Geophysical Research Abstracts
Vol. 12, EGU2010-10033, 2010
EGU General Assembly 2010

Reconstruction of past and prediction of future erythemal UV-radiation at two sites in Austria

Philipp Weihs (1), Harald Rieder (2), Jochen Wagner (1), Stana Simic (1), and Martin Dameris (3)

(1) Universität für Bodenkultur, Inst. fuer Meteorologie, Wien, Austria (weihs@mail.boku.ac.at), (2) Institute for Atmospheric and Climate Science, ETH Zurich, Zurich, Switzerland, (3) Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany.

Since the discovery of anthropogenic ozone depletion more than 30 year ago, the scientific community has shown an increasing interest in UV-B radiation and started to monitor UV-radiation. However, difficulties involved in the routine operation and maintenance of the instruments have limited the length of reliable data records to about two decades. Further the number of places where they were measured, result in a set of observations too short and too sparse for a good understanding of past UV changes.

Moreover state of the art climate models do not calculate future scenarios of UV-doses. Therefore detailed information about past and future UV-trends are lacking. Reconstruction techniques are indispensable to derive long-term time series of UV-radiation and fill this gap. Apart from the astronomical parameters, like solar zenith angle and sun-earth-distance, UV radiation is strongly influenced by clouds, ozone and surface albedo.

We developed and evaluated a reconstruction technique for UV-doses (from regional climate model output) that first calculates the UV-doses under clear-sky condition and afterwards applies corrections in order to take cloud effects into account. Since the input parameters cloud cover, total ozone column and surface albedo are available from the Regional Climate Models REMO and E39/C (DLR-model), we applied our reconstruction technique for the past and for future scenarios using REMO and E39/C data as input. Hence we simulated a seamless UV long-term time series from the past to the future. Our method was applied for the high alpine station Hoher Sonnblick (3106m) situated in the Austrian Alps and for Vienna (170m) in the Eastern part of the Austrian territory.
We first analyse the accuracy of the obtained backward reconstruction and intercompare the modelled and measured input parameters ozone, cloud modification factor, and ground albedo. Several approaches to improve the accuracy of the reconstruction are presented. Then we present the simulations of future UV.