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Reconstruction of past UV-levels in Austria: A comparison between alpine and urban regions

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Since the detection of the depletion of ozone in the stratosphere over Antarctica the scientific community and the general public has an increased interest in UV-levels at the Earth's surface. Since then a lot of studies show the harmful biological effects of higher UV-doses on terrestrial and aquatic ecosystems as well as on humans. Long-time measurement of the UV part of the spectrum is limited and only available from a few locations in Europe. For medical and biological impact studies longer time-series would be needed. Past UV-levels can only be estimated from meteorological data. In general there are two methodically different approaches for the reconstruction of historic UV-doses: statistical models and physical based radiation transfer models. The aim of our study is the reconstruction of past UV-doses for two stations in Austria for 1960-2005 by the use of a physical based radiation transfer model. One Station (Sonnblick) is located at 3.106 m in the Central Alps and the other one (Vienna) is located at 203 m in the flat eastern part of Austria. We reconstructed past UV-levels from meteorological data like total ozone, aerosol concentration, snow cover, ground albedo, cloud amount and global radiation. Because of the different length of the measurement time series we used two approaches for our reconstruction. The first one is a reconstruction based on cloud modification factors (CMFsol, CMFuv), for the second one sunshine duration data has been used. Additionally we reconstructed past UV-doses as hourly and daily values to investigate the model performance in two different temporal resolutions.