POST-DEPOSITION (AND ONGOING?) MODIFICATION OF CALORIS EJECTA BLOCKS. J. Wright[1], S. J. Conway[2], D. A. Rothery[1] and M. R. Balme[1], [1]School of Physical Sciences, The Open University, Milton Keynes, MK7 6AA, UK, [2]CNRS, Laboratoire de Planétologie et Géodynamic, Université de Nantes, France.

Introduction: Mercury's circum-Caloris region hosts numerous kilometer-scale knobs [1]. If these landforms, peculiar to Caloris, are its ejecta, then they can provide insight into the deep materials of the planet.

Observations: Circum-Caloris knobs are found up to ~1000 km from Caloris, but they are more densely distributed near the rim [2] (Fig 1a). They are up to ~10 km in diameter and are domal to conical in shape. They can be discrete or coalescent, and exist in isolation, clusters or, importantly, chains radiating from Caloris. This suggests the knobs are ejecta blocks.

Most knobs host few resolvable superposing impact craters, even at MESSENGER's NAC [3] resolution, on their steep (~20°) upper flank slopes (Fig. 1b). They often have lower-angle basal slopes that grade into the surroundings. Some seem to bury nearby craters (Fig. 1c). These observations suggest mass-wasting modification.

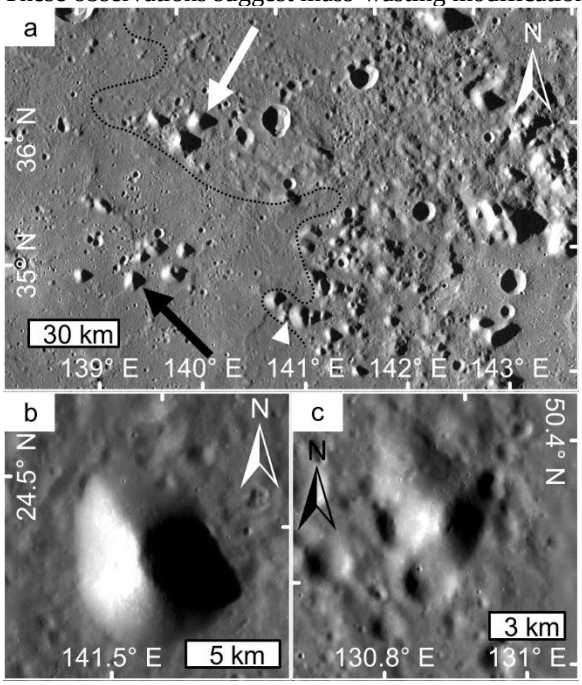

Fig. 1. *Circum-Caloris knobs.* ***(a)*** *Examples of knobs west of the Caloris rim. Discrete knobs within smooth plains (black arrow) and the Odin Formation (white arrow). Coalesced knobs (white triangle). Dotted line is approximate contact between smooth plains and Odin Formation. (b) A fresh, isolated knob (~36 m/pixel). (c) A degraded knob with flank material infilling an impact crater.*

Block modification may have taken place long after their formation, and is possibly ongoing. Knob material abuts a lobate scarp that deforms the Caloris plains, which resolvably post-date the Caloris impact [1]. Hollows (geologically young landforms believed to form by the sublimation of a crustal volatile [4]) are found on knob material, suggesting this Caloris ejecta has a volatile component. We hypothesize that volatile loss plays a role in the ongoing modification of the conical knobs. Thus, their geomorphology may help constrain the enigmatic volatile content of Mercury's deep interior.

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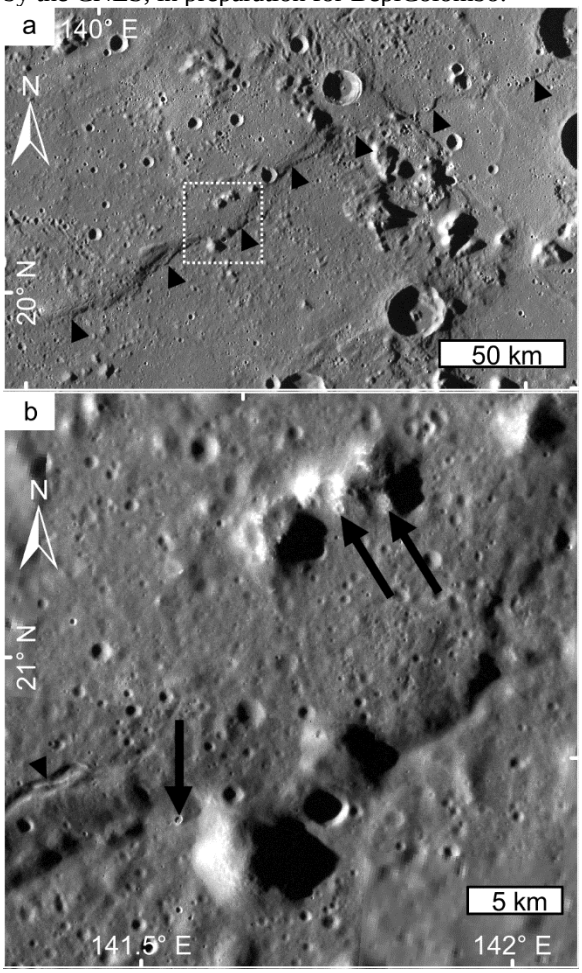

Fig. 2. ***(a)*** *Lobate scarp (triangles) cutting Caloris plains and rim. Extent of (b) (box).* ***(b)*** *Knobs abutting scarp. Hollows in knob material (arrows). Back-scarp graben indicating young fault movement (triangle).*

References: [1] Fassett C. I. et al. (2009) *Earth Planet. Sci. Lett., 285*, 297–308. [2] Wright J. et al. (2018) *LPS XLIX*, Abstract #2133. [3] Hawkins S. E. et al. (2007) *Space Sci. Rev., 131*, 247–338. [4] Blewett D. T. et al. (2013) *Science, 333*, 1856–1859.