



## **Aircraft measurements from Fennec: giant particles, optical properties, and effects of transport**

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During June 2011 and 2012 the Fennec project took place in the Western Sahara desert. Ground based and airborne measurements were taken in remote desert regions of Mali, Mauritania and Algeria. In-situ aircraft measurements of Saharan dust from the 2011 flights will be presented, with size distributions extending to 300  $\mu\text{m}$ , representing measurements extending further into the coarse mode than previously published for airborne Saharan dust. A significant coarse mode was present in the size distribution measurements with effective diameter ( $d_{\text{eff}}$ ) from 2.3 to 19.4  $\mu\text{m}$  and coarse mode volume median diameter ( $d_{\text{vc}}$ ) from 5.8 to 45.3  $\mu\text{m}$ . The mean size distribution had a larger relative proportion of coarse mode particles than previous aircraft measurements with significant contribution from the 'giant mode' – particles larger than 38 microns.

Properties of dust size distribution and optical properties will be presented in relation to dust age since uplift and altitude. Vertical distributions of dust over desert (for both fresh and aged dust events) and the Eastern Atlantic Ocean from 42 aircraft profiles will be presented, demonstrating how size distributions and optical properties change during the early stages of the dust lifecycle. Size distributions show a loss of 60 to 90% of particles larger than 30 microns 12 h after uplift. Single scattering albedo increases from 0.92 to 0.94 to 0.95 between fresh, aged, and Eastern Atlantic dust profiles. Finally the impact of transport and changing optical properties on the radiative effect of dust will be examined.