CTX DIGITAL ELEVATION MODELS FACILITATE GEOMORPHIC ANALYSIS OF MARS. Peter J. Mouginis-Mark and Harold Garbeil, Hawaii Institute Geophysics and Planetology, University of Hawaii, Honolulu, Hawaii 96822 (pmm@higp.hawaii.edu)

Introduction: Hagerty et al. [1] reviewed the goals of the national Regional Planetary Image Facilities (RPIFs) as they switch from archiving photographic and printed literature to serving the community with on-line access to unique or rare digital holdings. The goal of the Network is to serve as a resource to the planetary community to provide support and training to a broad audience of planetary data users. One objective of the University of Hawaii RPIF is to enhance the use of digital elevation models (DEMs) created in-house from stereo pairs of Context camera (CTX) images [2], using the Ames Stereo Pipeline software [3]. In no way do we intend to supplant archived data housed with the Planetary Data System (PDS), which provides the community with calibrated, large data sets [4]. Instead, because there is currently no routine production of DEMs from CTX images, we are trying to encourage topographic analysis of landforms on Mars using data which are intermediate in scale between on-line data from the High Resolution Imaging Experiment (HiRISE) [5] and the Mars Orbiter Laser Altimeter (MOLA) [6]. Our DEMs can be accessed via the Pacific Regional Planetary Data Center's (PRPDC) web site (https://www.higp.hawaii.edu/prpdc/CTX_DEMs/toplevel.html). For each scene, we provide GEOTIFF files of the DEM and visible image, a STL file (i.e., one from which a 3-D print can be made), as well as images of the topography, an example of the profile, location information, and an example of oblique views which can be generated (Fig. 1). In addition, we give suggestions for what the DEM might be used for, as well as a few references that provide the scientific context for this scene.

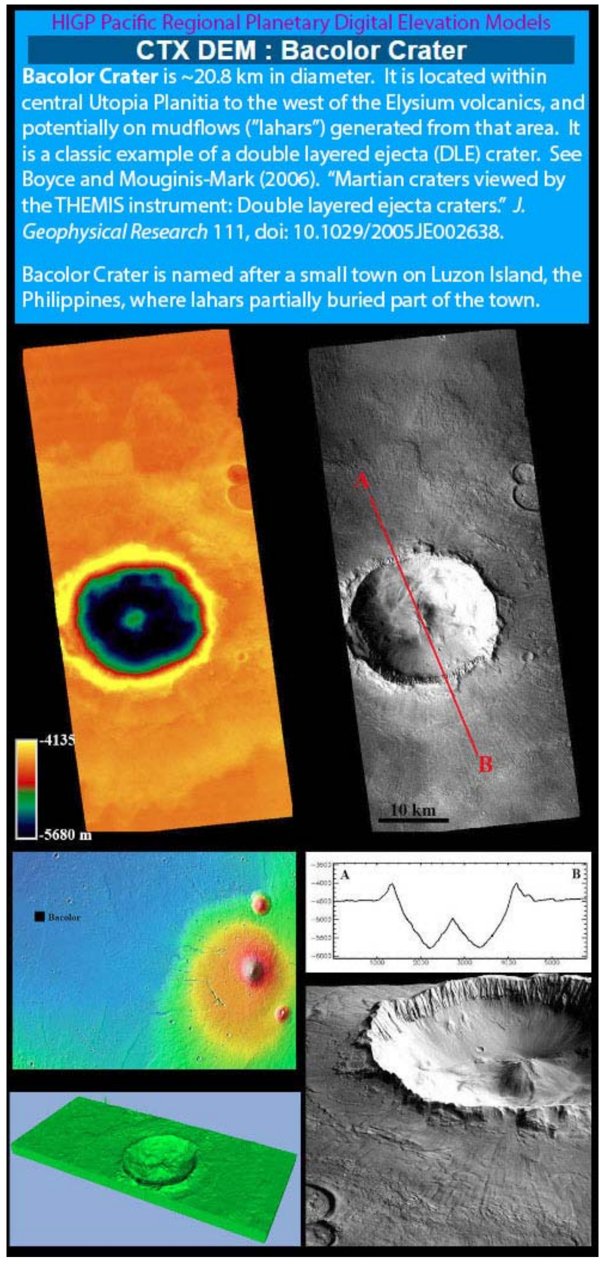

Fig. 1: Screen shot of the web page for the impact crater Bacolor. Background information given at top. Images show (top left) the colored elevation, (top right) CTX image with profile location, (middle left) location map, (middle right) topographic profile, (lower left) STL print; (lower right) example oblique image.

To date, we have focused on the production of DEMs for three different types of features: impact craters, volcanoes, and other landforms. These data are all accessible via clickable maps of Mars. The currently available DEMs are as follows:

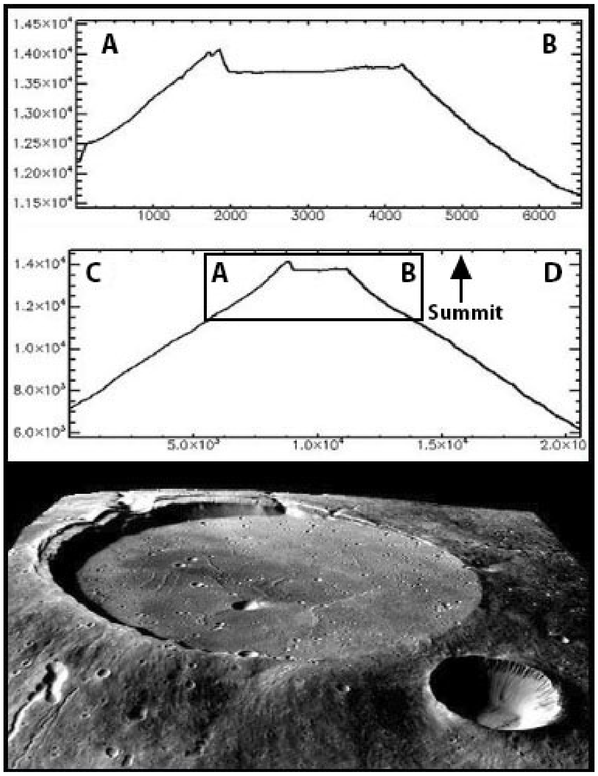

Fig. 2: (top) topography of Elysium Mons summit, (bottom) oblique view of Elysium Mons caldera.

Impact Craters: Our data set includes 22 morphologically fresh impact craters, including Arandas, Bacolor, Gan, Istok, Pangboche, Tomini, Tooting, and Zunil craters. The crater diameter range of these DEMs is 6.4 to 28.5 km and extends from 62°N to 45°S, thereby enabling geometric studies related to size and/or latitude to be undertaken [7].

Volcanoes

- Olympus Mons caldera
- Elysium Mons summit (Fig. 2)
- Lava flows south of Arsia Mons summit
- Tyrrhena Mons summit
- Inflated flow north of Hrad Vallis

Other Landforms

- Wrinkle ridges in Lunae Planum
- Landslides in Valles Marineris (Fig. 3)
- Eberswalde delta
- Hadriacus Cavi
- Northern plains north of Hecates Tholus
- Aeolis Dorsa
- Melas Chasma

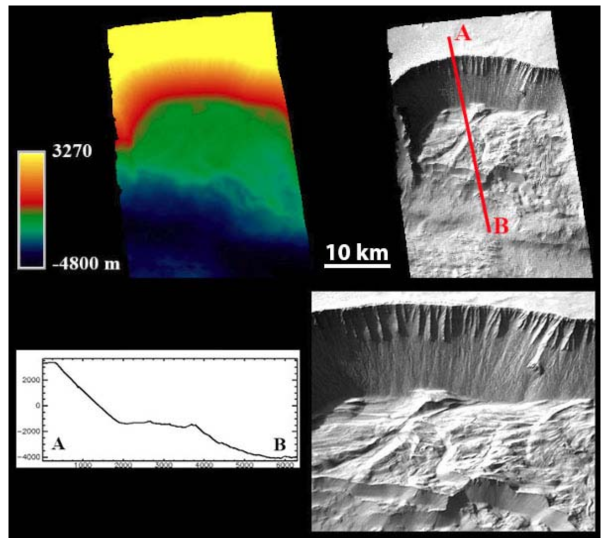

Fig. 3: DEM of landslide in Valles Marineris.

Future Plans: We currently place two or three new DEMs onto our web site each week, and hope to have at least 60 available by the time of the 50th LPSC. While we try to select DEMs with the greatest geomorphic interest, we welcome suggestions for specific targets which might benefit your research. If interested, please contact the lead author to add your favorite site to our list of future DEMs.

References: [1] Hagerty J. J. et al. (2017). 49th *LPSC* #2225. [2] Malin M. C. and 13 others (2007). *JGR* 112, doi: 10.1029/2006JE002808. [3] Moratto Z. M. et al. (2010). *41st LPS Conf.*, #2364. [4] Gaddis L. et al. (2017). *49th LPSC* #1540. [5] McEwen, A. S. et al. (2007). *JGR* 112, doi: 10.1029/2005JE002605. [6] Smith D. E. et al. (2001). *JGR* 106, 23,689 - 23,722. [7] Mouginis-Mark P. J. et al. (2018). *MAPS* 53 (4), 726 – 740.