

Name of research institute or organization:

**Laboratory of Radiochemistry and Environmental Chemistry,
University of Bern**

Title of project:

Source apportionment of carbonaceous aerosols with ^{14}C

Project leader and team

Sönke Szidat

Project description:

Carbonaceous particles comprises a large fraction of the atmospheric aerosol and, therefore, may badly affect global climate and human health. However, only a small part of it could be identified and apportioned to emission sources so far. For the solution of this problem, ^{14}C is a unique and powerful atmospheric tracer, as ^{14}C measurements enable a distinction between contemporary and fossil carbon. This directly allows a differentiation between biogenic and anthropogenic origin, which is based on the simple model that biogenic sources emit aerosols on the present $^{14}\text{C}/^{12}\text{C}$ level and anthropogenic particulate matter only derives from fossil fuel extinct in ^{14}C .

Within a previous project, new facts were discovered on the origin and fate of carbonaceous aerosols at downtown Zürich. For a deeper knowledge of the sources of carbonaceous aerosol particles, it is necessary to study ^{14}C in organic carbon (OC) and elemental carbon (EC) within other source regimes than those of urban sites. Consequently, this work will investigate remote aerosols for typical summer and winter conditions at the High Alpine Research Station Jungfrauoch.

Between 6 August and 28 September, 2004, four TSP (total suspended particles) samples were collected on quartz fiber filters at the Sphinx using a high-volume sampler with a heated inlet. For the source apportionment of OC and EC, the carbonaceous aerosol will be separated from the filters with a temperature-programmed combustion at Bern University, followed by ^{14}C measurements at the PSI/ETHZ accelerator mass spectrometry (AMS) facility. Results of summer 2004 and of a follow-up campaign in winter 2004/5 will be reported in the Jungfrauoch Activity Report 2005.

Key words:

Carbonaceous aerosol, environmental radiocarbon, source apportionment

Collaborating partners/networks:

Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut
Laboratory of Atmospheric Chemistry, Paul Scherrer Institut
Institute for Particle Physics, ETH Zürich

Address:

Laboratory of Radio and Environmental Chemistry
University of Bern
Freiestrasse 3
CH-3012 Bern

Contacts:

Sönke Szidat

Tel.: +41 31 631 4263

Fax: +41 31 631 4220

E-mail: szidat@iac.unibe.ch

URL: http://lch.web.psi.ch/analytic/members/project_soenke.html