



## **Can dust emission mechanisms be determined from field measurements?**

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Field observations are needed to develop and test theories on dust emission for use in dust modeling systems. The dust emission mechanism (aerodynamic entrainment, saltation bombardment, aggregate disintegration) as well as the amount and particle-size distribution of emitted dust may vary under sediment supply- and transport-limited conditions. This variability, which is caused by heterogeneity of the surface and the atmosphere, cannot be fully captured in either field measurements or models. However, uncertainty in dust emission modeling can be reduced through more detailed observational data on the dust emission mechanism itself. To date, most measurements do not provide enough information to allow for a determination of the mechanisms leading to dust emission and often focus on a small variety of soil and atmospheric settings. Additionally, data sets are often not directly comparable due to different measurement setups. As a consequence, the calibration of dust emission schemes has so far relied on a selective set of observations, which leads to an idealization of the emission process in models and thus affects dust budget estimates. Here, we will present results of a study which aims to decipher the dust emission mechanism from field measurements as an input for future model development. Detailed field measurements are conducted, which allow for a comparison of dust emission for different surface and atmospheric conditions. Measurements include monitoring of the surface, loose erodible material, transported sediment, and meteorological data, and are conducted in different environmental settings in the southwestern United States. Based on the field measurements, a method is developed to differentiate between the different dust emission mechanisms.