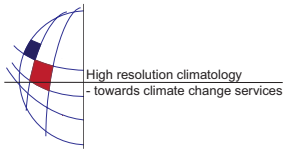
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-519, 2010
10th EMS / 8th ECAC



Snowline retrievals using operational satellite data

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Making use of atmosphere and surface parameters derived from satellite remote sensing is of increasing importance to describe appropriately status and changes of weather and climate. Even in regions with poor coverage concerning ground based measurements and/or heterogenous terrain satellite products contribute to fill temporal and spatial gaps. Imaging radiometers provide information on surface snow and ice based on multispectral algorithms with a spatial resolution from 250 m to about 3000 m.

Observations by passive imaging spectro-/radiometers like SEVIRI onboard Meteosat second generation, Noaa/MetOp AVHRR and Terra/Aqua MODIS have the potential to provide snow products on a daily basis with spatial resolution comparable or better than grid increment of the hydrological models.

For the evaluation of MODIS imagery a dedicated algorithm was set up utilising multispectral thresholding of calibrated radiances to separate clear land and sea from cloudy and snow-covered scenes. The scheme works independently of a-priori atmospheric data like numerical model forecasts. It outputs a combined snow/cloudmask that is finally convoluted with background topography information (GIS), allowing for the calculation of snowlines. The core snow and ice detection is based on a NDSI module (normalised difference snow index, Hall et.al. 2001). A well established algorithm developed within the framework of the Satellite Application Facility for Nowcasting (NWCSAF, Dybbroe et.al. 2005), is used to detect snowy pixels in the AVHRR imagery. MODIS and AVHRR results were compared to each other. It shows a good agreement by means of correlation (.94) but systematic deviations are considered.

A verification study was carried out by taking into account all European synoptical and climatological snow measurements with snow depths of at least 1 cm. The scores show a clear seasonal cycle with PODs of .2 in summer (both) and .86 (AVHRR) and .82 (MODIS) in winter months. The evaluation data ranges from May 2007 to April 2010.

The work presented here shows the applicability of an automatic scheme evaluating MODIS and AVHRR data to determine the snowline in mountainous areas.