



Observation of the first indirect aerosol effect with MODIS: Case studies

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The study presents the evidence of the first indirect aerosol effect in MODIS observations. We utilise retrievals of cloud albedo, cloud droplet number concentration, and geometrical cloud thickness from MODIS observations. To characterise the origin of air masses and its aerosol load we apply a back trajectory algorithm. The analysis focuses on stratocumulus clouds over the Atlantic Ocean. With the help of the back trajectory algorithm we are able to separate regions with different aerosol loads, one with maritime and one with continental influence. For both regions we compute the cloud albedo and the cloud droplet number concentration as a function of a fixed set of cloud geometrical thickness and liquid water path. The analysis on basis of a set of constant cloud geometrical thicknesses avoids misinterpretations which appear if the analysis focuses on effective radius. In addition to larger cloud albedos and cloud droplet number concentrations in the continental clouds we found a nearly linear relation between differences in cloud albedo and cloud droplet number concentration.