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Comment

Interactive comment on “Patterns of Saharan dust transport over the Atlantic: winter vs. summer, based on CALIPSO first year data” by B. A. Yuval et al.

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My comment is on the paper entitled: Patterns of Saharan transport over the Atlantic: Winter vs. summer, based on CALIPSO first year data

The two modes (SAL and Marine Boundary Layer -MBL- transport) of transporting dust from Africa to America across the Atlantic ocean have already been discussed in the journal JGR ("North African soil dust and European pollution transport to America during the warm season: Hidden links ..." by Gangoiti et al. in 2006). The article explains how dust is entrained from the SAL into the MBL during the oceanic transport, and why both layers can arrive separately at different times and locations in the American

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continent. The sinking of the dust plume top within the SAL and the rising (not sinking as stated in acp-2009-242) of its base during the oceanic transport, following LIDAR observations by Karyampudi et al., (1999) are also explained in the above mentioned contribution. Results during the experiment PRIDE, published by Reid et al. (2003), showed unexpected vertical distributions of dust in the Caribbean during summer: dust appeared in the Caribbean only in the MBL, only in the SAL or in both layers. Now we know that the wind shear between the MBL and the SAL is the responsible of this type of transport: both layers are decoupled from each other following their respective thermodynamic origin and evolution over the ocean (relative warm SAL over a cool MBL growing in height from East to West over increasing SST temperatures)

Thus, the base of the SAL does not sink as stated by the authors in acp-2009-242, reaching almost the sea level. Their calculations need revision. The large-scale sinking of the SAL within the Bermudas-Azores high pressure system, is taking part against convection within the MBL. Thus, sinking is vanished at the top of the MBL, which reaches higher altitudes in the Caribbean than at the African coast of the tropical Atlantic, with lower SST temperatures.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 13177, 2009.

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