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

D. L. Pegg¹, D. A. Rothery¹, M. R. Balme¹, and S. J. Conway². ¹The Open University, Milton Keynes, MK7 6AA, UK david.pegg@open.ac.uk. ²LPG Nantes – UMR CNRS 6112, Université de Nantes, France.

Introduction: Geological mapping of Mercury is crucial to build an understanding of the history of the planet and to set the context for BepiColombo's observations [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 0° – 90° E and 22.5° – 65° S. This will be the first high resolution map of the quadrangle as it was not 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. Craters larger than 5 km have been outlined. Ejecta, where observed, is being traced for craters larger than 20 km. Craters are classified based on crater degradation on both 3 class [3] and a 5 class [4] schemes. Tectonic features are shown by linework and extensive plains are being mapped as Inter crater or Smooth plains.

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

Rembrandt Basin: This 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, partially fill the basin. Rembrandt hosts many of the features characteristic of large basins including wrinkle ridges, grabens, and ghost craters[6].

Enterprise Rupes: The cooling and contraction of Mercury has led to the formation of thrust faults [7]. Enterprise Rupes cuts across Rembrandt basin. 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 include the east-west trending Belgica Rupes and the north-south Nautilus Rupes.

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