

Interactive comment on “The isotopic fingerprint of the pre-industrial and the anthropogenic N₂O source” by T. Röckmann et al.

T. Röckmann et al.

Received and published: 7 February 2003

The remark of the referee relates to the scatter in the data and the error estimates. Indeed, a fair degree of scatter is visible, in particular in the near-surface d18O data from DML. The reason for this discrepancy is not exactly clear. Nothing is known about a seasonality of the N₂O isotope signatures. Given the long life time of N₂O and the fact that even its mixing ratio exhibits almost no seasonality, it is unlikely that seasonal variability in the actual isotopic composition in the atmosphere is responsible for the scatter. A possible cause could be a seasonal signal from fractionation in the firn due to thermal diffusion, but then it would be expected to occur also in the other signatures. The most likely reason is random measurement error (the errors given are 1 sigma errors, and of course some values will lie outside the 1 sigma interval). Despite the scatter, note that the measurements from both sites can be fitted well with the same scenarios.

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

Interactive
Comment

Regarding the fits, to clarify which scenarios have been used for the error estimate, we have added one column in table 1 stating the range of scenarios that are used for the error estimate. We thank the reviewer for suggesting this rigid evaluation procedure, which has led to slight changes in the "best estimate" and "possible range" numbers. Regarding the weight of the data points, it is true that most weight is given to the deepest samples. As stated in the text, for both sites only the air from the deepest samples (indeed only the two lowest ones) is sufficiently old to allow a reliable estimate. The other samples are less than 10 years old, and it is clear from figure 2 that there the scenarios are so close together that one cannot reliably discriminate between them. So the critical samples to be reproduced by the model are indeed the lowest ones.

Following a suggestion of referee 1, it is now clearly stated how the error estimates are obtained: The ranges reported represent the range of model scenarios from figure 1 for which the firn profile results bracket the experimental error bars of the bottom samples; model errors are not included.

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 2021, 2002.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)