Geophysical Research Abstracts
Vol. 12, EGU2010-1331-1, 2010
EGU General Assembly 2010

Analysis of Aerosol-Cloud interaction from multi-sensor satellite observation

lorenzo costantino (1) and francois-marie breon (2)
(1) Laboratoire des Sciences du Climat et l'Environnement (LSCE), Université de Versailles-Saint-Quentin-en-Yvelines (UVSQ), (lore.costantino@gmail.com), (2) Laboratoire des Sciences du Climat et l'Environnement (LSCE)

Aerosol interaction with clouds is the main uncertainty for the quantification of the anthropogenic forcing on climate. The first step of the so-called "aerosol indirect effect" is the change of cloud droplet size distribution when seeded by anthropogenic aerosols. Satellite data provide the density and diversity of observations needed for a statistical estimate of this effect. Numerous such studies have demonstrated the correlation between aerosol load and Cloud Droplet Radius (CDR) and a few have quantified the impact of aerosol on the microphysics. Here, we go one step further by using the profiles from the spaceborne CALIPSO lidar that indicates the respective position of aerosol and cloud layers. The results show that, when aerosol and cloud layers are clearly separated, there is no correlation between aerosol load and CDR. On the other hand, when the lidar profile indicates mixing, there is a strong correlation.

We focus on the stratocumulus cloud fields off the coast of Namibia and Angola which are seeded by biomass burning aerosols from Africa. The log-log slope of CDR and a proxy of the condensation nuclei number is -0.22 in excellent agreement with theoretical estimate. When the vertical profile information is not used, the slope is significantly smaller.