



CM-SAF water vapour and temperature products from ATOVS onboard NOAA and MetOp: 2004-2008, five years of data

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The major objective of the satellite Application Facility on Climate Monitoring (CM-SAF) is the exploitation of the satellite measurement with state of the art algorithms to derive information about key climate variable of the Earth system. The derived products focus on the atmospheric part of the “Essential Climate Variable” developed within the Global Climate Observing System (GCOS) framework. Furthermore, the CM-SAF products are tailored with respect to the need of the current and potential future users and are developed by applying the GCOS climate monitoring principles as far as possible.

Concerning water vapour and temperature, which are essential climate variables, the CM-SAF operationally retrieves water vapour and temperature profiles from ATOVS observations. The ATOVS instruments, namely HIRS, AMSU-A, and AMSU-B are flying onboard the NOAA satellites and now onboard MetOp as well. The CM-SAF ATOVS data have a global coverage with a spatial resolution of 90 km² and are available as monthly and daily means.

The CM-SAF ATOVS retrieved products are vertically integrated water vapour from the surface to 100 hPa, layered vertically integrated water vapour, layered mean temperature and layered mean relative humidity all three on five layers, as well as temperature and water vapour mixing ratio on six pressure levels. A total of 28 CM-SAF ATOVS products is available. The CM-SAF ATOVS data are, for example, valuable products for the evaluation of climate models because of the simultaneous retrieval of temperature and water vapour profiles with global coverage and high quality in the upper troposphere. On the other hand, the CM-SAF ATOVS products are not suitable for monitoring the interannual variability and trends since the bias errors due to orbit shift and decay, and the intersatellite biases are not corrected.

The CM-SAF operational processing scheme is using the International ATOVS Processing Package (IAPP) developed by the University of Wisconsin to retrieve temperature and water vapour profiles from the ATOVS observations. The output of the Global-Modell (GME) of the Deutscher Wetterdienst is used as first guess input to the retrieval. The retrieved products are quality controlled and a Kriging routine is applied to average (the final products being monthly and daily means) and merge the results from the different satellites.

The CM-SAF is continuously improving the ATOVS products, the time period that is covered by the data sets is also regularly extending. The presentation will deal with the last improvements that have been implemented in the processing scheme and their impact on the final products as well as with the extension of the time period for which the data sets are now available. First of all, five years of data are now available, from 2004 to 2008. Validation of the data against quality controlled radiosonde data is shown and discussed for the five year time period. Furthermore, so far, only data from the NOAA satellites were used to generate the CM-SAF ATOVS products. Since May 2008, data from the MetOp satellite are used as well. The impact of the addition of the MetOp data on the final CM-SAF ATOVS products, as well as the validation of these products is also showed and discussed.