FINNISH METEOROLOGICAL INSTITUTE

Satellite Data and Applications from Sodankylä, Finland

Anna Kontu, Osmo Aulamo, Hanne Suokanerva, and Seppo Hassinen

Finnish Meteorological Institute, Finland
anna.kontu@fmi.fi

Satellite Reception

The Finnish Meteorological Institute (FMI) has operated a satellite reception system in the Arctic Research Centre, Sodankylä, since 2003. We are receiving X-band direct broadcast dissemination from three satellites: Aura, Terra and Aqua. All these satellites are on a polar low Earth orbit and are operated by NASA. We receive and process data of two instruments:

- OMI (Ozone Monitoring Instrument) is an imaging spectrometer onboard EOS Aura. It measures ozone, NO_2, BrO, HCHO, and aerosols, providing information used mainly in UV research but contributing also to atmospheric chemistry and air quality research.
- MODIS (Moderate Resolution Imaging Spectroradiometer) instruments onboard EOS Terra and Aqua provide information on several atmospheric, oceanic and surface parameters.

Direct broadcast dissemination gives us instant access to data covering Finland and its immediate surroundings. Because of our northern location (67.37°N, 26.63°E) we are able to receive polar data from over 10 orbits per day for each satellite. All the received MODIS overpasses and the best five OMI overpasses of the day are processed.

OMI products

The OMI data are processed in Sodankylä immediately after the satellite overpass to provide three very fast delivery (VFD) products: total ozone, UV index and erythemally weighted daily dose. Below is a figure showing a GoogleEarth version of the VFD products. It is available from the project web site *http://omivfd.fmi.fi/*.

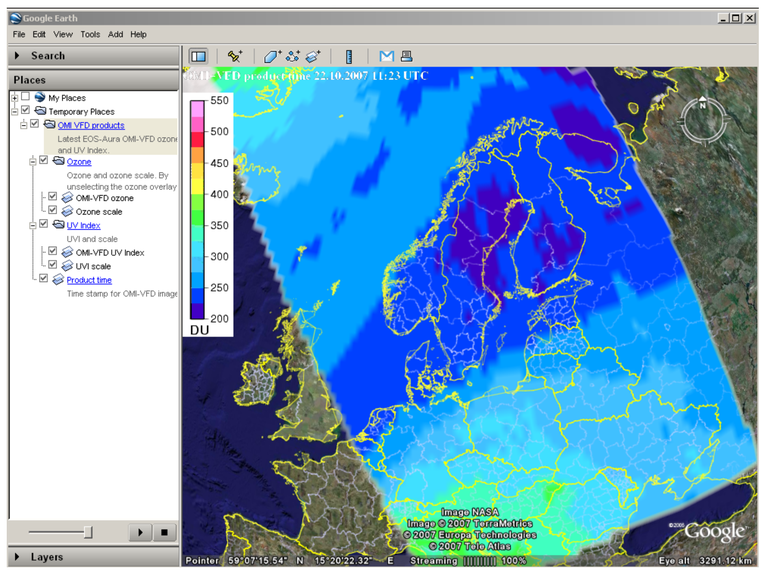

Fig. 1: OMI total ozone in GoogleEarth.

MODIS products

International co-operation

Several MODIS products are processed on-site in real-time from FMI data by Cooperative Institute for Meteorological Satellite Studies (CIMSS), University of Wisconsin, to provide accurate polar data for e.g. numerical weather prediction models. Figure below shows the primary product, polar winds. Other products include surface temperature, precipitable water and vegetation index. All the real-time products are available from *http://stratus.ssec.wisc.edu/products/db/sodankyla/*.

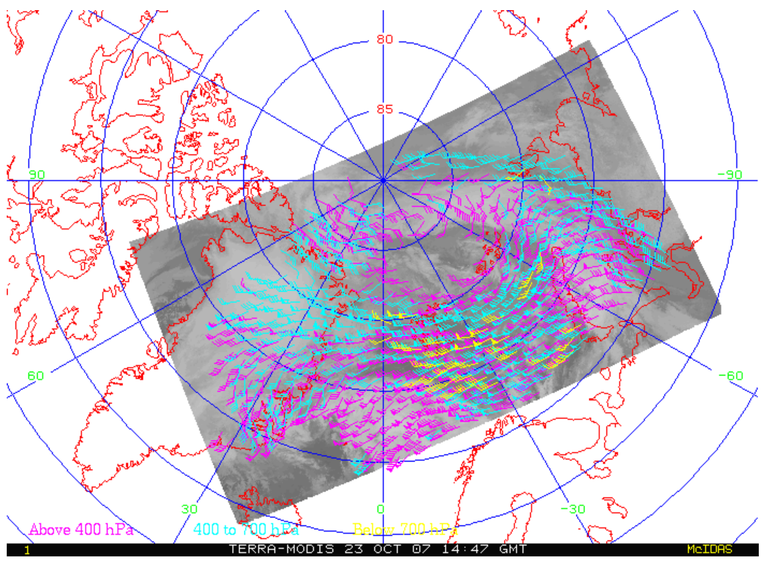

Fig. 2: Polar winds by CIMSS.

National co-operation

MODIS data are processed in Sodankylä to Level 1. The data are delivered to FMI in Helsinki for operational meteorological forecasting and our national co-operative partners Finnish Institute of Marine Research (FIMR) and Finnish Environment Institute (SYKE), who further process the data into end products.

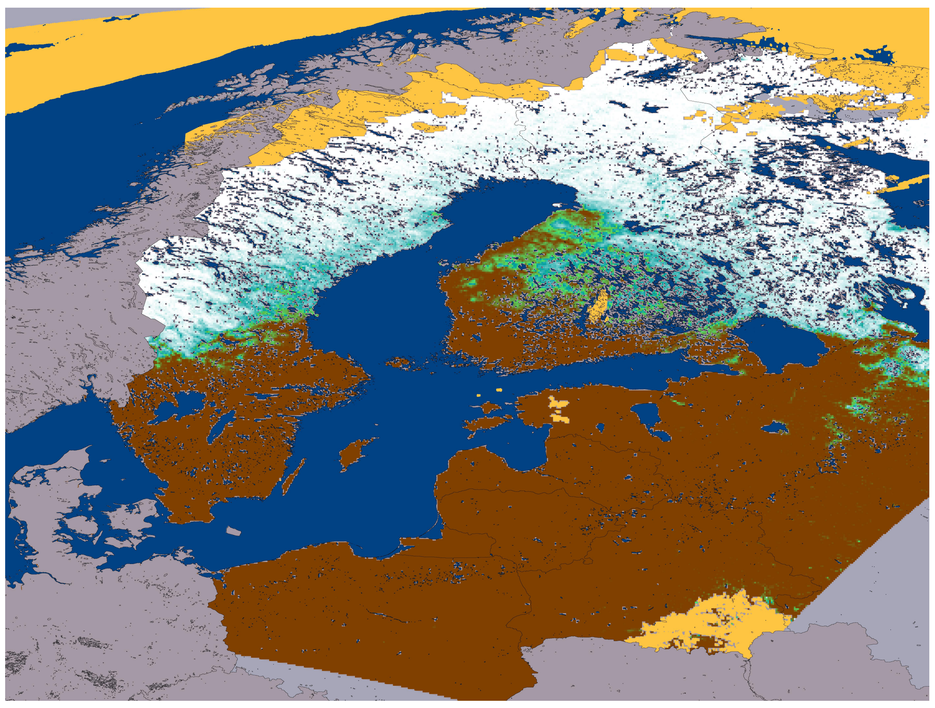

Fig. 3: Snow covered area map by SYKE.

In winter FIMR produces, in co-operation with FMI, daily ice charts and forecasts of the Baltic Sea for marine traffic and icebreakers, and in summer chlorophyl-A (algae) maps. During snow melt in spring, SYKE calculates daily snow covered area maps for the area around the Baltic Sea.

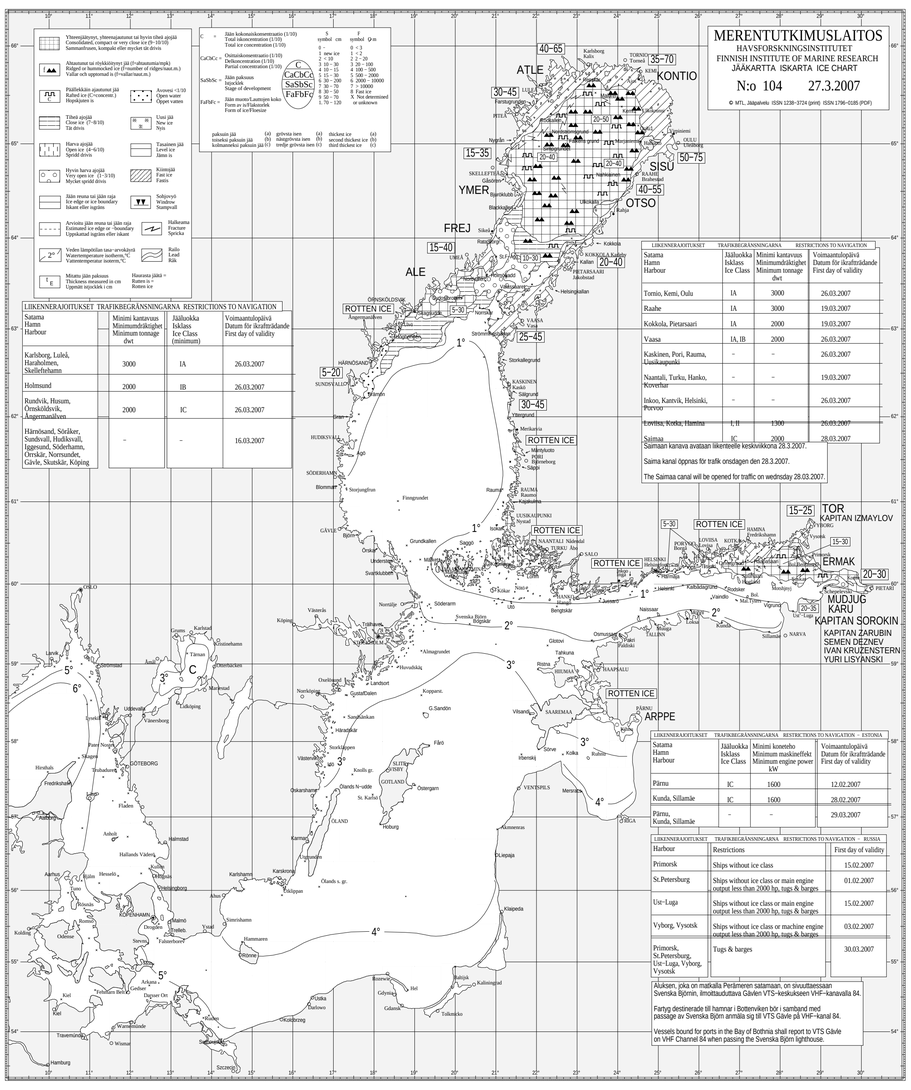

Fig. 4: Ice chart by FIMR.

Acknowledgment

Snow covered area map provided by SYKE/Miia Eskelinen.

Ice chart provided by FIMR/Jouni Vainio.

Polar winds map is processed by CIMSS and the NOAA/NESDIS Advanced Satellite Product Branch.