Distribution of Dark Slope Streaks in and Around Schiaparelli Impact Basin, Mars. S. J. Jaret[1] and J. R. Clevy[2], [1] Department of Earth and Planetary Science, University of Tennessee, Knoxville, Knoxville, TN 37996-1410 (sjaret@utk.edu) [2]Department of Geological Sciences, University of Idaho, Moscow, ID 83844-3022. (clev2739@uidaho.edu)

Introduction: First revealed in Viking orbiter images and later imaged by Mars Glober Surveyor (MGS) [1] and Mars Express's High Resolution Stereo Camera (HRSC) [2], dark slope streaks have remained complex, controversial geomorphic features. Slope streaks, dark narrow features (figure 1) along the slopes of impact craters and channels, are found clustered in the equatorial regions [3]. Characteristically tapered or triangular in shape, these features seem to be dynamic in nature, reappearing on Martian decadal and annual time scales [3].

Widely accepted as the result of mass wasting movements, the mechanism is not clearly understood.

Dry avalanche, dust deposits [1], aqueous flows [4], and a CO_2 enriched dust mixture [5] have all been proposed as possible origins.

This study examines Schiaparelli Impact Basin, noted for its prominent slope streaks [3,6] in an attempt to map the distribution of slope streaks and their correlation with surface geology as well as epithermal neutron counts from the Mars Odyssey Neutron Spectrometer (MONS)[7].

Mapping of Dark Slope Streaks: For our study, we examined 1,962 MOC Narrow Angle images from within the region bounded by -15° to +15° latitude and 0° E to 45° E longitude. We identified 228 images containing dark slope streaks and the locations of these images were plotted on a MOLA base map (figure 2). This was also combined with MONS plots of hydrogen abundance and drainage features mapped from MOLA data (figure 3).

Interpretation: The spatial distribution of dark slope streaks appears to be neither even nor random. The majority of slope streaks occur on the Northern and Eastern Schiaparelli faces. No slope streaks were found between 0° and 12° E and only 9 were found south of -2° latitude. The slope streaks also tend to cluster along and follow channels, suggesting possible relationships between these freatures and Martian channel-forming mechanisms.

With respect to the MONS data, all the slope streaks we identifiyed occur in areas predicted to yield between 7.0 and 9.0 weight percent Water Equivalent Hydrogen (WEH). Background values of <4% WEH are common between 45° and –45° latitude [7]. This relationship suggests a connection between high WEH percentages and the occurance of dark slope streaks.

The close correlation of dark slope streaks, large-scale paleo-drainage features, and hydrogen abundance is consistent with previous work [2], suggesting a formation process related to Martian channel formation and high hydrogen concentrations rather than dry dust avalanches.

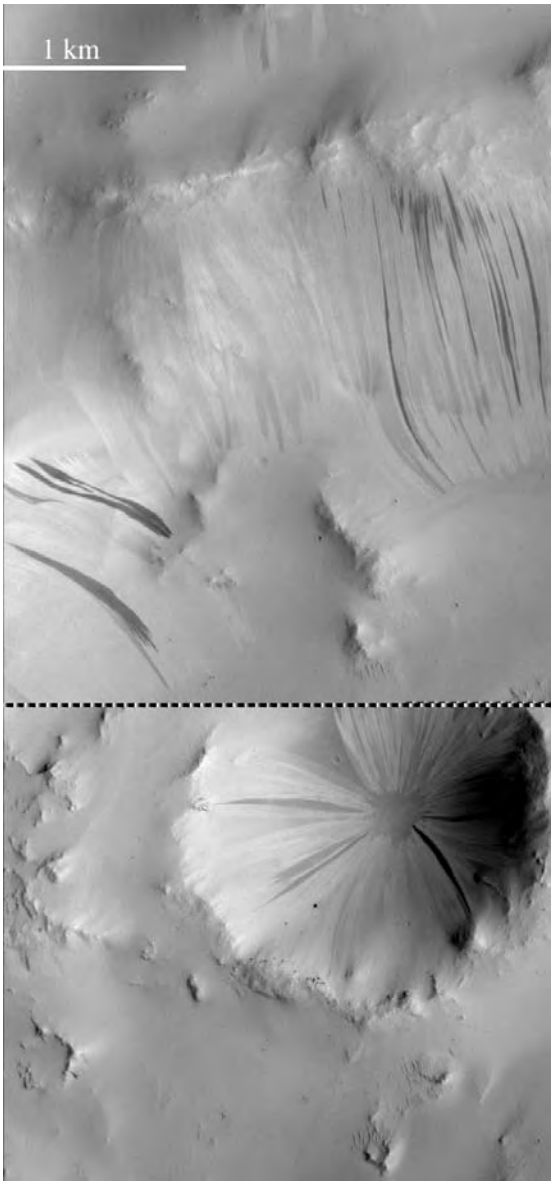
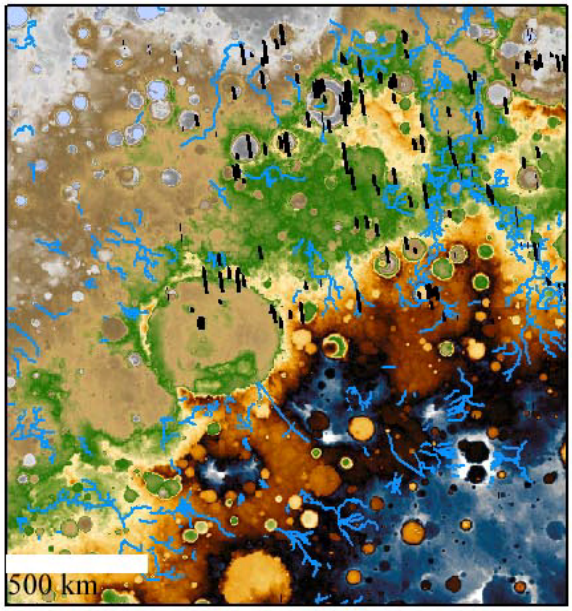
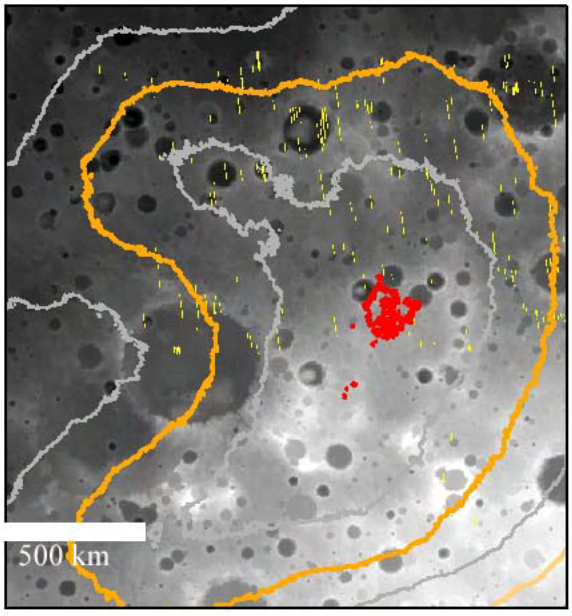


Figure 1: MOC image e0400591c, 14.77° N, 28° E showing dark slope streaks along one side of a valley network and small impact crater.

Conclusions: Mapping the spatial distribution of dark slope streaks has shown that these features occur in clusters and are not evenly distributed throughout the region. We cannot rule out the possibility of aeolean triggering; however, due to the degree of correlation between slope streaks, hydrogen abundance, and Martian hydrologic features we favor a streak genesis involving the movement of liquid or gaseous fluids.





References: [1] Sullivan, R. et al. (2000) *LPS XXXI*, Abstract #1911. [2] Baratoux, D et al. (2006) *Icarus. 183*, 30-45. [3] Edgett, K. S. (2000) *LPS XXXI*, Abstract #1058. [4] Ferris, J. C. et al. (2002) *Geophys Research Letters*, 29, no. 10 128-1. [5] Albin, E. F and King J. D. (2000) *LPS XXXII*, Abstract #1380. [6] Albin, E. F and King J. D. (2000) *LPS XXXII*, Abstract #1395. [7] Feldman, W. C. et al. (2002) *Science* 297, 75-78.

Acknowledgements: MOC images, courtesy of *NASA/JPL/Malin Space Science Systems*, PDS Mars Global Surveyor Mars Orbiter Camera (MOC) Image Collection, http://ida.wr.usgs.gov/

Figure 2: MOLA basemap showing the distribution of dark slope streaks on the Eastern side of Schiaparelli impact basin. The most dense population of streaks are found along channels and smaller craters. 6° – 37° E, 16° S - 17° N

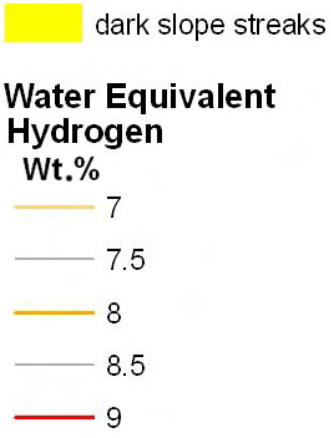


Figure 3: Greyscale MOLA basemap showing both the distribution of slope streaks (yellow), areas of high hydrogen abundance (contours of weight % WEH). 6° – 37° E, 16° S - 17° N.