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OBSERVATIONS REGARDING SMALL EOLIAN DUNES AND LARGE RIPPLES ON MARS. EDGETT, Kenneth S., Malin Space Science Systems, P.O. Box 910148, San Diego, CA 92191-0148, edgett@msss.com.

Eolian bedforms occur at the interface between a planetary surface and its atmosphere; they present a proxy record of the influence of climate, expressed in sediment transport, over that surface. High resolution images (1.5-12 m/pixel) from the Mars Global Surveyor (MGS) Mars Orbiter Camera provide glimpses of the most recent events shaping the martian landscape. Thousands of images exhibit small transverse dunes or large eolian ripples that have crest-to-crest spacings of 10 to 60 m, heights of a few to 10 m. Bedforms of the size and patterns seen in the Mars photographs are rarely described among Earth's eolian landforms; in terms of size and morphology, most of these fall between traditional definitions of "ripples" and "dunes". Dunes are composed chiefly of materials transported by saltation, ripples are smaller forms moved along by the impact of saltating grains (traction). The largest reported eolian ripples on Earth (granule ripples, megaripples) are typically smaller than the bedforms observed on Mars; likewise, most dunes are typically larger. The small dunes and large ripples on Mars come in a variety of relative albedos, despite an early MGS impression that they are all of high albedo. Some ripples occur on the surfaces of sand dunes; these are most likely true granule ripples. However, most of these bedforms occur in troughs, pits, craters, and on deflated plains. Despite impressions early in the MGS mission, they do not occur everywhere (e.g., they are rare on the northern plains) but they do occur at a range of elevations from the highest volcanoes to the deepest basins. Where they occur on a hard substrate among larger sand dunes, the big dunes have over-ridden the smaller bedforms, indicating that the smaller features are older and perhaps indurated or very coarse-grained. At other locales, the small bedforms have been mantled by material settled from suspension, in other cases they are being exhumed and may be lithified. Still other examples are peppered with small impact craters, implying considerable age. These bedforms present a complicated record of the geologically-recent past, one that has involved changes in climate, sediment transport capabilities, and sediment sources and sinks over time.

Key Words: Mars, martian, eolian, ripples, dunes