EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-552, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Assimilation of satellite data in the framework of the Concordiasi campaign.

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Concordiasi is a measurement campaign in Antarctica involving the launch of radiosoundings and stratospheric balloons. One the main goals of this campaign is the validation of the IASI sensor assimilation. In order to prepare this campaign, studies have been performed to improve the satellite data assimilation over high latitudes. Two types of sensors have been considered, microwave and infrared.
One of the main problems associated to the microwave satellite data is the calculation of the surface emissivity. In the meteorological model of Météo-France/ECMWF, an innovative approach based on satellite observations is used. The method, developed by Karbou (2006), improves the land surface emissivity modelling within the constraints of the 4D-VAR assimilation system. With this new calculation of emissivity, more microwave observations over land under clear sky conditions are taken into account during the assimilations. This application has also been applied for high latitudes, after some adjustments, allowing assimilation of AMSU-A/B data over cold areas (sea ice and land).
For the infrared sensors, an additional problem is the cloud detection. The use of additional data from IASI and AIRS sensors over land and sea ice has been tested in the framework of the Concordiasi campaign. Despite of the first positive results obtained in that context, work on cloud detection and emissivity must be continued to improve the assimilation. For cloud detection, different methods are tested such as CO2-slicing but also the assimilation of data in cloudy areas begun to be investigated. For the emissivity, the available radiosoundings from the campaign, will help to calibrate a better calculation of infrared emissivity.