



Ozone isotopic ratios from MIPAS limb emission spectra

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The observed variations in the isotope ratios often reveal information about the relative strengths of different sources and sinks of the trace gas in question, and about the transport processes which influence its distribution. Variation in isotope ratios have generally been well understood based on the mass dependence isotope fractionation in chemical reactions. However, the anomalous or "mass independent" isotope effect is not yet understood and is a quite common effect in atmosphere. The prime example is ozone, whose anomalous enrichment has been studied in detail in numerous laboratory experiments. This isotope effect has been observed in tropospheric and stratospheric ozone. Despite the progress made in the past 10 years, a convincing physical explanation of the process that results in enrichment is still missing. These anomalies offer the opportunity to advance the science of atmospheric chemistry and to relate its finding to fundamental atomic and molecular processes.

The MIPAS experiment, onboard Envisat satellite, launched on 1st March 2002, is a high resolution Fourier Transform Spectrometer observing infrared limb emission spectra. From these measurements, profiles of atmospheric pressure, temperature and several species can be retrieved. MIPAS spectra contain also information on isotopes of ozone.

The relative abundances of oxygen atoms O(16):O(18):O(17) are approximately 1:1/500:1/2700. In the present study we use Envisat-MIPAS to retrieve singly substituted isotopic variants, O₃-asym-18 and O₃-sym-18 of O₃(50) and O₃-asym-17 and O₃-sym-17 of O₃(49).