REVISION OF THE "CATALOG OF LARGE MARTIAN IMPACT CRATERS". N. G. Barlow, Dept. Physics and Astronomy, Northern Arizona University, Flagstaff, AZ 86011-6010; Nadine.Barlow@nau.edu.

Introduction: The *Catalog of Large Martian Impact Craters* has become a primary resource for information about impact craters ≥5-km-diameter on Mars. The *Catalog*, originally derived from Viking Orbiter data, is now undergoing revision utilizing new information from the Mars Global Surveyor and Mars Odyssey missions.

Original *Catalog*: The *Catalog of Large Martian Impact Craters* (henceforth called *Catalog 1.0*) was produced between 1982 and 1986 using the hard-copy versions of the Viking 1:2,000,000 photomosaics. *Catalog 1.0* contains information on 42,283 impact craters ≥5-km-diameter distributed globally across the planet. Each entry contains the crater's location (MC Subquadrangle, latitude and longitude of crater center), size (diameter and, if crater is elliptical, its minor diameter and azimuthal angle of orientation), terrain unit on which it is superposed, general preservational class (retains ejecta, no ejecta but crater is moderately degraded, and "ghost crater"), ejecta and interior morphologies (if applicable), central pit diameter (if applicable), and any comments (such as crater name).

Catalog 1.0 has become one of the primary resources of crater data for Mars. Studies utilizing data from the Catalog range from crater statistical studies [1] and analysis of whether elliptical craters are anomalously frequent on Mars [2] to studies of subsurface volatile reservoirs [3]. Although not currently available on-line, the database has been distributed to all who have requested a copy. The Mars Crater Morphology Consortium has selected the *Catalog of Large Martian Impact Craters* to be the foundational dataset for their GIS-based integrated crater inventory [4]. However, data being acquired by the Mars Global Surveyor (MGS) and Mars Odyssey (MO) missions have revealed new insights into martian impact crater morphologies and morphometries. The *Catalog of Large Martian Impact Craters* is being revised to incorporate the new information from MGS's Mars Orbiter Camera (MOC), Mars Orbiter Laser Altimeter (MOLA), and Thermal Emission Spectrometer (TES) and MO's Thermal Emission Imaging System (THEMIS).

***Catalog* Revision**: The *Catalog* revision (henceforth called *Catalog 2.0*) includes many changes from its predecessor. The latitude and longitude of the crater center are being revised to MDIM 2.1 standards, which are tightly controlled by MOLA topography. Crater diameters are being verified using MOLA topographic data (MEGDR Version 2.0, 1/128 pixel/degree). Terrain units have been updated to the stratigraphic units of the USGS geologic maps [5, 6, 7]. Preservational class is being revised using a 7-point system (0.0 = "ghost crater"; 7.0 = pristine crater) based on MOC, MOLA, and THEMIS analyses. The ejecta morphology classification is being revised using MOC and THEMIS according to the standardized nomenclature system recommended by the Mars Crater Morphology Consortium [8]. Up to three different interior morphologies can now be described rather than the single feature restriction of *Catalog 1.0*.

Several new columns of data are included in *Catalog 2.0* to describe the morphometric data acquired by MOLA. These include crater depth, rim height, central peak height, central peak basal diameter, central pit diameter, ejecta extent, and distal rampart height (if applicable). Ejecta perimeter (P) and area (A) are being measured and included, as is the lobateness value (Γ, related to ejecta sinuosity and defined by $\Gamma = P/(4\pi A)^{1/2}$ [9]). Ejecta mobility ratio (EM = maximum ejecta extent/crater radius) is being calculated and included [10]. Ejecta extent, perimeter, area, lobateness, and ejecta mobility ratio are all computed for the one layer of the single layer ejecta morphology and the outer layer of the multiple layer ejecta morphology and for both the inner and outer layers of the double layer ejecta morphology. TES and THEMIS mineralogic and thermal inertia data of the region surrounding each crater also are being incorporated into *Catalog 2.0* [11].

Archival and Distribution Plans: A preliminary version a *Catalog 2.0* will be provided to the Mars Crater Morphology Consortium by Fall 2003 for general review. The final version is expected to be released for general use by Fall 2004. The *Catalog* will be archived at the US Geological Survey's Astrogeology Branch in Flagstaff, AZ, and will be accessible to the research community through the USGS's Planetary Interactive GIS on the Web Analyzable Database (PIGWAD) (webgis.wr.usgs.gov). (Researchers desiring a non-GIS based version of the *Catalog* will be able to request one from the author.) PIGWAD utilizes ArcGIS software to analyze and compare large datasets [12]. Its advantages include the ability to perform spatial queries, conduct complex spatial analyses, and overlap multiple datasets. *Catalog 2.0* will form the base of an integrated crater inventory being compiled by the Mars Crater Morphology Consortium members [4, 8] and which will eventually be available to the planetary community via PIGWAD.

References: [1] Barlow N. G. (1988), *Icarus, 75*, 285-305. [2] Bottke W. F. et al. (2000) *Icarus, 145*, 108-121. [3] Barlow N. G. and Perez C. B. (2003) *JGR in press*. [4] Barlow N. G. et al. (2003) in *Advances in Planetary Mapping 2003*, ISPRS WG IV/9: Extraterrestrial Mapping Workshop, Houston, TX. [5] Scott D. H. and Tanaka K. L. (1986), *USGS Misc. Invest. Series Map I-1802-A*. [6] Greeley R. and Guest J. E. (1987) *USGS Misc. Invest. Series Map I-1802-B*. [7] Tanaka K. L. and Scott D. H. (1987) *USGS Misc. Invest. Series Map I-1802-C*. [8] Barlow N. G. et al. (2000), *JGR, 105*, 26733-26738. [9] Barlow N. G. (1994) *JGR, 99*, 10927-10935. [10] Barlow N. G. and Pollak A. (2002) *LPS XXXIII*, #1322. [11] Christensen P. R. et al. (2001) *JGR, 106*, 23823-23871. [12] Hare T. M. et al. (2003) in *Advances in Planetary Mapping 2003*, ISPRS WG IV/9: Extraterrestrial Mapping Workshop, Houston, TX.

COMPARISON OF DATA IN CATALOGS 1.0 AND 2.0

Catalog 1.0	Catalog 2.0
Subquadrangle	Subquandrangle
Crater ID	Crater ID
Latitude	Latitude (MDIM 2.1)
Longitude	Longitude (MDIM 2.1)
Diameter	Diameter (Major Axis if elliptical)
Terrain	Minor Axis Diameter (elliptical)
General Preservation	Azimuthal Angle (elliptical)
Ejecta Morphology	Stratigraphic Unit
Interior Morphology	Preservation Class (1-7 scale)
Central Pit Diameter	Ejecta Morphology
Minor Axis Diameter (elliptical)	Interior Morphology (3 columns)
Azimuthal Angle (elliptical)	Crater Depth
Comments	Rim Height
	Central Peak Height
	Central Peak Basal Diameter
	Central Pit Diameter
	Ejecta Extent (2 columns)
	Ejecta Perimeter (2 columns)
	Ejecta Area (2 columns)
	Distal Rampart Height
	Lobatness (2 columns)
	Ejecta mobility ratio (2 columns)
	Mineralogy (3 columns)
	Thermal Inertia
	Comments