Presentation for May 21, 2010
USC, Los Angeles, CA

The 2010 SCEC Heterogeneous Initial Conditions Dynamic Rupture Workshop

Ruth A. Harris
(U.S. Geological Survey)

SCEC Rupture Dynamics Code Validation Workshop

Friday May 21, 2010
Davidson Conference Center, USC, Los Angeles, CA

09:00	**Introduction**	Ruth Harris and Norm Abrahamson
09:30	**The Archuleta/Lavallee Method**	Ralph Archuleta and Daniel Lavallee
10:30	Break	
10:50	**The Dalguer/Mai Method**	Luis Dalguer and Martin Mai
11:50	Lunch	
12:40	**The Olsen Method**	Kim Olsen and Daniel Roten
13:40	**The Song Method**	Seok Goo Song
14:40	Break	
15:00	**The Andrews Method**	Joe Andrews and Michael Barall
16:00	**More Discussion**	All
17:00	Adjourn	

Andrews et al., BSSA, 2007 Figure 7

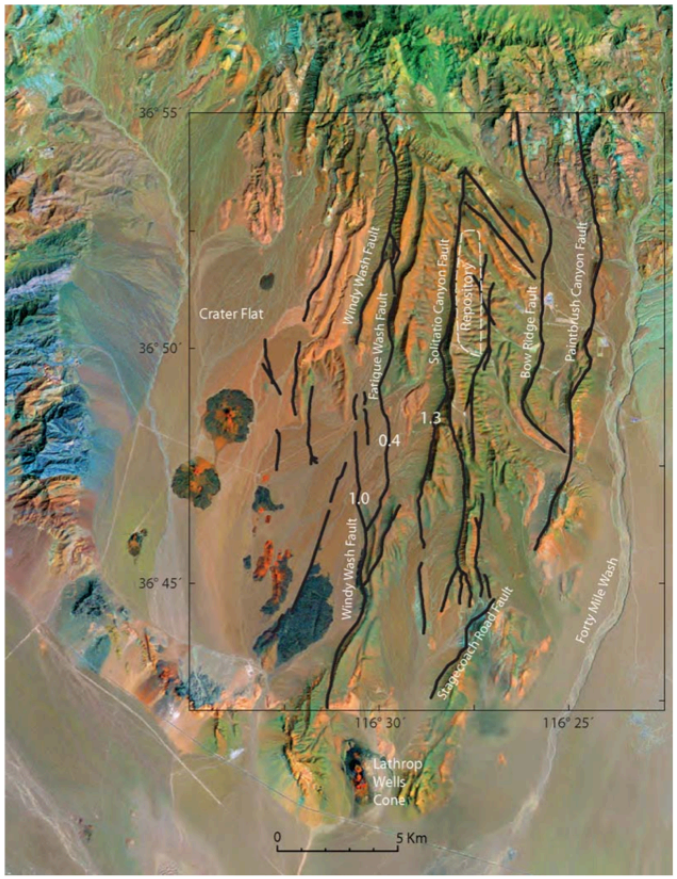
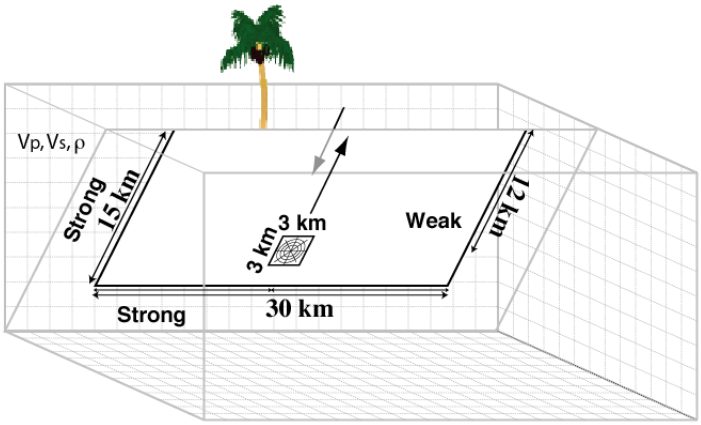


Figure 7. Color orthophoto map of the Yucca Mountain area with surface fault traces from figure 2 of Whitney, Taylor, and Menges, 2004 shown in the smaller boxed area. Numbers show locations of observed maximum-slip values of 1.3 m on the Solitario Canyon fault, 0.4 m on the Fatigue Wash fault, and 1.0 m on the Windy Wash fault at the time of the Lathrop Wells eruption. The footprint of the proposed repository is approximate.

Regular Ground Motion
produced by **regular M6.5's**



2010 plan:
use spontaneous rupture simulations
to produce '100' **M6.5 sources**

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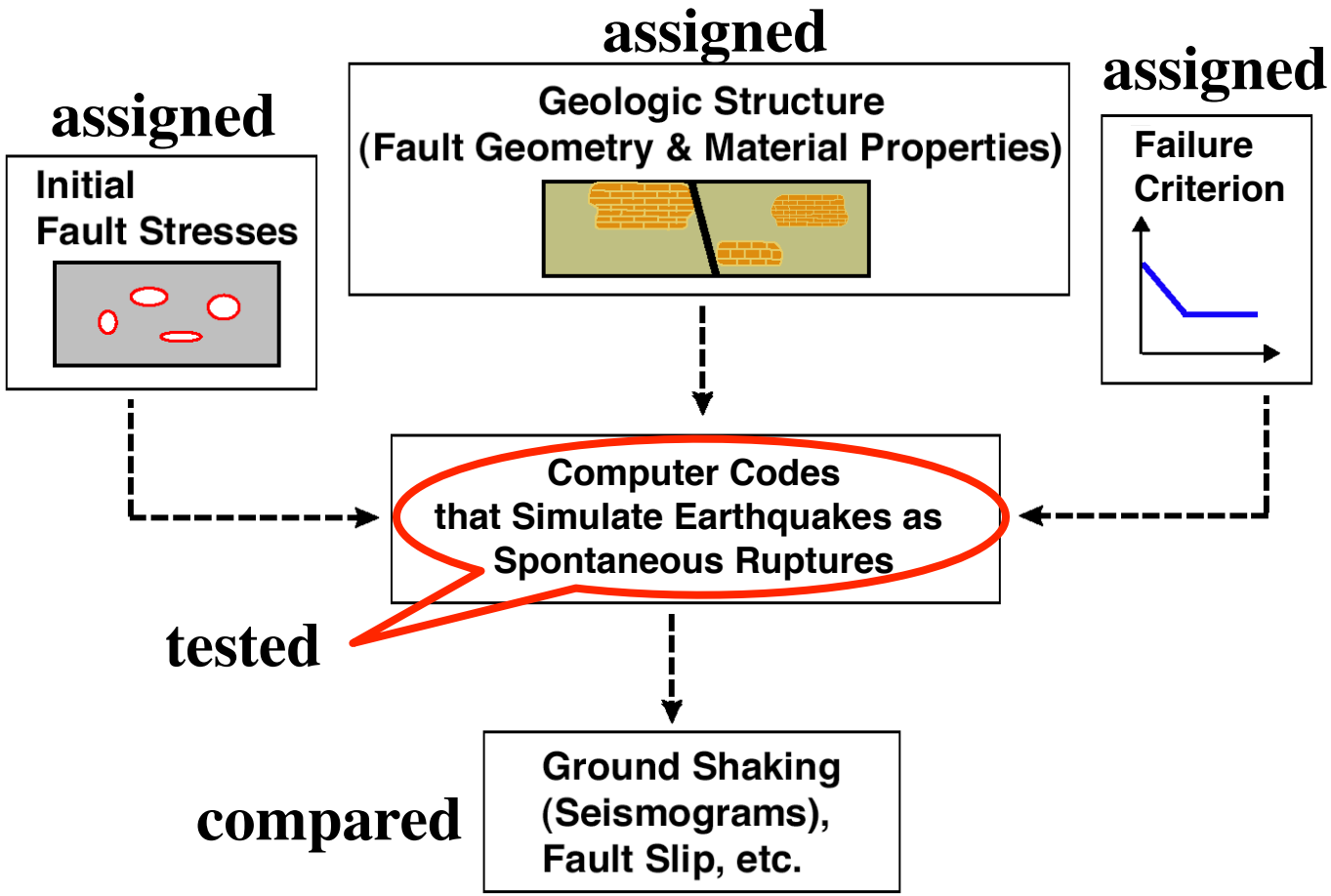
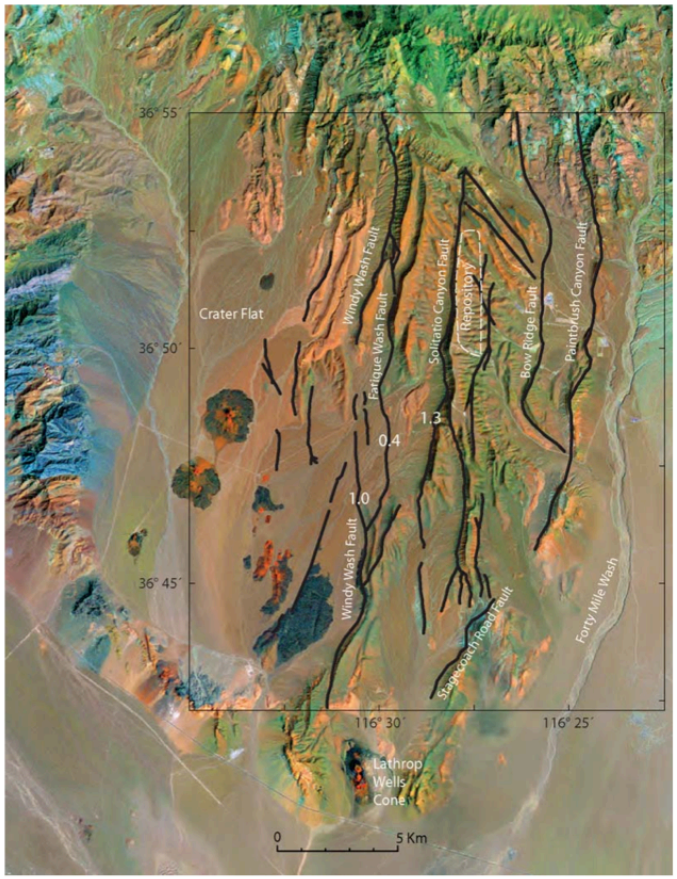
Work done to date by our Group – Code Testing and Comparisons



Please see our website http://scecdata.usc.edu/cvws

Andrews et al., BSSA, 2007 Figure 7



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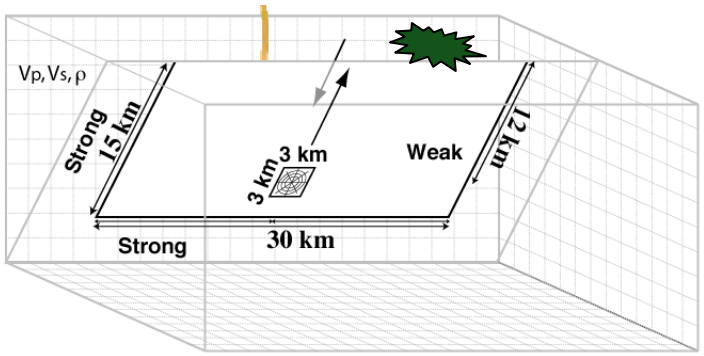
An example:
Extreme Ground Motion
Produced by an **Extreme Event**



TPV12 and 13

3D TPV12 - Elastic benchmark: Vertical velocity (m/s) vs. time (seconds)

Benchmark: tpv12 (The Problem, Version 12)

File: body-010st000dp003 (body -1.0 km, strike 0.0 km, depth 0.3 km)

Field: v-vel (vertical velocity)

Back to Field List Logout

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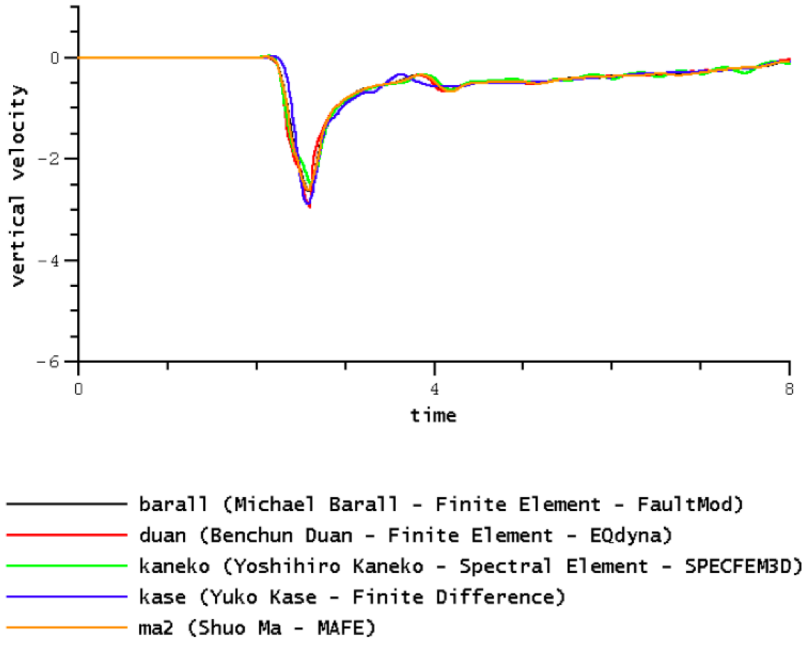

Lowpass Butterworth
Filter applied at 3 Hz

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3D TPV13 - Inelastic benchmark: Vertical velocity (m/s) vs. time (seconds)

Benchmark: tpv13 (The Problem, Version 13)

File: body-010st000dp003 (body -1.0 km, strike 0.0 km, depth 0.3 km)

Field: v-vel (vertical velocity)

Back to Field List Logout

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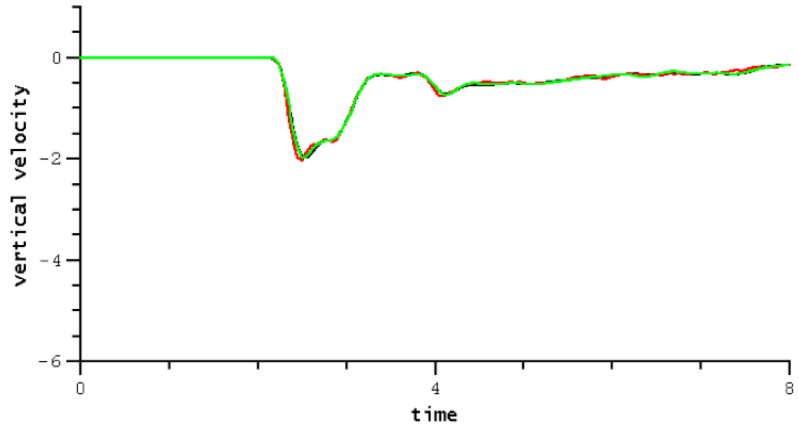

Lowpass Butterworth
Filter applied at 3 Hz

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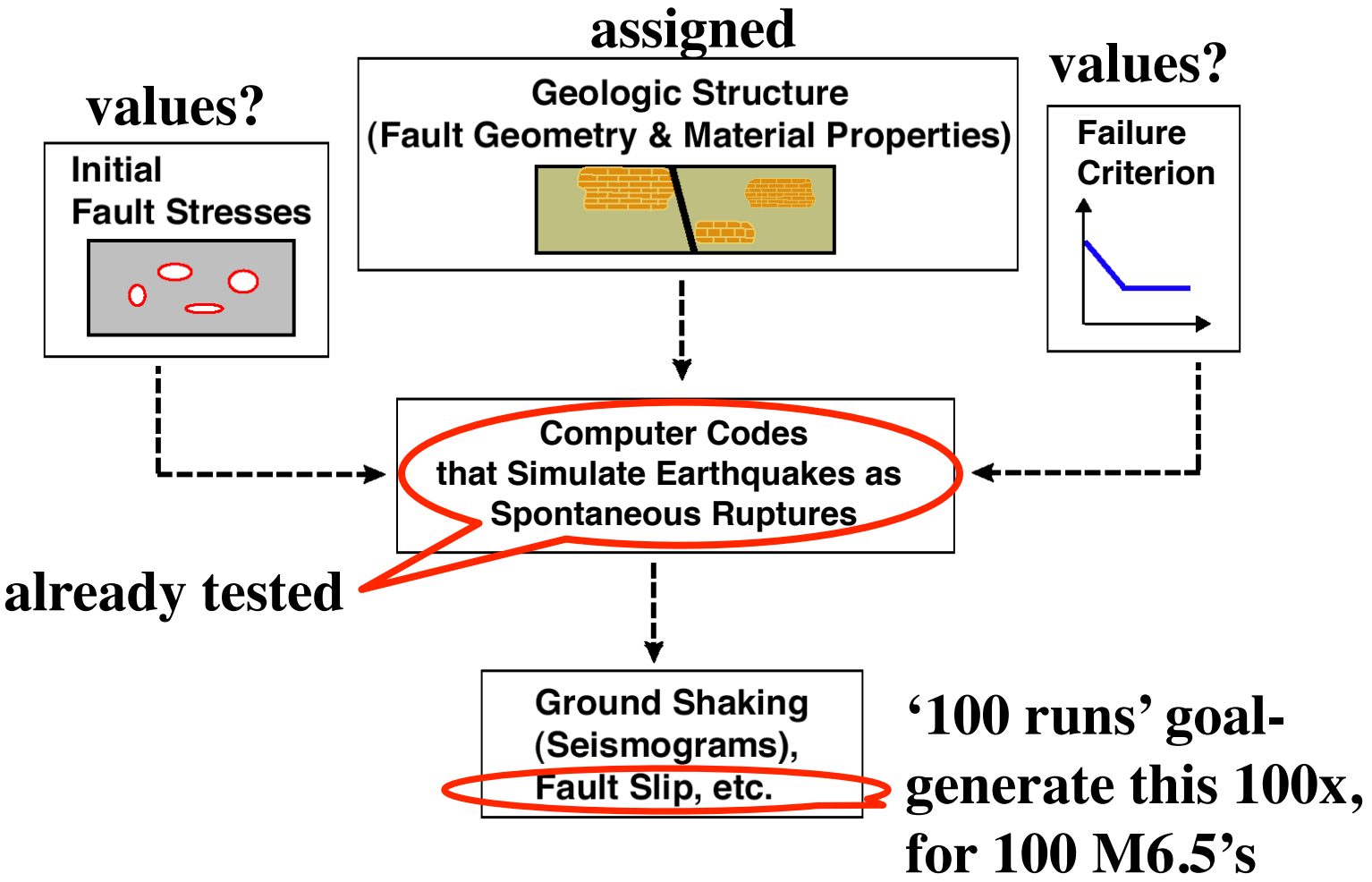
Work to do for '100 runs' – Assign 100 sets of 'values'



Plans for this workshop

Learn about methods currently being used to produce heterogeneous initial conditions for spontaneous rupture simulations (on flat faults), i.e. heterogeneous initial stresses and friction parameters

Discuss these and other aspects of the methods:

Does each method describe how to produce M6.5 events on a normal fault?

Can each method also be applied to strike-slip events on a vertical fault?

Can each method be used easily for the '100 runs' exercise?

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Our SRL article

link available on our website

http://scecdata.usc.edu/cvws

Harris, R.A., M. Barall, R. Archuleta, B. Aagaard, J.-P. Ampuero,
H. Bhat, V. Cruz-Atienza, L. Dalguer, P. Dawson, S. Day,
B. Duan, E. Dunham, G. Ely, Y. Kaneko, Y. Kase, N. Lapusta, Y. Liu,
S. Ma, D. Oglesby, K. Olsen, A. Pitarka, S. Song, and E. Templeton,
The SCEC/USGS Dynamic Earthquake-Rupture Code Verification Exercise,
Seismological Research Letters, vol. 80, no. 1, 2009.

SCEC/USGS Spontaneous Rupture Code Verification Project

SCEC/USGS Spontaneous Rupture ...

USGS science for a changing world | SCEC

The SCEC/USGS Spontaneous Rupture Code Verification Project

Quick Link to Description of TPV12 and TPV13

Quick Link to Description of TPV205 and TPV210

Benchmark Comparison Tool

Benchmark Descriptions

Code Descriptions

Workshop Presentations

Participants

References

Credit Page

If you use our SCEC/USGS Code Verification Web Server (CVWS) or benchmarks in research you submit for publication, please cite our paper:

Harris, R.A., M. Barall, R. Archuleta, B. Aagaard, J.-P. Ampuero, H. Bhat, V. Cruz-Atienza, L. Dalguer, P. Dawson, S. Day, B. Duan, E. Dunham, G. Ely, Y. Kaneko, Y. Kase, N. Lapusta, Y. Liu, S. Ma, D. Oglesby, K. Olsen, A. Pitarka, S. Song, and E. Templeton, The SCEC/USGS Dynamic Earthquake Rupture Code Verification Exercise, *Seismological Research Letters*, vol. 80, no. 1, pages 119-126, doi:10.1785/gssrl.80.1.119, 2009.

Code Comparison Benchmarks

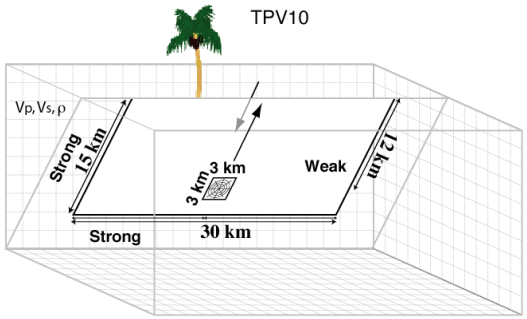
Rupture on a **Dipping** Dip-slip fault set in elastic material, Depth-dependent initial stresses, slip-weakening friction

→

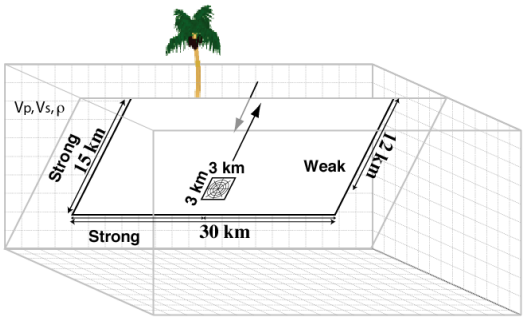
Rupture on a Dipping Dip-slip fault set in elastic material, Depth-dependent **Supershear** initial stresses, slip-weakening friction

→

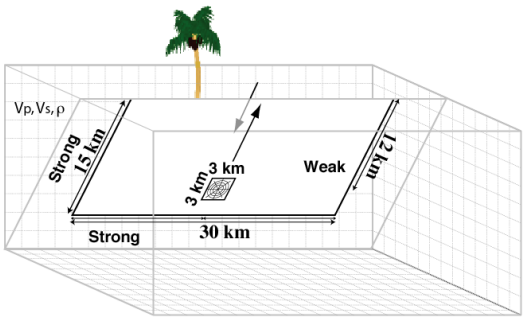
Rupture on a Dipping Dip-slip fault set in **Plastic** material, Depth-dependent supershear initial stresses, slip-weakening friction



TPV10



TPV11-12



TPV13

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