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Stable isotopic composition of CO, H₂ and CH₄ in the troposphere and lower stratosphere: results from the ATom-WAS samples

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The NASA Atmospheric Tomography Mission (ATom) aimed to improve the understanding of atmospheric composition through global scale aircraft sampling campaigns in different seasons. The flights included continuous profiling between 0.2 and 12 km over the Atlantic and Pacific Oceans.

A large number of samples were taken using the Whole Air sampler (WAS, UC Irvine, CA). In a selection of these samples, we measured the stable isotopic composition of CO, H₂ and CH₄. The samples cover remote clean air from different latitudes, from troposphere and lower stratosphere, and air influenced by specific (pollution) sources or processes.

We will give an overview of the data available and the main characteristics. We observe large variations in the isotopic composition, showing the large scale influence of tropospheric sources and sinks, but also stratospheric processing. The three gas species are mainly affected by the same sources and processes but in different ways, thus giving complementary information on the atmospheric processes.