Abstract: The “Catalog of Large Martian Impact Craters” has been utilized by many different researchers to study the conditions which give rise to specific morphologies and the evolution of the martian surface units. The Catalog was derived from Viking 1:2M photomosaics during the 1980’s and included information about subquadrangle, latitude, longitude, crater diameter, general terrain unit, preservational state, ejecta morphology, interior morphology, central pit diameter, minimum diameter and azimuthal angle of orientation for elliptical craters, and other information related to each crater. The Catalog contains information on 42,283 impact craters, generally greater than 5 km diameter. The Catalog is now being updated using Mars Global Surveyor information. New inclusions in the Catalog include the USGS stratigraphic units, maximum ejecta extent, quantification of the preservational state of each crater, elevation, crater morphometric information (depths, central peak heights, etc.), ejecta areas and perimeters, thermal inertia, and general mineralogic information.

Introduction: The “Catalog of Large Martian Impact Craters” was developed in the 1980’s using the Viking 1:2M photomosaics. Impact craters generally larger than about 5 km diameter were identified on each photomosaic and digitized into the Catalog. Each crater entry included information about the subquadrangle on which the crater is found, an identification number to cross-reference between the database and the original maps, latitude and longitude of the crater center, crater diameter (maximum diameter if crater is elliptical), general terrain unit (i.e., plains, cratered plateau, knobby, ridged, etc.), general preservational state (“ghost crater”, somewhat degraded, fresh, etc.), ejecta morphology (if applicable), interior morphology (if applicable), central pit diameter if crater contains a central pit, minimum diameter of the crater if it is elliptical, and azimuthal angle of orientation if crater is elliptical. There is also a comment column in the Catalog to include any additional information, such as crater name. The Catalog contains entries for 42,283 martian impact craters and has been utilized by the author and many other researchers in studies related to the geologic history of the planet [1, 2] and the conditions which give rise to specific ejecta and interior morphologies [3, 4, 5, 6].

New information about the surface of Mars is currently being acquired by the Mars Global Surveyor (MGS) mission. This new information extends and complements that already in the “Catalog of Large Martian Impact Craters” and its inclusion in the Catalog will make this database of even greater use to planetary scientists utilizing impact craters in their studies of Mars. As such, we are in the process of incorporating information obtained by various MGS instruments into the Catalog. The primary instruments providing information in the Catalog are the Mars Orbiter Camera (MOC), the Mars Orbiter Laser Altimeter (MOLA), and the Thermal Emission Spectrometer (TES). MOC images are providing us with the opportunity to review and update the initial classifications of ejecta morphology, interior structure, and preservational state of each crater. MOLA is allowing us to input topographic information for the first time into the Catalog--this includes the general elevation that each crater is located at as well as morphometric measurements of the crater such as crater depth, central peak height and base width, rim height, ejecta rampart height, etc. TES is providing thermal inertia information about the regions surrounding each crater and eventually we hope to include general mineralogic properties of the areas adjacent to each crater.

Current Status of the Update: The updates to the Catalog began in May 1999. At the present time, we have begun or completed five major tasks:

1. We have included the USGS stratigraphic units into the Catalog for each crater.
2. We have updated the ejecta classifications as per the new suggested nomenclature by the Mars Crater Morphology Consortium [7].
3. We have begun quantifying the preservational categories using MOC imagery.
4. We are using MOC imagery to review the original ejecta and interior classifications and update as necessary.
5. We have calculated the maximum ejecta lobe extents for the 2570 layered ejecta structures--preliminary results of this analysis are reported in [8].

Future Work: Within the next year, we plan to include the general topographic information from MOLA and begin inputting the crater morphometric data. Thermal inertia information from TES will be incorporated as it becomes available. Utilizing the MOLA information to better identify the edges of ejecta blankets, we will begin the measurement of layered ejecta morphology areas and perimeters and sinuosity values will be computed in a manner similar to that described in [4]. During this time, we also will be conducting a number of comparison analyses to determine which parameters strongly affect formation of specific crater features. For example, we will determine if elevation plays a role in the formation of specific ejecta and interior morphologies. We will determine how crater morphometric properties vary with crater diameter, terrain, location, and elevation. We will look into whether the thermal inertia of the surrounding terrain affects formation of specific ejecta and interior morphologies. And we will analyze whether the average extent of layered ejecta morphologies and their sinuosities are a function of crater diameter, terrain, location on the planet, or elevation. The results of these analyses will help us better constrain the extent to which environmental factors affect the formation of specific impact crater...
features versus the effects of impact energy. The updated Catalog will contain a wealth of new information that will be made available to the planetary community via an interactive Web site.