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Meeting abstract

Ambient levels of UV radiation

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The levels of solar ultraviolet (UV) radiation at the Earth's surface vary widely, depending on the atmospheric and environmental conditions of the observation site. Under clear sky conditions, the most important parameters are solar zenith angle, total ozone content, amount and type of aerosols, altitude above sea level and albedo of the ground [1]. In addition, attenuation and in special cases amplification by clouds has to be considered. Based on detailed measurements under a large number of different conditions, the effects of the individual parameters on global UV irradiance are quantified. Most of these effects depend strongly on wavelength and many of the effects are most pronounced in the erythemally weighted UV-range.

The effects of the most important parameters are: 1% decrease in ozone results in an increase of erythemally weighted UV irradiance of about 1.1% [2]; aerosols can attenuate erythemally weighted UV irradiance by up to 30%, but this depends strongly on amount and type of aerosols [3]; the increase of erythemally weighted UV irradiance with an increase in altitude of 1000 m amounts between 15% and 25%, for UVA-radiation this increase is about half that much [4]; an increase of ground albedo by 0.5 will increase erythemally weighted irradiance by about 17%, UVA irradiance by about 10% [5]; a complete cloud cover attenuates UV irradiance about 40% less than total irradiance [6].

Long-term changes of solar UV radiation are a complex combination of various effects, where stratospheric ozone depletion, increase of tropospheric ozone levels and effects of global climate change work together. Therefore predictions for future levels of UV radiation are limited to the assumptions of specific scenarios. Future measurements will be necessary to monitor any changes on a local and on a global scale.

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