

DEFINING CORRELATIONS BETWEEN PRESENCE OF ICE DEPOSITS AND AREA COVERED BY CRATERS IN VASTITAS BOREALIS. Mark Moore, Aurko Dasgupta, Stephanie Alva, Sean Casey, Matthew Figueroa, Curran Hendershot, Daniel Hwang, Siva Nagarajan, Thong Nguyen, Jessi Szymanski and Rachel Wilson. Klein High School, Spring, Texas.

Introduction: According to research conducted by Kim Seelos, small water ice deposits are present among the northern plains of the Martian northern pole after the polar cap recedes in summer. The team was immediately intrigued and, when examining a MOLA map of Mars, noticed distinct disruptions regarding topography in the Vastitas Borealis region. In order to narrow the scope of our study, we focused our research on the area between 75° and 80° North Latitude and 180°-225° Longitude.

Using a number of images from the Mars Odyssey THEMIS camera, the MSIP team attempted to answer the following question: Is there a correlation between area covered by ice deposits and area covered by craters in the specified region. (Klein HS MSIP Team, 2008)

Experimental Setup:

1) Images were obtained through THEMIS of an area within 75°-80° in North Latitude surrounding the pole.

2) After selecting the image we then determined the total amount of pixels in Adobe Photoshop for each image and divided the number of pixels for the ice deposits and craters by the total pixels per set (pps)

3) We used visual images of snow and ice deposits on Earth to reference visible patterns and similar pixel values that would be used to identify ice deposits on THEMIS images.

4) After analyzing all visual images, five sets of data have been obtained though some variation was acceptable.

5) The data was input for all the crater area percentages and ice deposit area percentages. A scatter plot graph was created using a ratio of the percent area covered by ice deposits to the percent area covered by craters (y) and the solar longitude (x).

Results and Discussion: The data follows an increasingly distinct positive trend as the solar longitude also increases. Our data showed a moderate linear relationship between the area covered by craters and the area covered by ice deposits. There was a noticeable outlier which contained no ice whatsoever and therefore should be disregarded as it did not concern our hypothesis.

The ratio of area covered by ice to the area covered by craters, when plotted against the season (with season as x and the ratio as y), shows a positive exponential growth pattern of correlation.

Figure 1



Figure 1- Image V04075007 clearly shows the ice deposits along the outer rim of the crater.

Figure 2

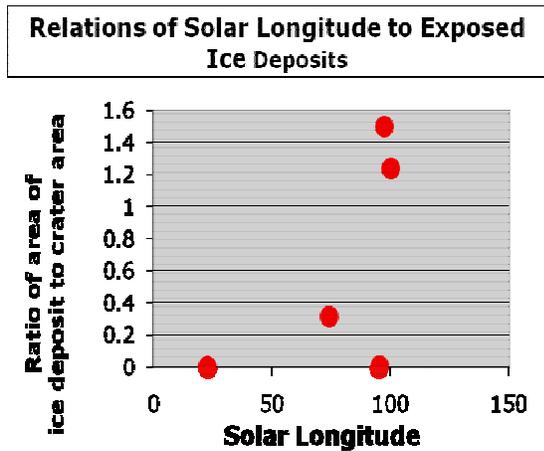


Figure 2- With one exception, the data follows a positive exponential increase as the solar longitude also increases.

Figure 3

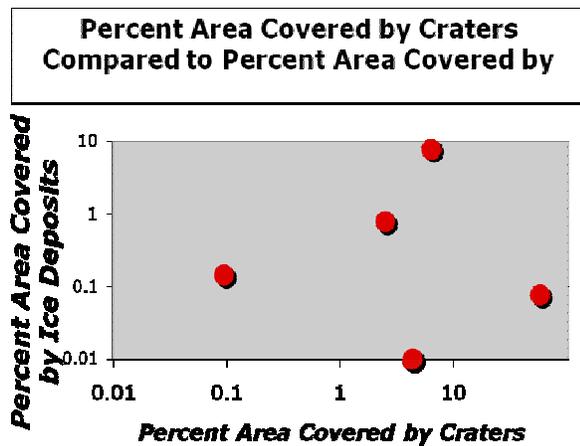


Figure 3- The area of craters to area of ice deposits has a moderate positive correlation with a logarithmic scale.

International Conference on Mars. [3] Hecht M.H. et al. (2004) *LPS XXV, Abstract #2007*. [4] Seelos K. D. et al. (2008) *LPS XXXIX, Abstract # 1885*.

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