



Extended validation of middle atmospheric water vapor measurements by ground based microwave radiometers

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First, we present a detailed intercomparison of the ground based microwave radiometers for middle atmospheric water vapor of the Network for the Detection of Atmospheric Composition Change, NDACC. For this purpose the retrievals of all microwave systems have been adapted as much as possible using the temperatures measured by EOS MLS and using the same set of spectroscopic parameters. The EOS MLS water vapor record has then been used as reference and allowed to perform an intercomparison of the ground based radiometers. The agreement between the ground based systems is better than 5% in a pressure range between 1 and 0.03 hPa.

Second, we focus on the water vapor time series at 10 hPa as measured by the Middle Atmospheric WAter vapor RAdiometer, MIAWARA, over Switzerland. A total of 6 coincident balloon soundings with a FLASH hygrometer on board are evaluated revealing good consistency between the in situ and the remote sensing measurements. We further analyze the variability of the 10 hPa time series in the context of the polar vortex and sudden stratospheric warmings that are accompanied by an increase of water vapor at 10 hPa.