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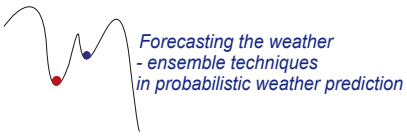

Variability of aerosol optical properties and their radiative effect over the Mediterranean region

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Atmospheric aerosols play a vital part in the Earth's energy balance, both in a direct, by scattering and absorbing the incoming solar radiation and an indirect way, by altering clouds' properties. Their radiative effect is very important, but at the same time it has a large degree of uncertainty, thus making the studying of atmospheric aerosols a modern field of research.

In this study, the temporal and spatial distribution of aerosol optical properties (optical depth, single scattering albedo etc.) in the ultraviolet and visible parts of the solar spectrum over the Mediterranean region are examined, using data from the ground-based network AERONET, AeroCom climatology and MODIS. Eight AERONET stations are chosen over the Mediterranean basin characterized by different aerosol types. The AERONET data cover the period until 2008, while the beginning of the operation differs at each station. AeroCom data are climatological values derived from ground-based measurements and model outputs from 1998 until 2007. Monthly mean data from 2000 until 2007 are used from MODIS instrument.

The AERONET monthly mean aerosol optical depth and single scattering albedo for two wavelengths in the ultraviolet and two in the visible range are compared with AeroCom data. Comparison is also made for the visible wavelengths with the MODIS aerosol products at 550 nm. This study examines the representativeness of the AERONET aerosol values for a wider area around the station and whether this can be reproduced by the AeroCom climatology.

The monthly mean aerosol values from the AERONET and AeroCom database are then used as input parameters in the LibRadTran radiative transfer model, in order to estimate the differences in the global ultraviolet and visible radiation reaching the ground that arise from the differences of aerosol properties from each dataset.