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Observations of dust uplift and transport in the western Sahara from the GERBILS field campaign

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The Sahara desert is the largest source of atmospheric dust aerosol in the world, and the Western Sahara is one of the main source areas. However, the meteorology that controls dust uplift and transport in this region is very poorly observed. Observations from the GERBILS field campaign, which took place in June 2007, provide valuable insights into this meteorology, and the resultant dust uplift and transport.

Observations show that the deep Saharan Air Layer (SAL) often contains multiple near-neutral layers separated by weak lids. The role of boundary-layer convection in uplifting dust and transporting it within the SAL will be discussed. Observations show a strong coupling between land surface albedo variations and the convection in the boundary layer, and modelling is used to investigate the impacts on the SAL. Finally, observations of dust uplift into the monsoon flow at the inter-tropical discontinuity will be presented. The seasonal cycle of this uplift is explained using remotely sensed data and global model fields. These show that the seasonal cycle of dust uplift in the western Sahara is controlled by the monsoon flow and in particular the cold pool outflows from convective storms.