



Iris: an ultra-sensitive infrared spectrometer for airborne water isotope ratio measurements

V. Gkinis (1), R. Iannone (1), S. Kassi (2), M. Chenevier (2), H.J. Jost (3), D. Romanini (2), E. Kerstel (1)

(1) Departement of Physics, Center for Isotope Research, University of Groningen, 9747AG, Groningen, The Netherlands,

(2) Laboratoire de Spectrométrie Physique CNRS UMR5588, Université J. Fourier Grenoble, Saint Martin d' Hères, France,

(3) NovaWave Technologies, Redwood City, CA 94065, USA,
(Contact: V.Gkinis@rug.nl)

We have designed and built a new ultra sensitive laser spectrometer, IRIS, for *in situ* detection of the isotopic composition of water vapor in the higher tropopause and the lower stratosphere. The isotope signals may be used to quantify troposphere-stratosphere exchange, and to study the water chemistry in the stratosphere.

IRIS is based on the technique of optical-feedback cavity enhanced absorption spectroscopy. It uses a room temperature infrared laser, needing no cryogens. The instrument combines a low weight (< 50 kg) and volume (\approx 50 L) with a low power consumption (< 200 W), making it uniquely suitable for future deployment on an Unmanned Aerial Vehicle. Airborne operation of IRIS demonstrated aboard on the European M55-Geophysica stratospheric research aircraft, during the AMMA campaign in Burkina Faso, Central Africa, in August 2006. We also hope to show data from its Summer 2007 participation in the NASA TC-4 campaign in Costa Rica.

Current instrument performance and anticipated future improvements will be discussed.