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Author(s):	Larmat, Carene; Froment, Marouchka; Saxena, Swasti; Rougier, Esteban; Lei, Zhou; Knight, Earl E.; Euser, Bryan Jeffry
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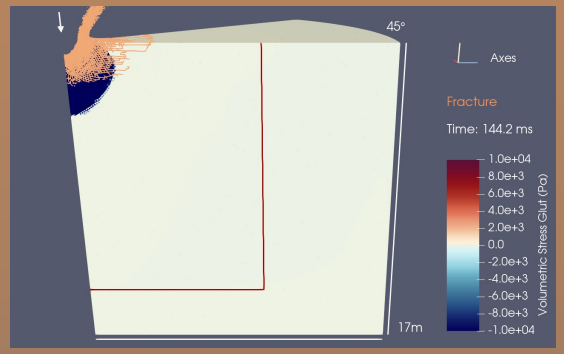
Viewgraphs for w20_marsimpacts

PI: Carene Larmat, Geophysics Group (EES-17), carene@lanl.gov, 505-667-2074

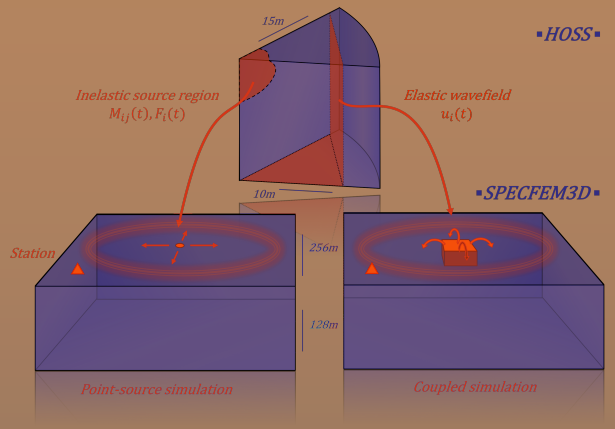
Co-investigators:
Marouchka Froment, EES-17 & Institut de Physique du Globe, Paris
mfroment@lanl.gov
Swasti Saxena, University of Reno
swasti@nevada.unr.edu
Esteban Rougier, EES-17
erougier@lanl.gov
Zhou Lei, EES-17
zlei@lanl.gov
Earl E. Knigth, EES-17
knigthe@lanl.gov
Bryan Euser, EES-17
beuser@lanl.gov

LA-UR-22-XXXX May 2022

COUPLING TWO CODES

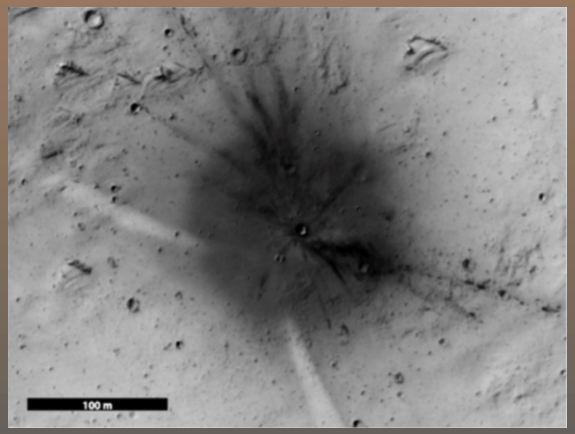


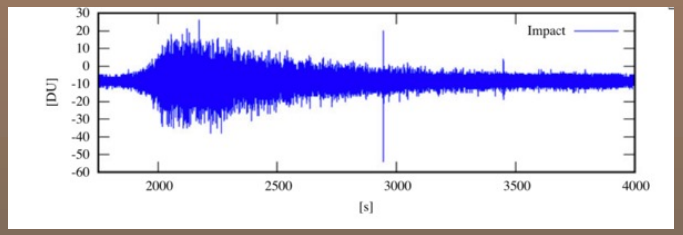
HOSS: finite-discrete element method for impact modeling.



SPECFEM3D: spectral element method for seismic modeling.

FOR THE DEVELOPMENT OF NEW SEISMIC MODEL OF IMPACTS





Left: New dated impact site with complex blast zone, including a complex albedo structure. Image credit NASA/JPL/University of Arizona. Figure from (Daubar et al. 2016). Top: seismic record of a lunar impact recorded on January 13, 1976.

Modelization of a 1000m/s impact

γ_i^V, γ_i^S : **equivalent forces of the impact.**

$\gamma_i^V \approx -\partial_j \Pi_{ij}, \quad \gamma_i^S \approx \Pi_{ij} n_j$ (and other terms…)

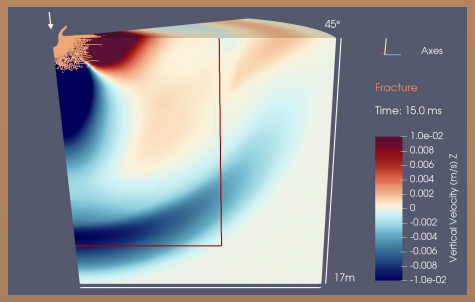
Stress Glut : $\boldsymbol{\Pi_{ij} = \psi_{ij} - S_{ij}}$

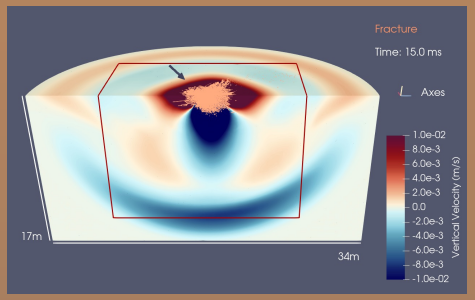
=

Ideal – Real stresses

VERTICAL

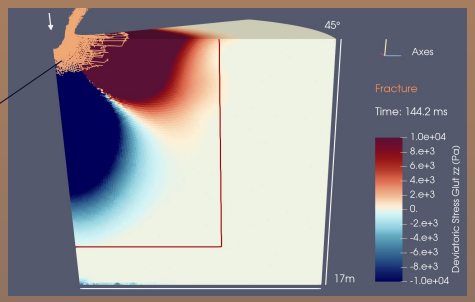
OBLIQUE

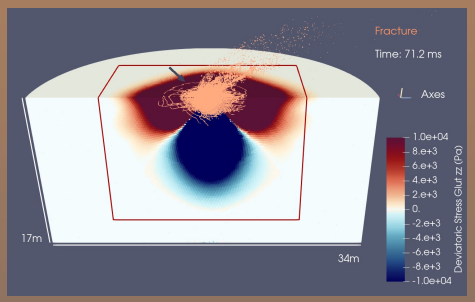




Vertical velocity field V_z at 15ms.

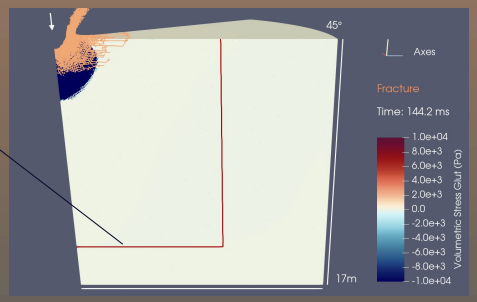
Fractured material.

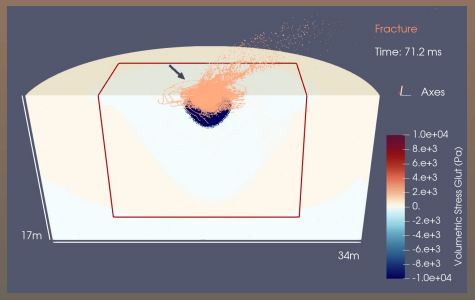




Deviatoric Stress Glut Field component Π_{zz}^D.

Limits of the coupling box.





Volumetric Stress Glut Field component Π^V.