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## Extensional Landforms as Evidence for Recent Large-Scale Compressional Tectonism?

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# Extensional landforms as evidence for recent large-scale compressional tectonism?

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A vast majority of tectonic landforms on Mercury have been formed by compression; extensional landforms do exist but are much rarer (Byrne, 2019; Crane & Klimczak, 2019). Pristine back-scarp grabens associated with small lobate scarps (tens of kms in length and tens of metres in relief) provide evidence for geologically recent tectonism (such features aren't expected to survive for extended periods of time due to impact gardening; Byrne et al., 2018; Watters et al., 2016). These grabens form when thrust material produces an anticline, causing local tensional stresses to form antithetic faults along the hinge zone. Calypso Rupes is the only large lobate scarp (381km in length and ~1km in relief) where such grabens have been identified to date (Banks et al., 2015). This work provides new evidence of graben formation along similarly large tectonic features and raises the question “has there been widespread recent tectonism and, if so, might it still be occurring to this day?”

Banks, M. E., Xiao, Z., Watters, T. R., Strom, R. G., Braden, S. E., Chapman, C. R., Solomon, S. C., Klimczak, C., & Byrne, P. K. (2015). Duration of activity on lobate-scarp thrust faults on Mercury. *Journal of Geophysical Research E: Planets*, 120(11), 1751–1762. <https://doi.org/10.1002/2015JE004828>

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Byrne, P. K., Klimczak, C., & Sengör, A. M. C. (2018). The Tectonic Character of Mercury. In S. C. Solomon, L. R. Nittler, & B. J. Anderson (Eds.), *Mercury: The View After MESSENGER* (1st Editio, pp. 249–286). Cambridge University Press. <https://doi.org/10.1017/9781316650684>

Crane, K. T., & Klimczak, C. (2019). Tectonic patterns of shortening landforms in Mercury's northern smooth plains. *Icarus*, 317(May 2018), 66–80. <https://doi.org/10.1016/j.icarus.2018.05.034>

Watters, T. R., Daud, K., Banks, M. E., Selvans, M. M., Chapman, C. R., & Ernst, C. M. (2016). Recent tectonic activity on Mercury revealed by small thrust fault scarps. *Nature Geoscience*, 9(10), 743–747. <https://doi.org/10.1038/ngeo2814>