February 2007
3D Rupture Dynamics Code Validation
SCEC Workshop

Organizer:
Ruth Harris
(USGS)

SCEC 3D Rupture Dynamics Code Validation Workshop

10:00 **Workshop Introduction**
(Ruth Harris)

10:20 **Discontinuum Modeling of Dynamic Ruptures**
(Matt Purvance)

10:50 **A New Finite Volume Approach for Modelling Dynamic Rupture along Non-Planar Faults**
(Victor Cruz Atienza)

11:20 **A Support-Operator Method for Dynamic Rupture Modeling**
(Geoff Ely)

11:50 **DynaShake**
(Steve Day)

12:15 **Lunch**

1:00 **Slip between Dissimilar Materials:**
Instabilities, Ill-posedness, and Implications for Numerical Modeling
(Eric Dunham)

1:30 **The New SCEC Code Comparison Website**
(Michael Barall)

2:00 **The Benchmarks:**
The Problem Versions 6 and 7 Comparisons and Discussion
(Ruth/All)

3:00 **General Discussion about the Benchmarks and Future Plans**
(All)

Feb. 12, 2007 SCEC Workshop

Introduction

Ruth Harris

(USGS)

Feb. 12, 2007 SCEC Workshop

SCEC 3D Rupture Dynamics Code Validation Workshop

Overall Goal of the SCEC Code Validation Group

Compare the 3D methods currently being used by SCEC scientists to simulate (spontaneous) rupture dynamics

Some Specific Objectives

*Understand if our methods are producing the same results when using the same assumptions about friction, crustal structure, fault geometry, etc.

*Learn which methods are best suited for which type of problem, for example, heterogeneous stress, heterogeneous materials, dipping faults, complex friction formulations.

SCEC 3D Rupture Dynamics Code Validation Workshop

This Workshop:

❖ Learn about new SCEC 3D codes and projects

❖ Learn the theory behind the current benchmarks

❖ Learn about our new website for code comparisons

❖ Compare results using our latest benchmarks

❖ Plan our next steps

The Problem, Versions 6 and 7 (January-February 2007)

Dynamic Rupture in a Bi-Material World

Earth's surface $Vp1, Vs1, \rho1$

$Vp2, Vs2, \rho2$

Strong

15 km

3 km

3 km

Weak

Strong

30 km

Strong
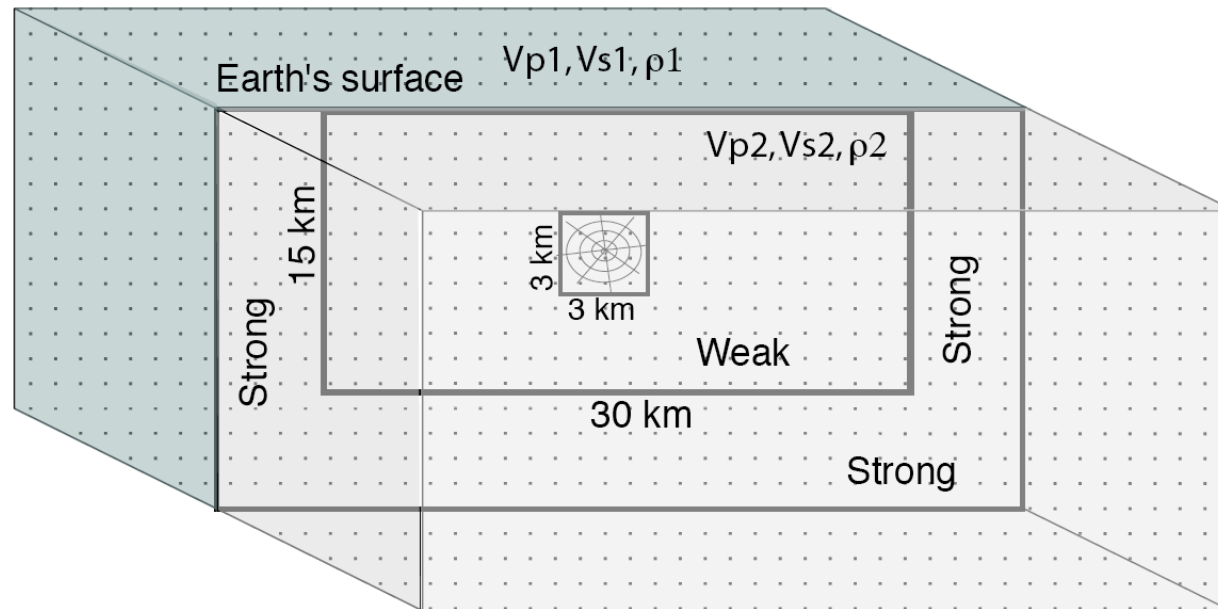
Vertical strike-slip fault is the boundary between two materials.
On the far side of the fault, Vp, Vs, density = Vp1,Vs1,ρ1
On the near side of the fault, Vp, Vs, density = Vp2,Vs2,ρ2

Discontinuum Modeling of Dynamic Ruptures

Matt Purvance
(UNR)

A New Finite Volume Approach for Modelling Dynamic Rupture along Non-Planar Faults

Victor Cruz Atienza

(SDSU)

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SC/EC

A Support-Operator Method for Dynamic Rupture Modeling

Geoff Ely
(UCSD)

Feb. 12, 2007 SCEC Workshop

DynaShake

Steve Day
(SDSU)

Lunch

The New SCEC Code Comparison Website

Michael Barall
(USGS)

Sept. 11, 2005 SCEC Workshop