



Observation of multilayer aerosol structures from an ultra light aircraft in the frame of the African Monsoon Multidisciplinary Analysis

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A new payload for an ultra-light aircraft has been designed. This payload including the LAUVA (Lidar Aérosols UltraViolet Aéroporté) system now developed and commercialized by the LEOSPHERE company. LAUVA is an eye safe and compact backscattering lidar system emitting at the wavelength of 355 nm. We operated this airborne configuration in the Sahel from the city of Niamey (Niger) during the first campaign of the African Monsoon Multidisciplinary Analysis (AMMA) in January-February 2006. The flight plans were defined to measure the aerosol optical properties in the planetary boundary layer between 0 and 5 km above the mean sea level. We take advantage of the lidar capability of pointing in different directions to retrieve the vertical profile of the aerosol backscatter to extinction ratio (BER) during a transport event with a mixing of dust and biomass burning aerosols. The synergy between lidar (355 nm), scatterometer (880 nm) and sunphotometer allowed us to identify different aerosol structures from the spectral dependency (a) of the aerosol extinction coefficient. Three types of aerosol layers have been identified to be associated with BER (a) close to 0.008 (1.5), 0.025 (0) and 0.012 sr^{-1} (0.5) for biomass burning (BB), dust (D) and a mixing between BB and D, respectively.