



‘Climate data operators’ as a processing tool for CM-SAF’s satellite-derived climate monitoring products

F. Kaspar (1) and U. Schulzweida (2)

(1) Satellite Application Facility on Climate Monitoring, Deutscher Wetterdienst, Offenbach, Germany (frank.kaspar@dwd.de), (2) Max-Planck-Institute for Meteorology, Hamburg, Germany

EUMETSAT’s Satellite Application Facility on Climate Monitoring (CM-SAF) provides satellite-derived geophysical parameter data sets suitable for climate monitoring. CM-SAF provides data on several cloud parameters, surface albedo, radiation fluxes at the top of the atmosphere and at the surface as well as atmospheric water vapor (total, layered integrated), temperature and humidity profiles. Application purposes are for instance input for climate models and validation of climate models. Although there is a growing interest in the climate modelling community to use satellite data for such validation studies, the different data formats and structures of both communities are still a drawback for such applications.

The ‘climate data operators (CDO)’ are a collection of command line operators that were originally developed for processing and analysis of data produced by a variety of climate and numerical weather prediction models (e.g. for file operations, simple statistics, arithmetics, interpolation or the calculation of climate indices). Supported file formats are therefore the frequently used output formats of such models as GRIB, NetCDF and several binary formats. With installations in more than 150 groups world-wide, the package is widely established in the climate modelling community.

CM-SAF’s climate monitoring products are provided as HDF5 (Hierarchical Data Format, release 5). Reasons for selecting HDF5 were its high compression efficiency and the features to include several data models and self-describing datasets. In order to allow easy access to CM-SAF datasets for the climate modelling community, the possibility to import CM-SAF data has recently been integrated into the ‘climate data operators’. Besides the pure conversion of CM-SAF-HDF5-files to NetCDF and GRIB, this offers additional possibilities for preprocessing the data for validation studies, especially interpolation to other grid types and selection of regions. The implementation considers special features, e.g. methods for interpolation of non-continuous datasets as e.g. cloud types. Daily and monthly mean products of CM-SAF are provided in equal-area projections that are described in the metadata entries of the HDF5-files. CDO employs this information for spatial operations on these final products. Processing of CM-SAF intermediate products on original pixel-resolution for polar-orbiting satellites as well as geostationary satellites is also facilitated when pixel-related geolocation is available. This allows access to datasets with high spatial resolution of a few kilometres.