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CM-SAF satellite-based datasets for validation of regional climate models

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Increasing the confidence in model-based climate projections requires evaluation of climate simulations with high-quality observational datasets. Satellite data provide information on the climate system that are not available or difficult to measure from the Earth's surface like top of atmosphere radiation, cloud properties or humidity in the upper atmosphere. In particular over ocean and sparsely populated areas space-based observations are largely the only data source. Existing satellite time series, especially from operational meteorological satellites, now reach a length that makes them useful for climate analysis.

Following this idea, the Satellite Application Facility on Climate Monitoring (CM-SAF) is dedicated to the high-quality long-term monitoring of the climate system‘s state and variability.

CM-SAF supports the analysis and diagnosis of climate parameters in order to detect and understand changes in the climate system. One goal is to support the climate modelling communities by the provision of satellite-derived geophysical parameter data sets. The intention of this poster contribution is to stimulate discussions on potential verification projects based on CM-SAF datasets. The CM-SAF product suite will be presented and methodological issues of model-data-comparisons will be discussed based on on-going activities. Strengths and weaknesses of parameters for the verification of climate simulations will be discussed.

CM-SAF provides data sets of several cloud parameters, surface albedo, radiation fluxes at the top of the atmosphere and at the surface, atmospheric temperature and

water vapour profiles as well as vertically integrated water vapour (total, layered integrated).

They are derived from measurements of the SEVIRI and GERB instruments on the geostationary Meteosat Second Generation satellites as well as from AVHRR, ATOVS and SSM/I instruments on the polar orbiting NOAA and DMSP platforms, respectively. Products from Meteosat cover the full Earth disk, that extends from South America to the Middle East, with Africa below the satellite and Europe to the top. AVHRR derived products cover Europe and the East Atlantic. SSM/I (over ocean only) and ATOVS products offer global coverage. The data sets cover different time periods depending on the availability of the individual sensors uitilised.

Results have mostly been validated against several ground-based data sets both in situ and remotely sensed. The length of the current time series is sufficient to perform a monitoring of variability on diurnal to seasonal scales. The SSM/I total column water vapour series based on intercalibrated radiances already covers almost 20 years with a quality sufficient to perform studies of inter-annual variability and possibly trends. A central goal of the current project phase (Continuous Development and Operations Phase) of the CM-SAF is to bring all products to this standard. We welcome any discussion on the needs of the climate modelling community.