STATUS REPORT ON THE *CATALOG OF LARGE MARTIAN IMPACT CRATERS*, VERSION 2.0. 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 [1]. In addition to revising existing *Catalog* data, we are including new topographic, mineralogic, and thermophysical information in the revised version of the *Catalog*.

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. 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. Longitude is being converted to the east longitude system.
- Crater diameters are being verified using MOLA topographic data.
- Terrain units have been updated to the stratigraphic units of the USGS geologic maps [2, 3, 4].
- Preservational class is being revised using an 8-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 [5].
- 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 data acquired by MOLA, TES, and THEMIS.

- MOLA-derived morphometric data 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.
- Lobatness (Γ), a measure of ejecta sinuosity, is computed using: $\Gamma = P/(4\pi A)^{1/2}$ [6].
- Ejecta mobility ratio (EM = maximum ejecta extent/crater radius) is being calculated and included [7].
- TES and THEMIS mineralogic and thermal inertia data of the region surrounding each crater also are being incorporated into *Catalog 2.0* [8, 9].

Ejecta extent, perimeter, area, lobateness, and ejecta mobility ratio are all computed for the one layer of the single layer ejecta morphology, for the outer layer of the multiple layer ejecta morphology, and for both the inner and outer layers of the double layer ejecta morphology. In addition, MOLA data are being utilized to confirm/refute the existence of previously reported basins. New craters and basins revealed by MOLA also are being included.

Status of *Catalog 2.0*: As of September 2003, the following revisions have been completed:

- Latitudes and longitudes for all craters ≥5-km-diameter (and a few smaller craters) in MC quad-

rangles 2, 3, 4, and 5 have been revised to MDIM 2.1 standards.

- Ejecta and interior morphology classifications have been updated for all craters in MC quadrangles 2, 3, 4, and 5.
- Preservational class has been updated to the 0.0-7.0 system in MC quadrangles 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19.
- Ejecta extents have been measured and ejecta mobility ratios have been computed for craters in MC quadrangles 2, 3, 4, 5, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 23, and 24.

A NAU undergraduate student recently has been hired to collect the MOLA-derived morphometric data and determine lobateness values. Barlow is beginning to incorporate mineralogic and thermophysical data from TES and THEMIS.

Timeline for Completion of *Catalog* Revision: We anticipate having *Catalog 2.0* available for general release by the end of 2004.

References: [1] Barlow N. G. (2003), *6th Intern. Conf. Mars*, Abstract #3073. [2] Scott D. H. and Tanaka K. L. (1986), *USGS Misc. Invest. Series Map I-1802-A*. [3] Greeley R. and Guest J. E. (1987) *USGS Misc. Invest. Series Map I-1802-B*. [4] Tanaka K. L. and Scott D. H. (1987) *USGS Misc. Invest. Series Map I-1802-C*. [5] Barlow N. G. et al. (2000), *JGR, 105*, 26733-26738. [6] Barlow N. G. (1994) *JGR, 99*, 10927-10935. [7] Barlow N. G. and Pollak A. (2002) *LPS XXXIII*, #1322. [8] Christensen P. R. et al. (2001) *JGR, 106*, 23823-23871. [9] Mellon, M. T. et al. (2000), *Icarus, 148*, 437-455.

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