EMS Annual Meeting Abstracts
Vol. 14, EMS2017-547, 2017

A world-wide analysis of the time variability of Integrated Water Vapour, based on ground-based GNSS and GOMESCIA satellite retrievals, and with reanalyses as auxiliary tools

Roeland Van Malderen (1), Eric Pottiaux (2), Gintautas Stankunavicius (3), Steffen Beirle (4), Juliette Legrand (2), Hugues Brenot (5), Thomas Wagner (4), Hugo De Backer (1), and Carine Bruyninx (2)

(1) Royal Meteorological Institute of Belgium, Observations, Brussels, Belgium (roeland.vanmalderen@meteo.be), (2) Royal Observatory of Belgium (ROB), Brussels, Belgium, (3) Dept of Hydrology & Climatology, Vilnius University, Lithuania, (4) Max Planck Institute for Chemistry (MPI-C), Mainz, Germany, (5) Royal Belgium Institute for Space Aeronomy (BISA), Brussels, Belgium

The use of ground-based observations is suitable for the assessment of the time variability of atmospheric water vapor in a changing climate. Global Navigation Satellite Systems (GNSS) provide information on the integrated water vapor (IWV), on a high temporal and spatial resolution. On the other hand, merged satellite IWV retrievals start to provide long data records for this essential climate variable.
For about 100 GNSS sites worldwide, IWV retrievals are available since 1995/1996 with a homogeneous data processing till March 2011. Furthermore, at those site locations, we also extract the IWV retrievals from a series of 3 UV/VIS satellites (GOME, SCHIAMACHY, and GOME-2) and from Numerical Weather Prediction model reanalyses (ERA-interim and NCEPNCAR), covering at least the same time period.
We show the results of the comparison of the IWV variability, on different time scales (seasonal cycle, diurnal varability, trends), between those different datasets. To understand the long-term IWV variability, we also present the outcome of a stepwize multiple linear regression with the surface temperature, tropopause height, but also teleconnection patterns as explanatory variables.