Geophysical Research Abstracts
Vol. 17, EGU2015-4100, 2015
EGU General Assembly 2015

Convection-Driven Resurfacing on Icy Satellites

Amy Barr
RIAMD, Inc. Boulder, CO, United States (amy.c.mlinar@gmail.com)

Ridge and trough terrain, characterized by kilometer-scale sub-parallel ridges and troughs, is found in a variety of settings on the icy satellites of the solar system. Examples include Ganymede's grooved terrain [1], Europa's bands [2,3], Miranda's coronae [4,5], and swaths of ridges and troughs in the northern plains of Enceladus [6]. The fault spacing implies a shallow brittle/ductile depth and thus, a high thermal gradient at the time of formation [e.g., 7]. I will show that similar rheological parameters can give rise to the heat flows and deformation rates inferred for the formation of many examples of ridge and trough terrain. These results suggest that convection in ice mantles with weak surfaces can explain the formation of these terrains, just as convection in Earth's mantle, beneath a weakened crust, can drive surface deformation.

References: [1] Pappalardo, R. T. et al., 2004. in *Jupiter*, Cambridge Univ. Press, pp.363. [2] Prockter, L. M. et al., 2002. *JGR* 107, 5028. [3] Stempel, M. M. et al., 2005. *Icarus* 177, 297. [4] Pappalardo, R. T. et al., 1997. *JGR* 102, 13369. [5] Hammond, N. P. and A. C. Barr, 2014. *Geology* 42, 931-934. [6] Bland, M. et al., 2007. *Icarus* 192, 92. [7] Nimmo, F. et al., 2002. *GRL* 29 62-1.