



A consistent global data set (1996-2009) of total column precipitable water from GOME-1, SCIAMACHY and GOME-2

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From UV/vis satellite instruments like GOME-1, SCIAMACHY and GOME-2 it is possible to retrieve the total column precipitable water over both oceans and continents. We retrieve the atmospheric water vapor distribution from the three instruments with a consistent analysis using the same set of reference spectra and the same wavelength ranges. The agreement between the three data sets is investigated during the respective overlap periods and very good consistency is found. Remaining differences might be caused by the different overpass times, different spatial resolution and different swath. The influence of these differences is investigated and quantified. We also present validation results based on SSM/I data and radio sondes. The combined observations of the three satellite instruments constitute a unique data set extending over more than 10 years (1996-2009), covering not only a strong ENSO event (1997/98) but also a time span of strong temperature increase due to climate change. We determine temporal trends (and their spatial distribution) of total column precipitable water over this period of time and relate them to variations of surface temperature.