

Name of research institute or organization:

Institut für Umweltphysik, Universität Heidelberg

Title of project:

Long-term observations of $^{14}\text{CO}_2$ and $^{222}\text{Radon}$ at Jungfraujoch

Project leader and team:

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Project description:

Atmospheric $^{14}\text{CO}_2$ observations at Jungfraujoch are used as background for other observational sites in Central Europe to estimate the regional fossil fuel CO_2 component. The measurements have been started in 1986 and were continued without interruption until today. In recent years, the Jungfraujoch background $^{14}\text{CO}_2$ level was used to estimate the fossil fuel CO_2 component at Schauinsland station as well as in Heidelberg from respective $^{14}\text{CO}_2$ observations. These results are described in detail by Levin et al. [2007].

Atmospheric $^{222}\text{Radon}$ daughter observations started at Jungfraujoch in April 2006 in the frame of the EU-funded CarboEurope-IP and EuroHydros Projects. These observations will be used to identify (polluted) air masses that have recently been in contact with continental surfaces as well as for flux estimates of other continent-borne trace gases using the Radon-Tracer-Method. An example of the comparison of $^{214}\text{Polonium}$ observations at Jungfraujoch with those performed at other high altitude Alpine sites, Zugspitze and Sonnblick observatory is given in Figure 1.

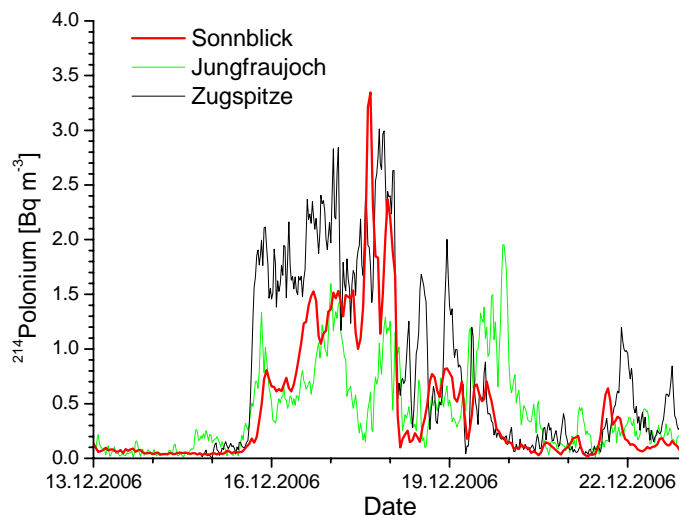


Figure 1: Measurement episode comparing the $^{214}\text{Polonium}$ activity at Sonnblick, Jungfraujoch and Zugspitze observatories. The variations at all three mountain sites are well correlated, showing clean air levels until December 16, 2006, and passage of a large scale pollution event thereafter.

Reference:

Levin, I., S. Hammer, B. Kromer and F. Meinhardt, 2007. Radiocarbon observations in atmospheric CO₂: Determining fossil fuel CO₂ over Europe using Jungfraujoch observations as background. *Sci. Total. Environ.*, doi. 10.1016/j.scitotenv.2007.10.019.

Key words:

carbon dioxide, Radiocarbon, fossil fuel CO₂, climate, Kyoto Protocol
²²²Radon, atmospheric tracer

Internet data bases:

<http://www.iup.uni-heidelberg.de/institut/forschung/groups/kk/>
<http://www.iup.uni-heidelberg.de/institut/forschung/groups/fa/radiokohlenstoff/radiometrie-web-html>

Collaborating partners/networks:

CarboEurope-IP (<http://www.carboeurope.org/>)
EuroHydros (<http://www.meteor.uni-frankfurt.de/eurohydros/>)

Scientific publications and public outreach 2007:

Refereed journal article:

Levin, I., S. Hammer, B. Kromer and F. Meinhardt, 2007. Radiocarbon observations in atmospheric CO₂: Determining fossil fuel CO₂ over Europe using Jungfraujoch observations as background. *Sci. Total. Environ.*, doi. 10.1016/j.scitotenv.2007.10.019.

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