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On the effect of different aerosol types on surface solar radiation levels over the region of Eastern Mediterranean

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In this work, we examine the direct effect of different aerosol types on the surface solar radiation (SSR) levels in the region of Eastern Mediterranean. Simulations with the Santa Barbara DISORT Atmospheric Radiative Transfer (SBDART) model were performed using ground and satellite-based data as input. An IDL tool that "feeds" SBDART with the appropriate input data was developed allowing us to simulate SSR with a time step of 1 hour. Level-2 aerosol optical depth, cloud optical depth, cloud fraction, effective droplet radius, cloud top pressure, precipitable water and surface albedo data from MODIS, as well as ozone total column data from Earth Probe TOMS and OMI satellite sensors, coarse resolution cloud data from the ISCCP and single scattering albedo, asymmetry factor and Angström exponent sunphotometric data from the AERONET are used in our radiative transfer simulations. Simulations are performed over selected spots within Eastern Mediterranean for clear, liquid cloud and ice cloud covered skies and for different aerosol types (maritime, dust, anthropogenic, fine-mode natural). The optical properties of aerosols were determined using a combination of satellite, ground-based, model and reanalysis products. The aerosol direct radiative effect is defined as the difference between simulations done with and without the presence of aerosols. This research has been financed by EPAN II and PEP under the national action "Bilateral, multilateral and regional R&T cooperations" (AEROVIS Sino-Greek project).