

Analysis of Correlations between Crater Diameter and Thermal Inertia of Associated Wind Streaks on Mars. A. Amara¹, S. Burleigh¹, A. Dasgupta¹, C. Hendershot¹, D. Lightbody¹, ¹Klein Independent School District, Klein, Texas.

Introduction: Using high resolution day-time and night-time images from the Mars Odyssey Spacecraft’s Themis IR Camera (IR images #’s: I01023002, I07689013, and I09026011), we examined a series of craters north of Terra Sirenum and asked the following question: “Does a larger crater diameter lead to more dust removal in an erosional wind streak, and thus a lower thermal inertia?”

Experimental Setup:

- 1) Using our main image and archived images, one of which was adjacent to the main image, we examined each to locate wind streaks within.
- 2) For each wind streak analyzed, we collected data from it by taking the RGB values of random pixels and the diameter of the crater associated with it.
- 3) Using predetermined formulas, we converted the RGB values to surface temperature and then to thermal inertia.
- 4) Finally, we graphed the diameter vs. the thermal inertia of each wind streak to find the correlation between these two variables.

Results and Discussion: There does not appear to be a strong correlation between the size of a crater and the thermal inertia of a wind streak associated with it. All of the craters we found had average thermal inertias indicating a grain size ranging from powdery dust to very fine sand. In addition, interesting correlations were noticeable in a few cases.

In image #I07689013, we found that there were two craters with diameters of 1457m and 1416m with average thermal inertias of 117.18 tiu and 118.60 tiu respectively (see figure 1).

Another observation uncovered was that two craters with similar diameters of 956m and 1095m had dissimilar thermal inertias. In image #I08026011, the thermal inertia was 134.6 tiu while in image #I01023002, the thermal inertia was 52.2 tiu (see figure 2).

Although our data doesn’t show a strong correlation between crater diameter and thermal inertia of the wind streak, there is a suggestion of an association that has yet to be documented. More data would have to be collected to determine which correspondence discussed earlier holds for wind streaks on Mars, or if there is no link at all.

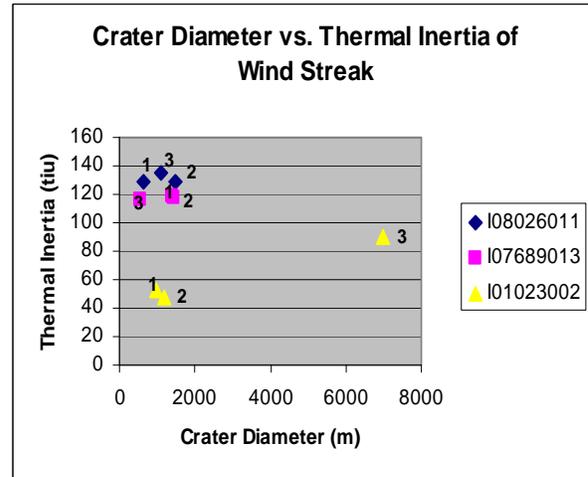


Figure 1: It shows us that there is no strong correlation between thermal inertia and the diameter of the crater.

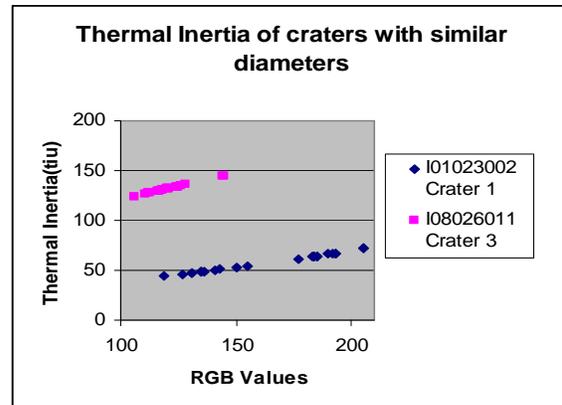


Figure 2: Craters with similar diameter had dissimilar thermal inertias.

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