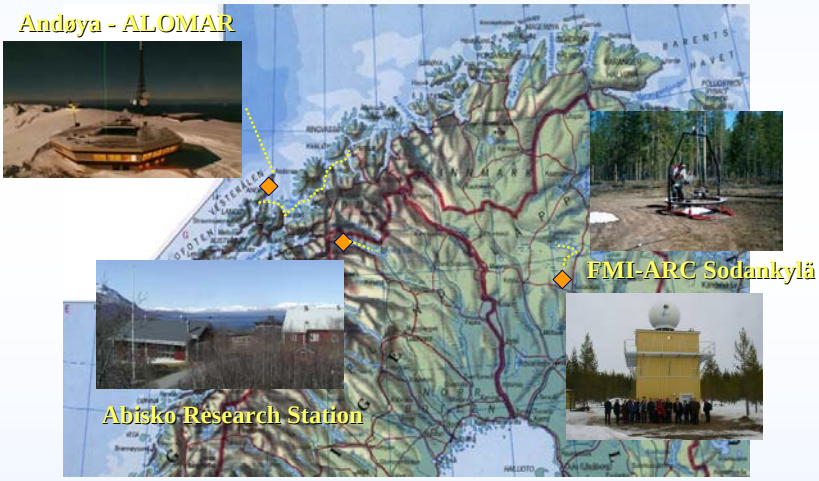
Partner institutions:

- Finnish Meteorological Institute – Arctic Research Centre (FMI-ARC) – Co-ordinator
- Finnish Environment Institute (SYKE)
- Helsinki University of Technology (HUT)
- University of Helsinki (UH)
- Finnish Forrest Institute (METLA)
- Finnish Geodetical Institute (FGI)
- Norwegian Institute for Air Research (NILU)
- Norwegian Institute for Nature Research (NINA)
- Norwegian Institute for Water Research (NIVA)
- Andøya Rocket Range (ARR)
- Abisko Research Station (ANS)
- Centre of Image Analysis – University of Uppsala (CB-UU)



Validation Tools

Near ground and air-borne spectral imaging with instruments adapted to satellite instruments to be validated

In-situ measurements of marine, freshwater, vegetation and other terrestric (e.g., snow) parameters, pluss reference reflectance surface

Acquisition of realistic atmospheric parameters in the region, especially aerosols and vertical trace gas profiles

Marshland at Andøya with masts as possible carriers of near-ground spectrometers

The Spextube III airborne; AirSpex. (Courtesy F. Sigernes) http://unis31.unis.no/Airspex2000/

HUT's airplane eqipped with imaging spectrometer

Surface types to be investigated

- Sub-Arctic coastal marshland (Dverberg myra, Andøya)
- Arctic-Alpine vegetation (Abisko Scientific Research Station)
- Boreal forest (Lapland)
- Sub-Arctic eutrophic and humic lakes (Lapland)
- Arctic-Alpine clear lake (Torneträsk)
- Sub-Arctic coastal waters (Along the route of the ferry "Hurtigruten")
- Sub-Arctic Ocean (continental shelf edge outside Andøya)
- An airport landing strip used as a reference reflectance surface

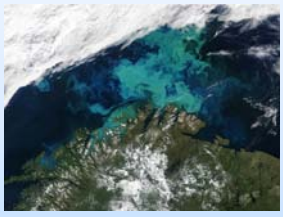
Main Aim:

To build a coordinated regional network of satellite data validation and application sites in Northern Fennoscandia, aiming at terrestrial, marine/hydrological and atmospheric key parameters for environmental monitoring in the Arctic and sub-Arctic regions.

Sub-goals:

- To build a network of satellite validation stations based on already existing infrastructure, in characteristic Arctic and sub-Arctic environments, using a uniform set of validation instruments
- To develop algorithm modules optimised for applications in the Arctic and sub-Arctic environment
- To develop validation strategies for key parameters of marine and terrestrial eco-systems at high latitudes
- To develop and implement infrastructure for efficient provision of relevant parameters and data quality information to end users in public administration and economy

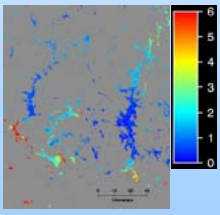
Some applications envisaged



Monitoring of algae bloom in Arctic oceans (MODIS)

Figure 1. MERIS mosaic of Northern Europe, composed of 85 images acquired by MERIS during the summer of 2002, representing the arithmetic averaged reflectance of the land surface. The combination of the three spectral bands of the image product, centred at 665, 560 and 442.5 nm respectively, generates an optical image in which it is possible to appreciate the differences in land cover. This Level 3 product represents a test of the algorithms implemented in the BEAM software, the MERIS/AATSR toolbox, which is available to ESA PIs. The image represents a mosaic of retrieved surface reflectances, after application of the atmospheric correction performed by the SMAC processor, a Simplified Method for Atmospheric Correction (SMAC) developed by Rahman and Dedieu (1994).

Monitoring of leaf area index and other terrestric parameters, including snow influence



Turbidity in Finnish lakes as monitored with MODIS

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