

Name of research institute or organization:

**Radioactive Tracers, Eawag**

Title of project:

Production, transport and deposition of cosmogenic radionuclides ( $^7\text{Be}$ ,  $^{10}\text{Be}$ ,  $^{36}\text{Cl}$ )

Project leader and team:

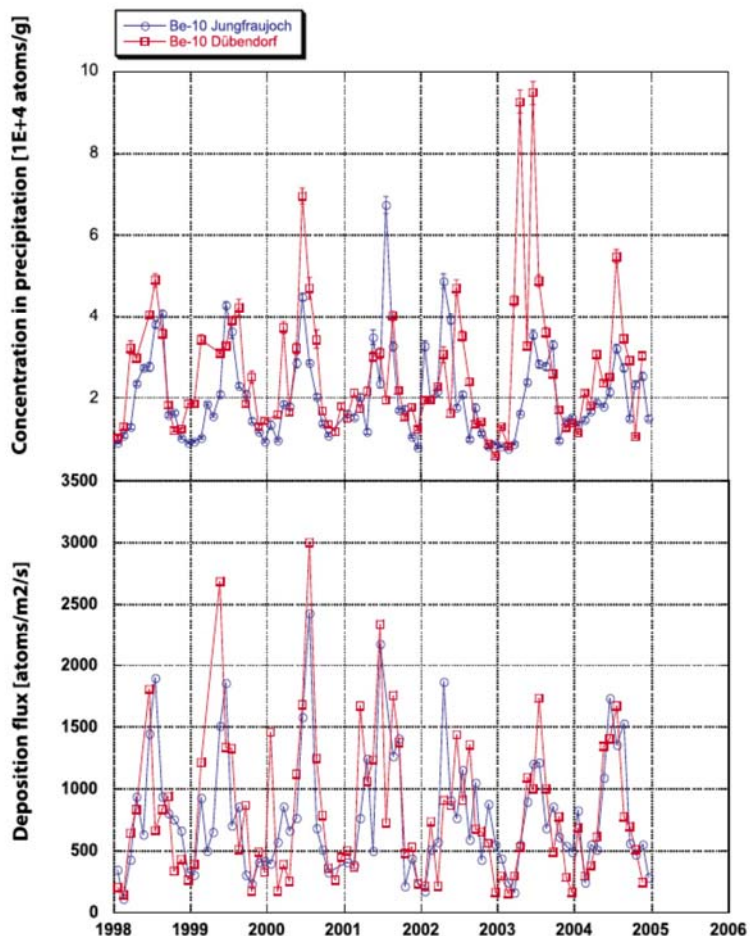
Prof. Jürg Beer, project leader  
Dr. Ulla Heikkilä, Marian Fujak

Project description:

$^{10}\text{Be}$  and  $^{36}\text{Cl}$  are widely measured in polar ice cores in order to reconstruct the history of cosmic ray intensity over the past several hundred thousand years. The production signal is slightly altered by the atmospheric transport and deposition processes. Monthly data from Jungfraujoch and from a station at Dübendorf allows us to study these processes and to improve the interpretation of the production signal. The isotopic ratio of  $^7\text{Be}$  (half-life: 53 days) and  $^{10}\text{Be}$  (half-life:  $1.5 \cdot 10^6$  y) is a useful tool to study atmospheric mixing. A study with the General Circulation Model ECHAM5-HAM revealed a good agreement between the measured and expected data based on production calculations [Heikkilä, et al., 2008]. While the monthly data show a clear transport signal the production signal dominates if the data are averaged over a few years.

$^{10}\text{Be}$  in precipitation of Jungfraujoch (blue) and Dübendorf (red).

The upper panel depicts the monthly concentrations, the lower panel the monthly deposition fluxes.



Key words:

---

long-term cosmic ray intensity, cosmogenic radionuclides, atmospheric mixing and deposition

Collaborating partners/networks:

---

Dr. Johann Feichter, MPI Hamburg

Scientific publications and public outreach 2008:

---

**Refereed journal articles and their internet access**

Heikkilä, U., et al. (2008), Beryllium-10 and beryllium-7 in precipitation in Dubendorf (440 m) and at Jungfraujoch (3580 m), Switzerland (1998-2005), *Journal of Geophysical Research-Atmospheres*, **113**, D11.

<http://www.agu.org/pubs/crossref/2008/2007JD009160.shtml>

**Theses**

Heikkilä, U. (2007), Modeling of the atmospheric transport of the cosmogenic radionuclides  $^{10}\text{Be}$  and  $^7\text{Be}$  using the ECHAM5-HAM general circulation model, PhD Thesis, ETH Zürich, Zürich.

Address:

---

Eawag  
Postfach 611  
Ch-8600 Dübendorf

Contacts:

---

Jürg Beer  
Tel.: +41 44 823 5111  
Fax: +41 31 631 4405  
e-mail: [beer@eawag.ch](mailto:beer@eawag.ch)  
URL: [www.eawag.ch](http://www.eawag.ch)