

Name of research institute or organization:

Centre for Isotope Research (CIO), Groningen

Title of project:

Flask comparison on Jungfraujoch

Project leader and team:

Prof. Harro Meijer, project leader, Huilin Chen, Groningen, and Bert Kers
Prof. M. Leuenberger, Michael Schibig, Tesfaye Berhanu, Peter Nyfeler (all UBern), Martin and Joan Fischer, Urs and Maria Otz (HFSJG)

Project description:

A flask comparison programme between CIO Groning, MPI Jena and the University of Bern is going on since late 2007. It was initiated within the EU project CarboEurope IP and continued within IMECC (The European project IMECC: Infrastructure for Measurements of the European Carbon Cycle).

A summary of the results for the period December 2007 and August 2011 are given in van der Laan-Luijkx et al., [2013]. The results were well comparable for CO₂ regarding both the trend as well as the amplitude. Less coherent were the results for O₂/N₂ as well as the isotopic composition of CO₂. However, in June 2012 the sampling of the Bern and Groningen flask suffered strongly from a leak that unfortunately hasn't been detected for a very long time, despite measuring extraordinary high CO₂ concentrations. The flask from MPI Jena should not be affected since they use a fully independent sampling unit as described in Figure 1.

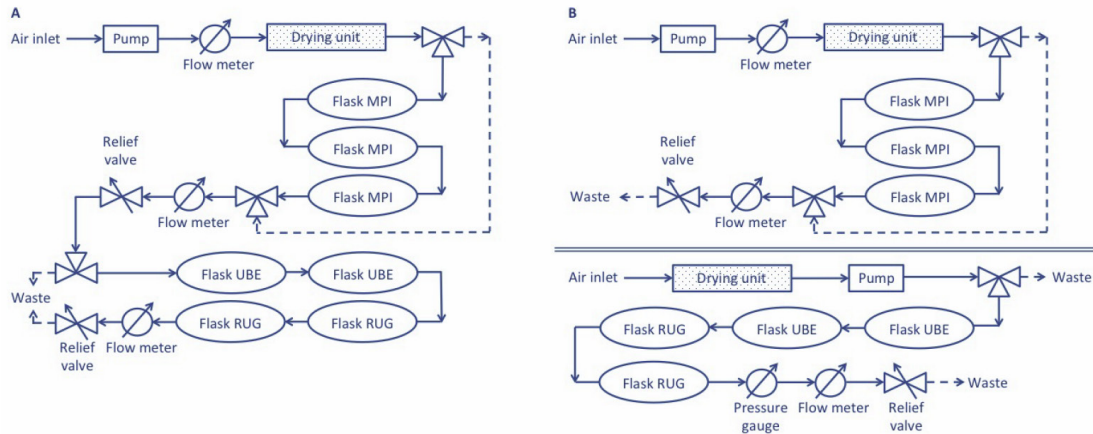


Figure 1. Schematic diagram of the setup for flask sampling at Jungfraujoch, before March 2009 (A) and after March 2009 (B).

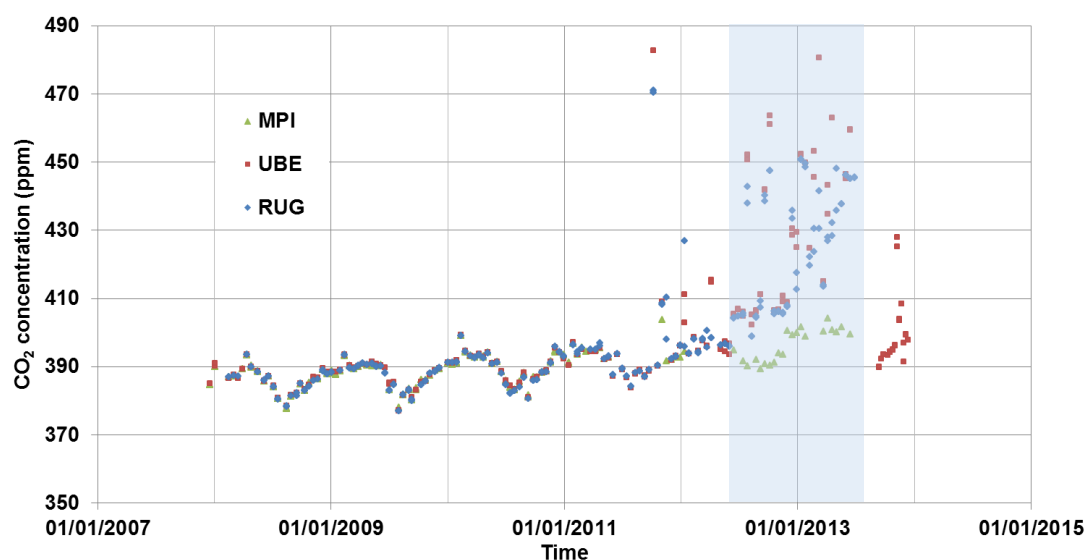


Figure 2. CO₂ concentration as measured by each laboratory. The period from June 2012 to August 2013, shaded in light blue, corresponds to continuously leaky conditions that progressively increased.

It is obvious from Figure 2, that the measurements in the period June 2012 to June 2013 are affected by leaky conditions, progressively sampling laboratory air instead of outside air. Since September 2013 the sampling works again properly. The flask takings of July and August 2013 have been skipped due to contamination after the leak was found. The contaminated samples show strongly variable O₂ and $\delta^{13}\text{C}$ of CO₂ values. The CO₂ measurements from MPI Jena do, however not show a contamination as expected since they are using an independent sampling device.

Key words:

Flask measurements, inter-comparison, oxygen and carbon dioxide measurements, greenhouse gas

Collaborating partners/networks:

ICOS partners

Scientific publications and public outreach 2013:

Refereed journal articles and their internet access

van der Laan-Luijkx, I.T., S. van der Laan, C. Uglietti, M.F. Schibig, R.E.M. Neubert, H.A.J. Meijer, W.A. Brand, A. Jordan, J.M. Richter, M. Rothe, and M.C. Leuenberger, Atmospheric CO₂, delta(O-2/N-2) and delta(CO2)-C-13 measurements at Jungfraujoch, Switzerland: results from a flask sampling intercomparison program, Atmospheric Measurement Techniques, 6, 7, 1805-1815, doi: 10.5194/amt-6-1805-2013, 2013.
<http://dx.doi.org/10.5194/amt-6-1805-2013>

Address:

Isotope Research — Energy and Sustainability Research Institute Gron.
Nijenborgh 4
9747 AG Groningen
The Netherlands

Contacts:

Prof. Dr. Harro Meijer
Tel.: +31 50 363 4760 (Secretariat)
Fax: +31 50 363 4738
email: h.a.j.meijer@rug.nl