

Name of research institute or organization:

Institut für Umweltphysik, Universität Heidelberg

Title of project:

Long-term observations of $^{14}\text{CO}_2$ at Jungfraujoch

Part of this programme:

ICOS

Project leader and team:

Dr. Ingeborg Levin, project leader

Dr. Samuel Hammer

Project description:

Atmospheric $^{14}\text{CO}_2$ observations at Jungfraujoch started in 1986 and were continued without interruption until today. This long-term record is used for studies of the dynamics of the regional and global carbon cycle. In combination with the marine background station Mace Head, Ireland, it is currently mostly used as background reference to estimate the regional fossil fuel CO_2 component at polluted European stations. The Jungfraujoch station has monitored the Northern Hemisphere background $\Delta^{14}\text{CO}_2$ trend now for more than 30 years; today the decrease rate amounts to about 5‰ per year. This recent trend is mainly due to dilution of the $^{14}\text{C}/\text{C}$ ratio in atmospheric CO_2 by ongoing input of ^{14}C -free fossil fuel CO_2 into the global atmosphere. Jungfraujoch data are currently also used to define the atmospheric $^{14}\text{CO}_2$ boundary condition for the most recent ocean model intercomparison OCMIP6 (see Orr et al., 2016).

Key words:

Carbon dioxide, carbon cycle modelling, radiocarbon, fossil fuel CO_2

Internet data bases:

<http://www.iup.uni-heidelberg.de/institut/forschung/groups/kk/>

Data have regularly been published in peer-reviewed journals, yet unpublished data are available on request at the authors

Collaborating partners/networks:

ICOS (<https://www.icos-ri.eu/>)

Scientific publications and public outreach 2016:

Refereed journal articles and their internet access

Orr, J.R., R.G. Najjar, O. Aumont, L. Bopp, J.L. Bullister, G. Danabasoglu, S.C. Doney, J.P. Dunne, J.-C. Dutay, H. Graven, S.M. Griffies, J.G. John, F. Joos, I. Levin, K. Lindsay, R.J. Matear, G.A. McKinley, A. Mouchet, A. Oschlies, A. Romanou, R. Schlitzer, A. Tagliabue, T. Tanhua and A. Yool, Biogeochemical protocols and diagnostics for the CMIP6 Ocean Model Intercomparison Project (OMIP), Geoscientific Model Development Discussions, doi:10.5194/gmd-2016-155, 2016.

<http://www.geosci-model-dev-discuss.net/gmd-2016-155/>

Conference papers

Hammer, S., et al., Long-term, regional ^{14}C -based fossil fuel CO_2 estimates in Heidelberg, Germany: Corrections, uncertainties and trends, oral presentation at the 2nd ICOS Science Conference on Greenhouse Gases and Biogeochemical Cycles, Helsinki, Finland, September 27-29, 2016.

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