

Tuesday, August 6, 2013
MODEL AND EXPERIMENTAL INSIGHTS INTO CRATERING PROCESSES
8:30 a.m. Fraser Auditorium

Hydrocode models and experimental impacts provide new insights into cratering processes.

Chairs: Gareth Collins
Debra Hurwitz

- 8:30 a.m. Elbeshausen D. * Wünnemann K. Collins G. S.
[*Crater Formation After Shallow Impacts — How do Elliptical Craters form?*](#) [#3082]
 Why do some impacts result in a circular crater whereas others form elliptical shapes? How does the formation of elliptical craters differ from those of circular craters? We addressed these questions by conducting 3D numerical simulations.
- 8:50 a.m. Wünnemann K. * Ivanov B. A. Streb del Toro E.
[*Advanced Crater Size Scaling Laws Through Hydrocode Simulations*](#) [#3023]
 Based on hydrocode simulations we propose improved scaling laws for the relation between impact energy and crater size in targets with varying properties including layered targets.
- 9:10 a.m. Crawford D. A. * Schultz P. H.
[*A Model of Localized Shear Heating with Implications for the Morphology and Paleomagnetism of Complex Craters*](#) [#3047]
 A numerical model of localized shear heating using fault spacing estimates, frictional heating and conductive cooling can yield high fault temperatures with sufficient duration to influence complex crater morphology and paleomagnetism.
- 9:30 a.m. Vasconcelos M. A. R. * Wünnemann K. Reimold W. U. Elbeshausen D. Crósta A. P.
[*Numerical Modelling of the Vargão Impact Structure, Southern Brazil*](#) [#3039]
 Vargão impact crater is a circular feature of ~12 km diameter, formed in basalts of the Southern Brazil. Here, we review the results of numerical simulations of Vargão carried out with the iSALE code, which explains its non-clear central uplift.
- 9:50 a.m. Poelchau M. H. * Kenkmann T. Hoerth T. Deutsch A. Thoma K. Schäfer F.
[*Experimental Cratering in Quartzite, Tuff and Sandstone: Final and Transient Crater Volumes*](#) [#3054]
 Cratering experiments show the effects of porosity and pore space saturation on crater volume. The experiments also show the importance of constraining the effects of spallation on crater morphology.
- 10:10 a.m. *Coffee Break*
- 10:25 a.m. Güldemeister N. * Moser D. Wünnemann K. Hoerth T. Schäfer F.
[*Numerical Modeling of Seismic Signals Generated by Hypervelocity Impacts in Comparison to Experimental Observations*](#) [#3019]
 We record and investigate seismic signals generated by hypervelocity impact experiments and compare experimental and numerical data to validate numerical material models and to quantify the seismic efficiency of hypervelocity impacts.
- 10:45 a.m. Johnson B. C. * Melosh H. J.
[*Jetting During the Vertical Impact of a Spherical Projectile*](#) [#3014]
 Here we use the axisymmetric iSALE hydrocode at the unprecedented resolution of 800 cells per projectile radius to resolve jetting during the vertical impact of a spherical projectile.

- 11:05 a.m. Matsui T. * Kurosawa K. Ohno S. Kadono T. Sugita S.
[Laser Gun Shock Experiments on Impact Vapor Plumes and its Implication for Origin and Evolution of Planetary Atmosphere](#) [#3066]
We present the results of laser gun shock experiments, including the Hugoniot curve for forsterite and the chemical composition in the impact vapor plumes. We applied the results to the atmospheric blow-off on the Earth and the K/Pg impact event.
- 11:25 a.m. Bierhaus M. * Wünnemann K. Ivanov B. A.
[Affect of Core Rheology on Shock Wave Propagation in Planetary Scale Impacts](#) [#3022]
We use the iSALE hydrocode to investigate the effect of the thermal conditions and rheology of the target on the propagation of shock waves. In particular we focus on the effect of a liquid or solidified core on shock wave decay.
- 11:45 a.m. Kowitz A. * Güldemeister N. Reimold W. U. Schmitt R. T. Wünnemann K.
[Porosity: The Reason for SiO₂ Melt Formation at even 5 GPa Shock Pressure. Experiments with Targets of 3 Different Porosities VS Mesoscale Modeling](#) [#3020]
The influence of porosity on shock metamorphism was investigated with impact experiments (2.5–17.5 GPa) with sandstones and a quartzite. The results are compared to mesoscale numerical models quantifying the processes upon single-pore collapse.
- 12:05 p.m. Cox R. * Bauer A. W.
[Through the Ice, Exposing the Ocean: Impact Breakthrough Parameters for Europa](#) [#3091]
Hydrocode modeling shows that impacts penetrate to water if transient depth exceeds 0.8× ice thickness. For likely ice thicknesses, impact breaching at Europa is feasible on geologically short timescales, which may permit surface-ocean exchange.