

Reorientation of Ganymede induced by furrow-forming impact

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Ganymede, the largest satellite of Jupiter, has a global concentric system of tectonic troughs. The trough system, so-called furrows, is the oldest recognizable surface feature on Ganymede and the largest impact structure identified so far in the solar system, created by an impactor with a radius of ~150 km. Interestingly, Ganymede is locked in synchronous rotation and the center of the furrow system coincides with the anti-Jovian longitude (180°W). This indicates the existence of large mass anomaly created by the impact (N. Hirata et al. 2020, *Icarus* 352, 113941). The largest impact basin on Pluto, the Sputnik Planitia, is also located very close to the longitude of Pluto's tidal axis. The basin possesses a positive gravity anomaly generated by nitrogen deposit and subsurface ocean, which explains the reorientation of Pluto along the tidal axis (F. Nimmo et al. 2016, *Nature* 540, 94-96). Similarly, we consider reorientation of Ganymede driven by furrow-forming impact. As a result, structures subsequent to the impact, such as ejecta deposit and icy shell thinning, can yield a sufficient positive gravity anomaly to cause the reorientation of Ganymede.

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