



Investigations of the accuracy of 3-D radiation Monte Carlo calculations in mountainous terrain in the UV wavelength range.

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In this study we made first investigations of the accuracy of 3-D radiation Monte Carlo calculations in the UV wavelength range in mountainous terrain. The accuracy of 3-D radiation Monte Carlo calculations in mountainous terrain depends on a) the resolution of the digital elevation map b) the accuracy of the calculation method c) the number of photons used for the calculations First we looked at the influence of the resolution of the digital elevation map. 3-D model simulations were performed for a 22x24 km area around Sonnblick Observatory in the austrian alps. The simulations were performed for digital elevation maps with 50 and 400 m grid size respectively. Results of incident UV irradiance calculations in the UV-B and the UV-A wavelength range are shown as a function of digital elevation map resolution and solar position. Second we looked in more detail at the aerosol and molecular scattering phase functions, at the absorption and scattering coefficients used in the model and at vertical profiles of the atmosphere and their influence on the uncertainty of the calculated irradiance. Third the number of photons used for the calculation, calculation time and accuracy of the calculations and their influence on results were investigated.