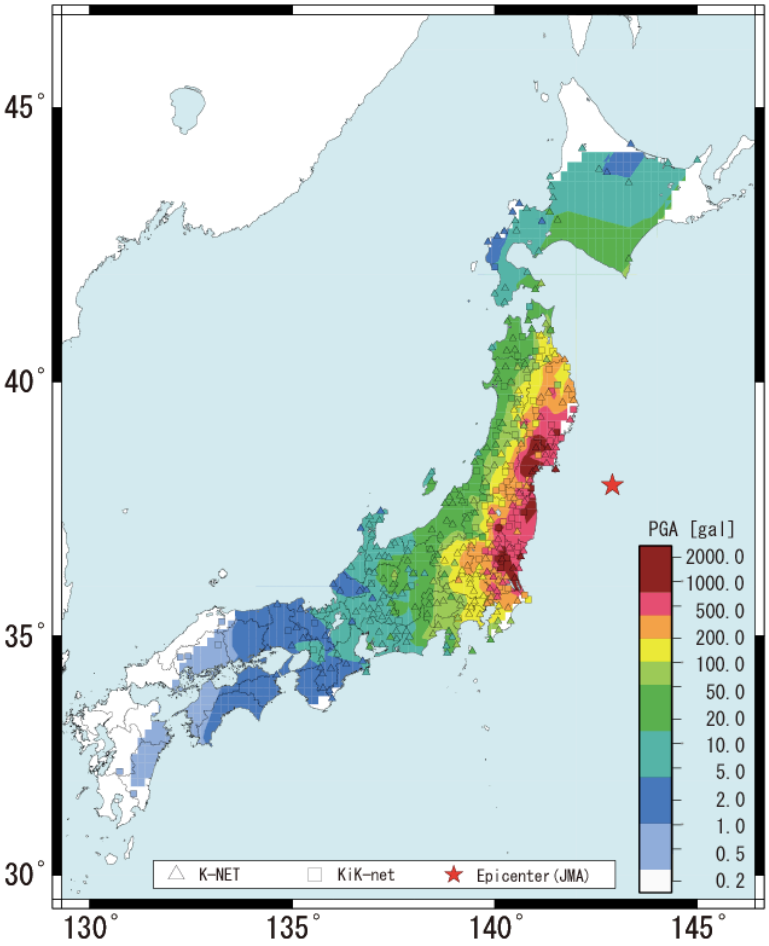
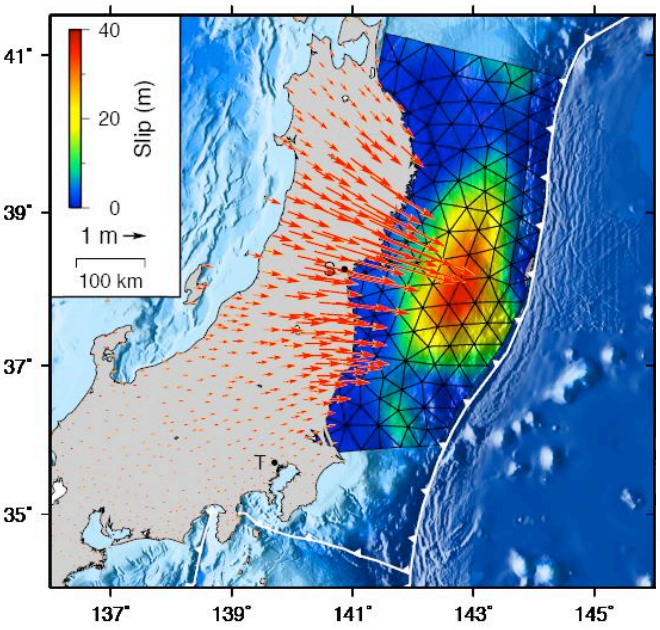


strong motion data: **huge** accelerations over a **large** area (USGS Shakemap had said Mercalli intensity of 7 - too low)

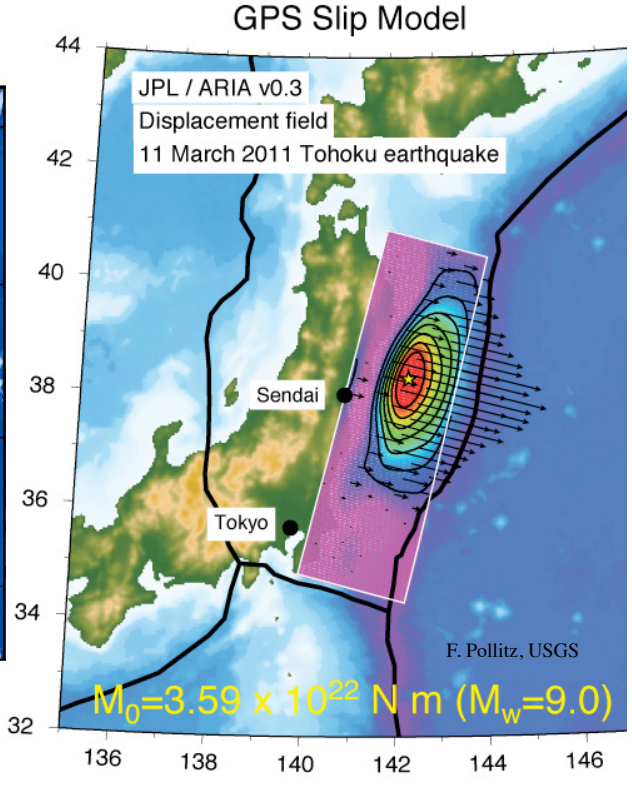
Compare these data with Sumatra (no strong motion record) and Chile (2 or 3 strong motion records)

Relatively small slip patch for a M 9 earthquake (slip estimates from GPS and surface waves are available: here are two GPS inversions)

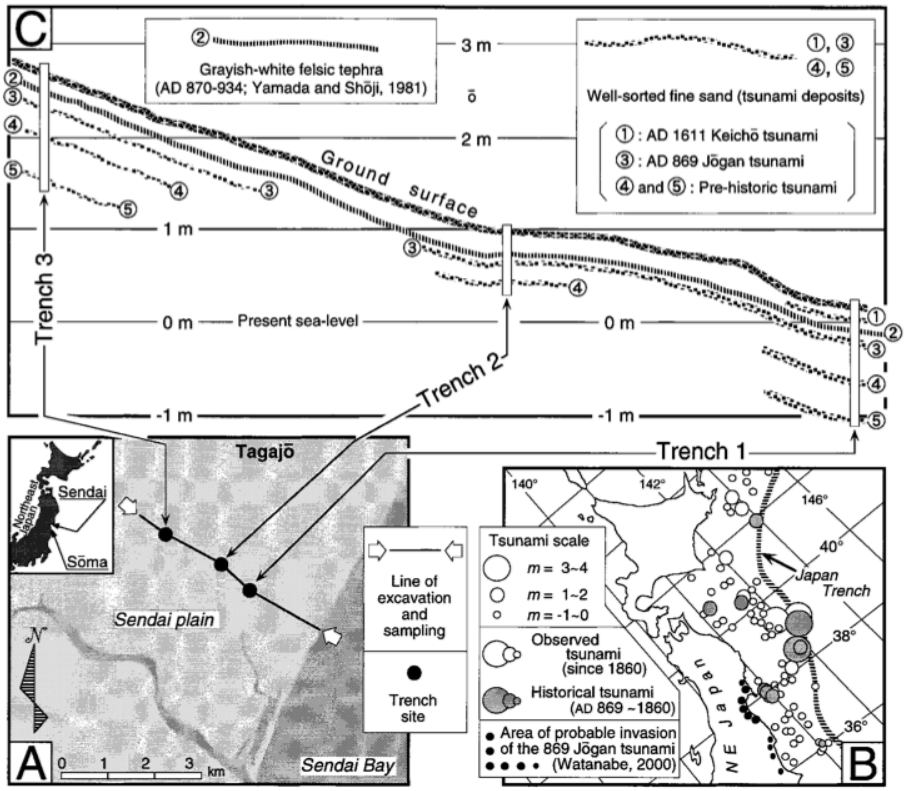


M. Simons, F. Ortega, J. Jiang, A. Sladen, and S. Minson at Caltech

"Damping parameters were chosen by sense of smell."

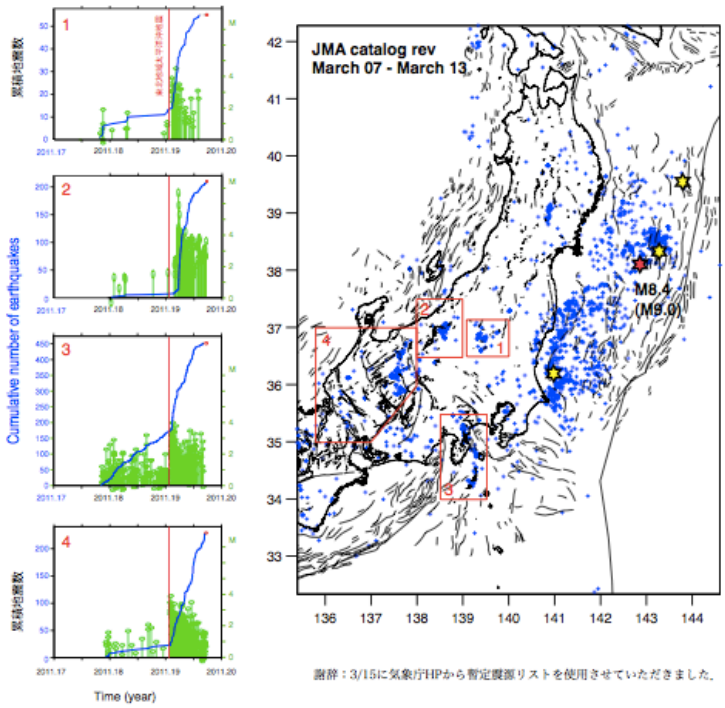


The 869 Jogan tsunami deposit and recurrence interval of large-scale tsunami on the Pacific coast of northeast Japan, Minoura et al., *Journal of Natural Disaster Science, Volume 23, Number 2, 2001, pp. 83-88***.**



"... gigantic tsunamis occurred three times during the last 3000 years ... The recurrence interval for a large-scale tsunami is 800 to 1100 years. More than 1100 years have passed since the Jogan tsunami and, given the reoccurrence interval, the possibility of a large tsunami striking the Sendai plain is high. Our numerical findings indicate that a tsunami similar to the Jogan one would inundate the present coastal plain for about 2.5 to 3 km inland."

JMA seismicity at several remote sites during March 7-13 reveals seismicity rate jumps followed by decays at many sites up to 300 km from the M=9.0 mainshock rupture



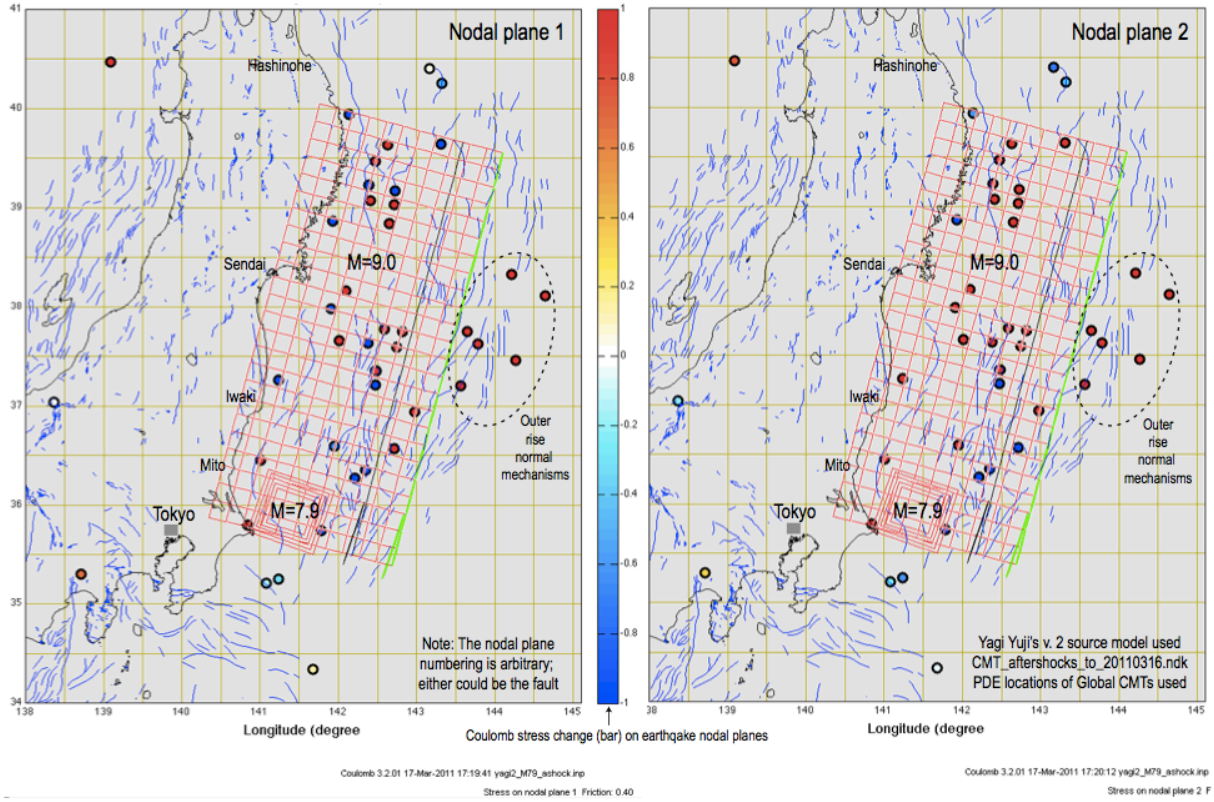
謝辞：3/15に気象庁HPから暫定震源リストを使用させていただきました。

東北地方太平洋沖地震にともなって地震活動が活発化した可能性がある地域の例

Shinji Toda (DPRI, Kyoto University) 16 March 2011

Testing the Coulomb hypothesis and earthquake source model on nodal planes of the 44 CMT aftershocks during 11-16 March 2011

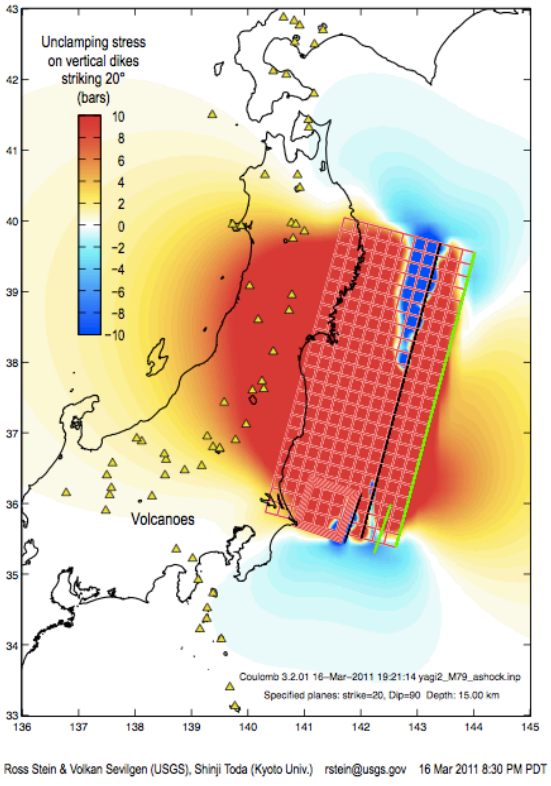
67% of nodal planes were brought closer to failure by the M=9.0 mainshock and its M=7.9 aftershock (compared to 53% of 1977-2011 pre-mainshock CMTs, the control population)



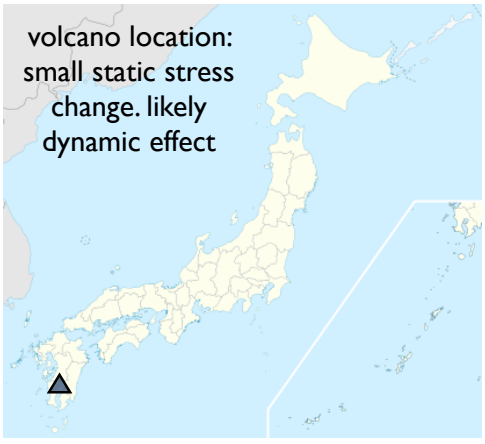
Shinmoedake Volcano Erupts in Japan

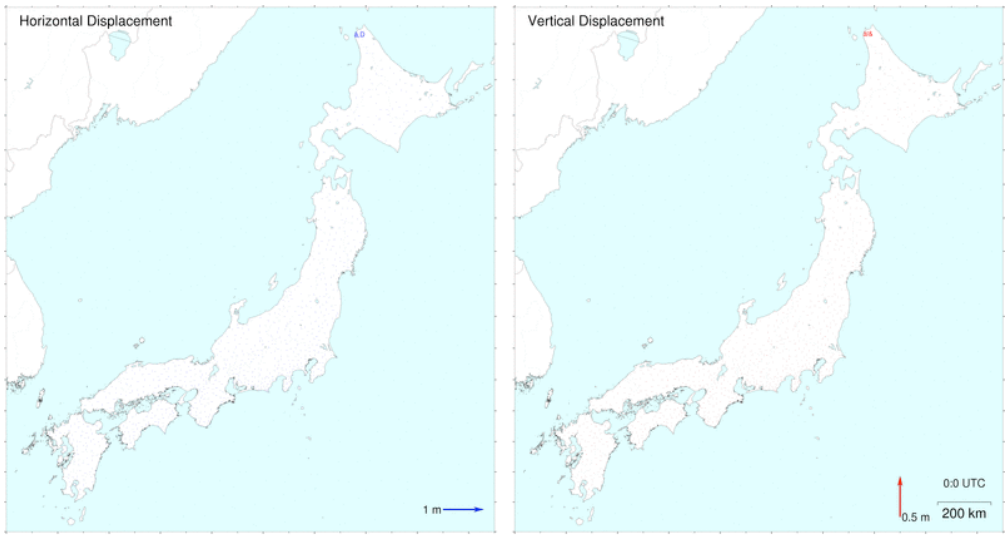
Sunday's activity was described as the most violent in 52 years and did its share in causing hundreds to flee and shattering windows four miles away, the BBC reported.

Vertical dikes presumed to feed active volcanoes are strongly unclamped

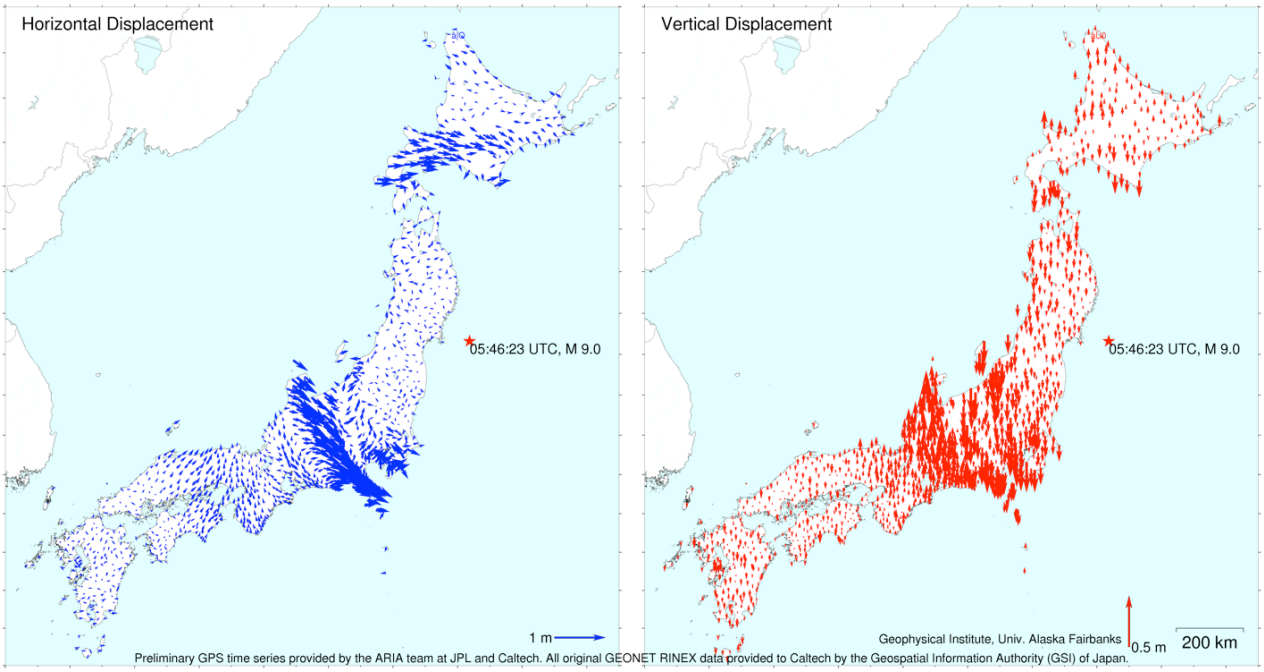


Ross Stein & Volkan Sevilgen (USGS), Shinji Toda (Kyoto Univ.) rstein@usgs.gov 16 Mar 2011 8:30 PM PDT





Preliminary GPS time series provided by the ARIA team at JPL and Caltech. All original GEONET RINEX data provided to Caltech by the Geospatial Information Authority (GSI) of Japan.

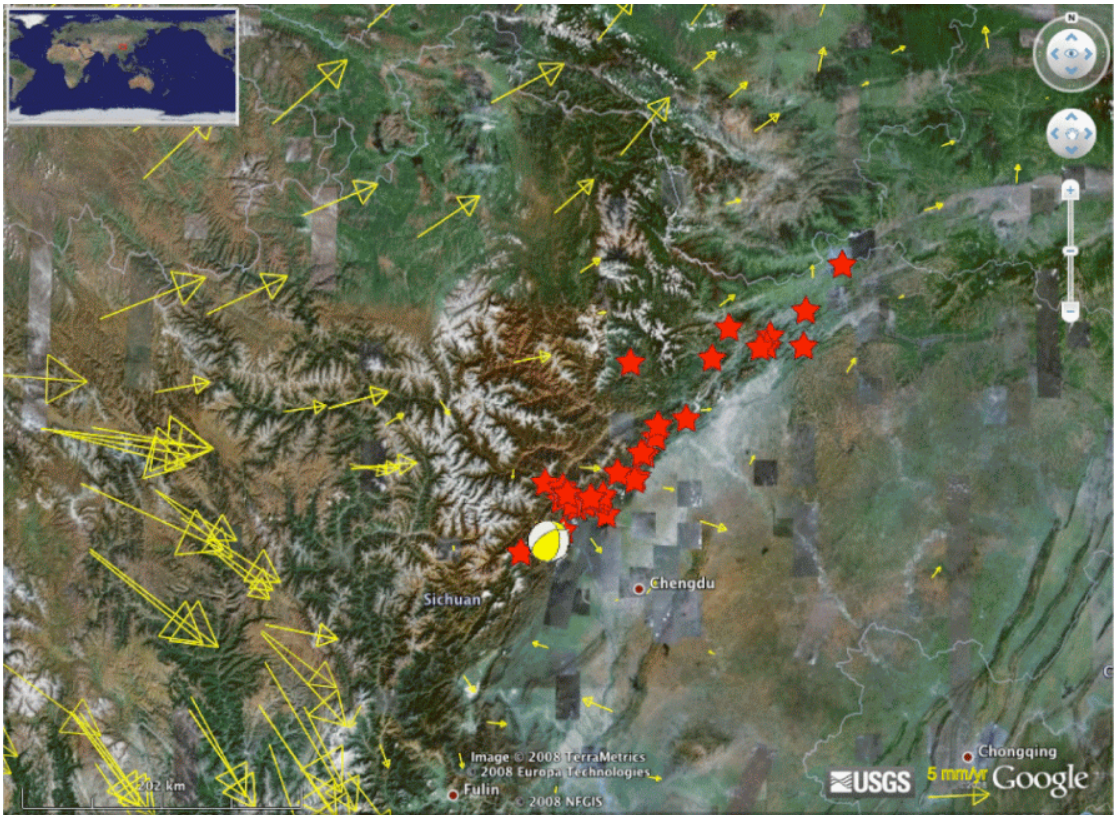


http://gps.alaska.edu/ronni/sendai2011.html

R. Grapenthein, UA Fairbanks

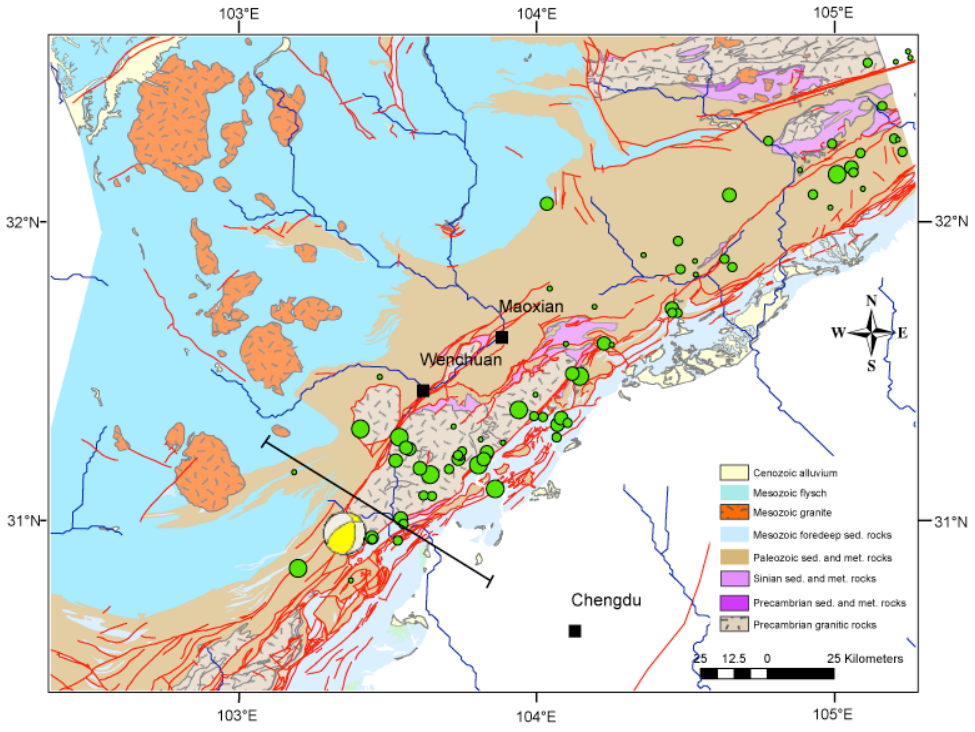
Earthquake near Wenchuan,West Sichuan, China

2008 May 12 06:28:01 UTC; Magnitude 7.9

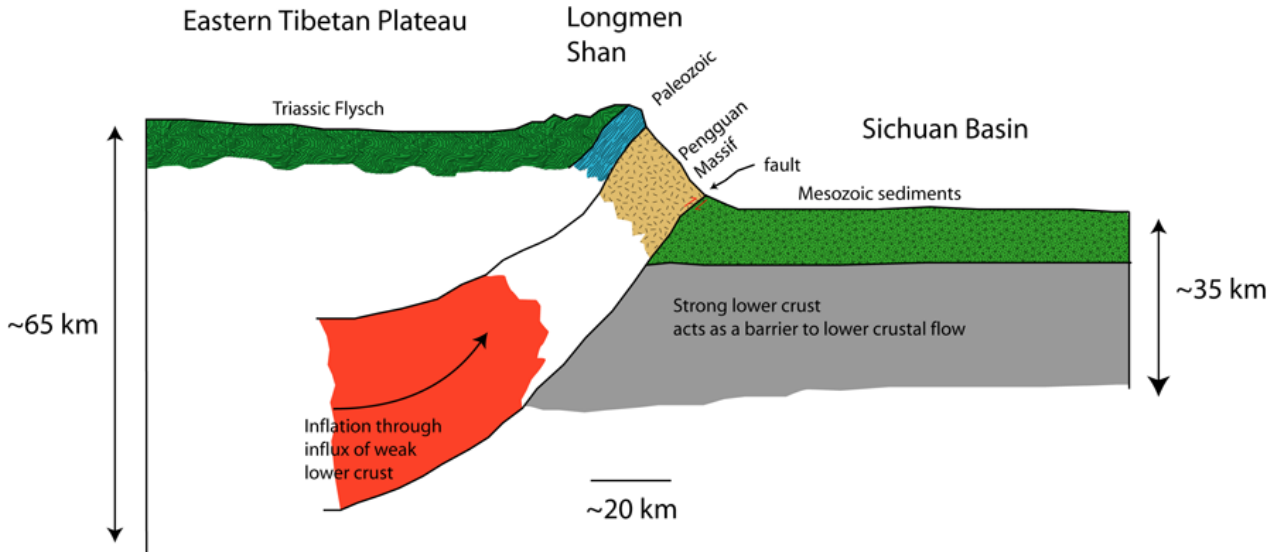


Earthquake near Wenchuan,West Sichuan, China

2008 May 12 06:28:01 UTC; Magnitude 7.9



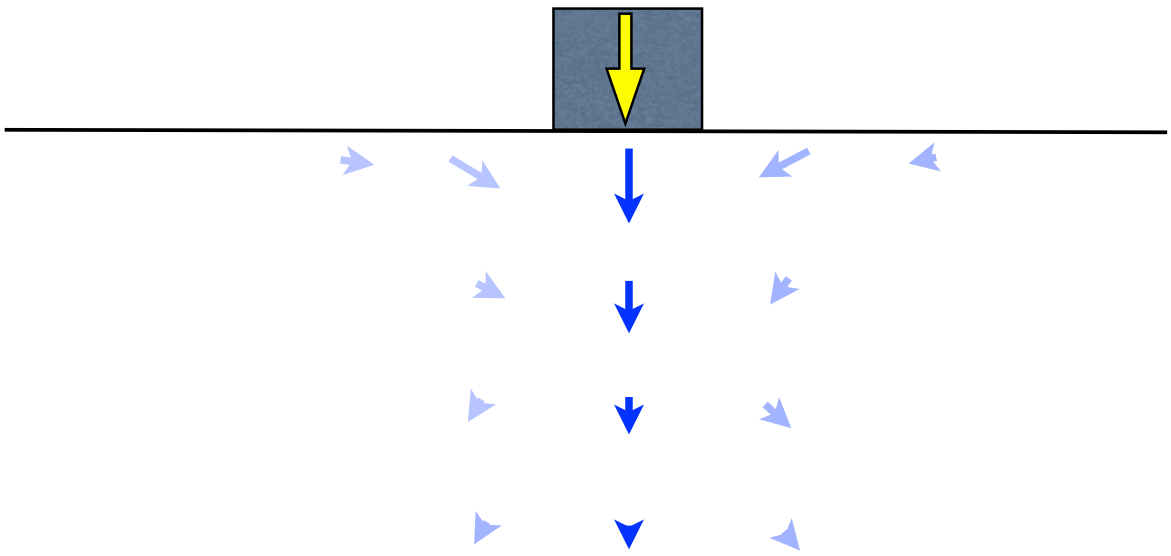
http://quake.mit.edu/~changli/wenchuan.html



$$\begin{bmatrix} \Delta\sigma_{11} & \Delta\sigma_{12} \\ \Delta\sigma_{21} & \Delta\sigma_{22} \end{bmatrix} \Rightarrow \Delta CFF = \Delta\tau + \mu_s \Delta\sigma_e$$

where

$$(\sigma_e = \sigma_n + P_p)$$

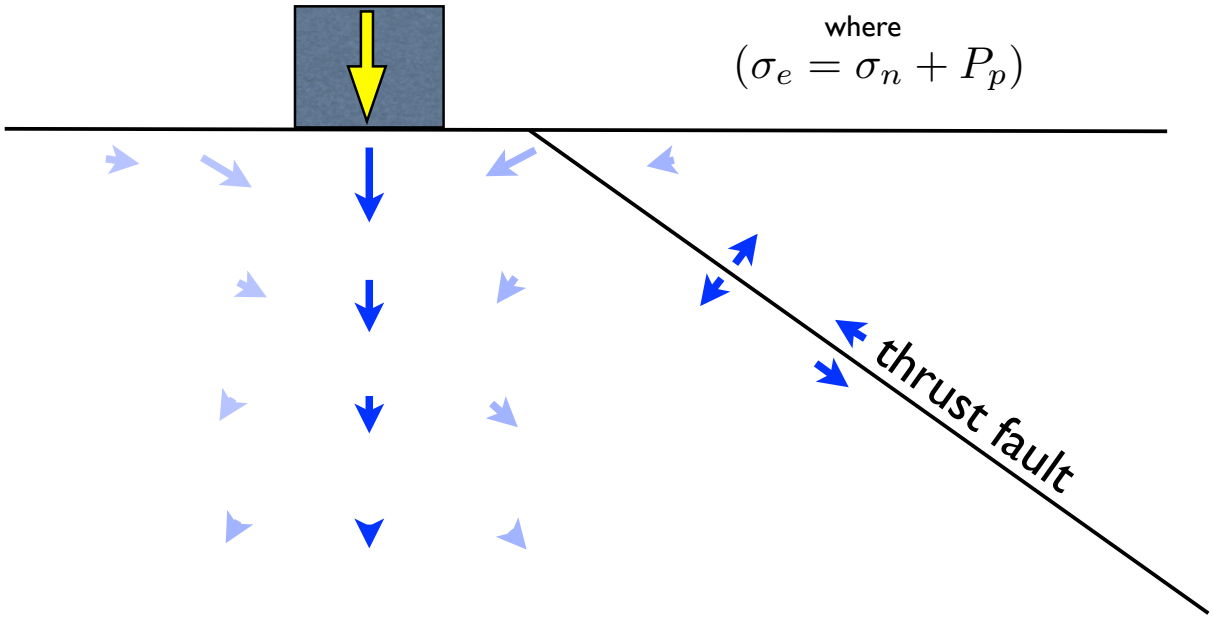


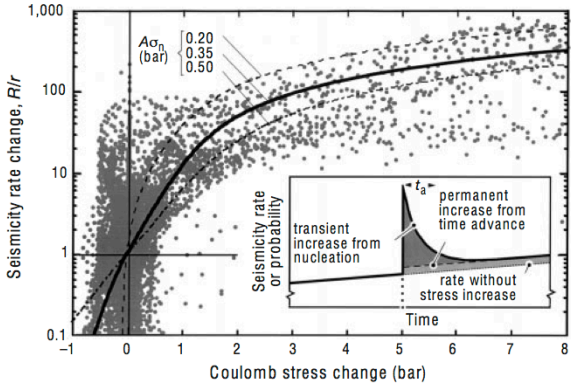
Chelungpu: load (reservoir) is on the footwall

$$\Delta CFF = \Delta\tau + \mu_s \Delta\sigma_e$$

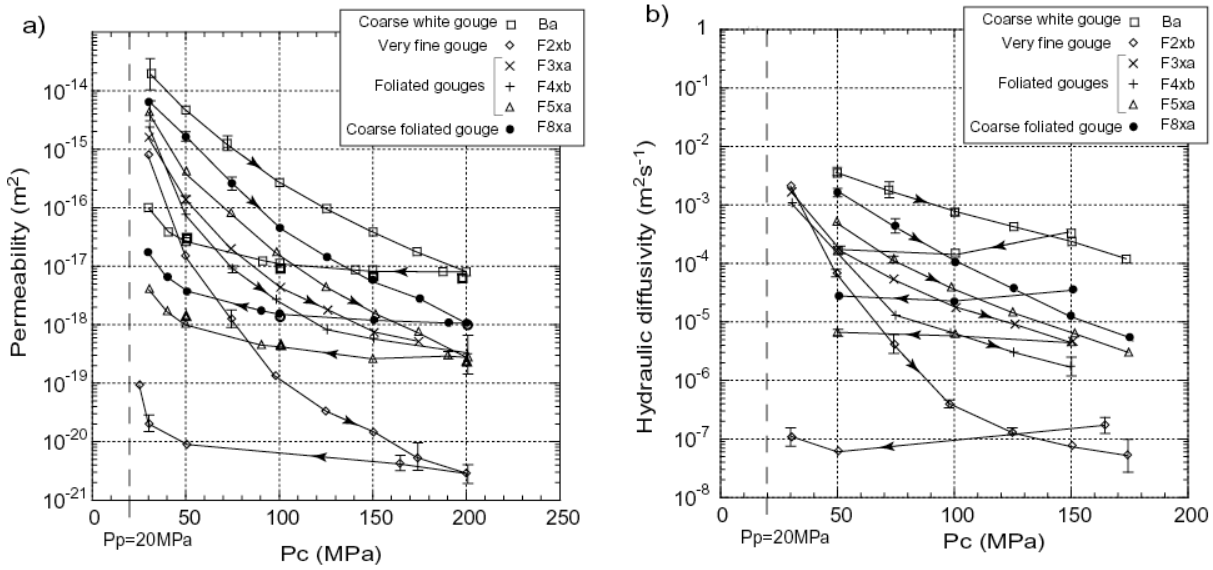
where

$$(\sigma_e = \sigma_n + P_p)$$





Stein, 1999


a)
Coarse white gouge Ba
Very fine gouge F2xb
Foliated gouges F3xa
F4xb
F5xa
Coarse foliated gouge F8xa
Permeability (m²)
Pp=20MPa
Pc (MPa)
b)
Hydraulic diffusivity (m²s⁻¹)
Pp=20MPa
Pc (MPa)