Comparing different algorithms for estimating satellite-based vertically integrated water vapor for Central/Eastern Europe

A. Kern (1), J. Bartholy (1), GY. Gelybó (1), R. Pongrácz (1), Z. Barcza (1), É. Borbás (2), H.M. Woolf (3) and CS. Ferencz (4)

(1) Department of Meteorology, Eötvös Loránd University, Budapest, Hungary, (2) Space Science and Engineering Center, University of Wisconsin - Madison, USA, (3) Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin - Madison, USA, (4) Space Research Group, Eötvös Loránd University, Budapest, Hungary (anikoc@nimbus.elte.hu/Phone: +3613722904)

There is a growing need in the meteorologist community for high spatial and temporal resolution atmospheric water vapor data since it is essential to understand the hydrological cycle, aerosol properties, aerosol-cloud interactions, energy budget, the greenhouse effect, and the climate system. Atmospheric water vapor is estimated in several places worldwide using the signal of the GPS (Global Positional System) satellites, measured in a network of ground-based meteorological stations, and also, in a sparse network of radiosondes. Remote sensing provides an alternative method to estimate the water vapor content of the atmosphere in high spatial resolution. Many techniques have been proposed to estimate atmospheric water vapor content using satellite data, primarily in the form of total column precipitable water, using a variety of electromagnetic spectrum. In this poster, we compare different estimation techniques of the vertically integrated water vapor (VIWV) for Hungary (located in Central/Eastern Europe) using remotely sensed data. One of the applications of VIWV data is also presented, namely, an atmospheric correction algorithm, the so-called SMAC method (Simplified Method for the Atmospheric Correction). In order to determine the VIWV, observations of the AVHRR (Advanced Very High Resolution Radiometer), the ATOVS (Advanced TIROS Operational Vertical Sounder) onboard the NOAA meteorological satellites, and measurements of the MODIS (Moderate Resolution Imaging Spectroradiometer) onboard the satellites Terra and Aqua are used. Our comparisonal study is based on the calibrated AVHRR radiances, on the water vapor products of AAPP (AVHRR and ATOVS Processing Package) and IAPP (International ATOVS Processing Package), on the estimated integrated water vapor data derived from MODIS measurements (using the MOD 05 and MOD 07 products), on the ECMWF vertically integrated total water content archived forecast data for the Central/Eastern European region, and on radiosonde measurements. The presented research activity is based on the data acquired by the HRPT/MODIS receiving station (being unique in Central/Eastern Europe) established in Budapest (Hungary) by the Space Research Group.