



## **Relations of cloud droplet number concentration and aerosol optical depth: An assessment using MODIS satellite observations and the global chemistry climate model EMAC**

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In this work, the relation of cloud droplet number concentration (CDNC) and aerosol optical depth (AOD550) as seen from MODIS satellite observations is compared with results from a four-years (2005-2008) simulation with the global chemistry climate model EMAC. This relation is basic to the aerosol first indirect effect on climate and is associated with large uncertainty. It has been shown that MODIS collection 5 data generally exhibit a negative relation over land, which contradicts previous model results. Recent studies attributed this to MODIS difficulties in retrieving CDNC at low cloud fractions. Here, we discuss the differences and similarities of the  $\ln(\text{CDNC})/\ln(\text{AOD550})$  spatiotemporal patterns from MODIS and EMAC. As far as the cloud droplet formation parameterization is considered, EMAC uses the Abdul-Razzak and Ghan (2000) scheme. The main question we address is whether the negative relation appearing over continental regions in MODIS data could be also seen in EMAC simulations for some regions. In these cases, the negative slopes could be attributed to a microphysical effect rather than a retrieval artifact. This work is funded by the QUADIEEMS project, which is co-financed by the European Social Fund (ESF) and national resources under the operational programme Education and Lifelong Learning (EdLL) within the framework of the Action "Supporting Postdoctoral Researchers".