

Monday, March 15, 2004
ICY WORLDS: MOVING AND GROOVING
8:30 a.m. Salon A

Chairs: R. T. Pappalardo
H. J. Melosh

- 8:30 a.m. Schubert G. * Anderson J. D. Jacobson R. A. Lau E. L. Moore W. B. Palguta J.
Mass Anomalies on Ganymede [#1892]
 Analysis of radio Doppler data from the Galileo spacecraft's flybys of Ganymede has detected the existence of mass anomalies on Ganymede that plausibly lie near the interface between the ice and silicate shells and near the surface.
- 8:45 a.m. Spaun N. A. * Head J. W. III Pappalardo R. T.
European Chaos and Lenticulae: A Synthesis of Size, Spacing, and Areal Density Analyses [#1409]
 We find near-global analyses of size, spacing, and areal density of chaos and lenticulae on Europa are consistent with a diapiric model of formation and also with an ice shell model that suggests variations in convective layer thickness.
- 9:00 a.m. Nimmo F. * Giese B. Figueredo P. Moore W. B.
Thermal and Topographic Tests of Europa Chaos Formation Models [#1403]
 We test the diapiric and melt-through models of chaos formation. Diapirism is unable to generate appreciable quantities of near-surface melting, while the melt-through model requires spatial or temporal increases in heat flux by a factor of ~100.
- 9:15 a.m. Hurford T. A. * Preblich B. Beyer R. A. Greenberg R.
Flexure of Europa's Lithosphere Due to Ridge-Loading [#1831]
 The thickness of Europa's ice shell is not known, yet has important implications. Using photogrammetry, we are investigating flexure near ridges which allows determination of the elastic thickness at a variety of locations across Europa's surface.
- 9:30 a.m. Melosh H. J. * Turtle E. P.
Ridges on Europa: Origin by Incremental Ice-Wedging [#2029]
 Europa's enigmatic ridges are still not understood. We present a model in which the ridge is raised by the gradual accumulation of ice in a thin vertical wedge beneath the surface.
- 9:45 a.m. Patterson G. W. * Head J. W. III Pappalardo R. T.
Convergent Boundaries on Europa: a Numerical Approach to Euler Pole Analysis and Its Implications for Plate Reconstruction [#1590]
 This analysis will focus on using numerical methods of determining an Euler pole to test quantitatively the validity of reconstructions that previously suggested that a set of lineaments in the Castalia Macula region had undergone compression.
- 10:00 a.m. BREAK
- 10:15 a.m. Mitri G. * Showman A. P. Geissler P.
Numerical Simulations of Subsidiary Convection in the Ice Shell of Europa: Implications for the Thermal Evolution and Present State [#1795]
 Two dimensional numerical simulations of convection in the ice shell of Europa are performed to explore the basic fluid mechanics that potentially govern the response to changes in amount of heat production.

- 10:30 a.m. Showman A. P. * Han L.
Effects of Plasticity on Convection in an Ice Shell: Implications for Europa [#1466]
Numerical simulations of convection in an ice shell including the effects of plasticity show that, under certain conditions, plastic deformation can play a major role in the convection. Such deformation may contribute to the formation of Europa's disrupted terrains.
- 10:45 a.m. Pappalardo R. T. * Barr A. C.
Non-Newtonian Convection and Compositional Buoyancy: Advances in Modeling Convection and Dome Formation on Europa [#1986]
Numerical modeling of non-Newtonian convection in ice does not predict significant surface topography. Instead, Europa's dome topography may be due to diapirs initiated by thermal convection that in turn induces compositional segregation.
- 11:00 a.m. Barr A. C. * Pappalardo R. T.
Convective Instability in Ice I: Application to Callisto and Ganymede [#1945]
The non-Newtonian behavior of ice adds complexity to the question of whether we expect an ice I layer to convect or not; study of the consequences of convection in an icy satellite must consider initial conditions in addition to physical, thermal, and rheological parameters.
- 11:15 a.m. Wagner R. * Wolf U. Neukum G.
Crater Size Distributions on Callisto: A Galileo SSI Summary [#1964]
The SSI camera aboard the Galileo spacecraft has imaged Callisto at high resolution (up to 4 m/pxl) during six close flybys. In this paper we address crater size distributions, their shape and variation with geology and/or geographic location across the surface, and implications on impactor origins.
- 11:30 a.m. Fortes A. D. * Wood I. G. Knight K. S. Brodholt J. P. Alfredsson M. Vočadlo L.
Neutron Diffraction Studies of Planetary Ices [#1252]
This presentation presents the results of neutron diffraction experiments aimed at measuring the equations of state of some rock-forming ice minerals; pure ice, ammonia dihydrate, and epsomite.
- 11:45 a.m. Baragiola R. A. * Loeffler M. J. Raut U. Vidal R. A. Carlson R. W.
H₂O₂ Synthesis Induced by Irradiation of H₂O with Energetic H⁺ and Ar⁺ Ions at Various Temperatures [#2079]
We studied the synthesis of H₂O₂ in water ice due to irradiation with 50–100 keV protons and Ar ions, by using infrared spectroscopy. H₂O₂ is produced even at 120 K, in higher numbers when using Ar ions, and is stable in the ice up to at least 160 K.