

Name of research institute or organization:

EMPA Dübendorf, Swiss Federal Laboratories for Materials

Title of project:

NABEL; National Air Pollution Monitoring Network

Project leader and team:

Brigitte Buchmann (project leader)

Konrad Stemmler; Beat Schwarzenbach, Claudia Zellweger (responsible for the Jungfrauoch monitoring station).

Project description:

The NABEL data acquisition network comprises 16 monitoring stations distributed over the whole country. The main aims of the NABEL system are the assessment of the air quality and its development in Switzerland and to control the success of measures taken to reduce air pollution. With its extremely low level of air pollution, the Jungfrauoch monitoring station takes on special significance in the NABEL network, it serves as a "background" station for the lower free troposphere in central Europe.

At the moment the analytical programme at the Jungfrauoch includes the continuous monitoring of following gaseous pollutants: ozone, carbon monoxide, nitric oxide (NO), nitrogen dioxide (NO₂) and the sum of the oxides of nitrogen (NO_x).

Additionally specific VOC's (alkanes, aromatics) are monitored with a time resolution of 4 hours, two-day grab samples are taken continuously for respirable particulate matter, which are further analysed for Lead and Cadmium (yearly means), and one-day grab samples are taken for gaseous SO₂ and for the sulphur content in particulate matter. The analytical results are reviewed on a monthly basis and combined with meteorological data. The Swiss Agency for the Environment, Forests and Landscape (SAEFL/BUWAL) is responsible for governing a NABEL database and for the publication of the data.

Daily mean Mixing Ratios for Carbon Monoxide at the Jungfrauoch

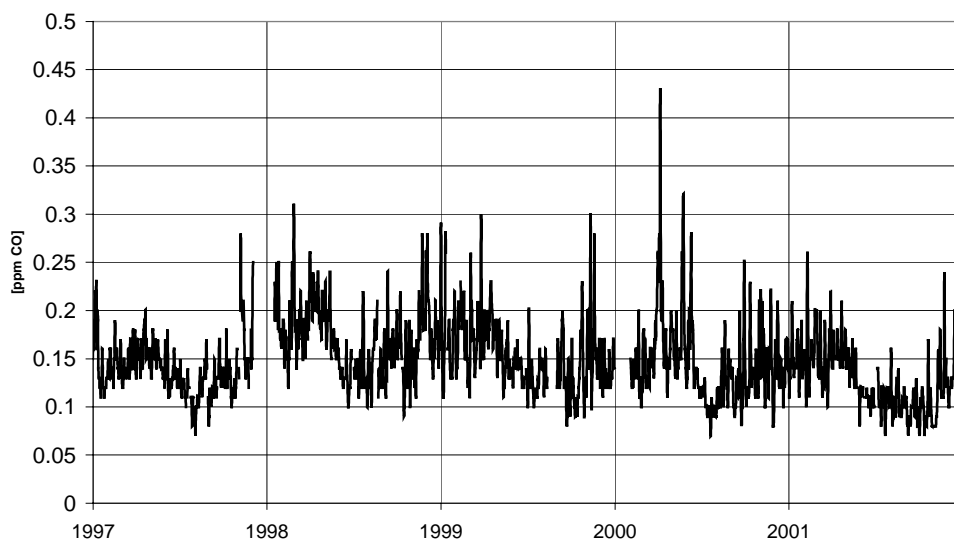


Figure 1 shows as an example for NABEL data a 5-year time series of the mixing ratio of carbon monoxide at the Jungfrauoch. The NABEL data is available upon request from BUWAL or EMPA.

The Swiss Federal Laboratories for Materials Testing (EMPA) use the Jungfrauoch Station additionally for field tests and comparisons of the performance of trace gas monitors under low pollution conditions. In this context this year a comparison of three types of CO-Monitors (i.e. using gas chromatography, non dispersive infrared spectroscopy and vacuum ultraviolet fluorescence, respectively, as analytical principles) had been performed.

Due to the in respect to air pollution remote position, but the geographically central position in the middle of Europe the Jungfrauoch Station can not only be used to measure background concentrations of pollutants, but also to obtain information on European emissions of long living air pollutants. Beneath the ongoing measurements of halogenated greenhouse gases, EMPA has investigated this year a method for the high frequency measurements of hydrogen in the atmosphere. As hydrogen is a very stable gas under tropospheric conditions and as hydrogen may become a very important energy source in the future, it is important to investigate its present natural and anthropogenic sources and its atmospheric behaviour in more detail.

Key words

Air quality assessment, criteria aior pollutants, meteorology, long-term measurement series, control instrument for air quality policy.

Collaborating partners/networks:

Swiss Agency for the Environment, Forests and Landscape (SAEFL/BUWAL)

Scientific publications and public outreach 2001:

NABEL, Luftbelastung 2000; Schriftenreihe Umwelt Nr. 330 Luft; Bundesamt für Umwelt, Wald und Landschaft, Bern 2001.

Technischer Bericht zum Nationalen Beobachtungsnetz für Luftfremdstoffe (NABEL); Eidgenössische Materialprüf- und Forschungsanstalt, Dübendorf 2000.

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