

Interactive comment on “Site selective real-time measurements of atmospheric N₂O isotopomers by laser spectroscopy” by J. Mohn et al.

Anonymous Referee #1

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This paper deals with a first, direct application of a well-know spectroscopic method to determine the IR of atmospheric molecular species. In this case, the fundamental vibration band of N₂O is investigated by absorption spectroscopy with a quantum cascade laser in the 2000 cm⁻¹ spectral range in order to detect site-selective ro-vibrational transitions of N₂O isotopomers with respect to ¹⁴N and ¹⁵N. High reproducibility and accuracy in $\delta^{15}\text{N}$ measurements was already demonstrated in past works (Waechter) as well as recent works by the same group. Nevertheless, in this manuscript, the authors present a first result on the use of such QCL spectrometer for N₂O isotopic composition in ambient air samples for real field applications, also using a gas pre-concentration unit. The long-term precision level achieved here is really impressive and appears competitive with well-established methods such as IRMS. The paper is well written and introduced. The main parts of the experimental set-up, though

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already described in previous articles, are recalled here. The experimental results are presented and discussed in a clear way and many useful information and details are given in this respect, even in comparison with different systems and methods. The authors also carried out an outdoor test of the instrument on a grassland, pointing out the fractionation effect due to soil microbial activity. Hence, this work is believed to provide a significant advance to the field.

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