CM SAF's cloud and radiation datasets derived from SEVIRI on geostationary Meteosat Second Generation satellites

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EUMETSAT's Satellite Application Facility on Climate Monitoring (CM SAF) presents its first release of cloud and radiation datasets derived from geostationary MSG1 and MSG2 satellites.

CM SAF uses space-based observations from geostationary Meteosat Second Generation (MSG) satellites and polar orbiting NOAA and MetOp to provide satellite-derived geophysical parameter data sets suitable for research on smaller time-scales as well as climate monitoring. CM SAF's product suite includes cloud parameters, radiation fluxes, surface albedo, and atmospheric water vapor, temperature and humidity layered profiles on a regional and partially on a global scale.

The introduced datasets in particular were derived from SEVIRI (Spinning Enhanced Visible and Infrared Imager) onboard MSG1 and MSG2. SEVIRI is a broadband line by line scanning radiometer with 12 spectral channels (0.4 -13.4 μm), its spatial resolution is 3×3 km^2 at sub-satellite point.

The radiation products were produced with the hybrid-eigenvector approach MAGICSOL developed at CM SAF, surface albedo is derived with the SAL algorithm from the Finnish Meteorological Institute. For the cloud products, CPP of the Royal Netherlands Meteorological Institute was employed to derive the microphysical properties, while the macrophysical fields were created with the NWC SAF algorithm by Météo France.

The main features of the datasets are:

- data will be available as daily and monthly means, as well as monthly mean diurnal cycles.

- high spatial and temporal resolution ($0.05° \times 0.05°$ for the daily and monthly averages from hourly data on SEVIRI's 3×3 km^2 grid)

- due to the high temporal resolution, errors resulting from sampling are very low

- SEVIRI radiances are calibrated against MODIS in channels 0.6, 0.8 and 1.6 μm

- the time span covered is 02/2004 – 12/2011.

The high quality of the produced data sets is assured in a validation framework including satellite measurements from spectrally and spatially finer resolved sensors (CALIOP and MODIS) as well as synoptic data. SEVIRI datasets allow for numerous applications on various temporal and spatial scales. The accurately retrieved mean cloud properties, due to the low sampling errors, allow to evaluate numerical models concerning various cloud parameters such as cloud fractional cover, cloud top parameters or microphysics. With unaveraged fields also the evolution of parameters during a day can be studied down to spatial mesoscale γ. The monthly mean diurnal cycles allow to study e.g. variations of diurnal fluctuations during a year. MAGICSOL enables an accurate treatment of the aerosol and cloud effect on solar surface irradiance as well as the consideration of water vapor and ozone.