

Interactive comment on “Trend in ice moistening the stratosphere – constraints from isotope data of water and methane” by J. Notholt et al.

Anonymous Referee #1

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General comments:

The authors present measurements of isotopic ratios of H₂O and CH₄ retrieved from balloon borne FTIR observations. These results are used to determine H₂O, HDO, and Delta D at the entry point. Finally a trend of particulate water transported through the tropopause is derived from these observations.

The topic is very important to understand trends of stratospheric water vapor and hence to investigate climate change. Balloon borne infrared observations are one of very few techniques which allows to measure isotopic ratios with good vertical resolution and precision. However, the number of flights is limited.

The paper is well written. The subject is fully appropriate for publication in ACP. I would

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recommend publishing it after minor revisions.

Specific comments:

The number of flights performed at 35 and 65 North should be given in chapter 2. In principle it can be taken from the Figures. However, a statement about the number of samples might be helpful for the reader.

The retrieval of the isotopic ratios is described very briefly. Do you use onion peeling or optimal estimation? In case of optimal estimation an interspecies constraint may even improve the precision of the delta D profiles.

Technical corrections:

- To my memory SMOW is about $3 \cdot 10^{-4}$?
- Brackets are missing for the term $([H_2tr]-[H_2])$ in eq. 4.
- ‘as described in Sect. 5.1’: Do you mean Section 4.1 since there is no section 5.1.?

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