

2010 Western Pacific Geophysics  
Meeting  
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91(26), West. Pac. Geophys. Meet. Suppl., Abstract xxxxx-  
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HR: 1400h  
AN: **P33B-024**  
TI: [Strength of the Lithosphere of Mercury](#)  
AU: **Egea-Gonzalez, I**  
EM: [isaegea@iaa.es](mailto:isaegea@iaa.es)  
AF: *Instituto de Astrofísica de Andalucía. CSIC, Granada, Spain*  
AU: **Ruiz, J**  
EM: [jaruiz@geo.ucm.es](mailto:jaruiz@geo.ucm.es)  
AF: *Departamento de Geodinámica, Facultad de Ciencias Geológicas. Universidad Complutense de Madrid, Madrid, Spain*  
AU: **Fernández, C**  
EM: [fcarlos@uhu.es](mailto:fcarlos@uhu.es)  
AF: *Departamento de Geodinámica y Paleontología, Universidad de Huelva. Campus de El Carmen, Huelva, Spain*  
AU: **Marquez, A**  
EM: [Alvaro.Marquez@urjc.es](mailto:Alvaro.Marquez@urjc.es)  
AF: *Departamento de Biología y Geología, Universidad Rey Juan Carlos, Móstoles, Spain*  
AU: **Luisa M., L**  
EM: [lara@iaa.es](mailto:lara@iaa.es)  
AF: *Instituto de Astrofísica de Andalucía. CSIC, Granada, Spain*  
AB: Mercury's most characteristic tectonic features are lobate scarps, which are interpreted to be the surface expression of thrust faults and provide important clues on the geological and thermal history of this planet. Indeed, the large depth of faulting deduced from modeling lobate scarps topography suggests that it represents the crustal brittle-ductile transition, which in turn permits us to put limits on the thermal and mechanical properties of the lithosphere at the time when faulting occurred. Here we analyze fault geometries and depths associated with Santa Maria Rupes and S\_K4 Rupes, two prominent lobate scarps located in the Kuiper quadrangle region of Mercury by using topographic profiles derived from Earth-based radar altimetry data obtained by the Arecibo antenna. Using elastic dislocation modeling we obtain best-fit models suggesting maximum depths of faulting between 35 and 40 km. These results are similar to those previously obtained for Discovery Rupes (from stereo-derived Mariner 10 topography) and for two unnamed lobate scarps (from MLA derived profiles). This could suggest that the strength of the lithosphere of Mercury was relatively homogeneous at the time when those scarps were formed, although the relative timing of formation of the diverse features needs to be carefully addressed.  
DE: [6235] PLANETARY SCIENCES: SOLAR SYSTEM OBJECTS / Mercury  
SC: Planetary Sciences (P)  
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