IRS2012-567
International Radiation Symposium 2012
Dahlem Cube, Berlin, Germany, 06 – 10 August 2012

ESA DUE GlobVapour Water Vapour Products: Validation

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The main objective of the ESA DUE GlobVapour project is the development of multi-annual global water vapour data sets. Since water vapour is a key climate variable it is important to have a good understanding of its behaviour. The ESA DUE GlobVapour project will provide water vapour data, including error estimates, based on carefully calibrated and inter-calibrated satellite radiances in response to user requirements for long time series satellite observations.

GlobVapour total columnar water vapour (TCWV) products derived from GOME (1996-2008) and combined MERIS–SSM/I (2003-2008) have been validated for the mentioned period, using ground-based measurements (radiosonde and microwave radiometer). In addition, inter-comparisons with other satellite-based measurements such as from AIRS, MODIS, ATOVS and radio-occultation measurements have been performed. Due to the focus of the project, which is the mid- and long-term characterization and monitoring of atmospheric water vapour, only monthly averages have been considered.

Comparing SSM/I+MERIS with GUAN radiosonde data over land and coastal regions shows a small dry bias over coast, which increases over land. Also a dry bias over coast and land against AIRS is found, whereas a slightly wet bias is found over sea. ATOVS shows a dry bias for all scenes, being smallest over ocean and highest over land. Also compared to MODIS, both Terra and Aqua, SSM/I+MERIS is consistently drier, with a clear trend to a lower bias with time.

The GOME products against GUAN radiosondes show similar results, with a slightly dry bias for all scenes, being lowest over sea and highest over land. The same picture is found against ATOVS. Versus AIRS, a dry bias is evident only over land whereas a small to moderate wet bias is found over coast and sea area. Compared to MODIS however, the bias for Terra and Aqua have opposite sign, respectively being dry and wet.

The SSM/I+MERIS TCWV fields were also compared with the ERA-Interim reanalysis fields and a set of climate model simulations from the CMIP5 intercomparison.

For more information and data download follow the link: www.globvapour.info