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Atmospheric dust emission mechanisms at the summer global dust maximum: observations from Bordj Mokhtar, Algeria

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In boreal summer, the central Sahara is the dustiest place on Earth. Until recently, however, due to its extreme aridity and inaccesibility, only a very small number of high-quality in-situ observations have been made in the region. In summer 2011, the Fennec Project, an Oxford University-led consortium of five UK universities, the UK Met Office, African, European, and US partners, conducted a major ground-based and airborne field campaign in the central Sahara. As part of this intensive observation period, the site of Bordj Mokhtar, on the Algeria-Mali border, very close to the satellite-identified summer global dust maximum, was heavily instrumented.

From these measurements, a detailed record of the June 2011 meteorological and aerosol conditions over Bordj Mokhtar is being compiled. Due to the number of different instruments employed (up to 3-hourly radiosonde launches, 15m flux tower, sun photometer, lidar, sodar, nephelometer, dust sampler) and their high temporal resolution, it is possible to characterise in detail the multiple dust emission and transport mechanisms in operation. Among others, these include low level jets, density currents, and convective mixing. The work is developing our understanding of these processes and, combined with satellite retrievals, beginning to provide objective criteria for the identification of these processes in other regions of the Sahara where instrumentation is more rudimentary and dispersed.