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Deuterium conservation in the stratosphere

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The Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) has originally not been designed to examine the most rare species in the atmosphere. However, due to its very high spectral resolution and unpredecented quality of Level-2 products there is now a wealth of information from MIPAS regarding the composition of the atmosphere between 6 and 120 km.
This asset of information comprises a description of the global stratospheric distribution of the water isotopologues HDO and H218O. Evaluation of this data set reveals the existence of an isotopic tape recorder which gives valuable insight how seasonal variations in water vapor at the tropical tropause propagate and develop into the stratosphere. Moreover, assuming that our picture of the sources and sinks of water in the stratosphere is complete the HDO data set in general supports total deuterium conservation in the stratosphere. However, careful examination of the data shows that the correlation between total water and its minor isotopologue HDO is indicative for atmospheric areas with distinct dynamical features, i.e. polar regions, where deviations from the closed-budget-assumption for deuterium occur, i.e. due to psc forming processes.
This presentation shows some of the features that have been observed in the current MIPAS HDO data set.