

DESCRIPTION OF THE DIGITAL DATABASE FOR  
Geologic Map of MTM -15027, -20027, -25027, and -25032 Quadrangles, Margaritifer Terra Region of Mars  
USGS SCIENTIFIC INVESTIGATIONS MAP 3209

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Reference: Irwin, Rossman P., III, and John A. Grant, 2013, Geologic Map of MTM -15027, -20027, -25027, and -25032 Quadrangles, Margaritifer Terra Region of Mars, U.S. Geological Survey Scientific Investigations Map 3209, scale 1:1,000,000. Available at <http://pubs.usgs.gov/sim/3209/>

#### INTRODUCTION

Mars Transverse Mercator (MTM) quadrangles -15027, -20027, -25027, and -25032 (lat 12.5°-28° S., long 330°-335° E. and lat 22.5°-28° S., long 324.5°-330° E.) in southwestern Margaritifer Terra include diverse erosional landforms, sedimentary deposits, and tectonic structures that record a long geologic and geomorphic history. The northeastern regional slope of the pre-Noachian crustal dichotomy (as expressed along the Chryse trough) and structures of the informally named Middle Noachian or older Holden and Ladon impact basins dominate the topography of the map area. A series of mesoscale outflow channels, Uzboi, Ladon, and Morava Valles, integrated these formerly enclosed basins by overflow and incision around the Noachian/Hesperian transition, although some flooding may have occurred earlier. The area includes excellent examples of Late Noachian to Hesperian valley networks, dissected crater rims, alluvial fans, deltas, and light-toned layered deposits (LTDs), particularly in Holden and Eberswalde craters. Structural forms include Tharsis-radial grabens, Hesperian wrinkle ridges, floor-fractured impact craters, and severely disrupted chaotic terrains. These well-preserved landforms and sedimentary deposits represent multiple erosional epochs and discrete flooding events, which provide significant insight into the geomorphic processes and climate change on early Mars.

All GIS data are in Transverse\_Mercator projection using the Mars 2000 geographic coordinate system (GCS\_Mars\_2000). Units are in meters.

GEOLOGIC CONTENT (contents of "Vector" Folder, SIM3209\_geodatabase.gdb)

This ArcGIS geodatabase contains one feature dataset (SIM3209\_feature\_dataset) with the following features:

SIM3209\_contacts - Line feature class, geologic unit and map boundaries including symbol types: Approximate, certain.

SIM3209\_label\_points - Point feature class, center point locations of geologic units.

SIM3209\_nomenclature - Annotation feature class, contains the names approved by the International Astronomical Union Working Group for Planetary System Nomenclature.

SIM3209\_Geology - Polygon feature class, geologic unit polygon feature class. Contains a "Unit\_type" field denoting the unit symbol.

SIM3209\_structure - Line feature class, denoting structural features.

SIM3209\_impact\_basin\_rings - line feature class denoting impact basin rings.

#### BASE MAP CONTENT

The U.S. Geological Survey provided the 231 m/pixel base map derived from the Viking Mars Digital Image Mosaic 2.1. The base uses a Transverse Mercator projection, the Mars Orbiter Laser Altimeter (MOLA) 2000 datum, and a central meridian of 330° E. We made an equivalent base mosaic using Mars Odyssey Thermal Emission Imaging System (THEMIS) daytime infrared (DIR) imaging at 100 m/pixel (fig. 2), and we reprojected and georeferenced part of the Arizona State University THEMIS nighttime infrared mosaic 2.0 at 231 m/pixel as an overlay (fig. 3). Detailed mapping was based on THEMIS visible images at 18 m/pixel and Mars Reconnaissance Orbiter (MRO) Context Camera images at 5 m/pixel (not included). Where available, Mars Orbiter Camera (MOC) images at ~2-5 m/pixel, MRO High Resolution Imaging Science Experiment (HiRISE) visible images at 25 cm/pixel, and Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) products facilitated local interpretations of within-unit 2 stratigraphy (not included). Topographic measurements were based on the 128 pixel/degree MOLA Mission Experiment Gridded Data Record (not included).

#### DIGITAL DATABASE AND METADATA PACKAGE (SIM3209\_database.zip)

The geologic map files, basemaps, and supportive files are included in the database package, as described below:

"SIM\_3209" directory

Files	Description
SIM3209_README.txt	This readme file.
SIM3209_metadata.txt	Text-format FGDC-style metadata for the database package
SIM3209_metadata.xml	XML-format FGDC-style metadata for the database package
SIM3209_ArcMap10.mxd	ArcGIS (version 10) project for the database package

"Base\_maps" directory

SIM3209\_basemap\_THEMIS\_IRday.tif - THEMIS daytime mosaic produced by authors  
SIM3209\_THEMIS\_IRnight.tif - THEMIS daytime mosaic produced by Arizona State Univ.  
SIM3209\_Viking\_MDIM21.tif - Viking MDIM 2.1 produced by USGS

"Vector" directory

"SIM3209\_geodatabase.gdb" - ArcMap 9.3 versioned geodatabase

"Shapefiles" -

This directory contains GIS shapefiles exported from the ArcGIS geodatabase described above. As such, the names and descriptions for each shapefile are identical to the content of the included geodatabase. See above "GEOLOGIC CONTENT" for details.

Users of the database package may wish to download the PDF version of the map for the Description of Map Units.

The material described above is available on the World Wide Web at <http://pubs.usgs.gov/sim/3209/>.

ZIP FILES

The files described above are packaged within a ZIP file. Utilities to uncompress ZIP files are available for most operating systems and may be found readily with a simple web search.

DIGITAL DATABASE FORMAT

The digital information compiled in this report used v 10, a commercial Geographic Information System produced by Environmental Systems Research Institute, Redlands, California.

OBTAINING HARD-COPY OF SIM 3209

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