

STUDIES IN MARTIAN AEOLIAN GEOLOGY

Grant NAG5 3909

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This report gives the results from the investigation through March 15, 1999 for the first two years of the three year investigation (year 3 runs from March 1, 1999 to February 27, 2000).

The investigation included three tasks, all involving windblown dust (particles a few micrometers in diameter) to simulate the aeolian regime on Mars. Experiments were conducted primarily in the Mars Surface Wind Tunnel (MARSWIT) at NASA-Ames Research Center.

1. Threshold of dust as a function of surface roughness.

These experiments were completed and the results were presented (Wilson et al., 1997) and published (White et al., 1997). The results provide the first quantitative data on particles of this size for Mars.

In addition, models of the Mars Pathfinder landing site were run in the wind tunnel to determine morphologies resulting from net deposition versus net erosion. Results are consistent with interpretation that the MPF site is the result of net deflation; presented orally (Greeley, 1998) and submitted for publication (Greeley, 1999).

2. Flux of dust as a function of surface roughness.

Preliminary results have been obtained, as presented orally (Wilson, et al., 1998; Greeley, 1998), and a manuscript is in preparation. Additional runs will be made in the final year of the study to complete the series.

3. Investigations of saltation effects on dust entrainment and application of saltation models to Mars.

Experiments were run to study the triggering effects of sand in saltation on dust threshold; results show that the effect is not as great as previously suspected. Part of the reason is the development of electrostatic charges (Desch and Wilson, 1997). Follow-on systematic experiments are proposed for the next stage of study.

A saltation model developed in this study was applied to the global analysis of the potential movement of sand on Mars and the results are in press (Anderson et al., 1999).