Geological Mapping of the Derain (H-10) Quadrangle

Chris Malliband[1], David Rothery[1], Matt Balme[1] and Susan Conway[2]

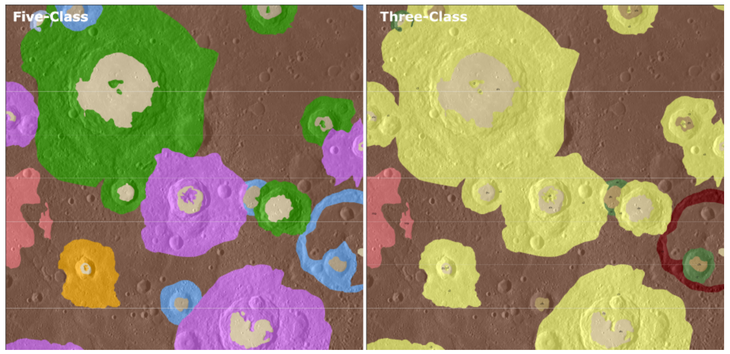
[1] School of Physical Sciences, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK
[2] CNRS, Laboratoire de Planétologie et Géodynamique, Université de Nantes, France

: @chrismalliband
Email: chris.malliband@open.ac.uk

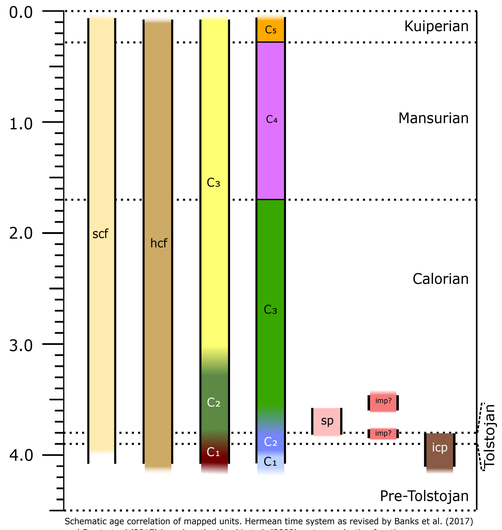
Summary

We have produced a map of the Derain (H-10) quadrangle of Mercury. The map has been completed to the same standards as previously published MESSENGER-era maps (e.g. Galluzzi et al. 2016, Wright et al. 2019) at a publication scale of 1:3 million. This means we are able to integrate this map with the completed maps in Hokusai (Wright et al. 2019) and Debussy (Pegg 2020) quadrangles to the north and south of Derain, as part of an effort to build a global geological basemap in advance of BepiColombo's arrival at Mercury. In common with these workers we found it useful to distingush a intermediate plains unit.

Mapping has been completed with craters classified in both the five and three-class systems (Kinczak 2020, Galluzzi et al. 2016). This allows comparison to the global map (Kinczyk et al. 2018) as well as the previously published maps.



Comparison between an area with craters mapped with five and three-class scheme. The five-class scheme can show more local stratigraphic detail. In this area crater degradation fits well with observed superposition relationships, however this is not true everywhere. In contrast, some stratigraphic resolution is lost with the three-class system, but we have not mapped crater degradation out of local stratigraphic order.



Schematic age correlation of mapped units. Hermean time system as revised by Banks et al. (2017) and Ernst et. al (2017) based on the Marchi et al. (2009) crater production function.

Acknowledgments

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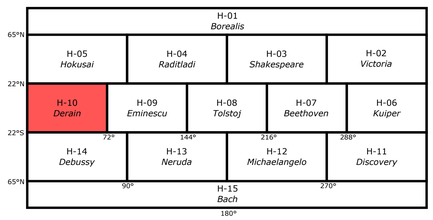

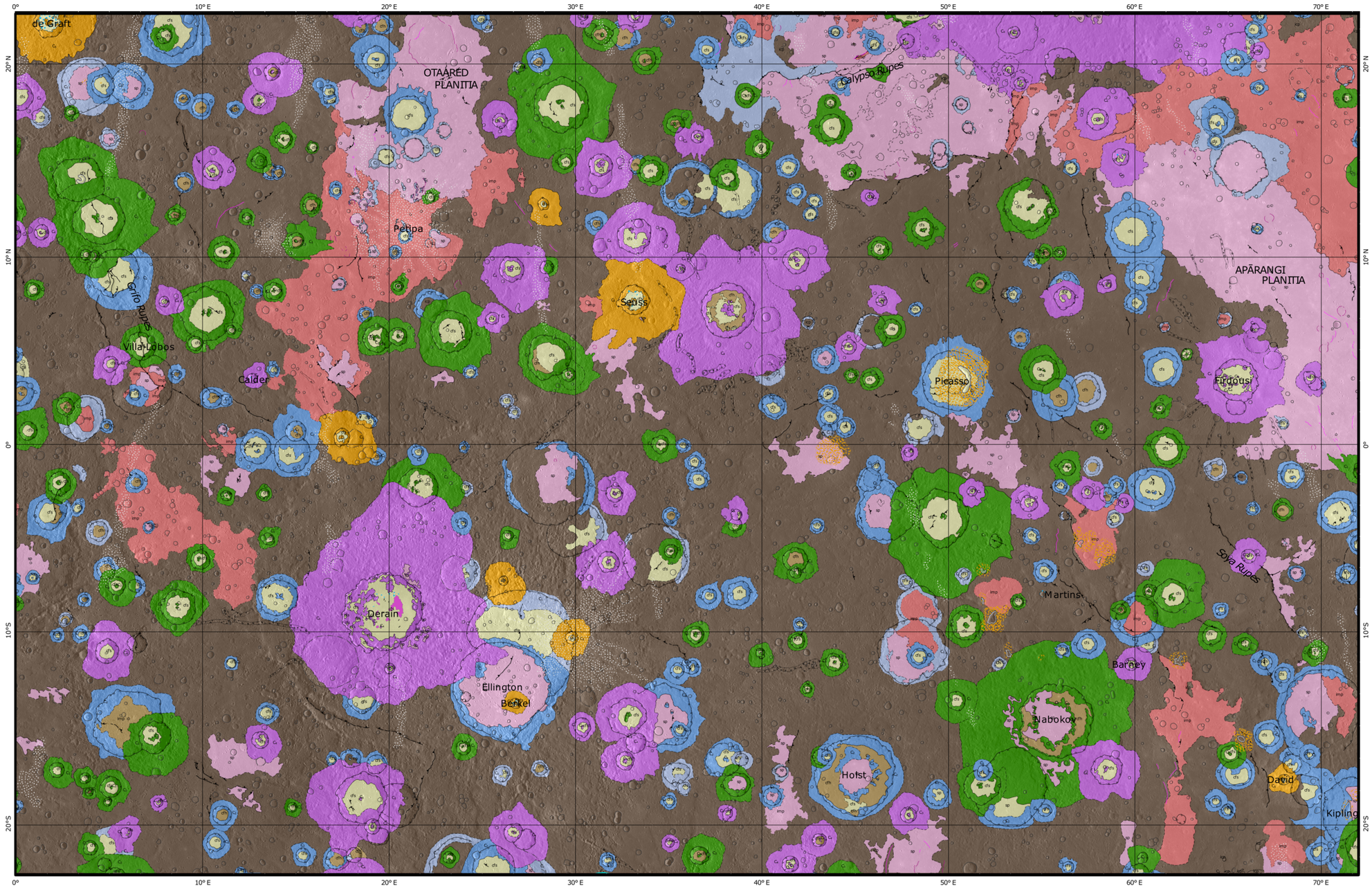

Geological Units

- sp — Smooth Plains: *Smooth and sparsely cratered plains*
- imp — Intermediate Plains: *Morphologicaly intermediate plains unit. Usually incorporates many subdued craters.*
- icp — Intercrater plains: *Heavily cratered plains with rough, uneven texture*

Crater Units

- C_5 Crater Material: *Pristine. Sharp rims, albedo rays present*
- C_4 Crater Material: *Well-preserved. Sharp rim, radially textured ejecta blanket. No albedo rays.*
- C_3 Crater Material: *Degraded. Muted, but continuous rim. Terraces, and continuous ejecta blanket present.*
- C_2 Crater Material: *Heavily degraded. Subdued rim. Absence of terraces or peaks. Ejecta may not be continuous.*
- C_1 Crater Material: *Very degraded. Rims absent or very fragmented. Crater wall and floor barely distinguishable.*
- cfs — Smooth Crater Fill: *Very smooth, sparsely cratered crater floor surfaces*
- cfh — Hummocky Crater Fill: *Rough or moderately textured crater floor surfaces*

Superficial Units

- Hollows: *Flat floored irregular depressions with blue colour*
- Facula: *Often interpreted as an explosive eruption deposit*
- Irregular Pit: *Interpreted as an explosive volcanic vent*
- Pitted Ground: *Facula with shallow flat floor morphology*
- Rays
- Secondary Chain

Geological Contacts

- Certain contact
- Approximate Contact
- Inferred Contact

Crater Rims

- Crater with 20 km>d>5 km
- Craters with d>20 km
- Flooded or subduded crater >20 km

Tectonic Features

- Thrust
- Uncertain Thrust
- Wrinkle Ridge
- Wrinkle Ridge Ring

Projection:

Mercator
Planetocetric Radius: 2439.4 km

Basemap:

MESSENGER BDR 166mpp global mosaic