

Name of research institute or organization:

Institut for Medical Physics, University Innsbruck

Title of project:

Solar UV irradiance

Project leader and team:

Univ-Prof. Dr. Mario Blumthaler, project leader
Dr. Martin Huber, Prof. Dr. Monika Ritsch-Marte, Josef Schreder,
Michael Schwarzmann, Wolfgang Singer, Barbara Schallhart, Roland Silbernagl

Project description:

Since 1980 variability and trend of solar UV irradiance have been observed at the High Alpine Research Station Jungfraujoch in annual campaigns of about 8 weeks duration. Especially the biologically significant erythemally weighted UV-irradiance is of interest, as it can be taken as a general indicator of harmful reactions on humans. The erythema dose is measured with broadband detectors, and long-term variations are investigated within our long-term project.

Furthermore, spectral measurements between 280 nm and 500 nm with a resolution of 0.25 nm are carried out with a double-monochromator spectroradiometer. Total ozone column and spectral extinction by aerosols is derived from direct sun irradiance. Close international cooperation guarantees high quality of the UV measurements.

In 2002, the measurements at Jungfraujoch took place between 05.03.2002 and 18.04.2002. During the whole period at least one scientific collaborator from the Institute for Medical Physics was taking care of the measurements at Jungfraujoch for continuous quality control and for manual ancillary measurements on clear sky days. With the spectroradiometer, spectral global flux and actinic flux density from the upper hemisphere were measured continuously, as the actinic flux density is especially important for tropospheric chemistry. First analyses show significant differences in the relation to global irradiance, when compared with similar results at valley stations, which mostly are a consequence of the snow covered surrounding, which was especially pronounced during this spring-time measurement period.

Also in the following years the measurement campaigns at Jungfraujoch will be continued. Thereby further specific sensitivity studies on the influence of individual parameters on solar UV irradiance will be carried out. Furthermore, it will be of special interest, if in the next years a tendency for recovering of the ozone layer will really occur, which should be accompanied by decreasing levels of UV-B irradiance. Such conclusions can be drawn only from measurements carried out over several years, because otherwise any long-term trend may be masked by the natural strong short-term variations of the various atmospheric parameters, which influence UVB-irradiance at the earth's surface.

Key words

UV, erythemal irradiance, ozone, aerosols, albedo effects, actinic flux density

Collaborating partners/networks:

Close contact to Meteo Schweiz concerning radiation measurements and to BUWAL concerning ground level ozone measurements. International cooperation in several EC-projects concerning spectral UV measurements.

Scientific publications and public outreach 2002:

Blumthaler M., M. Huber, J. Schreder (2002) Spectral measurements of vertically and horizontally polarized UV sky distribution; Remote Sensing of the Atmosphere, Ocean, Environment, and Space, Hangzhou, China, 23-27. 10. 2002, Ultraviolet ground- and space-based measurements, models, and effects II, J.R. Slusser, J.R.Herman, W. Gao (Eds), Proceedings of SPIE Vol. 4896.

Address:

Institute for Medical Physics
University Innsbruck
Müllerstrasse 44
A-6020 Innsbruck

Contacts:

Mario Blumthaler Tel. +43 512 507 3556 e-mail: Mario.Blumthaler@uibk.ac.at
URL: <http://www.uibk.ac.at/projects/uv-index/index.html>