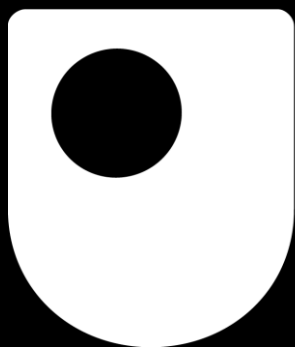


Geological mapping of Mawrth Vallis, Mars, by PLANMAP

EPSC2020-807



The Open
University

Jack Wright*

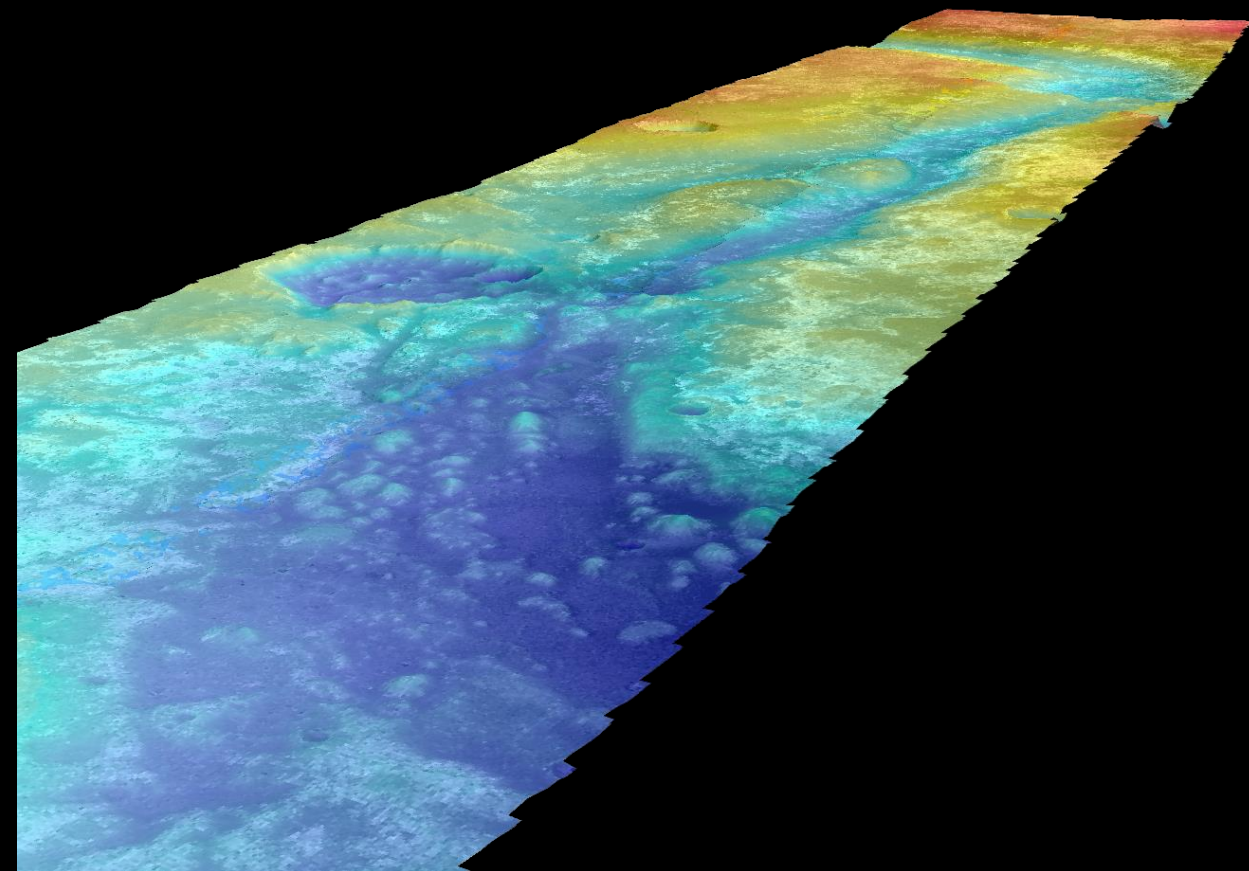
Matthew Balme

Peter Fawdon

David Rothery



Joel Davis



*presenting author



@wrightplanet @planmap_eu

PLANMAP

- The PLANMAP project is generating standards for planetary geologic map production to aid dissemination of European researchers' maps [1].
- Geologic maps of Earth are syntheses of several data types. Planetary geologic maps should also fuse as many available data types as possible (geomorphic, compositional, chronostratigraphic, 3D).
- To demonstrate these two points, the PLANMAP project is producing new, exemplar geologic maps of Mercury (e.g. Fig. 1), the Moon, and Mars.

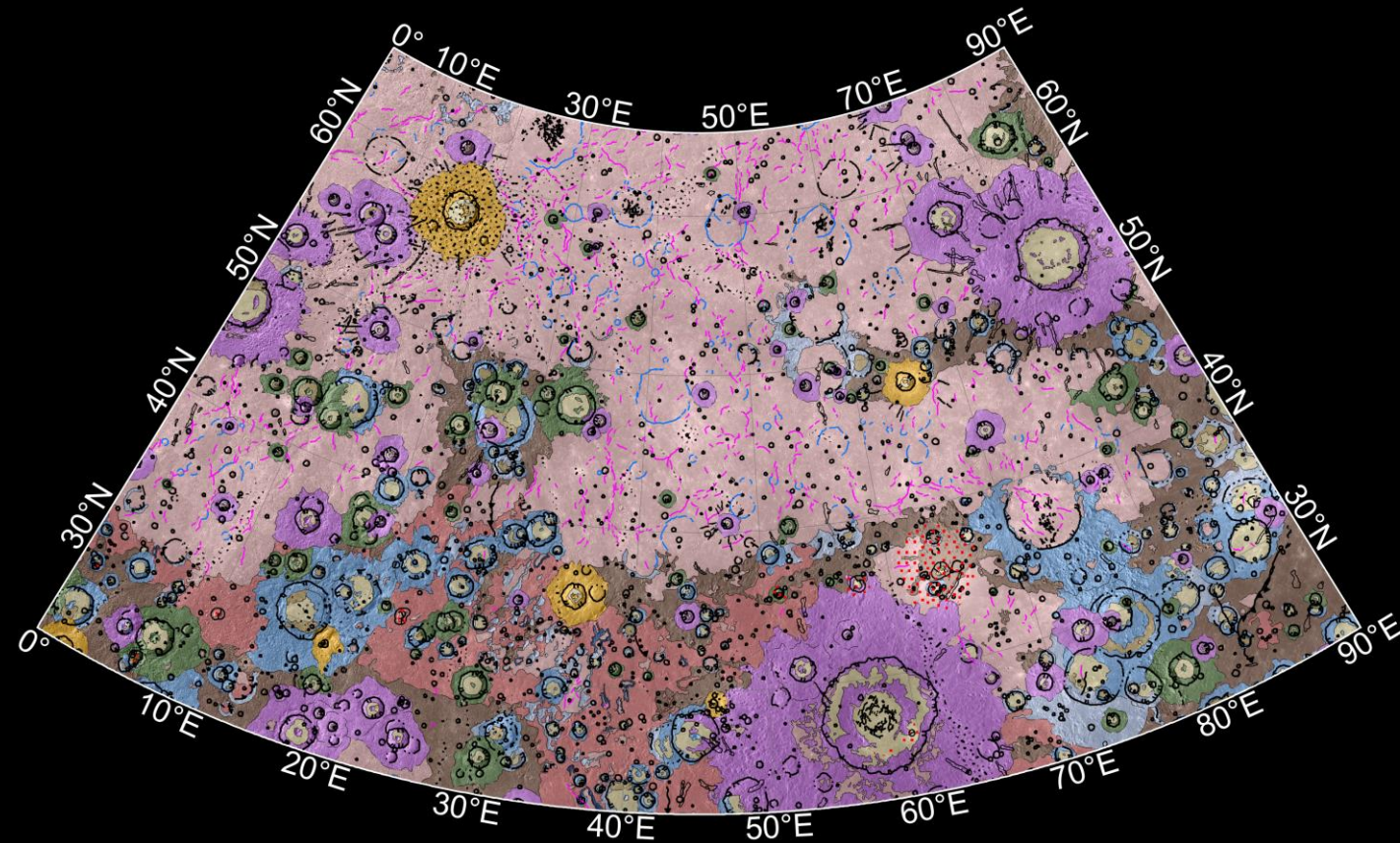


Fig. 1: Exemplar PLANMAP geomorphic map of the Hokusai quadrangle of Mercury [2].

Mawrth Vallis

- Mawrth Vallis is Mars' oldest outflow channel [3]. It incises Noachian terrain (>3.7 Ga) and has associated (>150 m) clay-bearing deposits [4].
- Mawrth Vallis' geomorphology, which records its history of deposition/burial and erosion/exhumation, is less well-studied than its mineralogy.
- The abundance and diversity of data types available for Mawrth Vallis make it particularly suitable as an exemplar mapping location for PLANMAP.

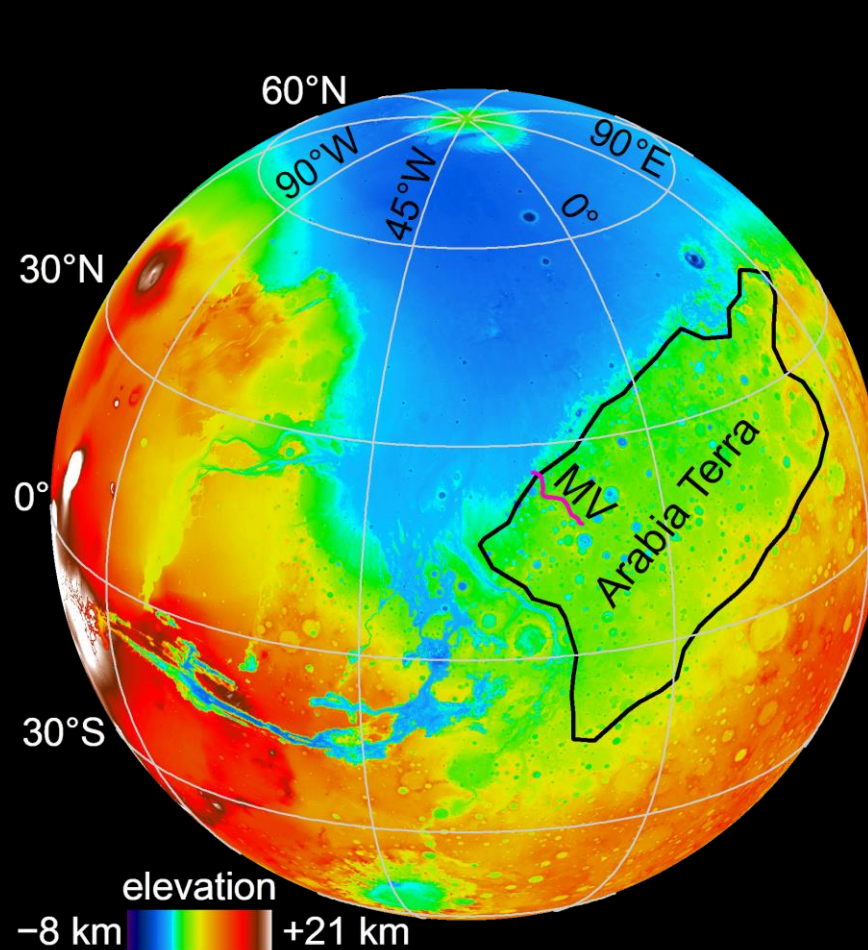


Fig. 2: Mawrth Vallis' (MV; magenta line) setting.

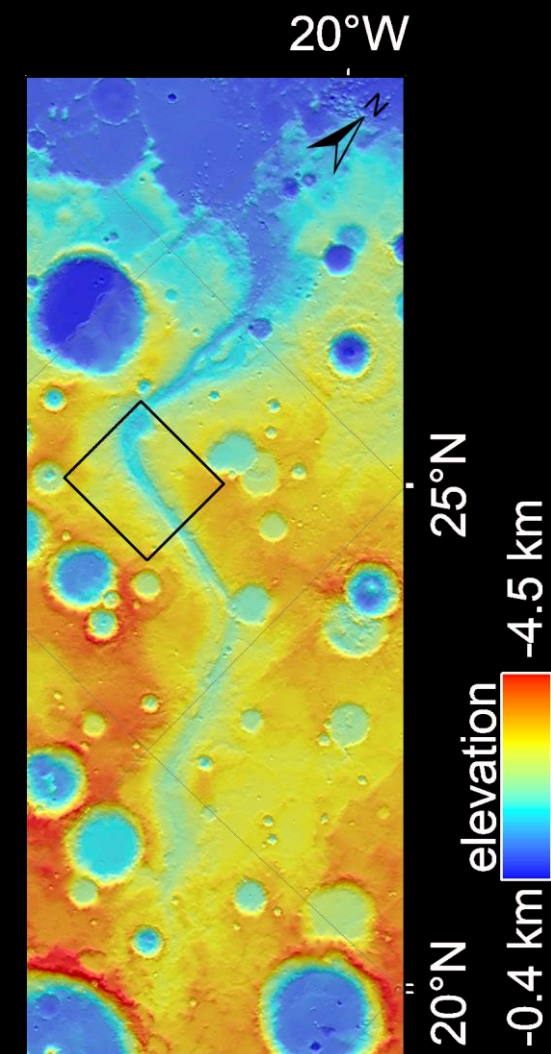


Fig. 3: MV and detailed mapping area (black outline).

Data

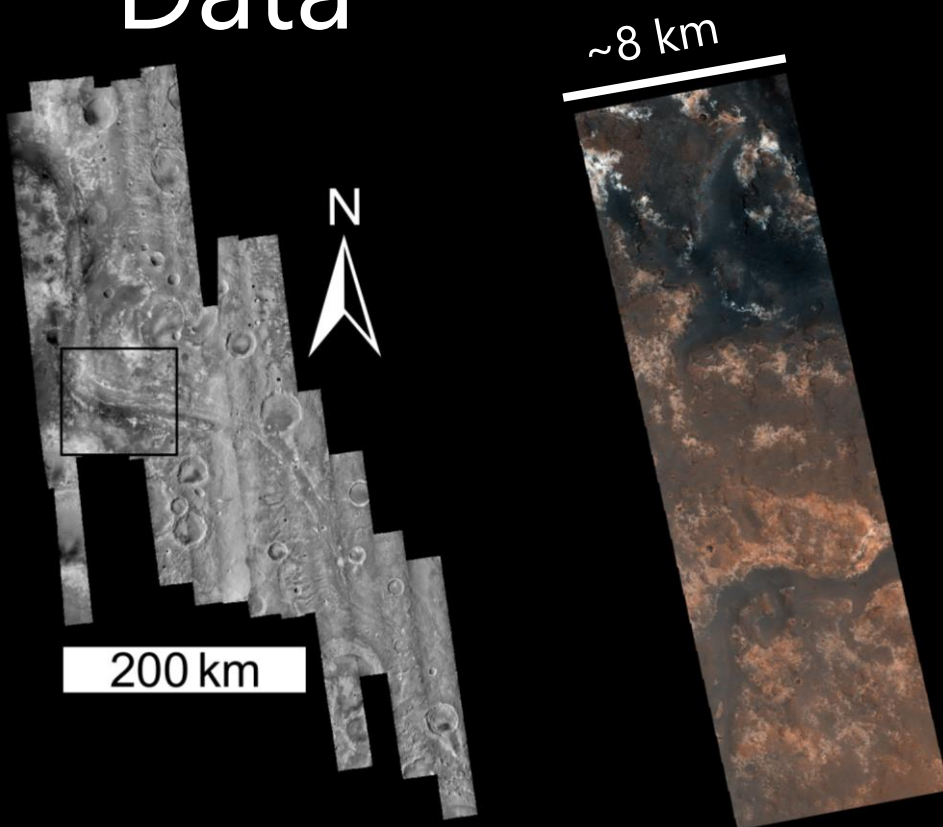


Fig. 4: CTX mosaic basemap for detailed mapping (black box) and whole-channel feature map.

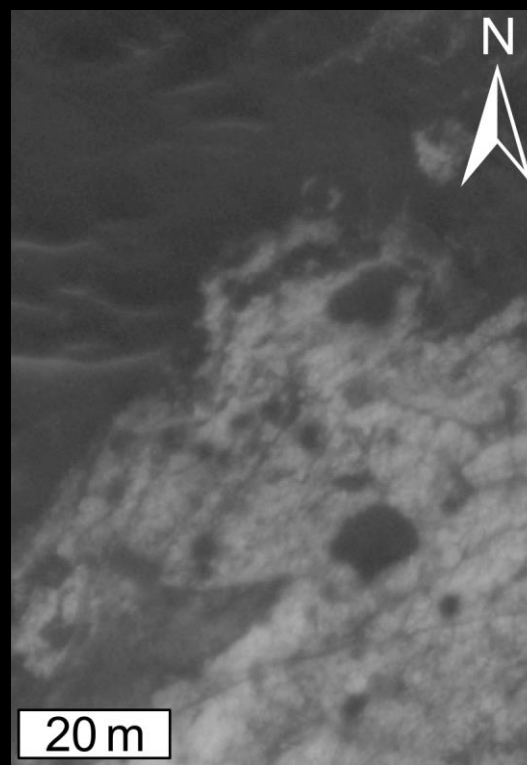


Fig. 5: CaSSIS (left) and HiRISE (right) for unit definition.

- Research questions
- Relationship between MV and large craters?
 - Origin of unusual channel morphology?
 - History of deposition and erosion?

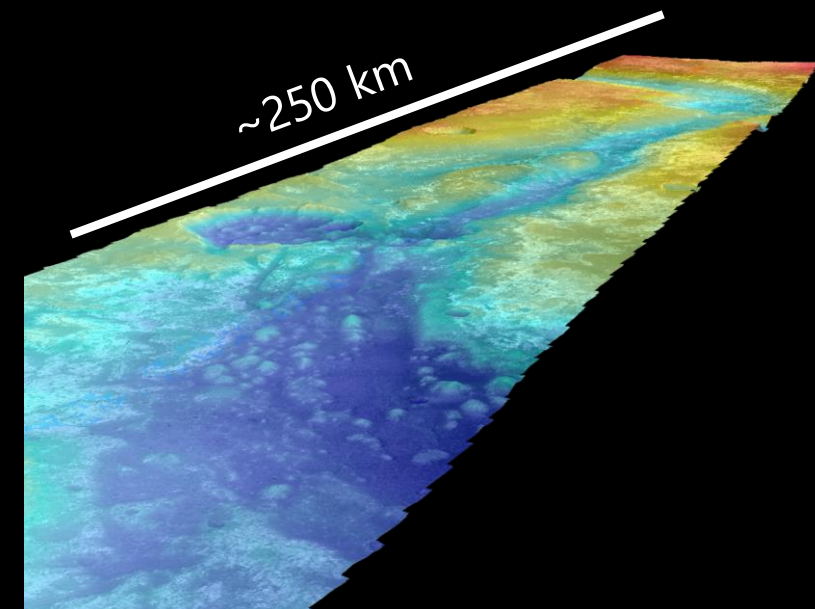


Fig. 6: CTX DEMs for assessing stratigraphic relationships. View facing south of MV from Chryse Planitia. ×2 vert. ex.

Methods, progress, and future work

- We are making a detailed map incorporating the deselected ExoMars landing ellipse.
- We will also make a smaller scale geomorphic feature map encompassing all of Mawrth Vallis

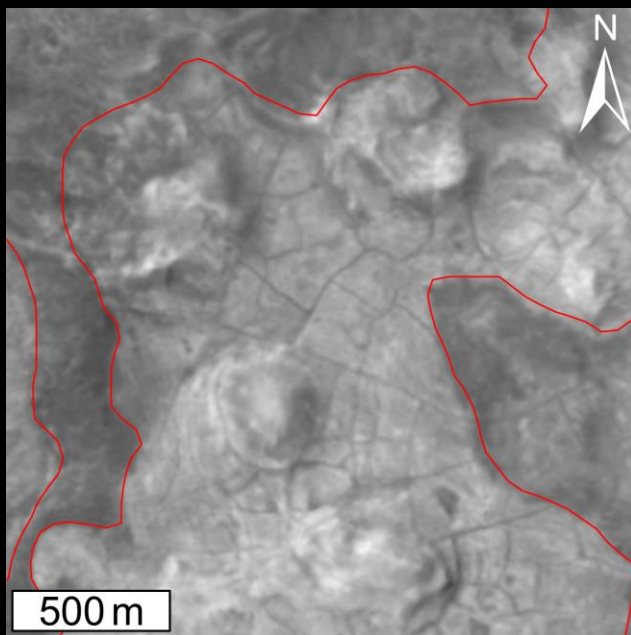


Fig. 7: CTX basemap at 1:20k linework scale. 1:100k publication scale.

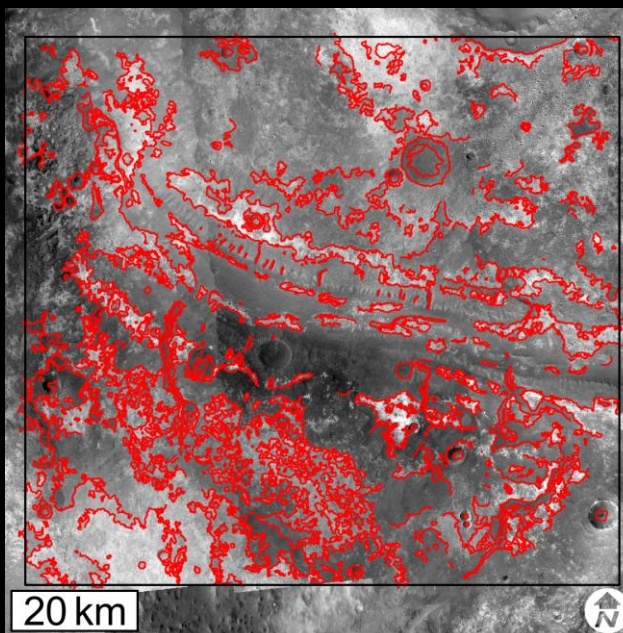


Fig. 8: Current progress of detailed mapping linework.

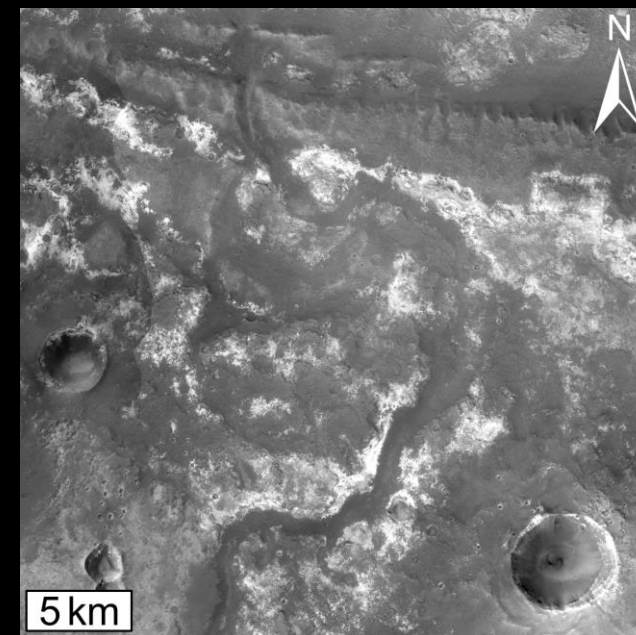
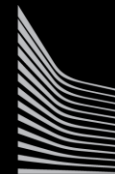
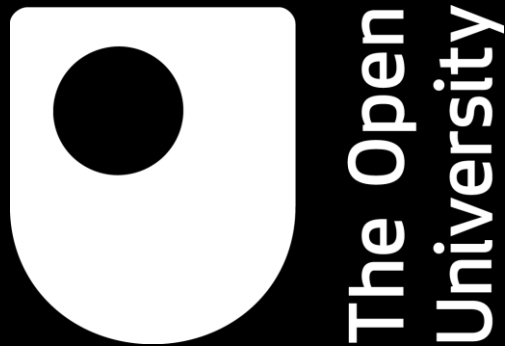


Fig. 9: Features, such as this channel, will be put in the accompanying feature map.

Acknowledgements and References

Thanks to Peter Fawdon for making the CTX DEMs used in this poster.



European Commission

Horizon 2020
European Union funding
for Research & Innovation

"This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 776276".

- [1] Massironi et al. (2018), Geophys. Res. Abs., 20, EGU2018-18106.
- [2] Wright et al. (2019), J. Maps, 15, 509–520.
- [3] Ivanov and Head (2001) J. Geophys. Res., 106, 3275–3295.
- [4] Loizeau et al. (2007), J. Geophys. Res. Planets, 112, E8.