



Assessment and applications of Odin/SMR measurements of water vapour in the middle atmosphere.

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Water vapour, the strongest greenhouse gas, is not only a good tracer of the dynamics in the entire middle atmosphere, but is also linked to many processes (chemical and physical) like the natural destruction of ozone (through the HO_x family) in the UTLS and in the mesosphere, and the formation of clouds in the lower stratosphere (PSCs) and in the mesopause region (noctilucent clouds). The determination of its variability in the middle atmosphere is thus of great interest. The Sub-Millimetre Radiometer (SMR) onboard the Odin satellite, launched in February 2001, observes the Earth's limb using 4 tunable receivers in the 486-581GHz spectral range. From 2001 to 2005, water vapour has been measured (one day per week) at 489 and 557GHz, allowing H₂O profiles to be retrieved from 20 to 100km. Vertical profiles of its isotopes HDO and H₂O-18, of ozone, and of the temperature have also been obtained in parallel. An assessment of the so-called "water isotope mode" will be presented, with emphasis on the error budget and the capabilities of Odin/SMR, as well as on comparisons with other instruments (POAM, MIPAS, WVMS, Hygrosonde-II,...). Various results regarding the general circulation in the atmosphere, polar vortex studies, and seasonal variations of water vapour will be presented as well.