



Water vapour retrievals from ground-based FTIR observations at Ile de la Réunion: Focus on isotopologues

S. Fally (1), P.-F. Coheur (1), M. Carleer (1), D. Hurtmans (1), M. De Mazière (2), C. Hermans (2), K. Janssens (2a), M. Kruglanski (2), E. Neefs (2), F. Scolas (2), A.C. Vandaele (2), C. Vigouroux (2), B. Barret (3), J. Leveau (4), J.M. Metzger (4)

(1) Université Libre de Bruxelles, Service de Chimie Quantique et Photophysique, Brussels (ULB-SCQP), Belgium (sfally@ulb.ac.be / Phone : +32-2-6502057)

(2) Belgian Institute for Space Aeronomy (BIRA-IASB), Brussels, Belgium

(2a) formerly at BIRA-IASB

(3) Laboratoire d'Aérogologie, Toulouse, France (formerly at BIRA-IASB and ULB-SCQP)

(4) Laboratoire de l'Atmosphère et des Cyclones (LACy), Université de La Réunion

The key role that water vapour plays in the atmosphere is widely recognized. In particular, the concentration and evolution of its different isotopologues are of growing interest, because knowledge of them can help to elucidate the transport and transformation processes controlling the global water vapour atmospheric cycle. Also, tropical latitudes are of particular importance, as this is the region where deep convection occurs.

This work presents retrievals of H₂16O, H₂18O, and HDO vertical profiles from ground-based Fourier transform infrared (FTIR) absorption spectra recorded at the Ile de la Reunion in the subtropics (21°S, 55°E) during two short-terms campaigns in 2002 and 2004.

After a brief description of the retrieval procedure, including the search for optimum micro-windows, retrieval results are shown and discussed along with detailed characterizations of the retrieved quantities, in terms of error sources and vertical sensitivity for each species. For the H₂17O isotopologue, which only displays weak absorption

signatures in the spectra, only total columns can be derived.

Preliminary results of isotopic ratios and comparisons with coincident PTU soundings for the main isotopologue are also shown.

Concluding remarks highlight the advantages and weaknesses of the ground-based FTIR measurements for monitoring water vapour in the tropics, especially with regard to the sounding of the free and the upper troposphere. The perspectives for future scientific studies using the measurement of isotopic ratios are put forward.