

Name of research institute or organization:

**Section of Environmental Radioactivity, Radiation Protection
Division of the Swiss Federal Office of Public Health**

Title of project:

Continuous aerosol radioactivity monitoring

Project leader and team

Prof. H. Völkle, Section Head, Pierre Beuret, project responsible

Project description:

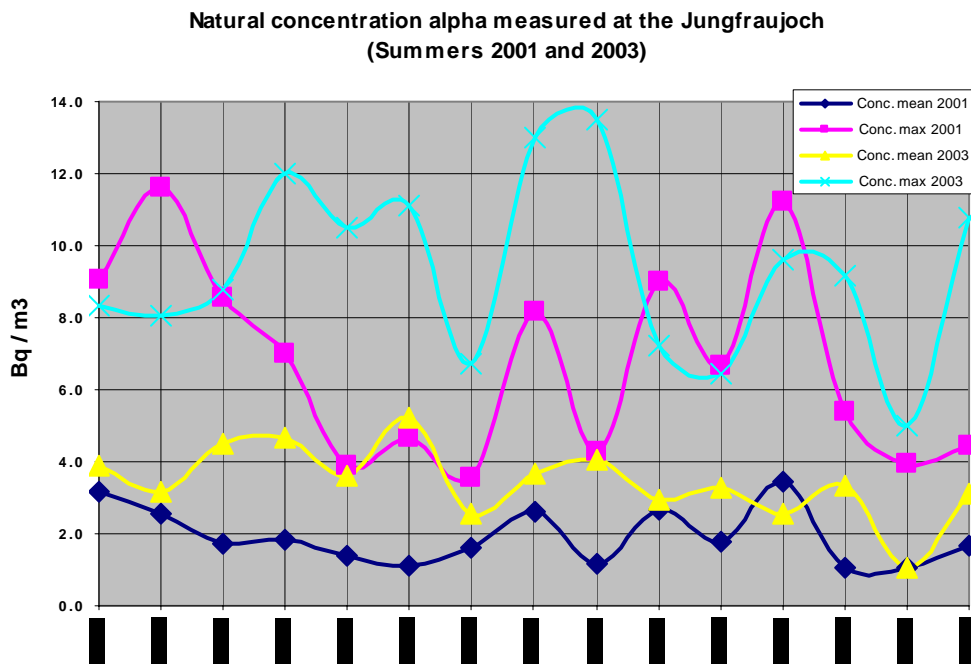
Continuous monitoring of aerosol radioactivity at 11 places in Switzerland, including one at the Hochalpine Forschungsstation Jungfrauojoch; automatic data transmission to the data center in Fribourg

The automatic monitoring station FHT59S for aerosol radioactivity operated by the Swiss Federal Office of Public Health at Jungfrauojoch has a particular interest for two reasons:

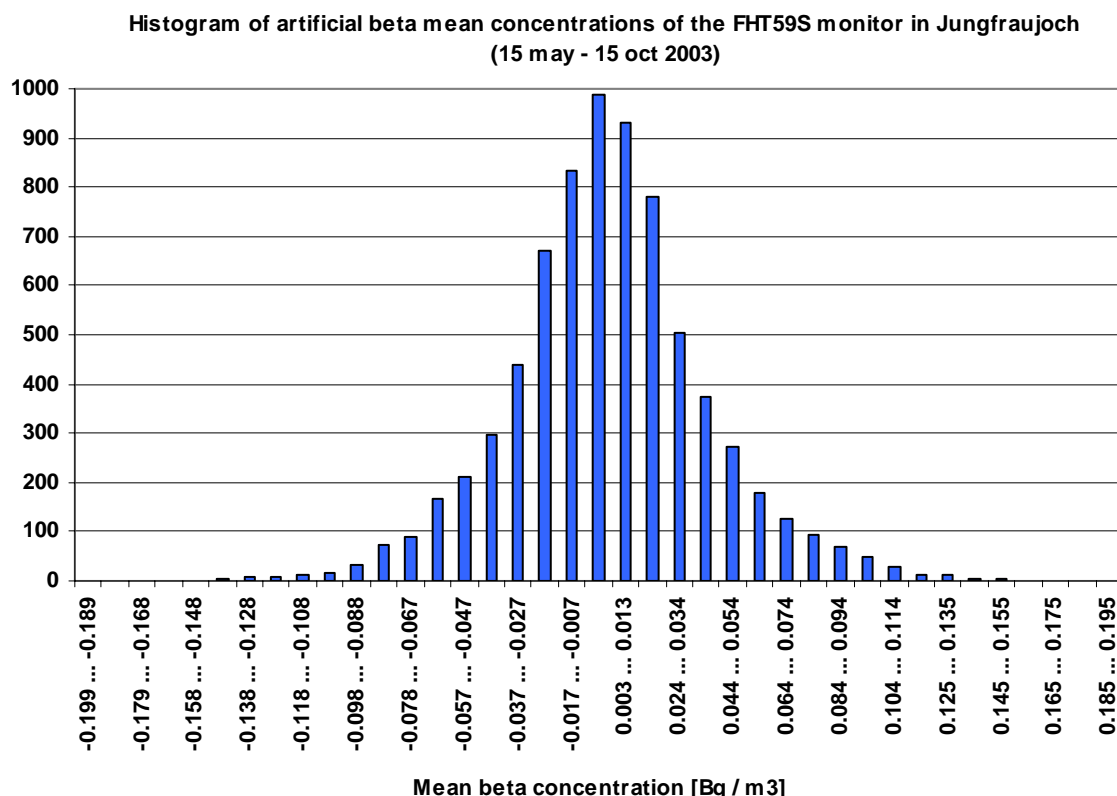
- The possibility of a rapid detection of a radioactive contamination of the air at an altitude of 3400 m above sea level,
- A detection limit of less than 0.1 Bq/m^3 for artificial radioactivity (five times lower than on the Swiss Mittelland) due to the very low Radon concentration at high altitude.

Comments on the measurement of 2003:

During the hot period of summer 2003 the aerosol monitoring stations in the Swiss Mittelland recorded higher Radon concentrations than in the last years. So the thermal air flows up to the Jungfrauojoch were more frequent and more important than in the previous years. As a consequence also at the Jungfrauojoch higher Radon values have been recorded as shown on the figure below.



For reminder: The automatic α/β -compensation method used by the aerosol monitoring stations is based on the simultaneous measurement of gross Alpha (A_G) and gross Beta (B_G) radioactivity of the aerosols collected on the filter. The net (artificial) Beta radioactivity (B_N) is calculated by the following formula: $B_N = B_G - f \cdot A_G$. The constant factor f can be adapted either by the programme or by the operator. By this compensation technique, we can make sure that in the absence of artificial radioactivity in the air the calculated value of the net Beta radioactivity is below 0.1 Bq/m^3 . As shown in the histogram below during summer 2003 some 90 percent of the values were below 0.07 Bq/m^3 .



Histogram of the artificial Beta radioactivity registered by the FHT59S monitor at the Jungfraujoch

Comments on the technical part:

The problem with the Mylar membrane situated between the air flow and the radiation detector mentioned in the last report has been solved by doubling the Mylar sheet. As a consequence the Alpha efficiency decreased from 26 to 16 percent and the one for Beta's from 23 to 21 percent, but they remain within the interval for these parameters fixed by the manufacturer of the instrument. Since July 20th 2003 when the Mylar membrane has been changed the instrument worked properly.

Key words:

Environmental Radioactivity Monitoring

Internet data bases:

http://www.bag.admin.ch/strahlen/ionisant/radio_env/pdf-2002/Chap.04.1_01.pdf

Scientific publications and public outreach 2003:

see: http://www.bag.admin.ch/strahlen/ionisant/radio_env/pdf-2002/Chap.04.1_01.pdf

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