**USING ELLIPTICAL CRATERS AS STRAIN MARKERS IN MARIUS REGIO, GANYMEDE.** Constantine Thomas[1] and Richard Ghail[2], [1]Environmental Science Department, Lancaster University, Lancaster, LA1 4YQ, United Kingdom. *constantine.thomas@lancaster.ac.uk* [2]T.H. Huxley School, Imperial College, London, SW7 2BP, United Kingdom. *R.Ghail@ic.ac.uk*.

**Introduction:** Marius Regio is located at 40°N, 200°W, in the mid-latitudes near the antijovian point. It was imaged at 940 m pixel$^{-1}$ during orbit G8 of the Galileo mission. It consists of large blocks of older dark terrain, separated by swathes of younger bright material. Ghail and Thomas [1] suggest that the dark terrain has undergone tectonic deformation which is recorded in the non-circularity of some dark-terrain craters. Accordingly, elliptical dark-terrain craters can be restored to circularity by removing inferred tectonic movements to provide a quantitative measure of the strain.

**Technique:** To test this hypothesis, we chose a prominent elliptical crater within a strike-slip rotational block (Fig 1) in the area mapped by [1], immediately south of Akitu Sulcus. Rotation is implied by the curvature of the bounding en-echelon fractures, but cannot be recovered directly from the crater deformation. Wrench movement along the strike-slip faults was reversed by skewing a rectangular block bounded by the faults (Fig 2). A range of values were tested and the best fit found. However, restoring the wrench movement did not recover a circular crater. A futher uniform shortening parallel to the strike-slip faults was required to restore circularity. Again, a range of values were tested and the best fit determined.

**Results:** A 5·75° skew together with 5% shortening was required to circularise the crater completely. We can therefore infer transtensional strike-slip movement of the original block, consistent with the interpretation of [1]. The deformation observed in the crater implies 13 km of sinistral strike-slip movement along 180-km long wrench faults, plus 10 km uniform extension. Strike-slip deformation dominates over extension, again consistent with a transtensional interpretation. The block-bounding faults intersecting the wrench faults can be confidently interpreted as *en-echelon* fractures caused by transtension.

**Conclusions:** Despite ignoring rotation for model simplicity, the quantitative degree of strain from transtensional movement along paired wrench faults can be successfully recovered by restoring the circularity of elliptical craters. We intend to apply this method to other craters on Ganymede and extend it to include craters deformed by extension, compression and transpression.

**References:** [1] Ghail, R. C., & Thomas, C., (2001) *LPSC XXXII*, this issue.

**Fig 1.** Strike-Slip Block and Deformed Crater

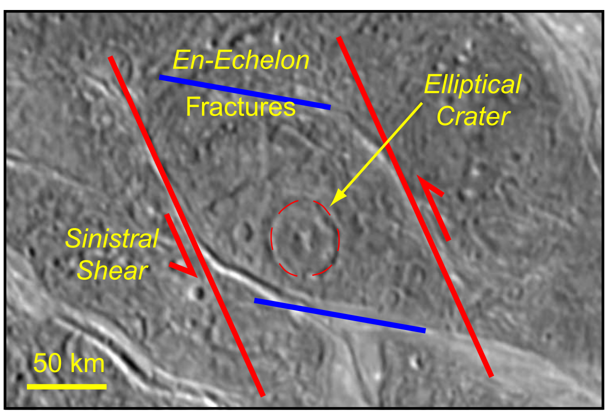


**Fig 2.** Restored Block and Crater