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Dust Mechanisms in the Central Sahara: An Overview from Fennec

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This paper provides an overview of the progress thus far in understanding the mechanisms of dust production in the central Sahara, particularly from field observations gained during the Fennec campaigns. Much of what was known about dust production and transport in the central Sahara derived from satellite products and numerical models. The view gained from these tools was, at times, platform dependent and so that view changed rather than evolved as new data sets became available. The Fennec project with combined satellite, aircraft and ground-based observations provided the opportunity to assess the veracity of the emerging views. In particular, ground-based observations from lidar, sodar, flux towers and a series of automatic weather stations across the core of the dust laden region of the Saharan atmosphere in 2011 and 2012 combined with specific airborne missions in the instrumented BAe-146 aircraft to both young and mature dust storms, has provided the opportunity to construct the first comprehensive data set of dust production in the central Sahara. The overview in this paper draws on the findings thus far and assesses what new insights have been gained from the observations. Some outstanding issues are also flagged.