

Interactive comment on “High-precision isotope measurements of $H_2^{16}O$, $H_2^{17}O$, $H_2^{18}O$, and the -anomaly of water vapor in the southern lowermost stratosphere” by P. Franz and T. Röckmann

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Referee comment

High-precision isotope measurements of $H_2^{16}O$, $H_2^{17}O$, $H_2^{18}O$, and the $\delta^{17}O$ -anomaly of water vapor in the southern lowermost stratosphere P. Franz, T. Röckmann Atmospheric Chemistry and Physics Discussions, 5, 5373-5403, 2005.

This paper describes relatively high precision measurements of water vapour and its

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oxygen isotopologues in the southern hemisphere UT-LS. The measurements provide insights into the sources and processing of water vapour in this important region. The samples were collected during ferry flights between New Zealand and Antarctica, and consequently lack the support of other correlative measurements, for example of other trace gases and meteorological parameters, which might have been obtained from "research" flights. This is not to detract from this study, but rather to suggest the potential value of isotopic measurements in the UTLS in a future "full research" mode.

The paper is suitable for publication with minor amendments below and as suggested by other reviewers (with which I concur).

Page 2. R(VSMOW) is given for D, which plays no further role in the paper, but not given for 18-O and 17-O. During calibration, isotopic water vapour standards were generated by mixing humidified airstreams from two bubblers containing water of different isotopic composition. There will be strong fractionation during evaporation in the bubblers - perhaps the authors could explain how this effect was allowed for or avoided?

In flight preparation, were inlet lines and tubing heated in a dry atmosphere or dry purge flow to remove water vapour on walls? Even a little heat goes a long way to desorbing water vapour from walls.

"The blank in August showed a 0.5 V s background signal" Please explain the units.

4.2 discussion and Figure 5. The three parallel lines of figure 5 are intriguing, but their discussion is somewhat brief. Could this be expanded or clarified a little? I think this section is saying that if air at the lowest mixing ratios (3ppmv) all had a common origin, it would all have a common δ -18O value, ie appear as an end-member in the plot. The fact that it doesn't suggests that the 3ppmv air has different origins, due to different relative contributions of older stratospheric air (with constant δ -18O) and tropospheric air with variable δ -18O.

Typos and grammar

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Abstract - replace "dissolve" with "resolve"? Also on page 3, end of section 1. Last line "ratio" not "ration".

"Data" is a plural noun - replace instances of "data is", "data was", "data implies" throughout the text with "data are", "data were", "data imply" etc.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 5373, 2005.

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