Name of research institute or organization:

Labor für Radio- und Umweltchemie der Universität Bern und des Paul Scherrer Instituts

Title of project:

Palaeo atmospheric chemistry studies using high-altitude glacier firn and ice cores

Project leader and team:

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Project description:

The investigation of mercury's role as a global pollutant is of immense interest, because of its high toxicity and the severe effects of mercury poisoning on biota, animals and human beings. The main transport pathway for mercury is the atmosphere, where it prevails in the elemental state (Hg^0). Hg^0 has a residence time of about one year, leading to global distribution of this heavy metal. The remainder consists of gaseous or particle bound divalent mercury (Hg^{II}) with residence times of days to weeks. After transformation of Hg^0 to soluble Hg^{II}, it is mainly removed from the atmosphere by wet or dry deposition.

Preliminary investigation of snow samples from the Swiss Alps showed concentrations of mercury in the low ng/L range. However, it is still unclear whether concentrations in snow indeed reflect atmospheric concentrations, which is a prerequisite for interpreting ice core records of mercury. A recent study suggested that mercury in fresh snow is not stable, but re-enters the atmosphere, possibly as a result of radiation-induced reduction of Hg^{II} to Hg^0. In order to study the behaviour of mercury in fresh snow at high-alpine conditions, we collected samples at the Jungfraujoch (3500 m asl) during a four-day period from 25 to 28 November 2002.
Preliminary results show Hg concentrations in the low ng/L range, which decrease slightly after a snowfall, even without direct UV-irradiation. Hg analyses were performed by cold vapour inductively coupled plasma mass spectrometry (CV-ICP-MS).

Key words:

Mercury, snow, air pollution, ice core record

Internet data bases:

http://lch.web.psi.ch/

Collaborating partners/networks:

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Scientific publications and public outreach 2002:

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Tagesanzeiger, Im tiefen Eis stecken geblieben, 7 June 2002.

Magazin Umwelt, Umweltgedächtnis im Gletschereis, Winter 2002, BUWAL.

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