Geological Mapping of the Debussy Quadrangle (H-14) - Preliminary Results

Conference or Workshop Item

GEOLOGICAL MAPPING OF THE DEBUSSY QUADRANGLE (H-14) PRELIMINARY RESULTS

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Introduction: Geological mapping of Mercury is essential to build an understanding of the history of the planet and to set the context for observations by BepiColombo [1]. Geological mapping of the Debussy quadrangle (H-14) is now underway as part of a program to map the entire planet at a scale of 1:3M using MESSENGER data [2]. The quadrangle is located in the southern hemisphere of Mercury at 0º – 90º E and 22.5º – 65º S. This will be the first high resolution map of the quadrangle as it was not previously imaged by Mariner 10.

Data and Methods: Mapping began in October 2017 using the MESSENGER 166 mpp mosaic as a base map supplemented with additional images from MESSENGER's Mercury Dual Imaging System.

Line work is currently underway; all craters larger than 5 km are being outlined and ejecta, where observed, traced for craters larger than 20 km. Craters are classified based on crater degradation [3,4]. Tectonic features such as lobate scarps and wrinkle ridges are also outlined.

Features of Debussy Quadrangle: There are several large-scale features within the Debussy quadrangle that are of interest during mapping:

Rembrandt Basin: The 720 km diameter impact crater is the largest well-preserved basin in Mercury's southern hemisphere [5]. Smooth volcanic plains (lavas), which postdate the impact, fill the basin. Rembrandt hosts many of the features characteristic to large basins including wrinkle ridges, grabens, and ghost craters as well as multiple stages of volcanic fill [6].

Enterprise Rupes: The cooling and contraction of Mercury has led to the formation of thrust faults [7]. Enterprise Rupes cuts across Rembrandt basin and its later volcanic fill as well as multiple other impact craters. It can thus play an important part in building understanding of the tectonic history of the planet [5]. The interaction of the lobate scarps with other landforms illustrates the structural controls that pre-existing landforms can have on the morphology of scarps [8]. Other rupes in the quadrangle including the east-west trending Belgica Rupes and the north-south Nautilus Rupes help build on the complex and prolonged history of tectonism on Mercury.

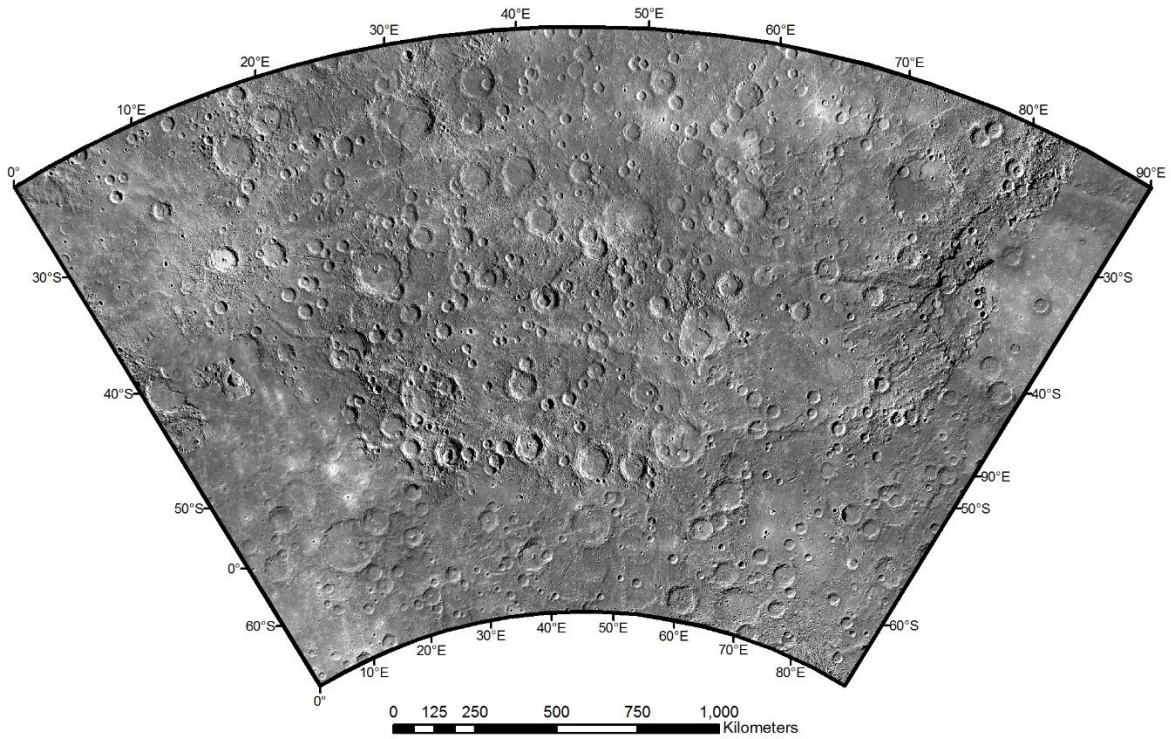

Figure 1: Debussy H-14 quadrangle. basmap is MESSENGER 166 mpp mosaic

References:

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