



High spatial resolution solar radiative flux over clouds estimated from MODIS to validate a regional climate model (REMO)

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A study is presented of the use of top of atmosphere measurements from the Moderate resolution Imaging Spectroradiometer (MODIS) to validate simulated solar radiative flux over clouds with REgional climate MOdel (REMO). One of the fundamental properties of a climate model is the radiation budget. To evaluate the accuracy of a model it is important to compare simulated results with observed data. An algorithm has been developed for estimating the upward solar radiative flux over clouds which is applicable to MODIS. The method is based on a narrowband to broadband conversion, the simulations of a radiative transfer model and an artificial neural network. The results of the algorithm have been compared with broadband measurements of the Clouds and Earth's Radiant Energy System (CERES) which is also on board the Terra satellite and shows excellent agreement. REMO is a regional hydrostatic atmospheric climate model. The dynamical core of the regional atmospheric climate model REMO consists of the EM/DM-system of the German weather service (DWD), but the set of physical parameterizations is absorbed from the ECHAM4 model. The model domain covers the Baltic sea as well as major parts of continental Europe with a horizontal resolution of $1/6^\circ$ (18km). The year 2002 is chosen to compare the upward solar radiation over clouds from the model and the measurements. The focus of this study will be on the annual, diurnal and seasonal cycle. In general, the model is in good agreement with observed data in terms of annual and seasonal means. Additionally, the relation to different cloud heights will be presented.