



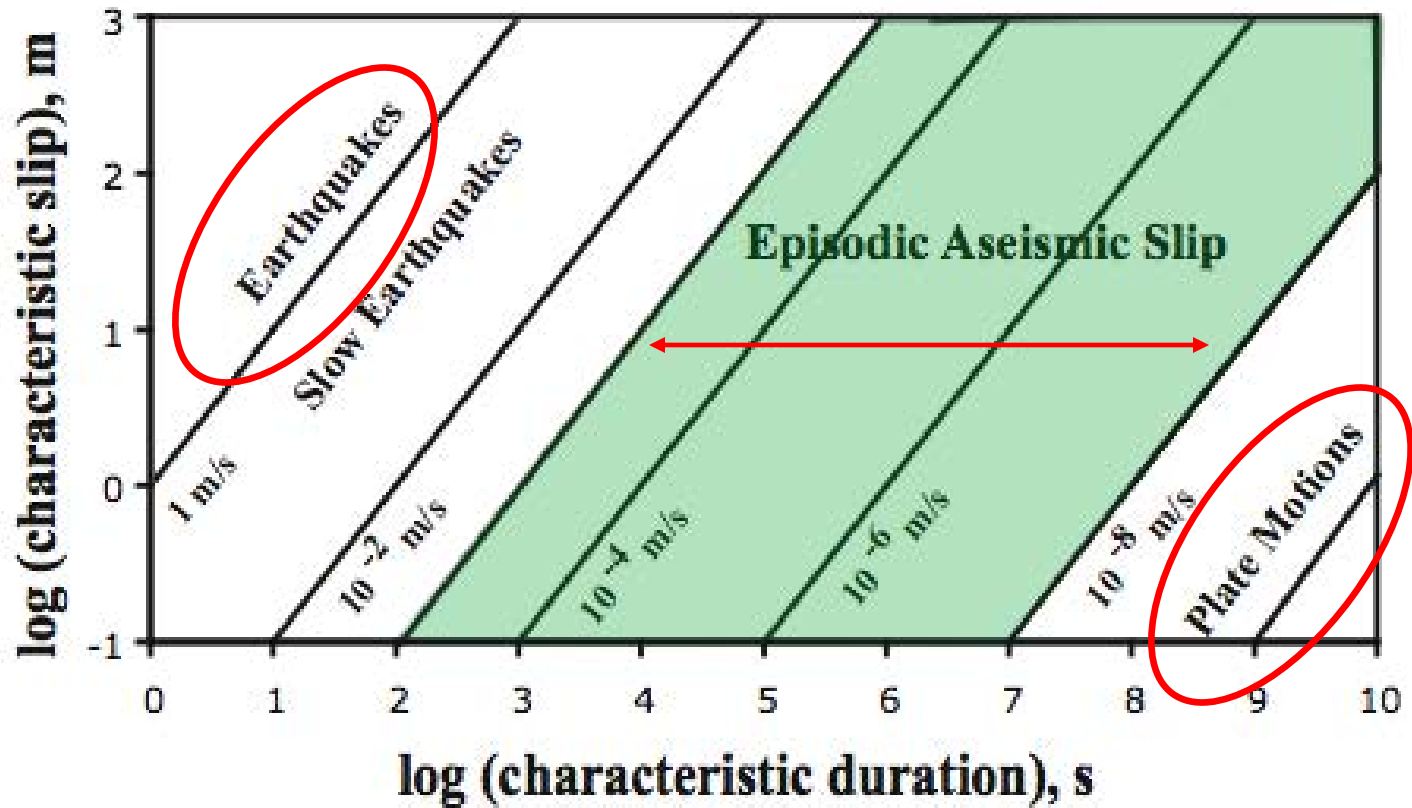
Global Comparison of Slow Slip Behavior: How Does the Alaska Margin Measure Up?

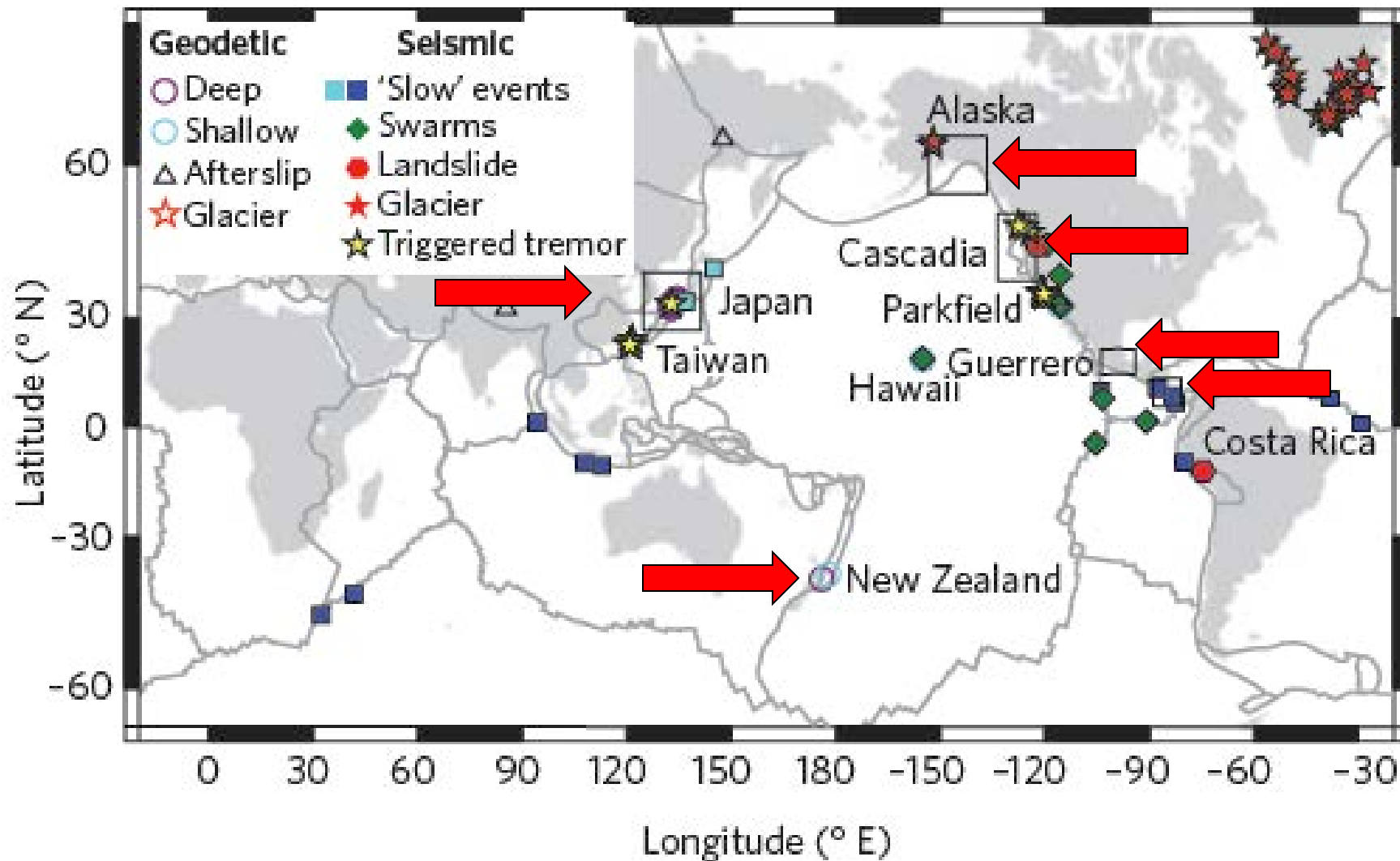
Susan Y. Schwartz



Department of Earth and Planetary Sciences, UC Santa Cruz

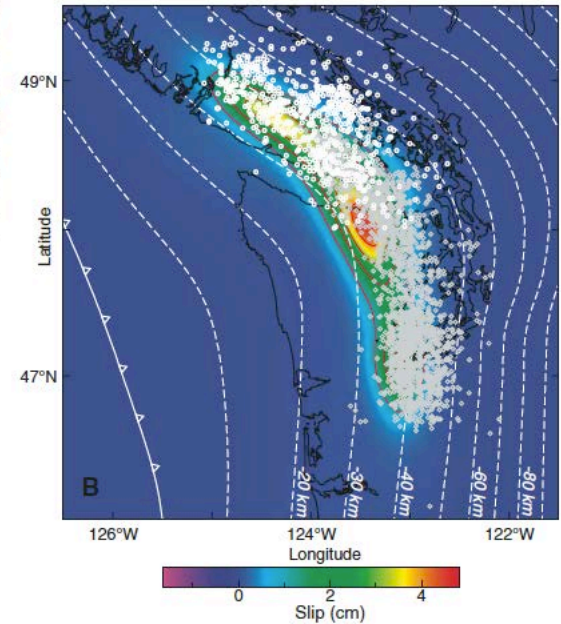
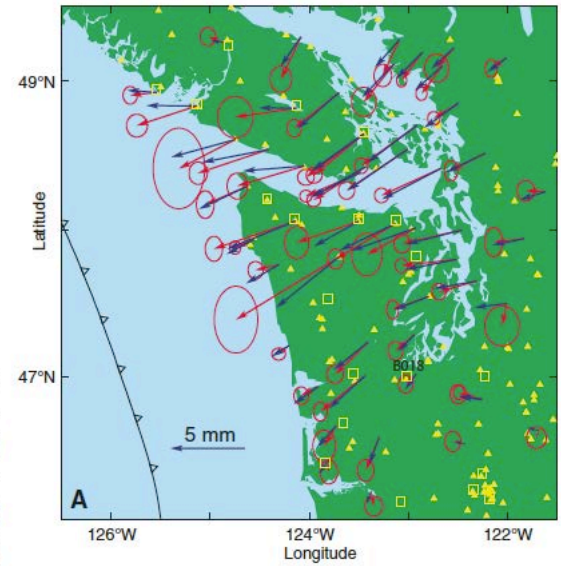
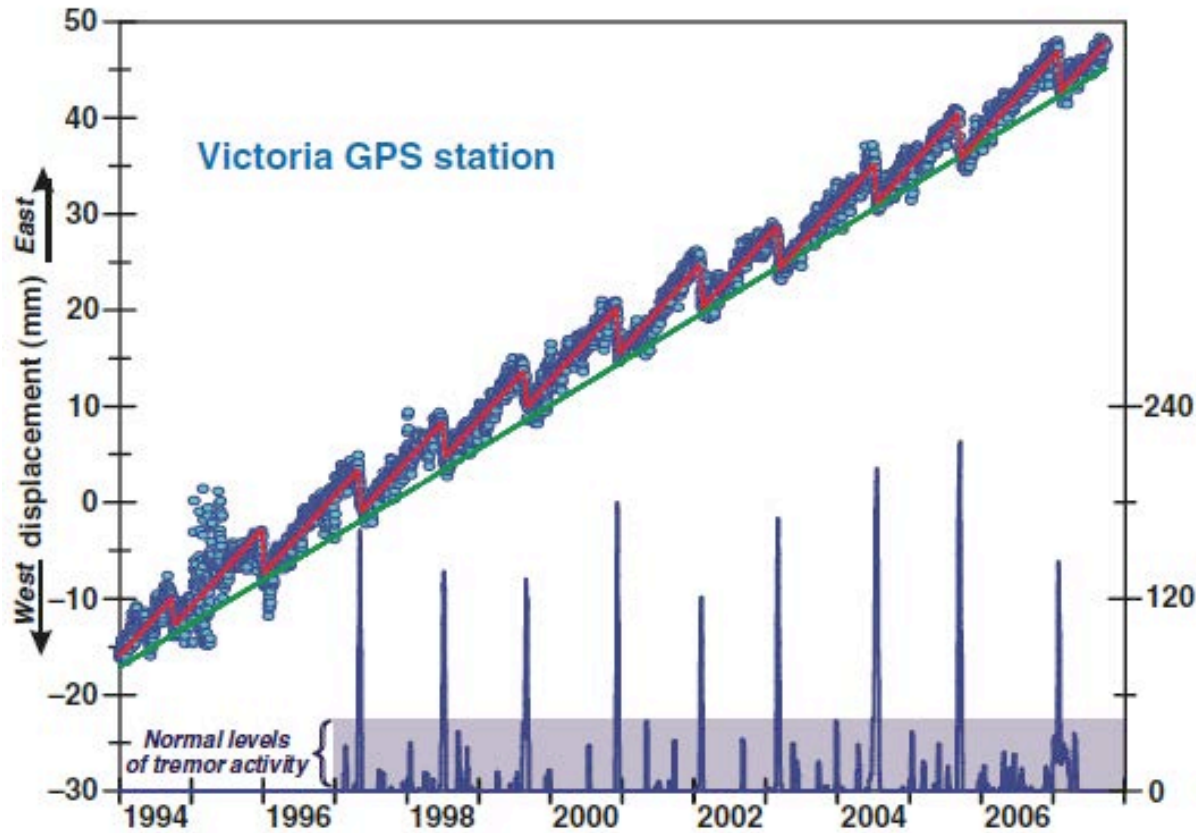
Modes of Strain Release





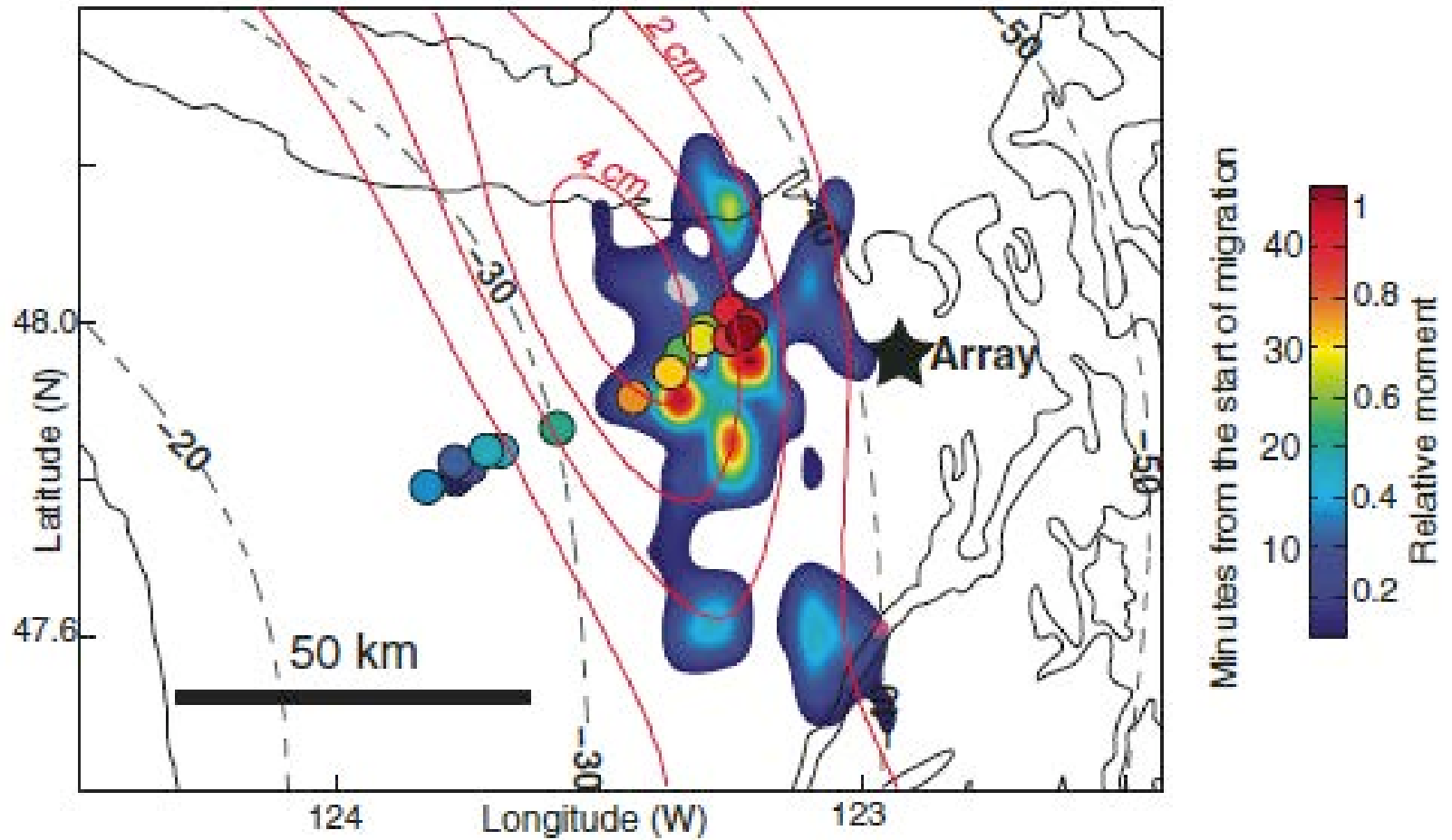
*Peng and Gomberg,
Nature Geoscience 2010*

Cascadia

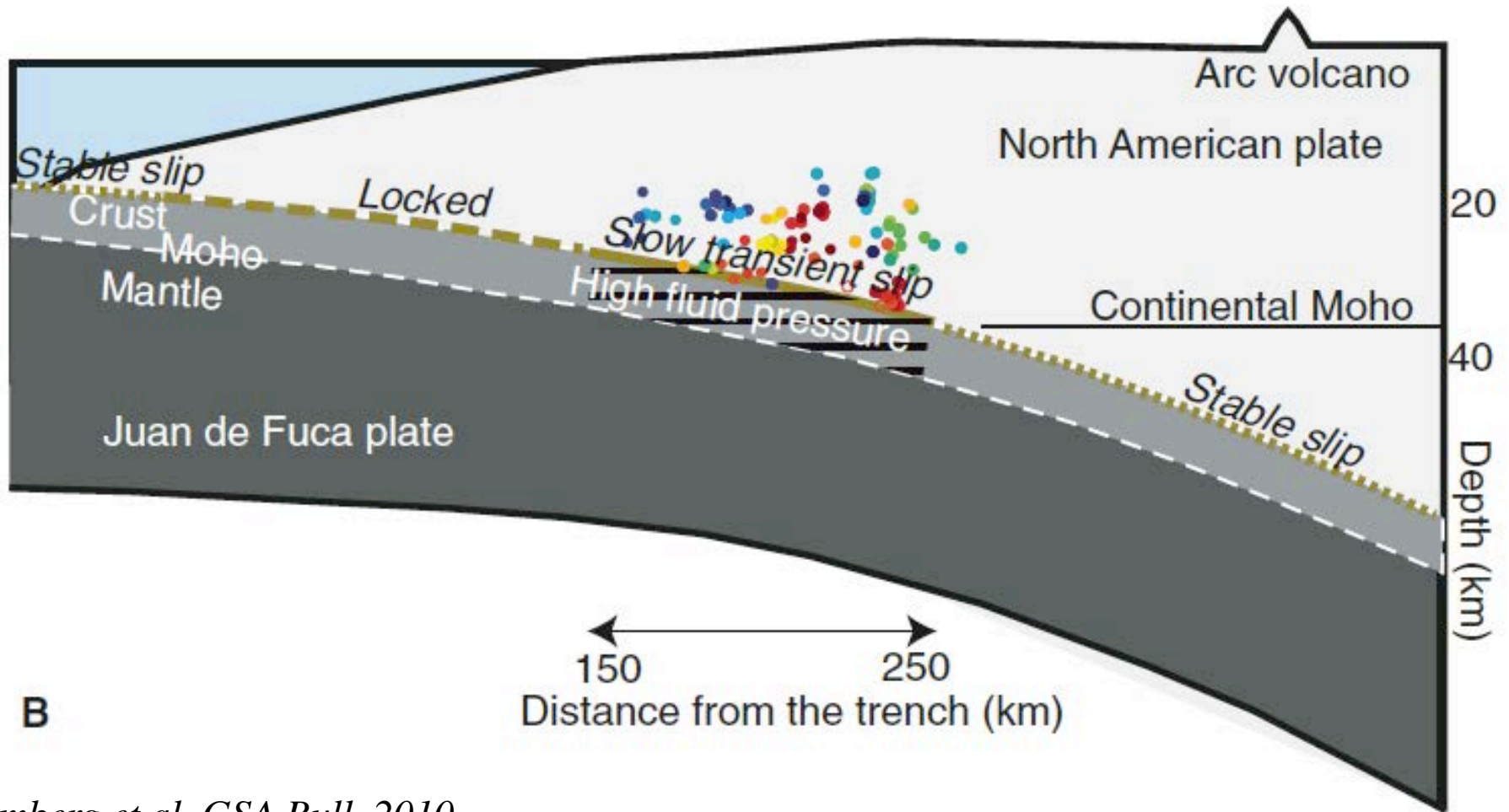


Gomberg et al, GSA Bull. 2010

Cascadia

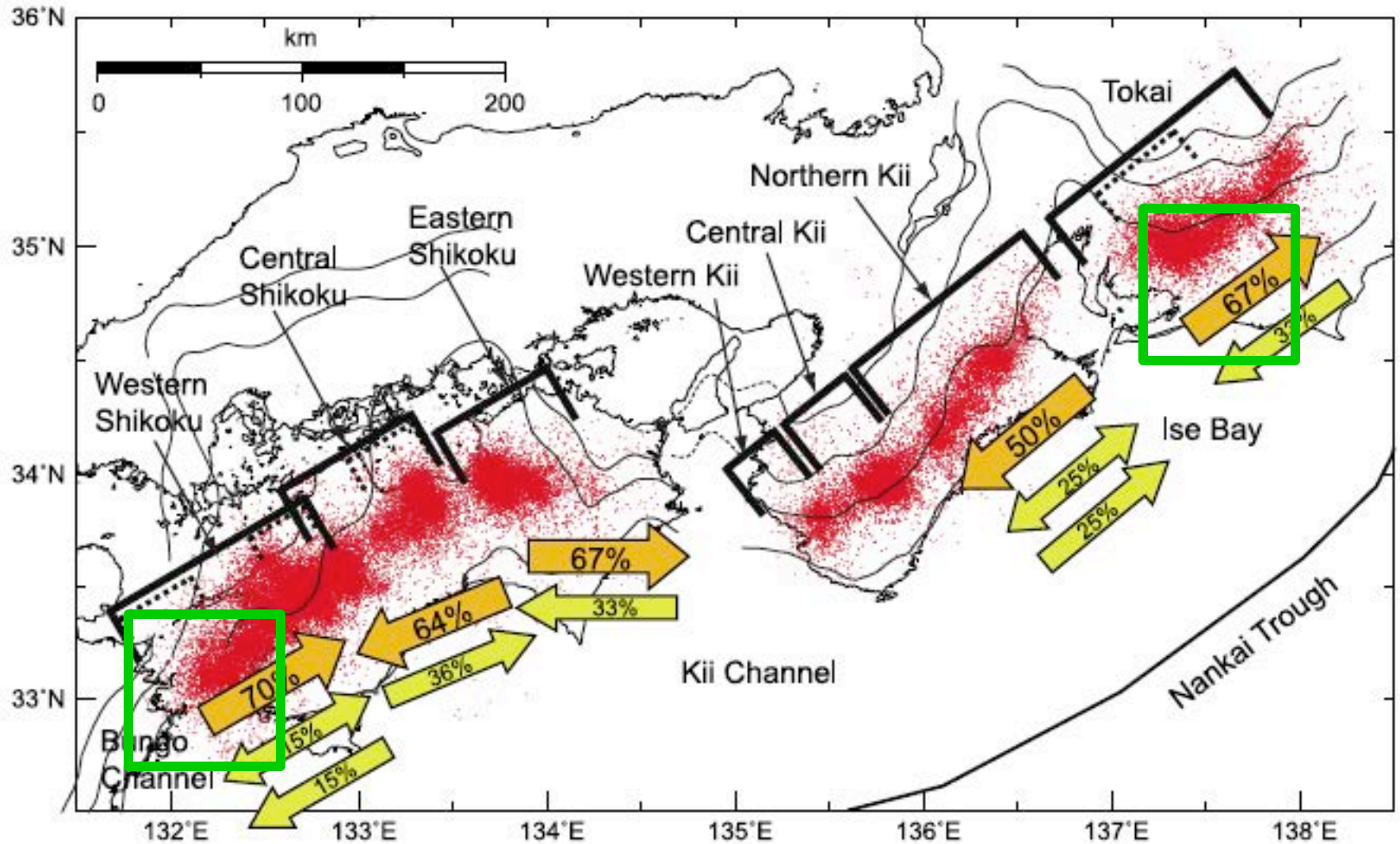


Cascadia

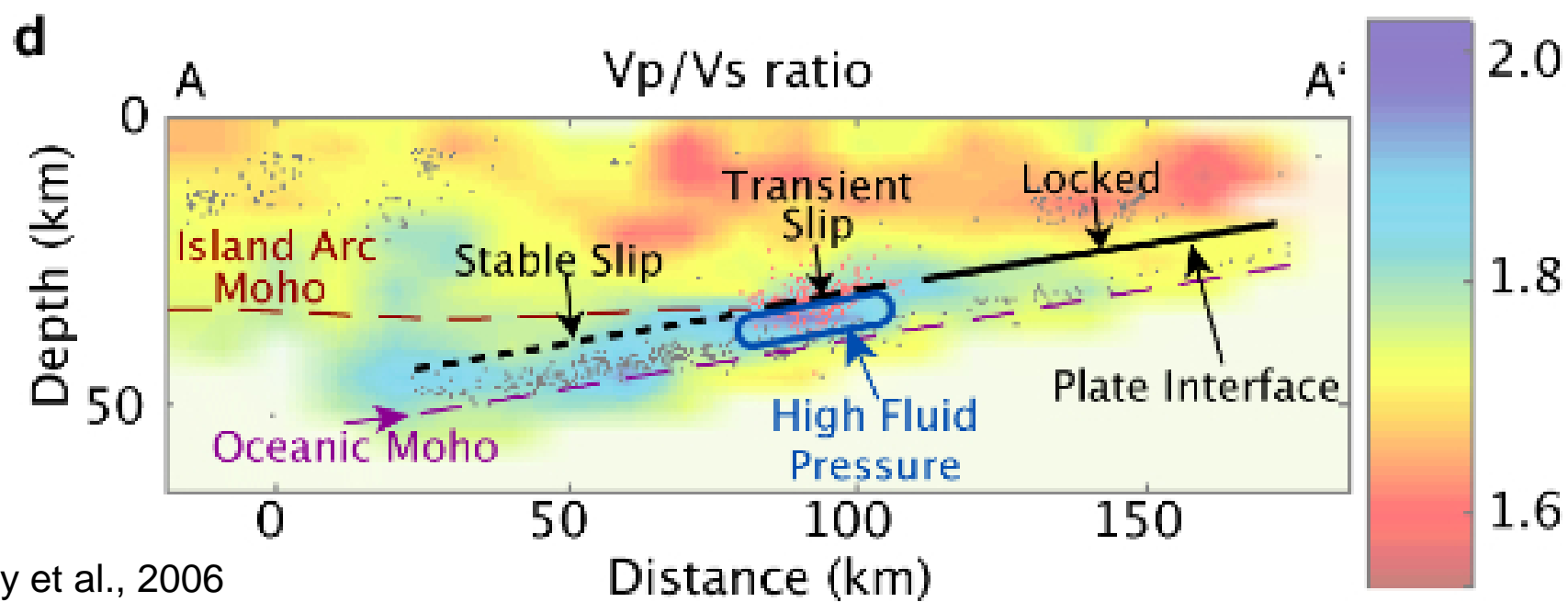
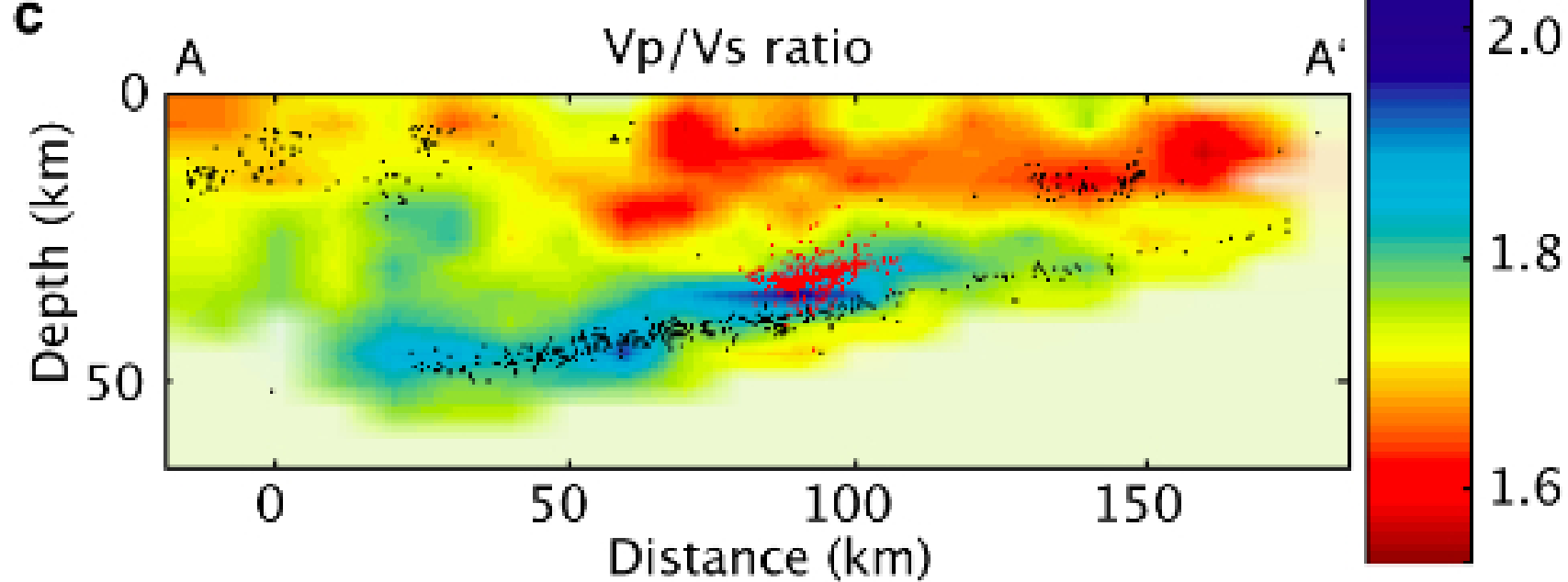


Gomberg et al, GSA Bull. 2010

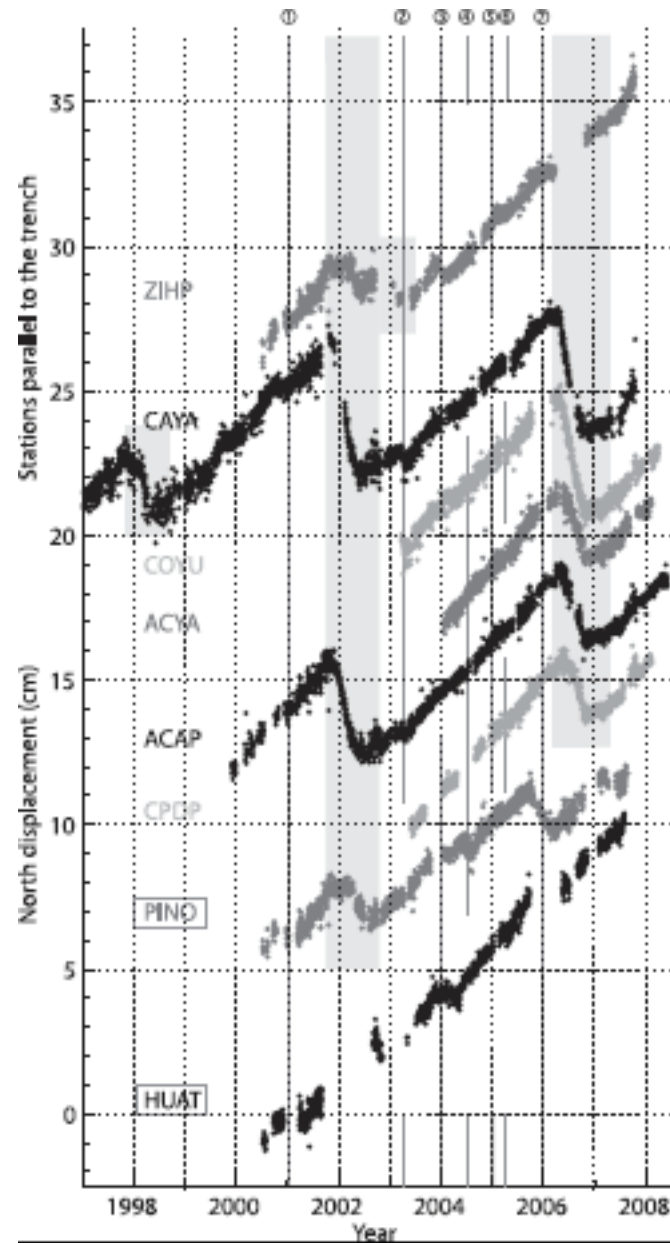
SW Japan



Obara, JGR 2010



Guerrero-Oaxaca Mexico



*Vergnolle et al., JGR,
2010*

OBSERVATIONS:

Slow slip occurs in regions inferred to have fluids

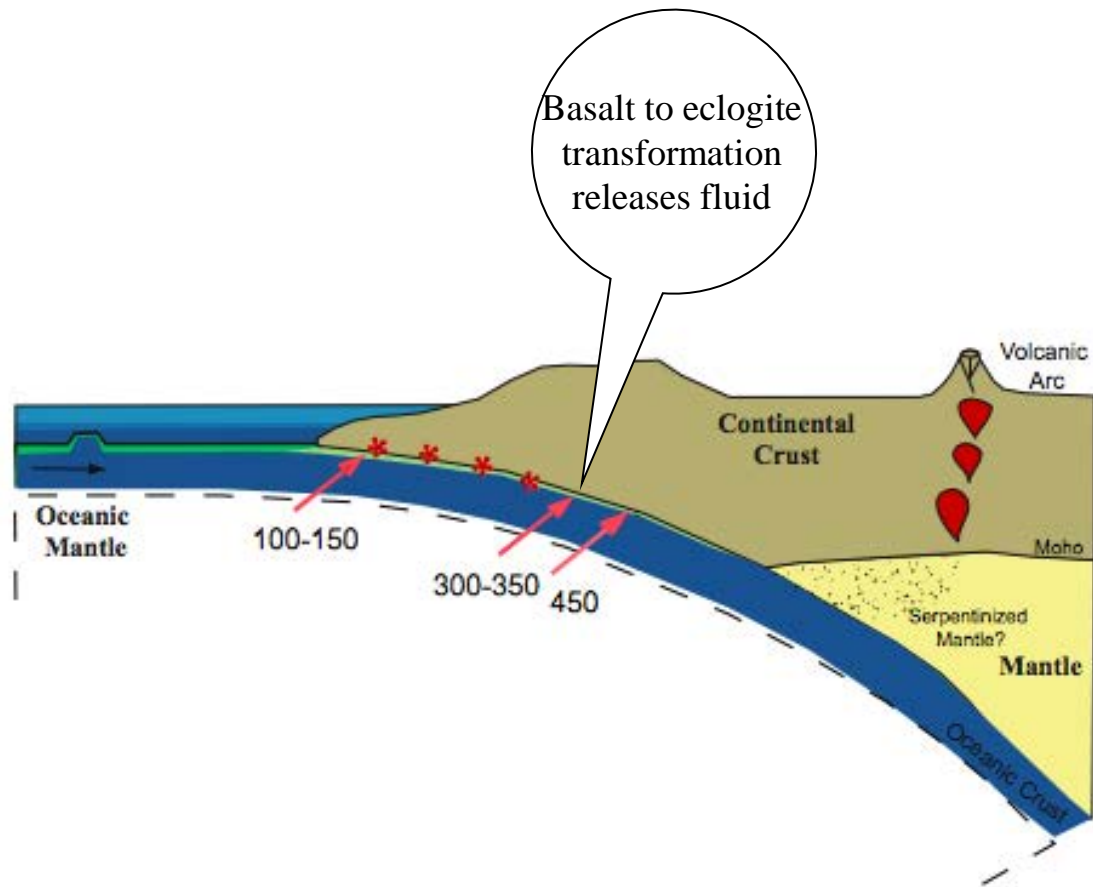
Slow slip occurs at 30-40 km depth (the downdip edge of the seismogenic zone) where $T \sim 450-550^\circ\text{C}$

IMPLICATIONS:

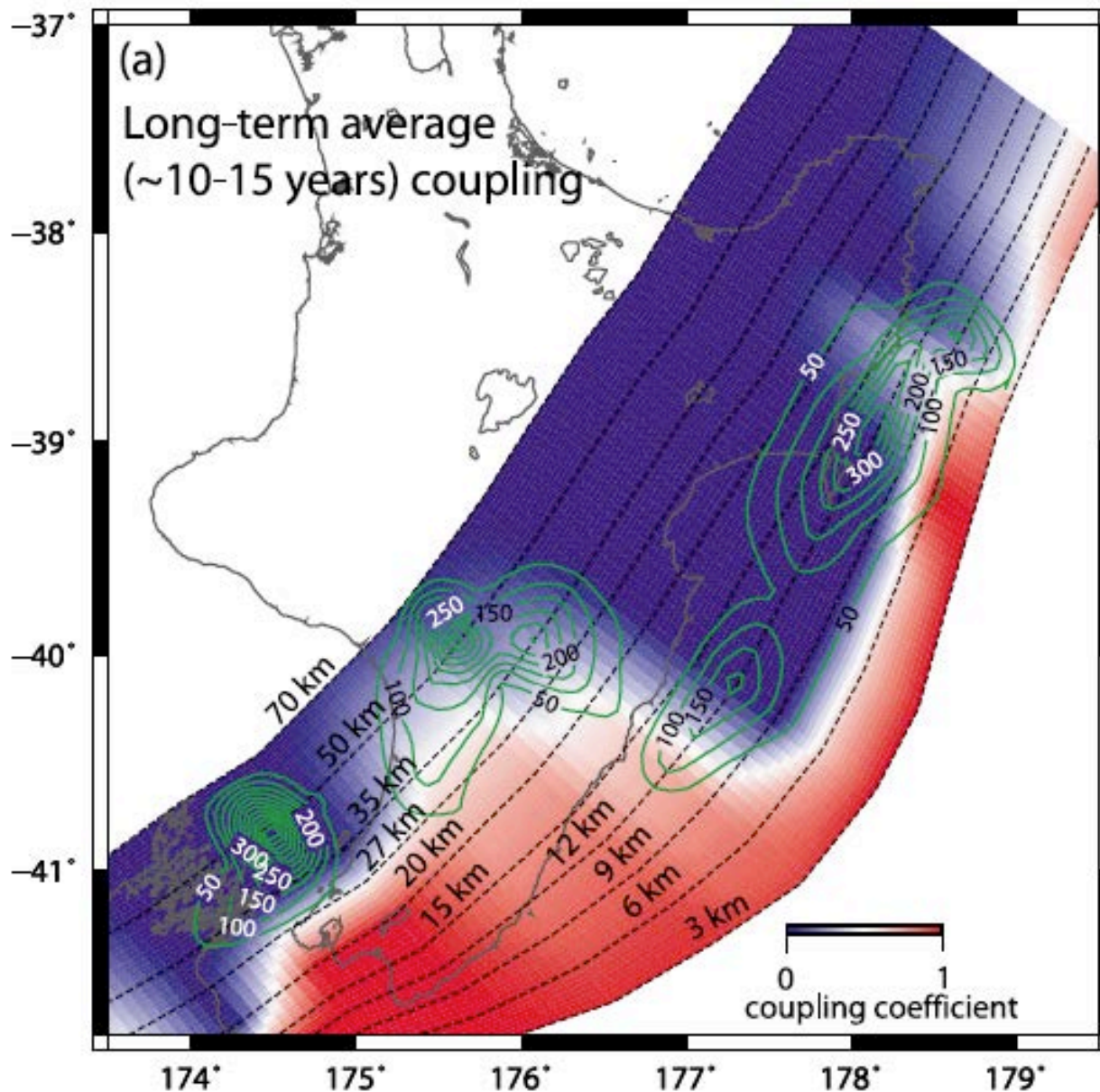
Both slow slip and tremor involve fluids released from the basalt to eclogite transformation.

PREDICTION:

Cooler subduction zones may not exhibit slow slip and tremor



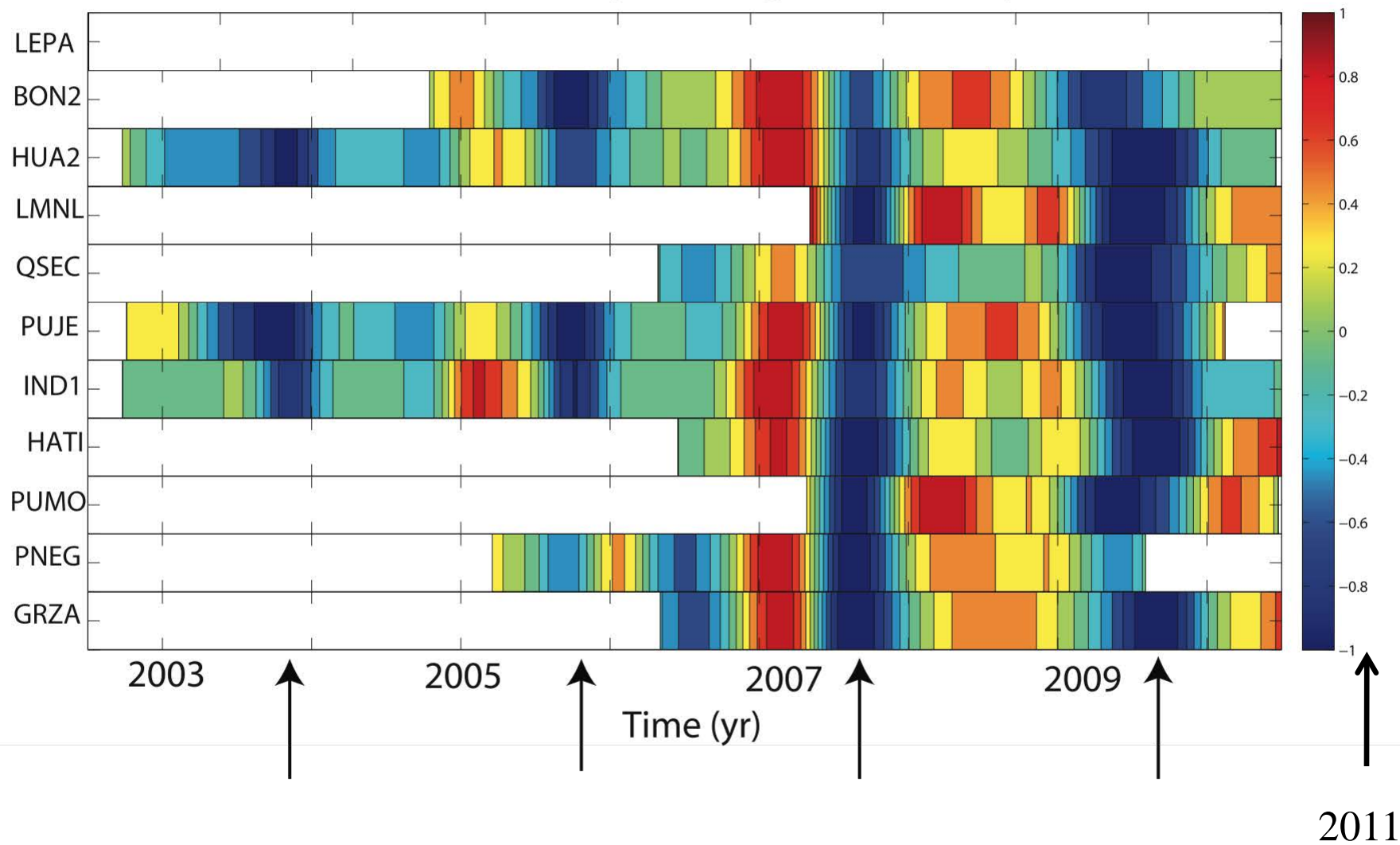
New Zealand

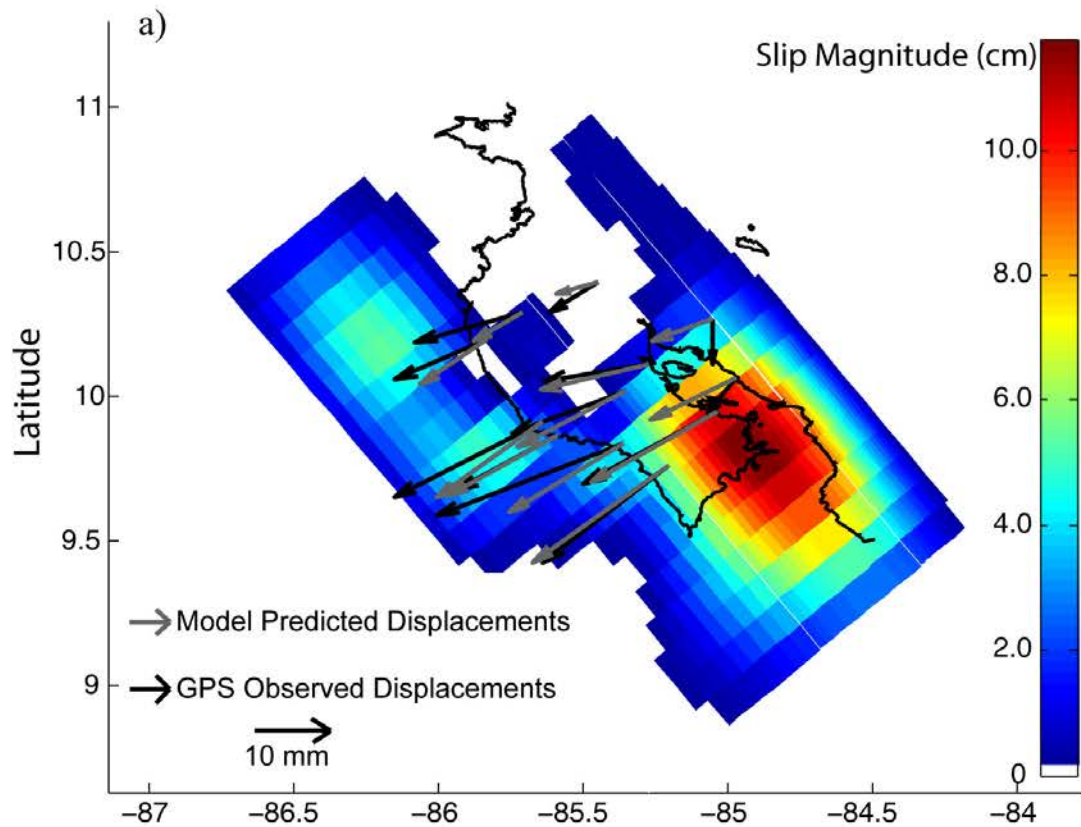


- 15 SSE since 2002
- All SSE occur at transition from locked to slipping
- Bimodal behavior with shallow, small and short duration in north and deep, large and long duration in south
- Triggered microseismicity and some tremor

*Wallace and Beavan,
JGR, 2010*

Costa Rica CGPS positionogram-east component



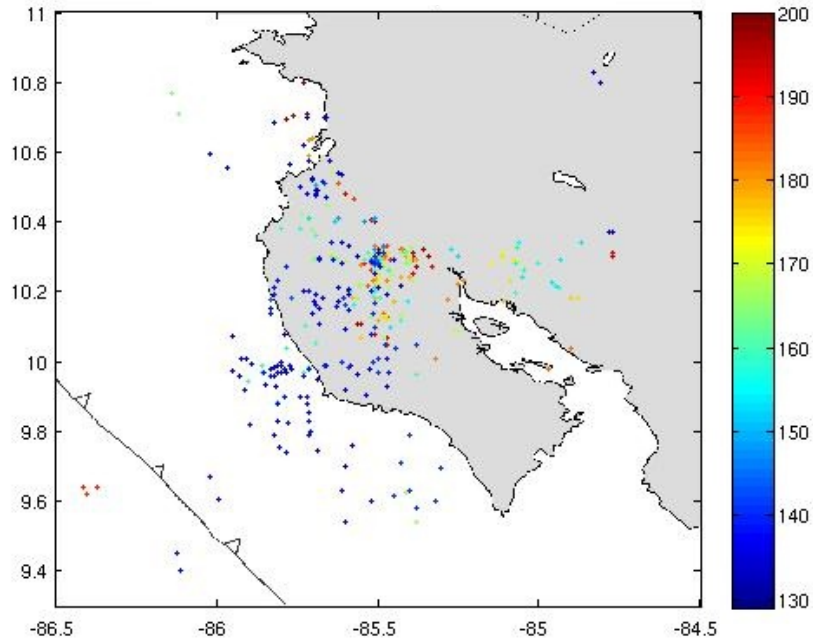


May 2007 Slip Inversion
 Duration = 1-64 days
 Consistent duration= 40 days

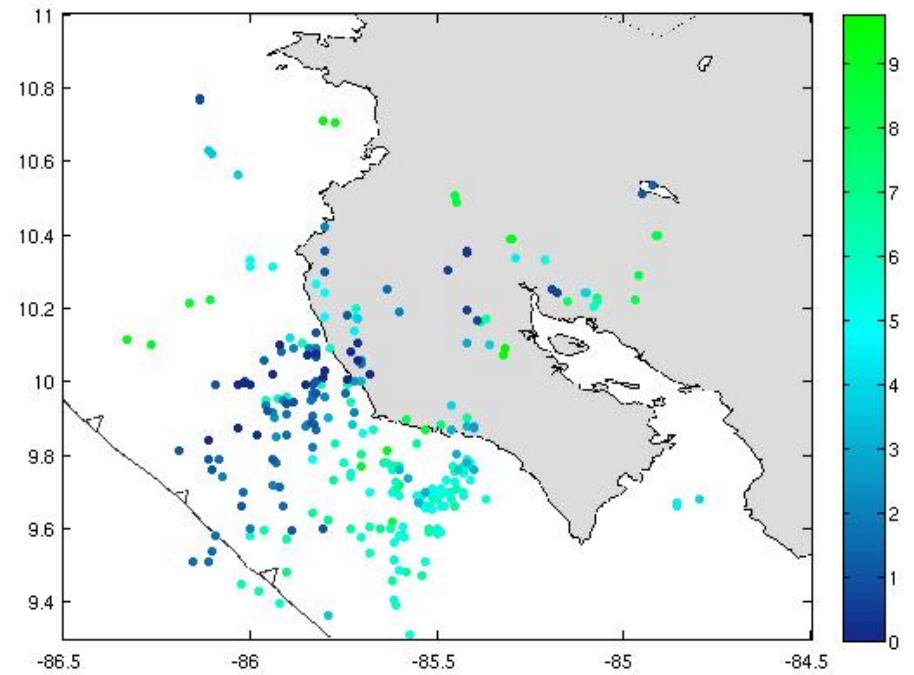
Moment= 3.49×10^{19} Nm
 $M_w = 7.0$

Both deep and
 shallow slow slip

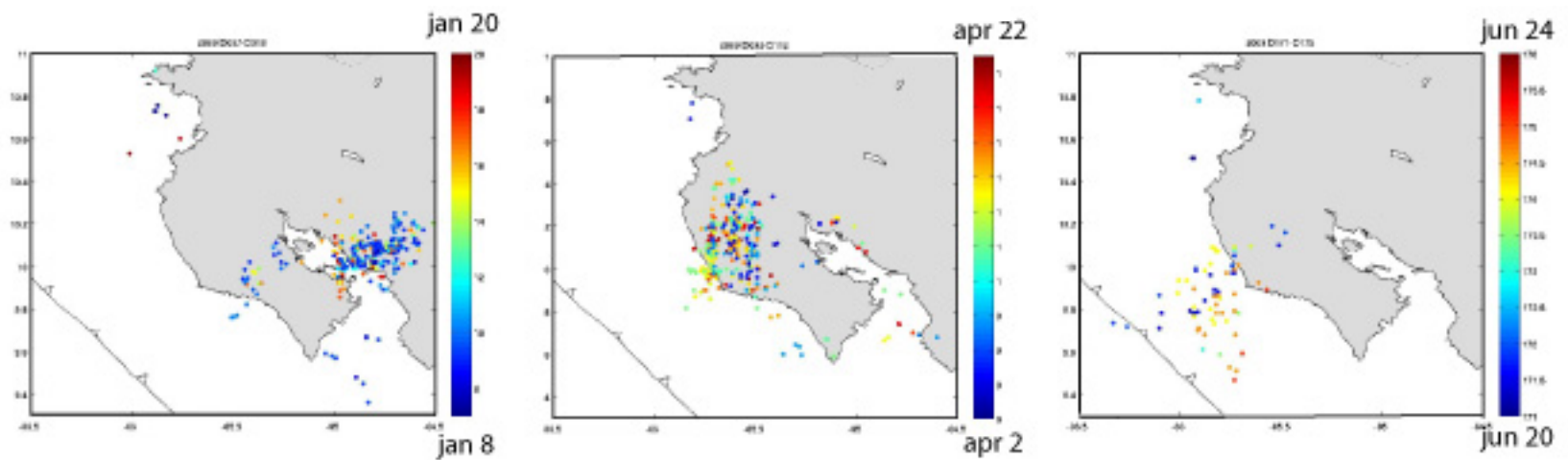
2007 SSE

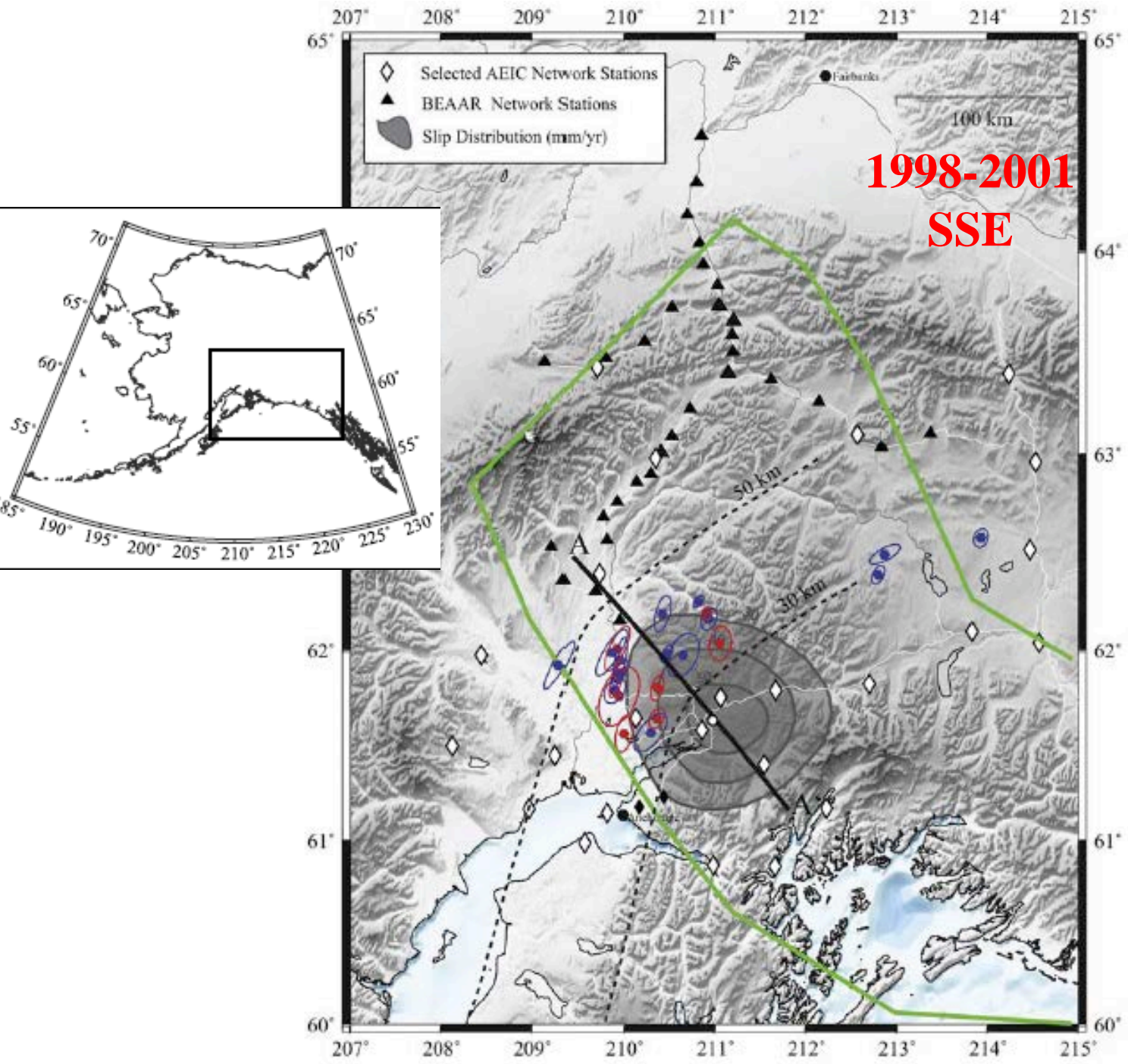


2008 tremor event



2009 SSE

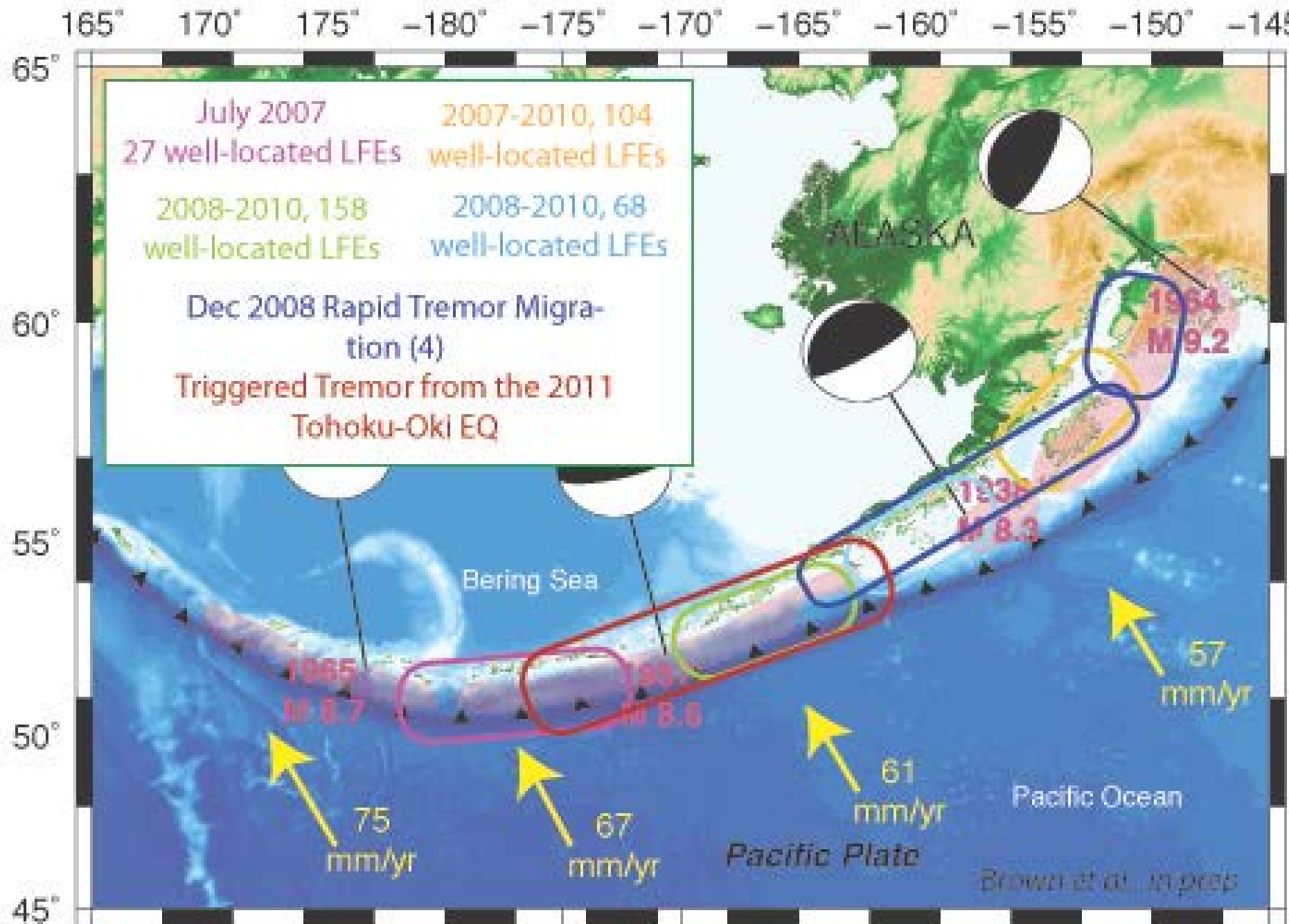


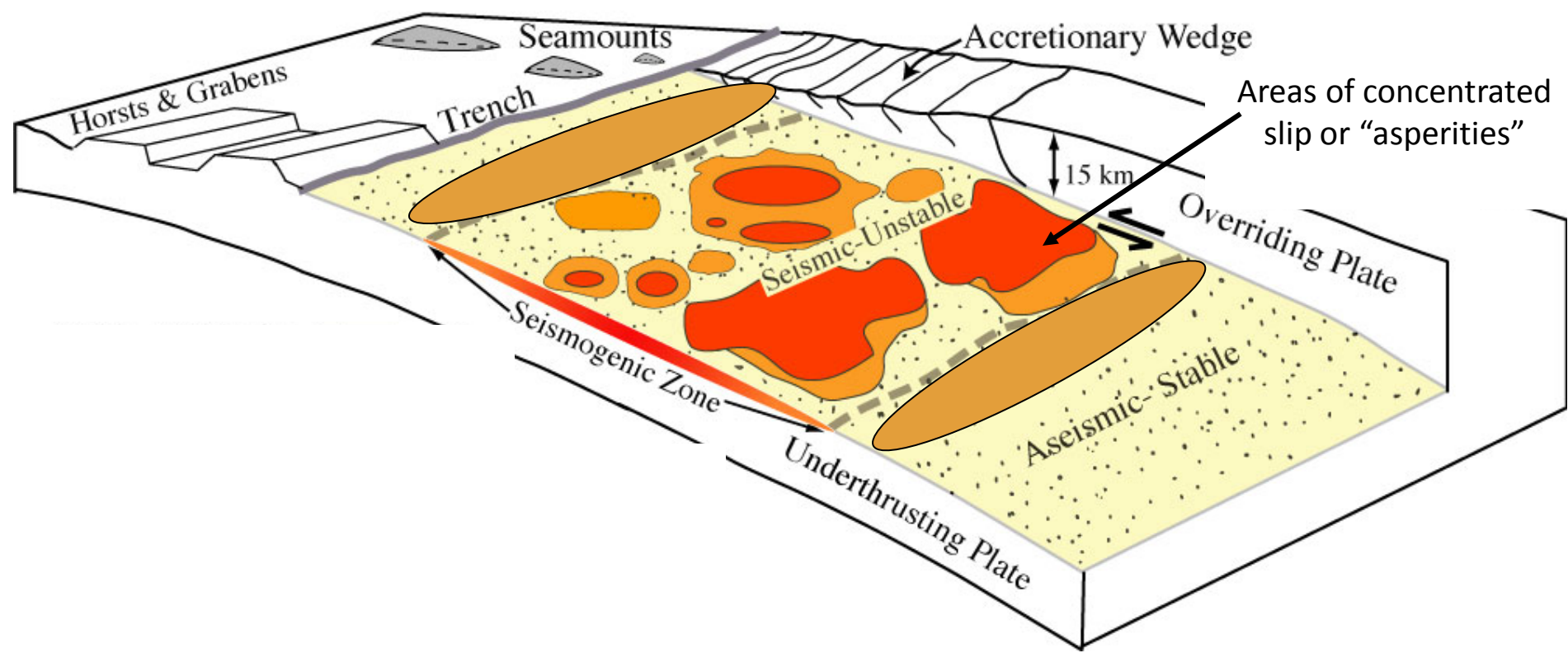


**1998-2001
SSE**

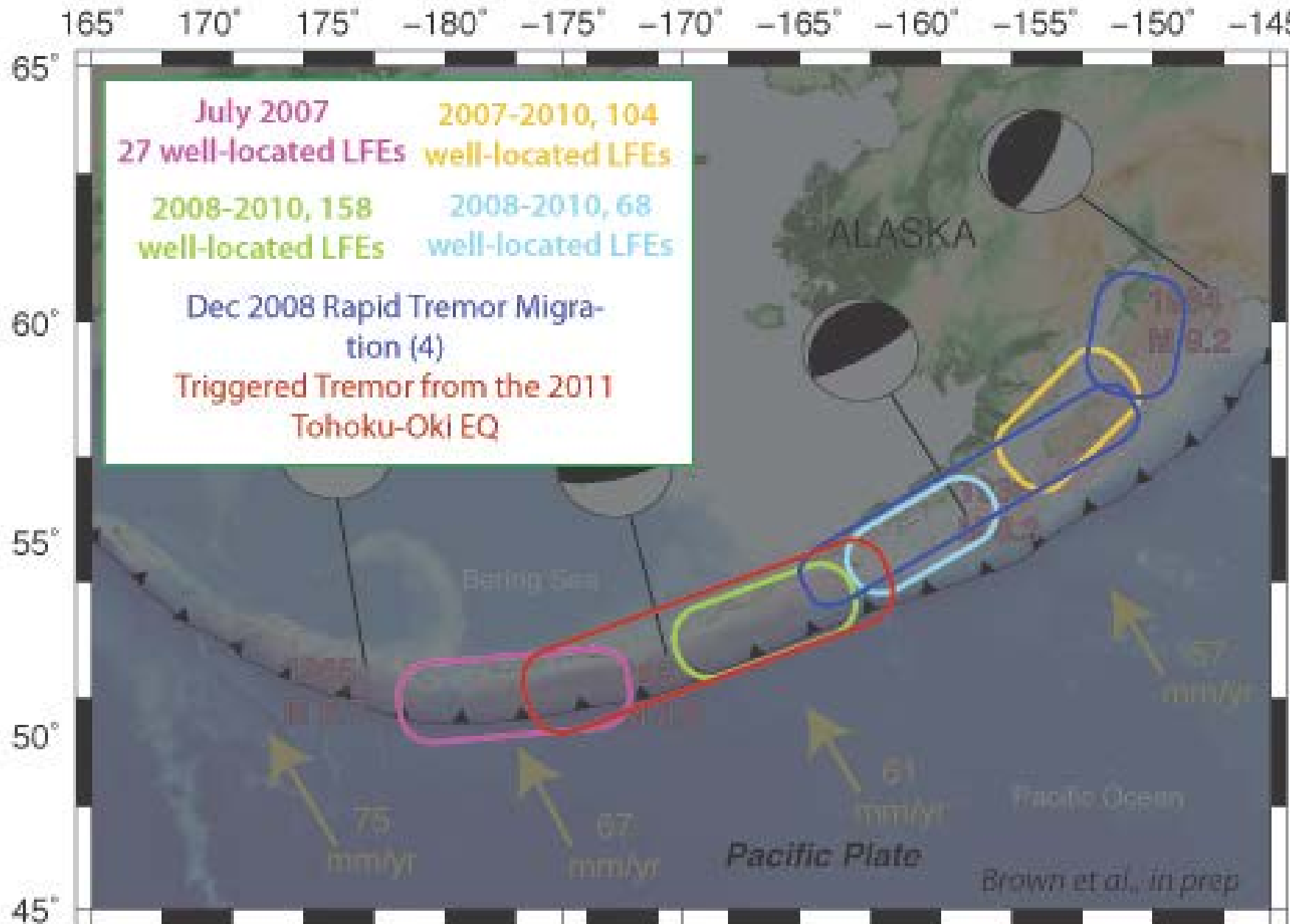
SSEs with
tremor:
2004
2005-2006

*Peterson and
Christensen, 2009*

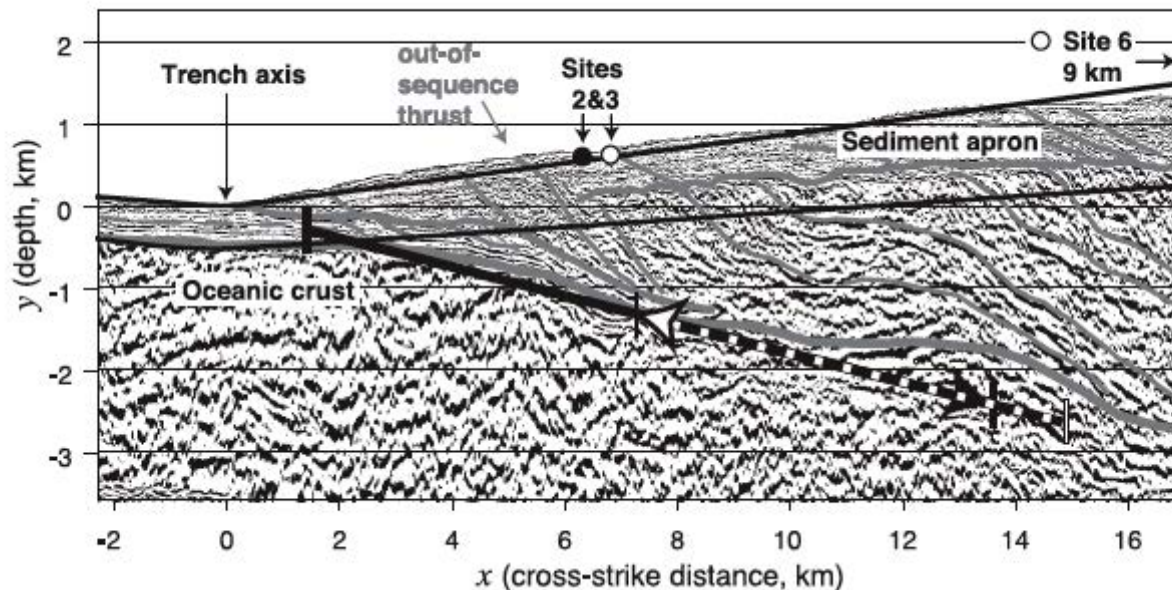
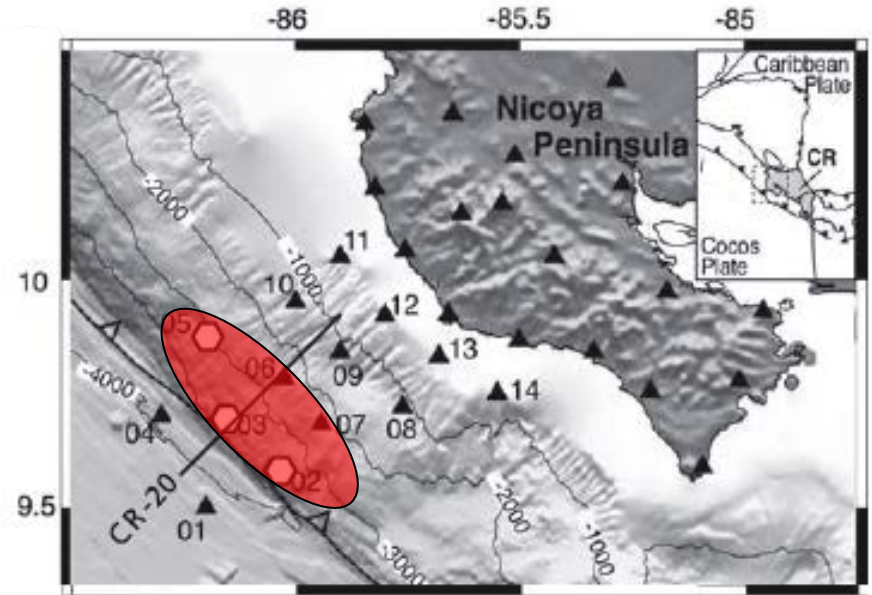
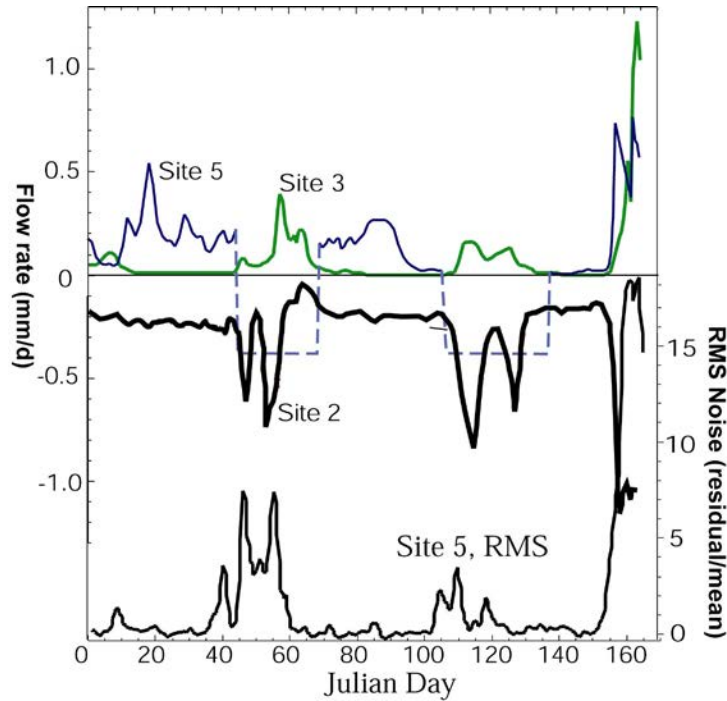




(Modified from Bilek and Lay, 2002)

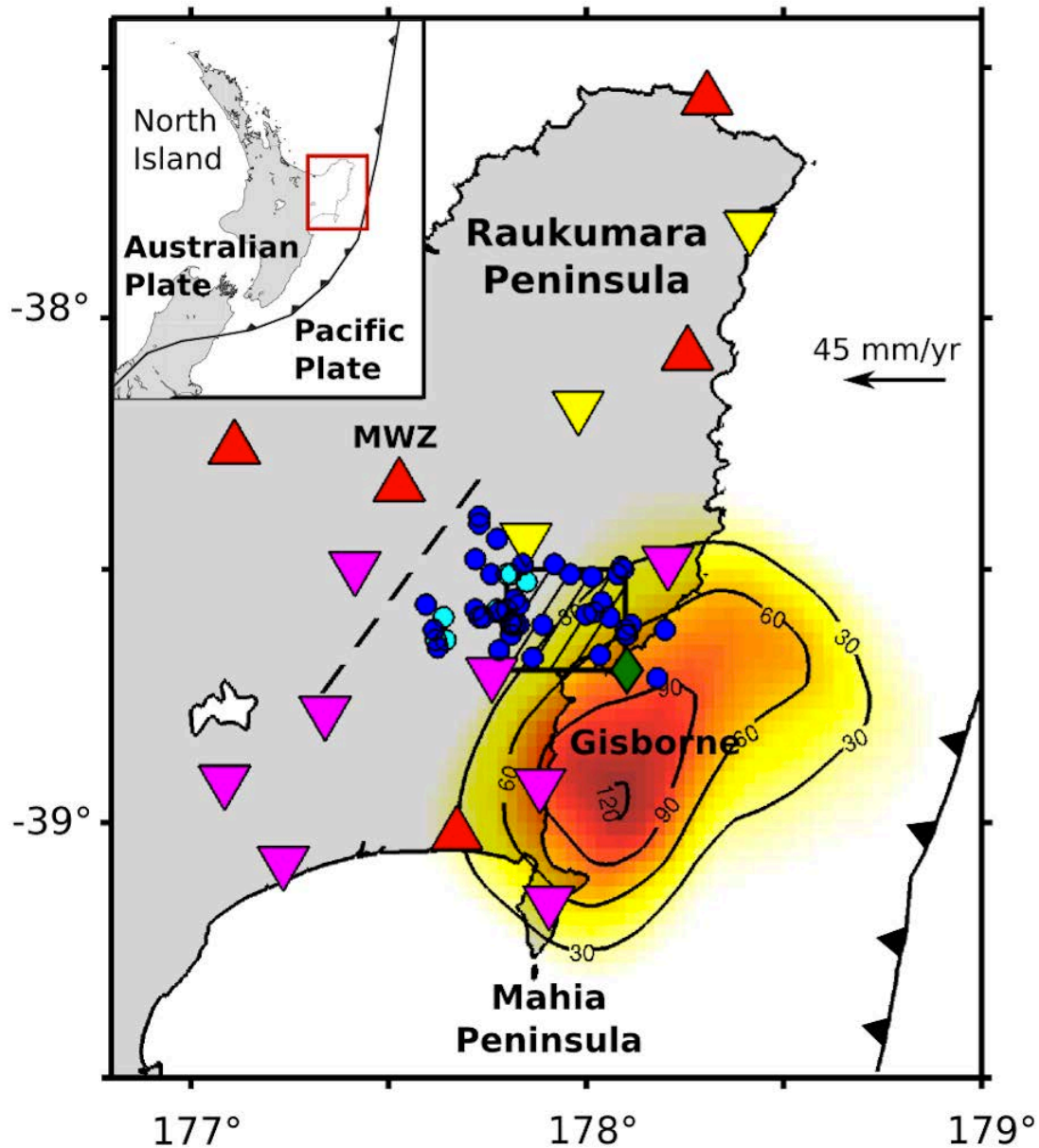


2000 Slow Slip Events- Postulated from Fluid Flow



Brown et al., 2005
LaBonte et al., 2009

New Zealand



*Kim, Schwartz and
Bannister, GRL, 2011*