



Aerosol-cloud interaction determined by satellite data over the Baltic Sea countries

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The present study investigates the use of long-term satellite data to assess the influence of aerosols upon cloud parameters over the Baltic Sea region. This particular area offers the contrast of a very clean environment (Fennoscandia) against a more polluted one (Germany, Poland).

The datasets consists of Collection 6 Level 3 daily observations from 2002 to 2014 collected by the NASA's Moderate-Resolution Imaging Spectrometer (MODIS) instrument on-board the Aqua platform. The MODIS aerosol optical depth (AOD) product is used as a proxy for the number concentration of aerosol particles while the cloud effective radius (CER) and cloud optical thickness (COT) describe cloud microphysical and optical properties respectively. Satellite data have certain limitations, such as the restriction to summer season due to solar zenith angle restrictions and the known problem of the ambiguity of the aerosol-cloud interface, for instance.

Through the analysis of a 12-years dataset, distribution maps provide information on a regional scale about the first aerosol indirect effect (AIE) by determining the aerosol-cloud interaction (ACI). The ACI is defined as the change in cloud optical depth or effective radius as a function of aerosol load for a fixed liquid water path (LWP). The focusing point of the current study is the evaluation of regional trends of ACI over the observed area of the Baltic Sea.