



## **Continued monitoring of aeolian activity within Herschel Crater, Mars**

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In this work, we study a dark dune field on the western side of Herschel crater, a 300 km diameter impact basin located near the Martian equator (14.4°S, 130°E), where the ripple and dune motion reflects the actual atmospheric wind conditions.

We develop an integrated analysis using (1) automated ripple mapping that yields ripple orientations and evaluates the spatial variation of actual atmospheric wind conditions within the dunes, (2) an optical cross-correlation that allows us to quantify an average ripple migration rate of 0.42 m per Mars year, and (3) mesoscale climate modeling with which we compare the observed aeolian changes with modeled wind stresses and directions.

Our observations are consistent with previous work [1] [2] that detected aeolian activity in the western part of the crater. It also demonstrates that not only are the westerly Herschel dunes movable, but that predominant winds from the north are able to keep the ripples and dunes active within most (if not all) of Herschel crater in the current atmospheric conditions.

### References:

- [1] Cardinale, M., Silvestro, S., Vaz, D.A., Michaels, T., Bourke, M.C., Komatsu, G., Marinangeli, L., 2016. Present-day aeolian activity in Herschel Crater, Mars. *Icarus* 265, 139-148. doi:10.1016/j.icarus.2015.10.022.
- [2] Runyon, K.D., Bridges, N.T., Ayoub, F., Newman, C.E. and Quade, J.J., 2017. An integrated model for dune morphology and sand fluxes on Mars. *Earth and Planetary Science Letters*, 457, pp.204-212.