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# Granular Electrification, Sand Transport and Mineralogy.

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We present details of recent investigations of the electrification of fine granular materials (dust) under various laboratory simulation conditions, including Terrestrial and Martian environments. Specifically the dependence of dust electrification on grain size, mineralogy, atmospheric composition and pressure will be described.

In nature such electrification often leads to the generation of intense electric fields. The effect of such electric fields on the transport and structure of wind driven granular materials will be discussed and recent laboratory work which expands the current description of grain detachment and entrainment in the presence of electric fields.

In related studies the effects of erosion as a result of wind driven particulate transport has been investigated, specifically the effects on grain size, structure and mineralogy. These studies suggest that a wide range of chemical/mineralogical alteration processes may be possible as a result of mechanical surface activation generated during erosion (i.e. as a result of wind driven sand transport). This could have implications for the evolution of all planetary surfaces which posses an atmosphere. In the case of Mars, erosion induced surface activation may explain a series of unexpected observations, specifically; the apparent oxidizing nature of the Martian regolith as seen by the NASA Viking landers, the lack of observed organics, the presence of chlorate (at the NASA Phoenix landing site) and the (reddish) oxidized nature of the Martian dust.

The combined effects of electrification and mechanical activation seems to make the interface of planetary regolith with an atmosphere a potentially complex and active environment even in the absence of liquid water.

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