

The Nordkalotten Satellite Evaluation & Co-operation Network (NorSEN)

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- Finnish Environment Institute (SYKE)
- Helsinki University of Technology (TKK)
- University of Helsinki (UH)
- Finnish Forrest Institute (METLA)
- Finnish Geodetical Institute (FGI)
- University of Turku (UT)
- Norwegian Institute for Air Research (NILU)
- Norwegian Institute for Nature Research (NINA)
- Norwegian Institute for Water Research (NIVA)/Akvaplan-niva (Apn)
- NORUT IT(NI)
- Bioforsk Holt, Bioforsk Svanhøvd (Bioforsk)
- Andøya Rocket Range (ARR)
- Abisko Research Station (ANS)
- Centre of Image Analysis – University of Uppsala (CB-UU)
- University of Umeå (UmU)

Hurtigruten MS Trollfjord



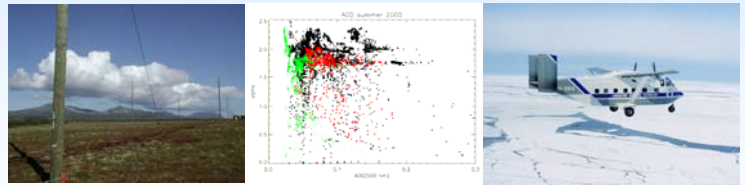
Validation Tools

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 terrestrial (e.g., snow) parameters, plus reference reflectance surface

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

Phenological registrations of natural vegetation to be used as ground data for calibration of satellite data time series



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

Aerosol optical density (AOD) measurements from Andøya (red), Sodankylä (black), compared with high Arctic measurements (green)

HUT's airplane equipped 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 (Tometräsk)
- Sub-Arctic coastal waters (Along the route of the coastal steamer MS Trollfjord)
- An airport landing strip used as a reference reflectance surface

Some applications envisaged

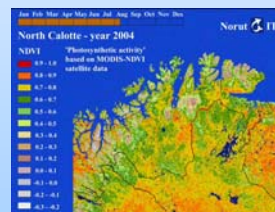


Monitoring of algae bloom in Arctic oceans (MODIS)

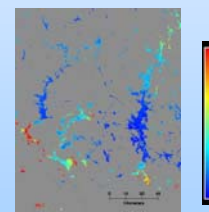


Monitoring of leaf area index and other terrestrial parameters, including snow influence

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, centered at 665, 680 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 algorithm implemented in the BEAM software, the MERIS AATSR tool, which is available in ESA FTP. 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 Rahnin and Dedieu (1994).



Photosynthetic activity based on MODIS-NDVI data



Turbidity in Finnish lakes as monitored with MODIS

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 establish, in northern Fennoscandia, a phenological registration network by coordinating the ongoing ground observations and establishing new observation sites where gaps are found
- To develop algorithm modules optimised for applications in the Arctic and sub-Arctic environment, and validation strategies for key parameters of marine and terrestrial ecosystems at high latitudes
- To coordinate and share in an open web interface time-series of relevant data and present registrations in suitable forms, e.g., animations, trend maps
- To develop and implement infrastructure for efficient provision of relevant parameters and data quality information to end users in public administration and economy, e.g., international satellite agencies

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