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ESA WACMOS multi satellite water vapour products

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Water vapour is a key variable in the Earth's water and energy cycles and varies strongly in space and time leading to the necessity of its global monitoring from satellites. Today, a large number of scientific and operational satellites are capable of providing information on atmospheric water vapour. Various spectral ranges and retrieval techniques are utilized, each having its own particular advantages and disadvantages. Employed are passive microwave sensors (e.g., DMSP SSM/I), infrared sounders (e.g., MetOp IASI) and imagers (e.g., MSG SEVIRI), near-infrared imagers (e.g. Envisat MERIS) and radio occultation measurements (e.g., MetOp GRAS).

The basis concept of ESA's Water Cycle Multimission Observation Strategy (WACMOS) is the exploitation of synergies of satellite observations with the aim to optimise the temporal and spatial sampling of variables governing the water cycle. In the framework of WACMOS, two merged water vapour products from three different sensors (MSG SEVIRI, MetOp IASI and Envisat MERIS) are developed in order to profit from the benefits of different sensors. The first water vapour product combines the high vertical sampling and expected high quality of MetOp IASI measurements with the high temporal sampling of SEVIRI. The merged SEVIRI+IASI product consists of tropospheric water vapour profiles for 3 layers within the full MSG disc with a spatial resolution of 0.25° for the time period from June 2008 to December 2008. The second WACMOS water vapour product is based on MSG SEVIRI measurements with high temporal sampling and Envisat MERIS data featuring a high spatial resolution. It comprises the total column water vapour for the Elbe/Oder basin on a 0.025° grid for the time period between June and November 2008. A three-hourly temporal resolution is available for both cases.

This presentation discusses the merging approach, the results and the findings obtained from the validation with radiosondes and independent satellite measurements.