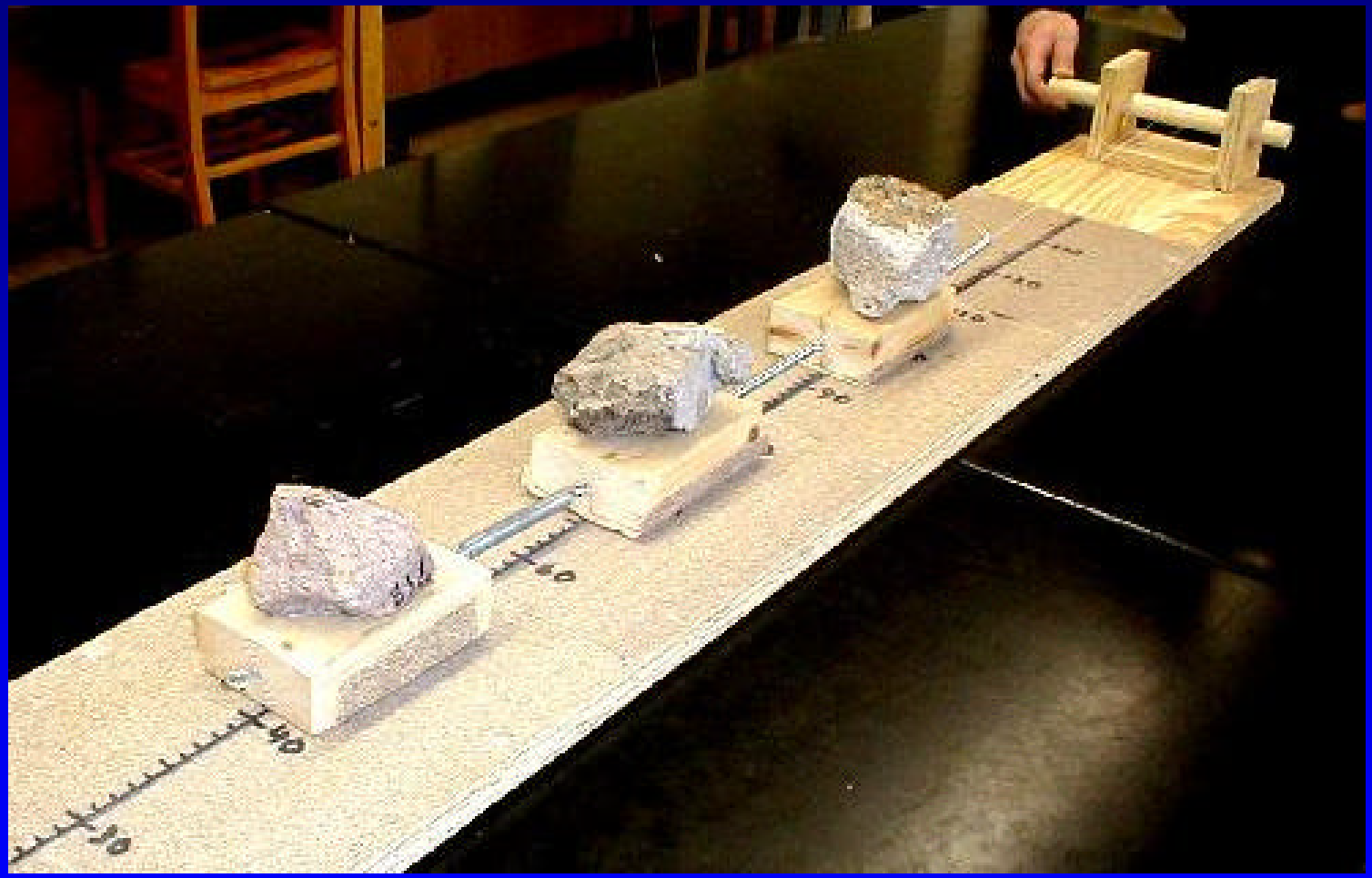
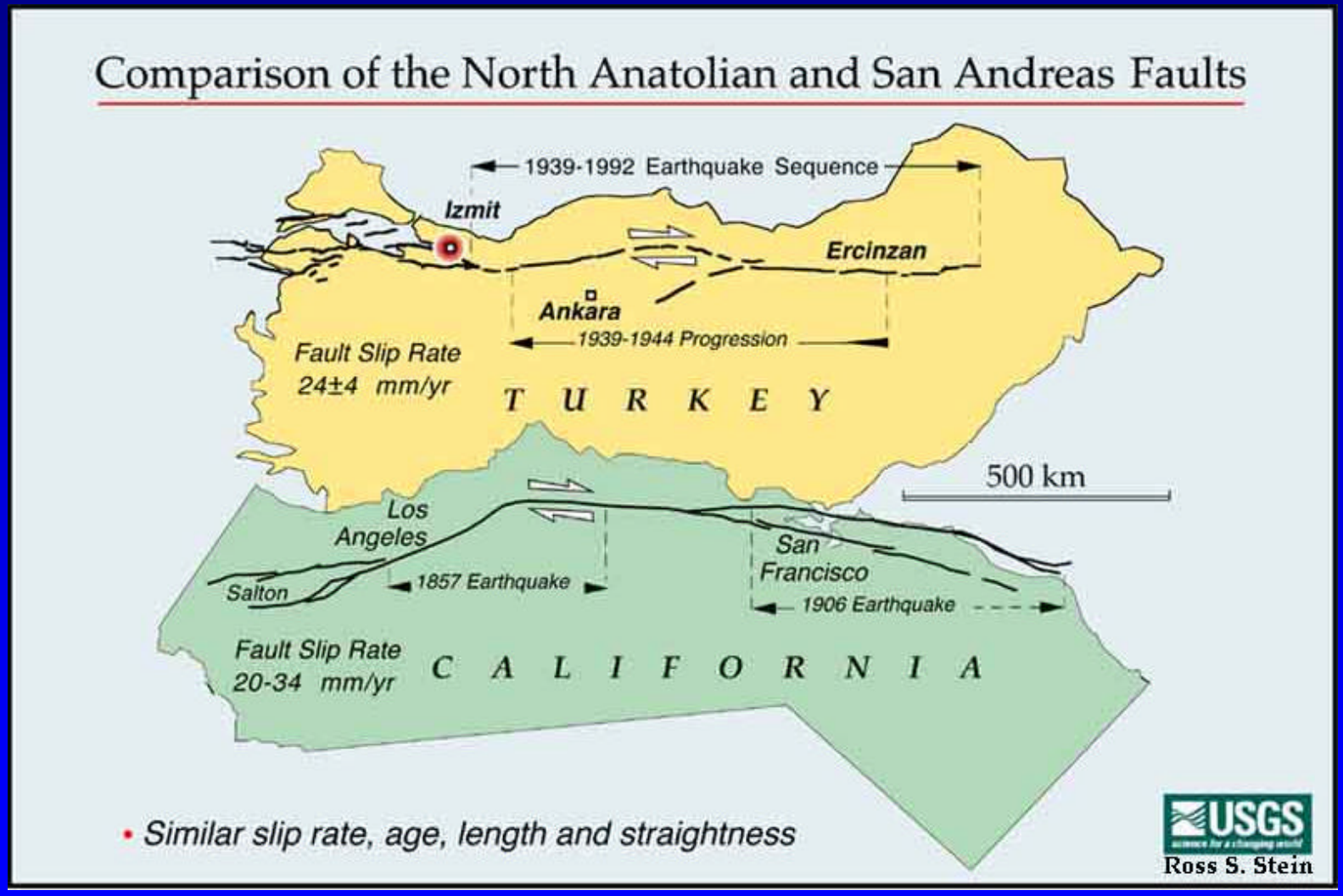
Another version of the Earthquake Machine

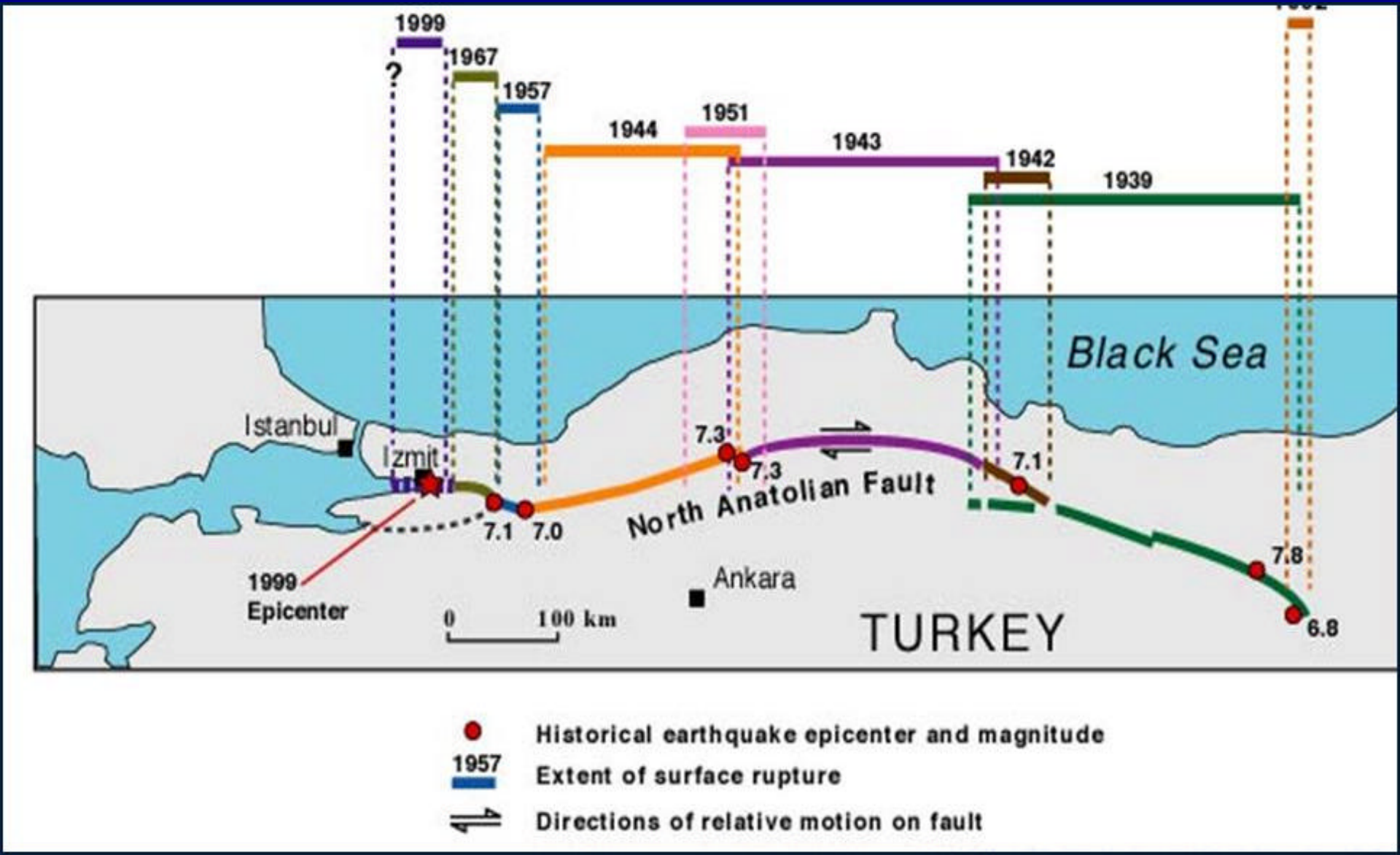


fault segmentation and interaction

North Anatolian Transform Fault - Turkey

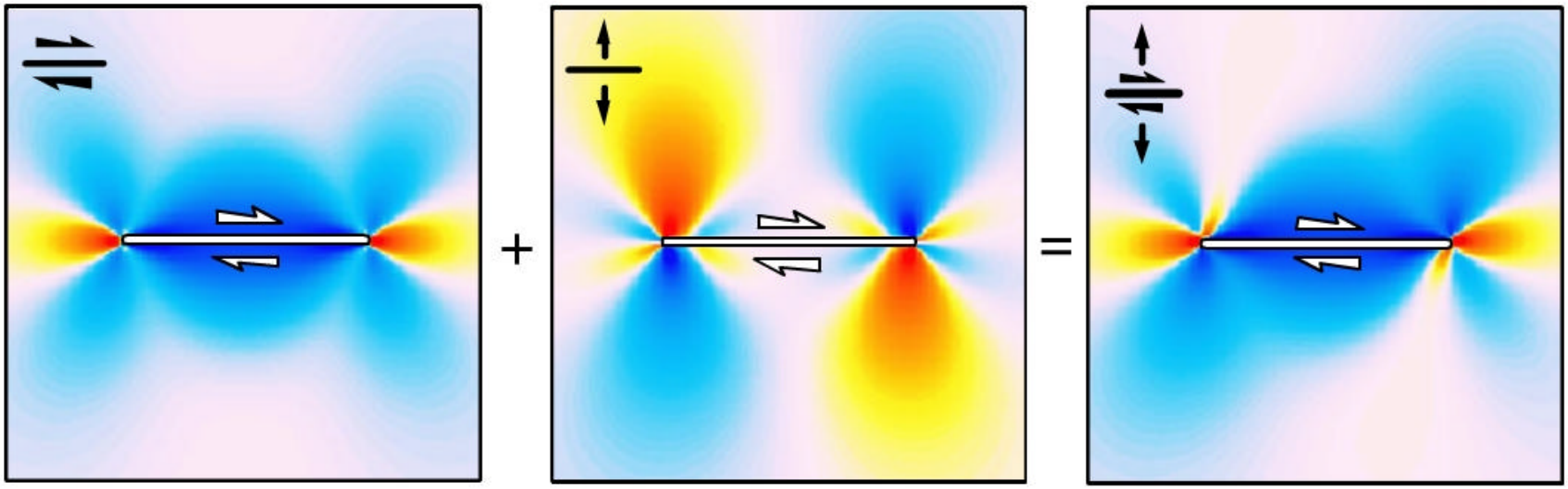


A series of seemingly triggered earthquakes on the North Anatolian Transform Fault.



How the Coulomb Stress Change is Calculated

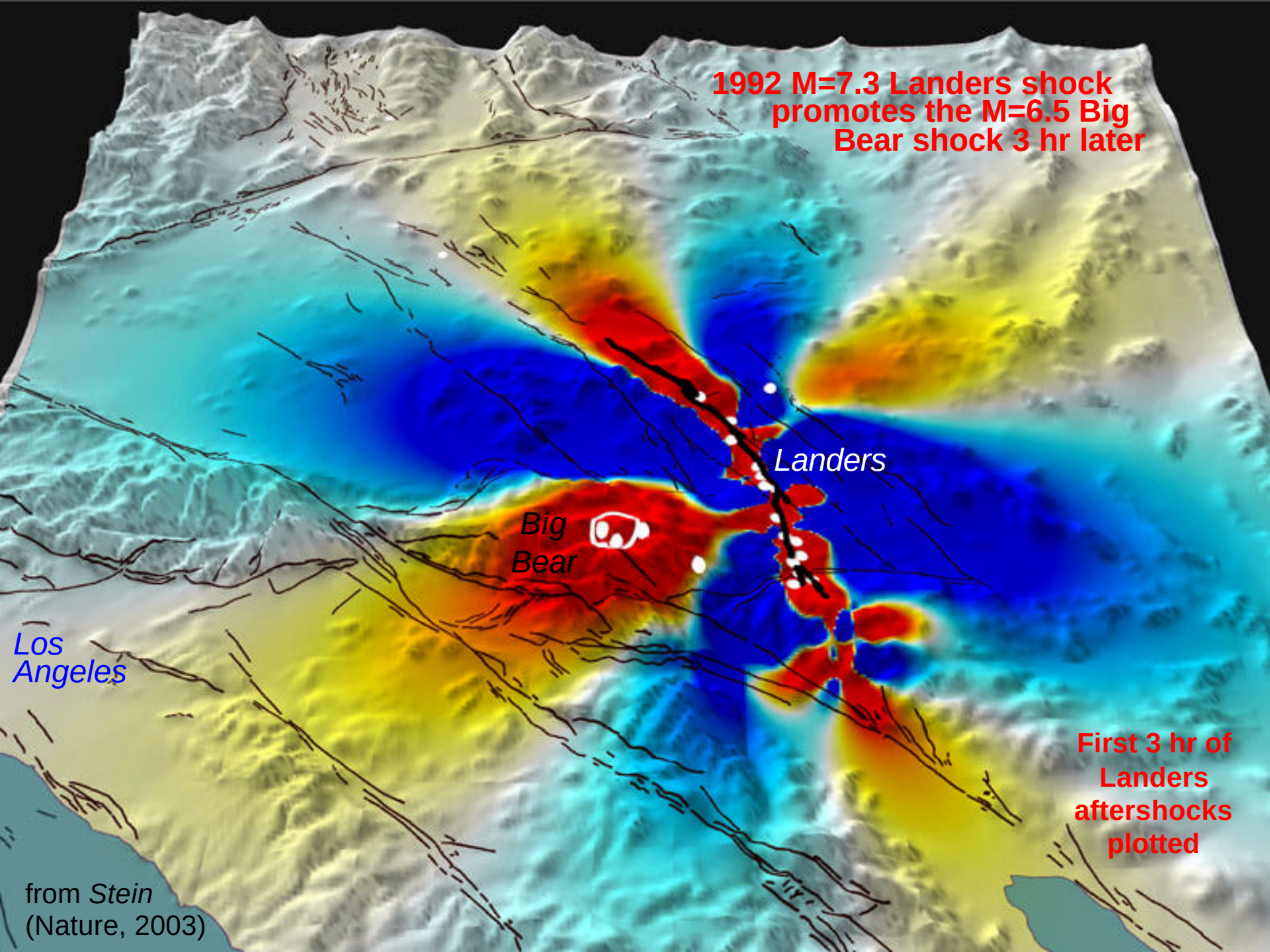
Stress Rise Drop

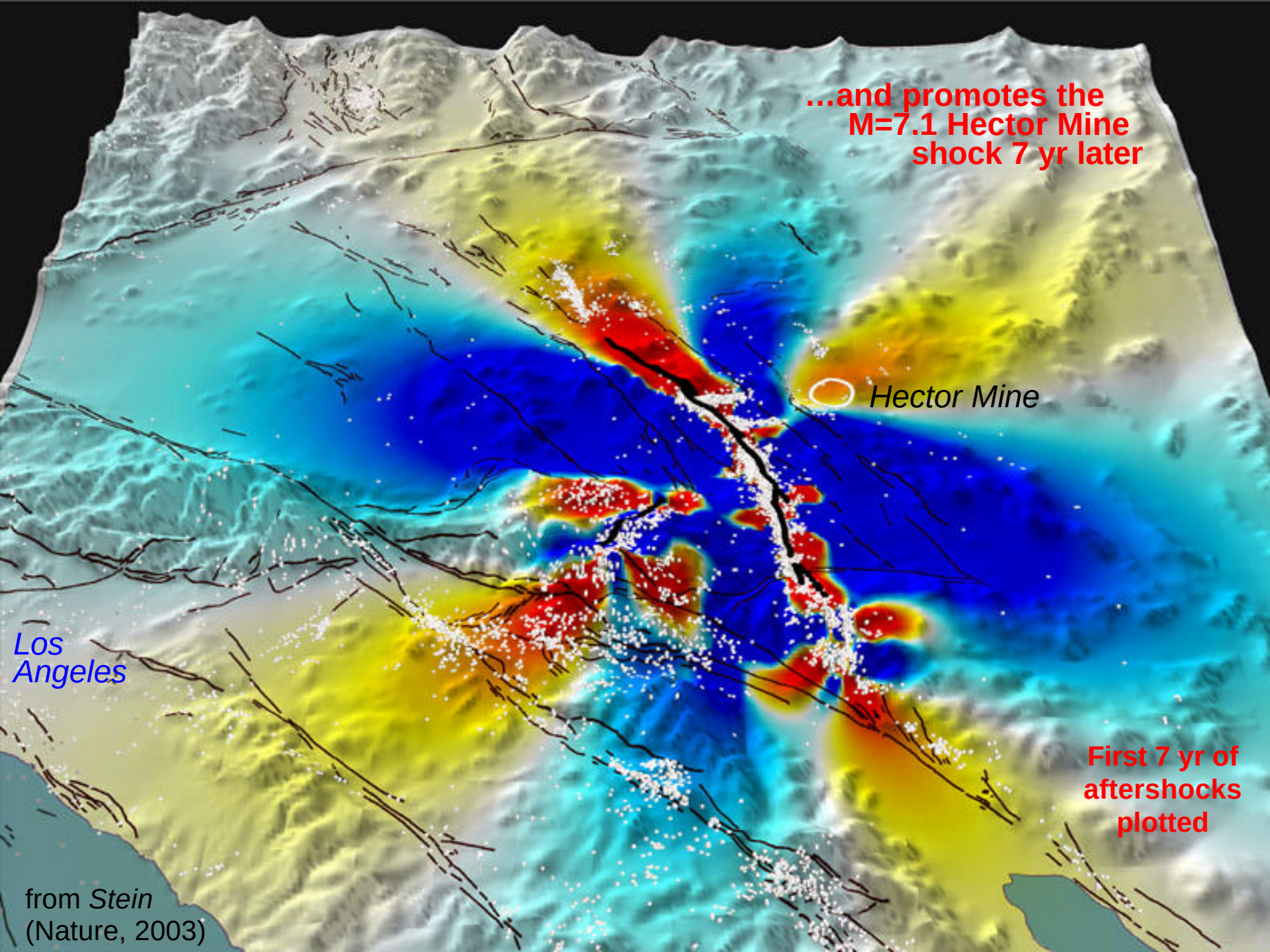


Shear stress change	+	Friction coefficient x normal stress change	=	Coulomb failure stress change
$\Delta\tau_s$	+	$\mu' (\Delta\sigma_n)$	=	$\Delta\sigma_f$

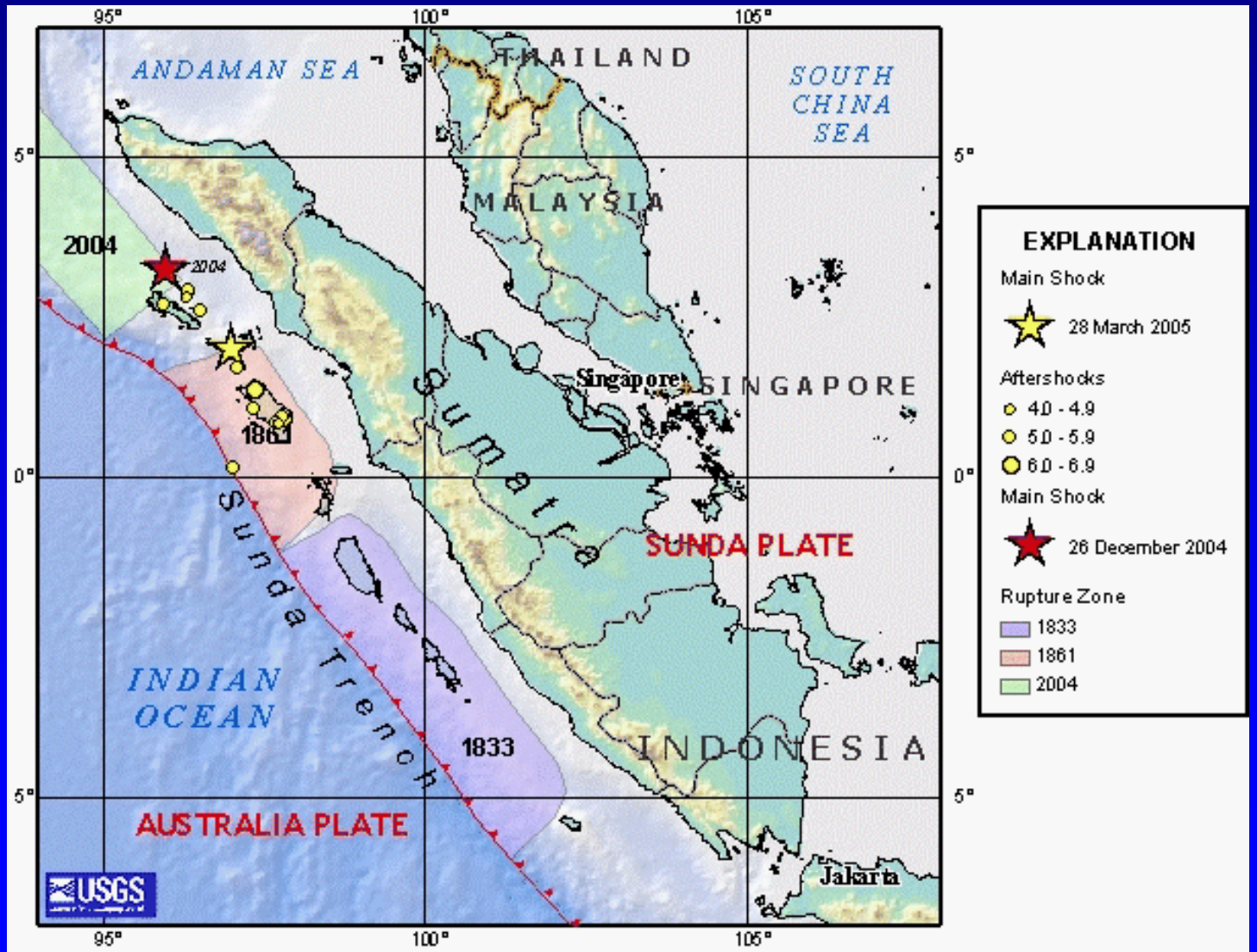
- Example calculation for faults parallel to master fault

From King et al (BSSA, 1994)

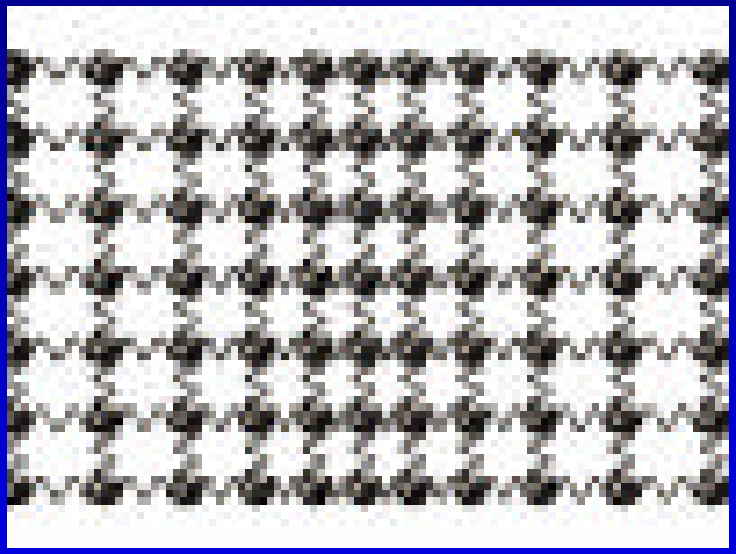

1992 M=7.3 Landers shock promotes the M=6.5 Big Bear shock 3 hr later
Landers
Big Bear
Los Angeles
First 3 hr of Landers aftershocks plotted
from Stein (Nature, 2003)


...and promotes the
M=7.1 Hector Mine
shock 7 yr later
Hector Mine
Los
Angeles
First 7 yr of
aftershocks
plotted
from Stein
(Nature, 2003)

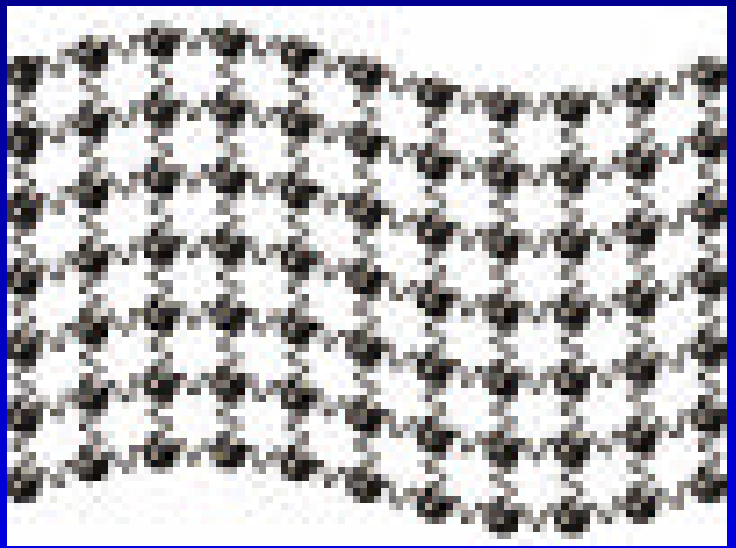
It appears the Sumatra M 9.3(?) earthquake on December 26, 2004 triggered the M 8.7 earthquake on March 28, 2005.



Seismic Wave Propagation



P

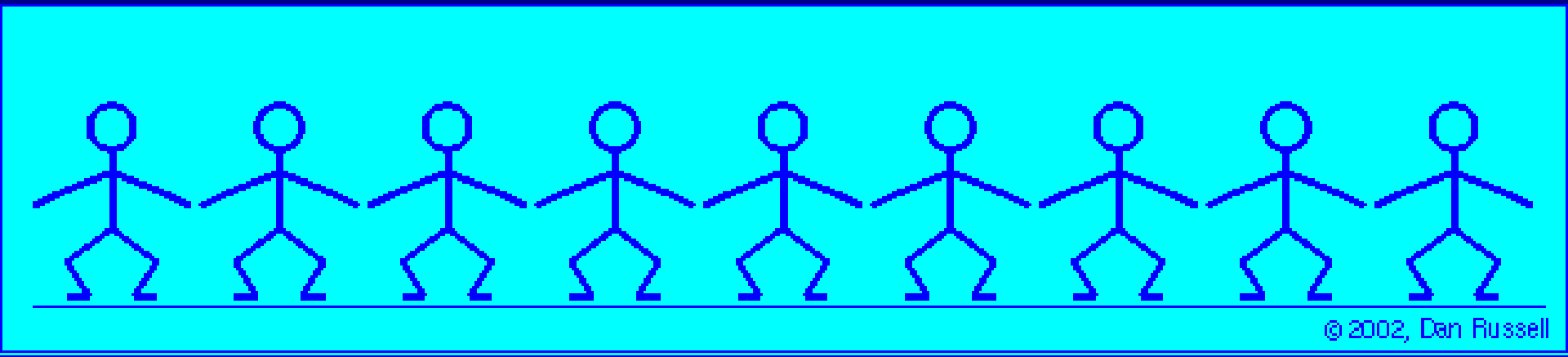


S

The wave *speed* depends on the ***resistance*** of the material to being compressed or sheared

- S wave speed depends on *rigidity*, the resistance to shear
  - Fluids (like air or water) have *no* rigidity.
- P wave speed depends on both *rigidity* and *incompressibility*, the resistance to being compressed
  - P waves travel faster than S waves

The Human Wave



- P wave in a solid
- S wave in a solid
- P wave in a fluid
- S wave in a fluid