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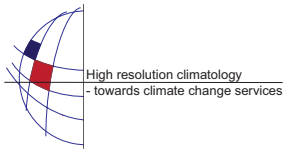

Climate monitoring with meteorological satellites: CM-SAF's cloud and radiation products derived from AVHRR observations

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As component of EUMETSAT's activities in climate monitoring, the Satellite Application Facility on Climate Monitoring (CM-SAF; www.cmsaf.eu) provides climate monitoring products derived from meteorological satellites. A variety of satellite instruments is exploited in order to provide information on various components of the atmospheric energy and water cycle. The Advanced Very High Resolution Radiometers (AVHRR) are in operation on-board polar-orbiting satellites since more than two decades. They therefore allow in principle to provide long-term satellite based climate monitoring products that also cover regions with only sparse ground-based measurements. Currently, CM-SAF provides several cloud parameters (cloud fraction; cloud type; cloud top height / temperature / pressure) as well as surface radiation parameters that derived from AVHRR observations in near-real time for Europe and the Arctic. For Europe, the product suite also includes cloud physical products (cloud liquid water path, cloud optical thickness).

CM-SAF's operational processing environment generates daily and monthly mean products with a spatial resolution of 15km*15km on a day-to-day basis. The current version exploits AVHRR data (NOAA-17/19 and MetOP2) at full spatial resolution ($\sim$1.1 km at nadir) for all available overpaths ($\sim$ 43 per day for the three satellites) and is based on algorithms that were provided by the "EUMETSAT SAF in Support to Nowcasting and Very Short-Range Forecasting". These are based on multi-spectral threshold techniques applied to each pixel of the satellite scenes.

Operational processing of the Arctic products has been started with January 2009. Selected months in 2007 had been generated for product validation. In this contribution we illustrate features of these datasets and show results of validations against ground-based measurements (synoptic manual observations) and comparisons to other satellite products. In agreement with other studies, the data indicate that for some part of the Arctic, low cloud amounts occurred in summer 2007 which could be a contributing factor to the ice melt during the summer of 2007. In support of the International Polar Year CM-SAF has also processed these data for winter 2007/08.

CM-SAF currently reprocesses a long-time series of AVHRR data starting in 1982. Based on intercalibrated radiances, the same cloud and radiation parameters will be provided with global coverage. Beyond the long-term monitoring of the climate system, these datasets also provide opportunities to validate climate model simulations, especially hindcasts of the last decades.