

PROGRESS ON CONSTRUCTING THE GLOBAL GEOLOGICAL MAP OF MERCURY.

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ABSTRACT

The goal of this project is to refine an existing (but not yet standardized) geomorphological map of Mercury by subdividing plains materials, deriving crater size–frequency statistics for major map units, and revising tectonic structures and point-feature landforms. The resulting map will conform to USGS standards and will be published as a USGS Scientific Investigation Map (SIM) series product at 1:15,000,000 scale. Standardization efforts will ensure that the final product is scientifically objective and cartographically consistent with other planetary geological maps and so will be of maximum value to the scientific community and general public. The current project timeline anticipates a submission for review in early 2021. Early mapping efforts [1] revealed that most contacts between the two dominant surface units on Mercury, the relatively younger smooth plains and older, more rugged intercrater plains, have strong color and compositional differences [2], but there are several regions without such differences—particularly in the intercrater plains. This observation supports the emerging view that portions of intercrater plains may once have been smooth plains deposits, their present rugged texture a function solely of being older and subjected to impact bombardment for longer. Identifying and mapping these different facies of intercrater plains, therefore, is an important contribution to our understanding of Mercury’s geological history and evolution, and a valuable addition to the Mercury global map. **Figure 1** shows newly identified regions of intercrater plains subunits, identified on the basis of morphological unit boundaries and color properties with the enhanced color global image mosaic [3].

References: [1] Denevi, B. W. et al. (2013) *J.G.R. Planets*, 118, 891–907. [2] Robinson, M. S. et al. (2008) *Science*, 321, 66–69. [3] Denevi, B. W. et al. (2018) *Mercury: The View after MESSENGER*, 144–175.

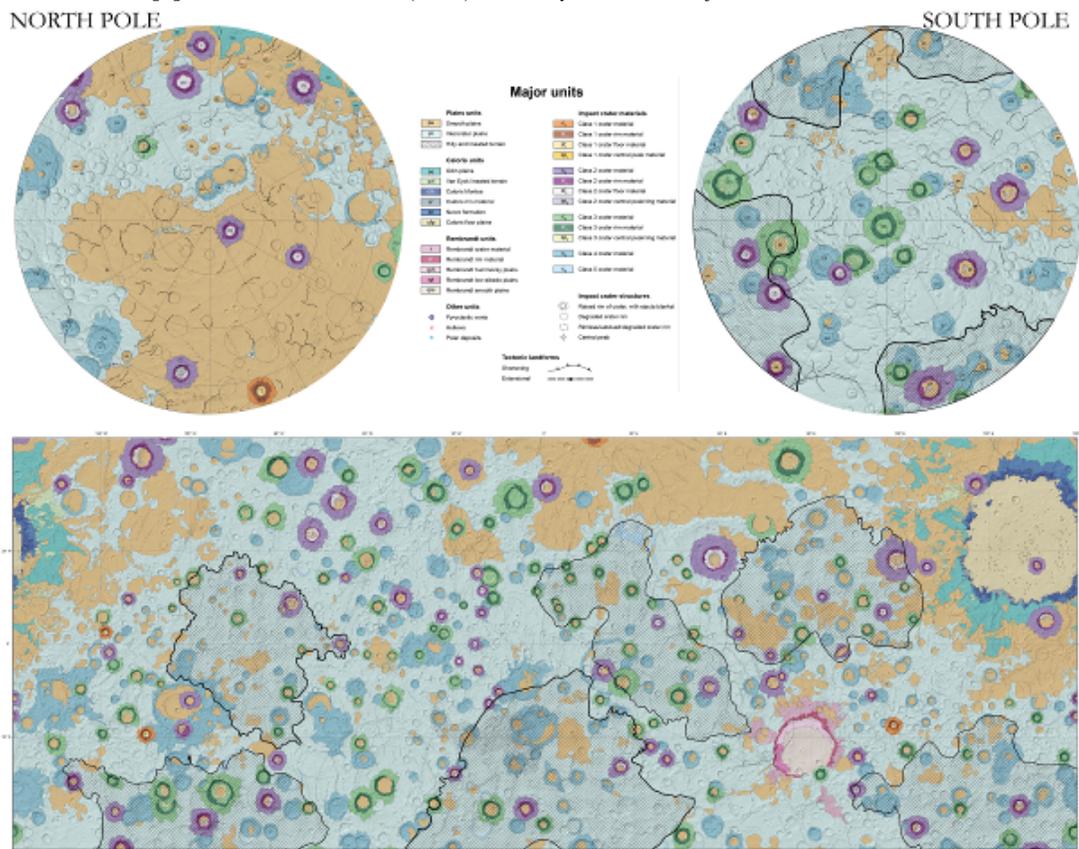


Figure 1. Current Mercury global geological at 1:15M scale. Major plains units, craters ≥ 90 km in diameter, and tectonic landforms ≥ 100 km in length are shown. Newly identified “intercrater plains” subunits are outlined in black.