Geophysical Research Abstracts, Vol. 9, 11504, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-11504

Transverse Aeolian Ridges (TARs) on Mars

M. R. Balme (1, 2), D. C. Berman (1) and M. C. Bourke (1)

(1) Planetary Science Institute, 1700 East Fort Lowell Road, Tucson, AZ 85719, USA

(2) Dept. of Earth Sciences, Open University, Walton Hall, Milton Keynes, UK, MK7 6AA

Aeolian processes are probably the dominant ongoing surface modification process on Mars, as demonstrated by observations of dunes, ripples, yardangs, ventifacts, wind streaks, dust devils and dust storms. Large Dark Dunes (LDDs) are particularly common and were first recognized in the 1960's from Mariner data. However, another population of smaller, often brighter, ripple-like aeolian bed-forms that are morphologically distinct from LDDs has been observed in recent higher resolution images. Calculations of saltation path length under Martian conditions suggest these small bed-forms could have formed as small barchanoid dunes or as mega-ripples – also known as granule ripples. These features have therefore been called "Transverse Aeolian Ridges" (TARs) as this label has no genetic inference.

We have begun a study of TARs that examines all high resolution Mars Orbiter Camera data (1.5 to 8 m/pixel resolution) in a 45^o longitude wide, pole-to-pole swath. We aim to determine the geographic distribution of TARs, assess whether they are active, and to identify possible sediment sources. We have already made some key observations: First, we present a new classification of TAR deposits based on crest-ridge morphology of individual forms and the size and degree of topographic control of the entire sediment mass. Crest ridge morphologies can be simple, forked, sinuous, barchan-like, networked or feathered. We show examples of each class, using MOC and HiRise data. Second, we present associations of TARs with LDDs, slope streaks, dust devils tracks and small impact craters that provide clues as to whether TARs are currently active. Finally, we present preliminary pole-to-pole survey results for the northern hemisphere that show clusters of TAR deposits in the low latitudes, suggesting possible local sediment sources in these regions. We also show preliminary measurements of TAR azimuths and match these to Mars Global Climate Model (GCM) predictions.