

Geological Mapping of the Neruda Quadrangle (H13), Mercury

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Project Overview:

I am producing a geological map of the Neruda Quadrangle (H13), Mercury at a scale of 1:3M.

Digital mapping is being undertaken using ArcGIS software using MESSENGER (Mercury Surface, Space ENvironment, GEochemistry and Ranging) Mercury Dual Imaging System data, collected between 2011–2015.

The base map used (Figure 1) is the 166 m/pixel monochrome global mosaic. Additionally, the 665 m/pixel enhanced colour global mosaic (Figure 2) as well as narrow-angle camera (NAC) images are being used for interpretation and quality control.

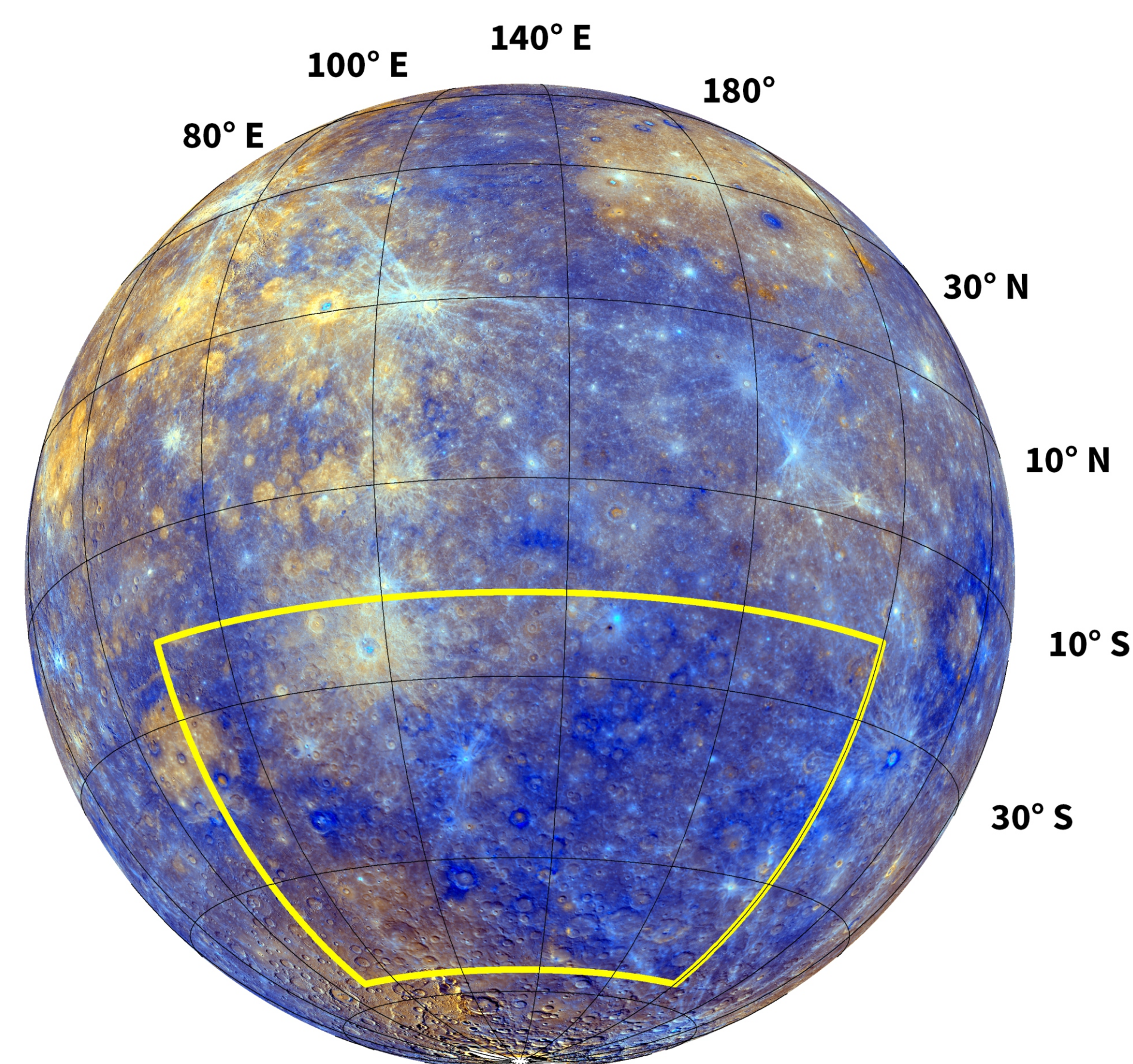
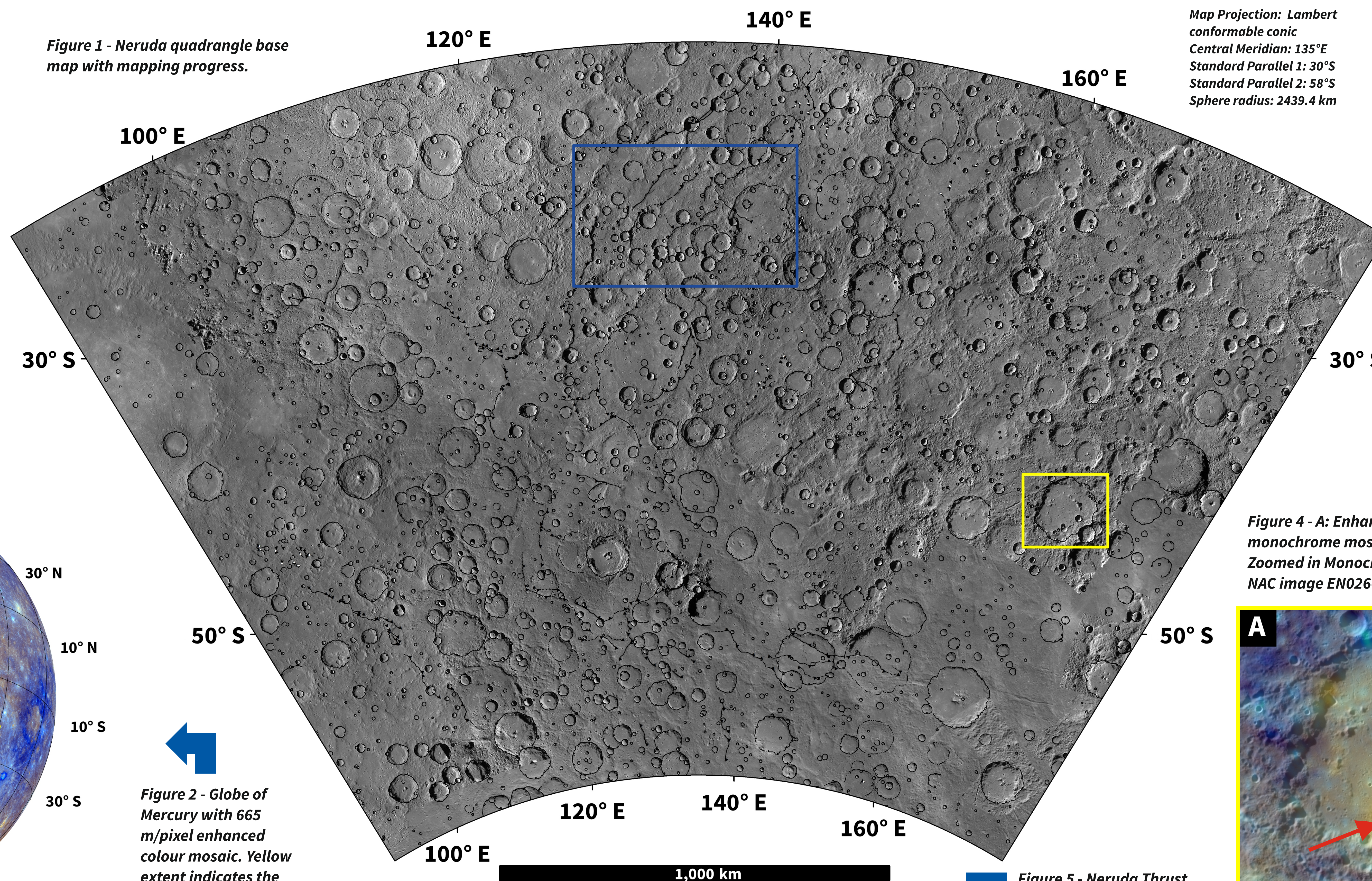


Figure 2 - Globe of Mercury with 665 m/pixel enhanced colour mosaic. Yellow extent indicates the Neruda quadrangle.

Figure 1 - Neruda quadrangle base map with mapping progress.



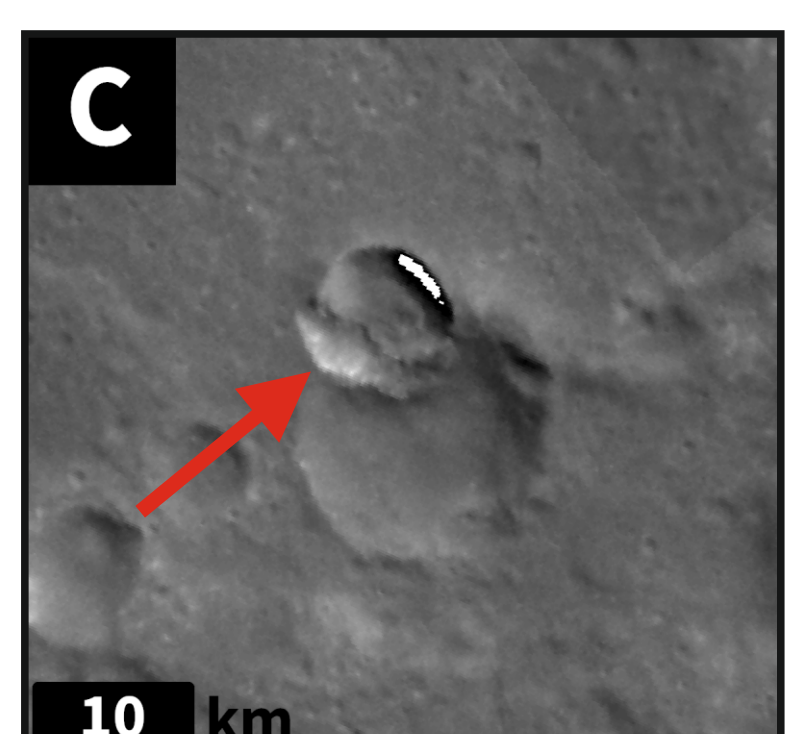
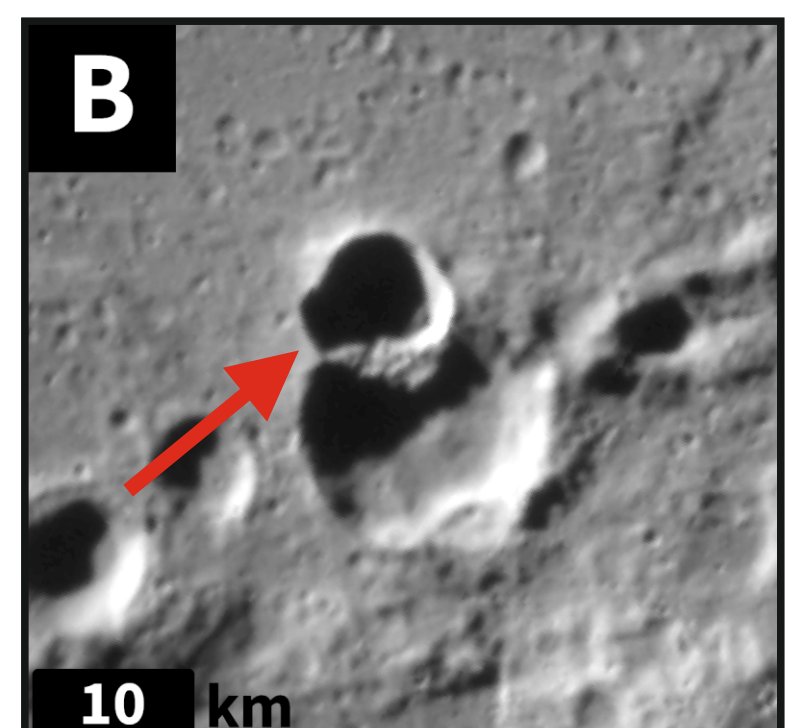
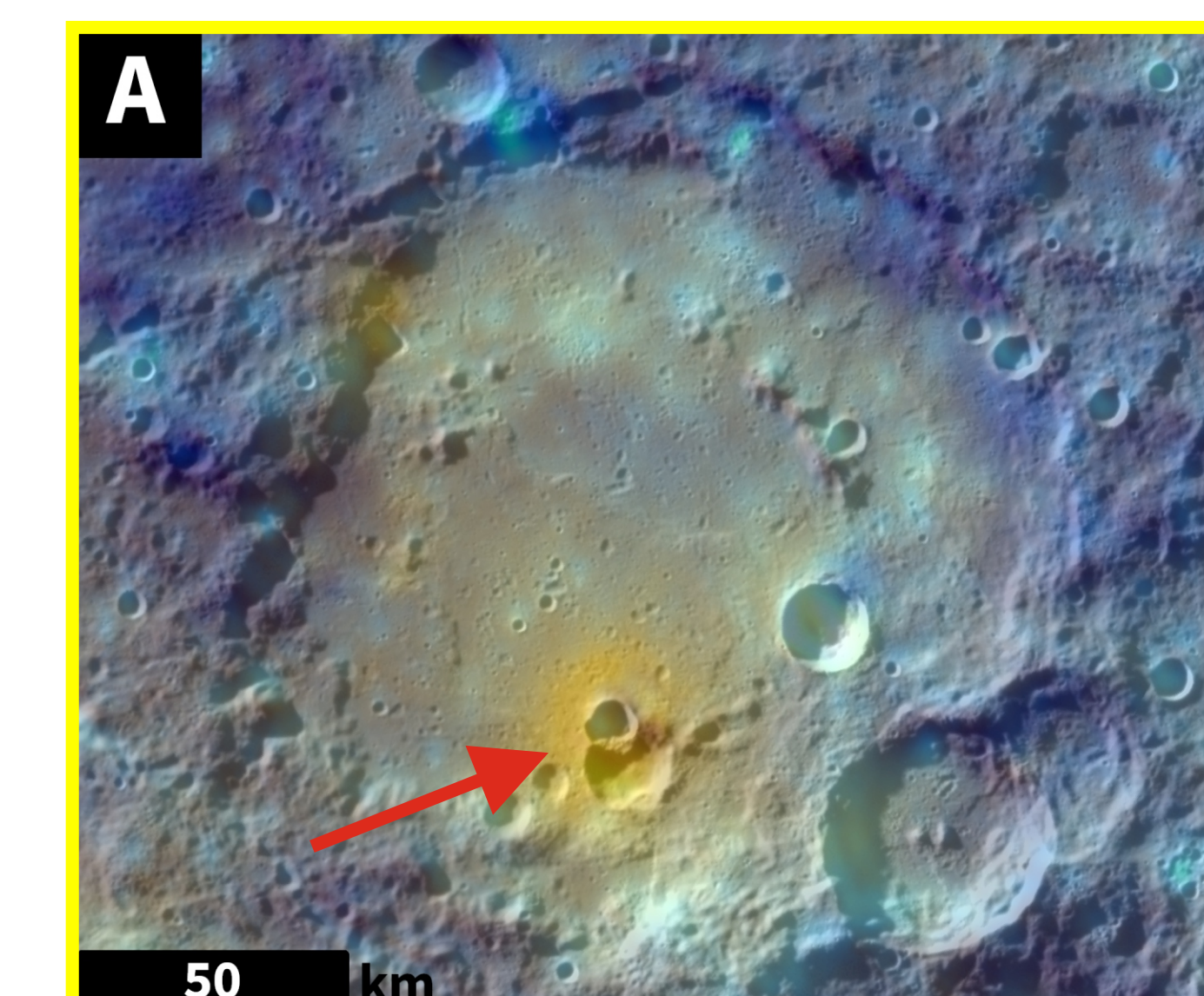
Map Projection: Lambert conformable conic
Central Meridian: 135°E
Standard Parallel 1: 30°S
Standard Parallel 2: 58°S
Sphere radius: 2439.4 km

Findings:

Newly discovered facula (168.74° E, 46.35° S)

Figure 4 A, B & C display a newly discovered volcanic vent and associated facula. Notice the bright orange spectral signature surrounding the two small craters within the much larger basin (indicated by the arrow in Figure 4 A). The two craters are situated on the remnants of a peak ring mountain chain. It is plausible to suggest that explosive volcanism was able to exploit pre-existing structural weaknesses associated with the formation of the peak ring as well as structures formed by the overlapping cratering. Figures 4 B & C show the irregularly shaped vent (identified by arrows) and area of textured ground.

Figure 4 - A: Enhanced colour overlay of monochrome mosaic showing facula. B & C: Zoomed in Monochrome mosaic image and NAC image EN0260938274M respectively.



PLANMAP progress:

The PLANMAP project is a consortium of institutions funded by a European H2020 grant, which are collectively producing up-to-date, informative geological maps of Mercury, Mars and the Moon. PLANMAP is mapping Mercury at a 1:3M scale following mapping protocols and conventions that are consistent with USGS practices. Figure 3 (right) displays PLANMAP's mapping progress for Mercury.

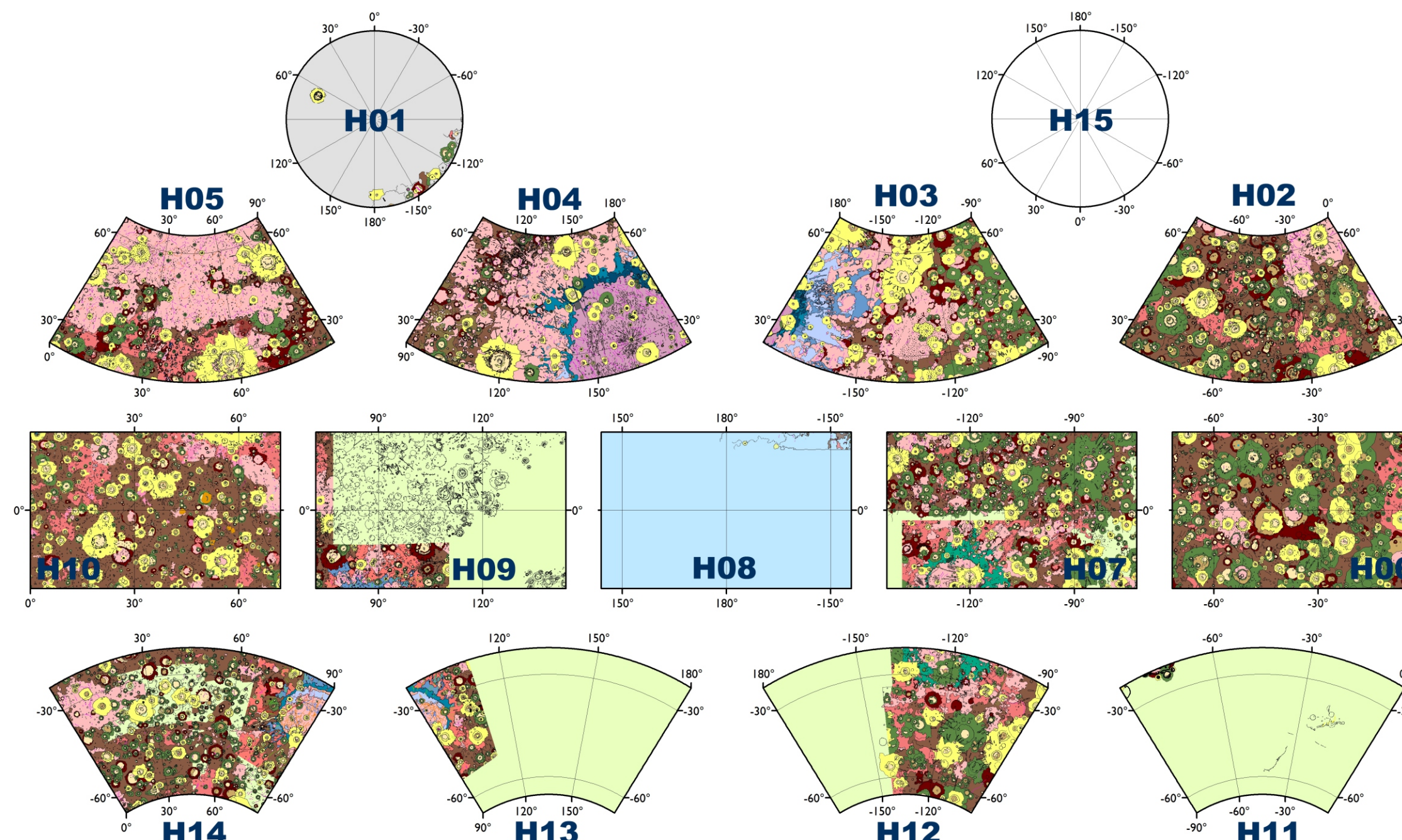
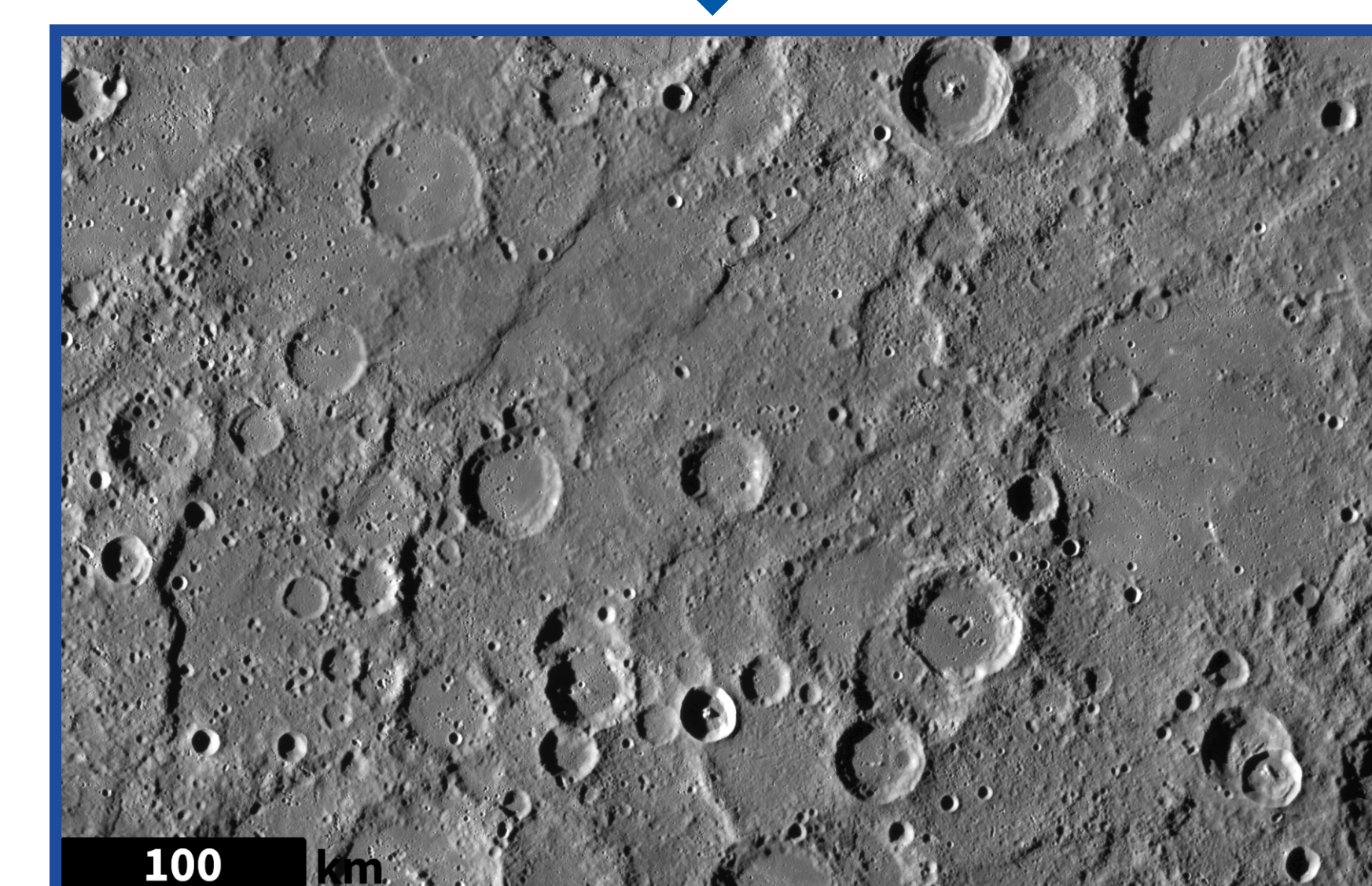


Figure 3 - Mercury mapping progress. Grey = being mapped but not by PLANMAP, white = not scheduled, blue = scheduled, yellow = in progress. (Image courtesy of Galuzzi, V. et al 2019)

Figure 5 - Neruda Thrust system



Neruda Thrust system - current investigation

Observations:

- Multiple lobate scarps exhibiting similar orientations
- Generally striking south/north-east
- Mostly verging south-east
- Cross-cut craters and basins
- Presence of superimposed craters results in discontinuous structures
- 10s to over 1000 kilometres in length
- Intersecting structures observed; merging and also perpendicular

Acknowledgements:

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