



Seismic Data Examples

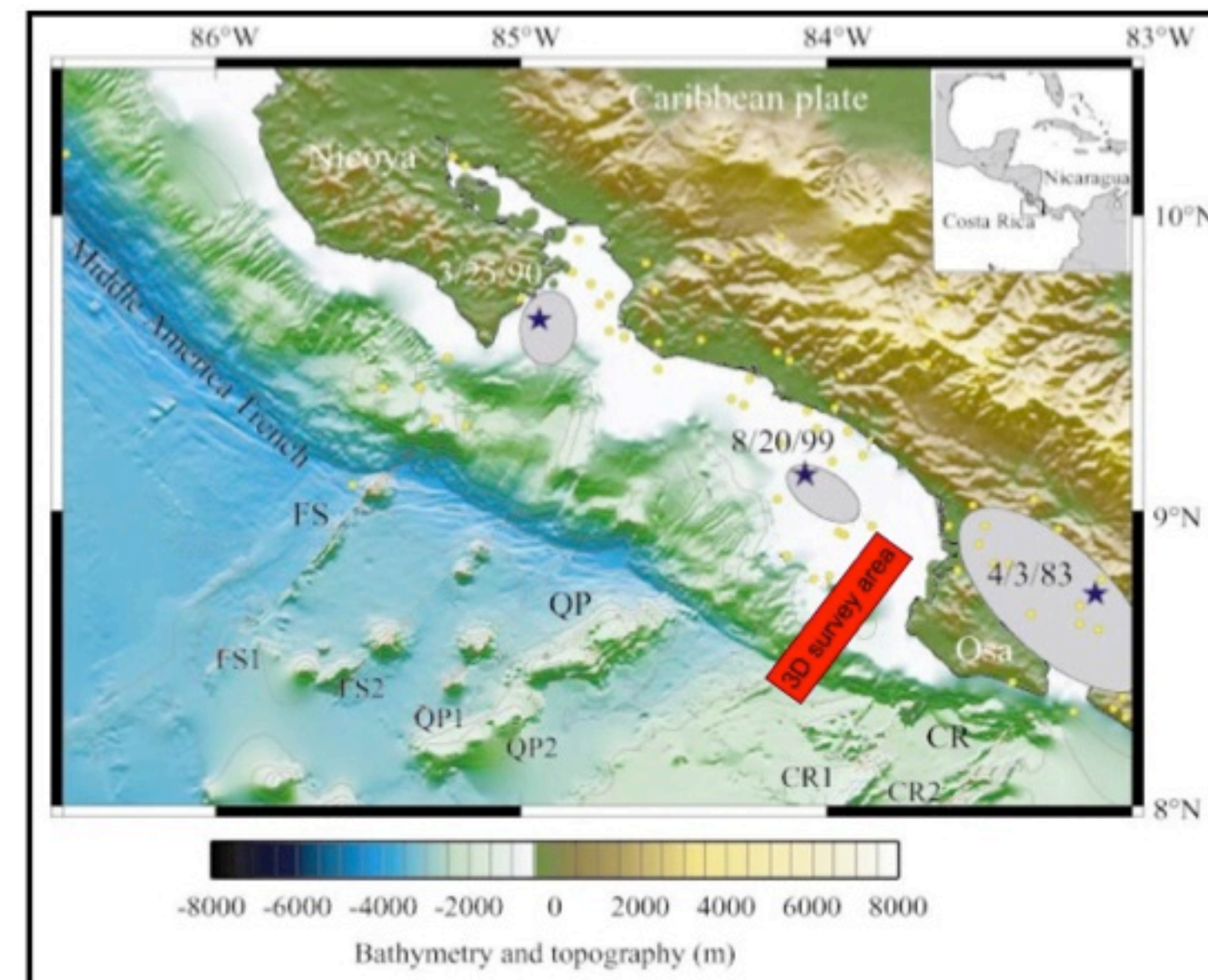
R/V Marcus G. Langseth

Lamont-Doherty Earth Observatory, Columbia University

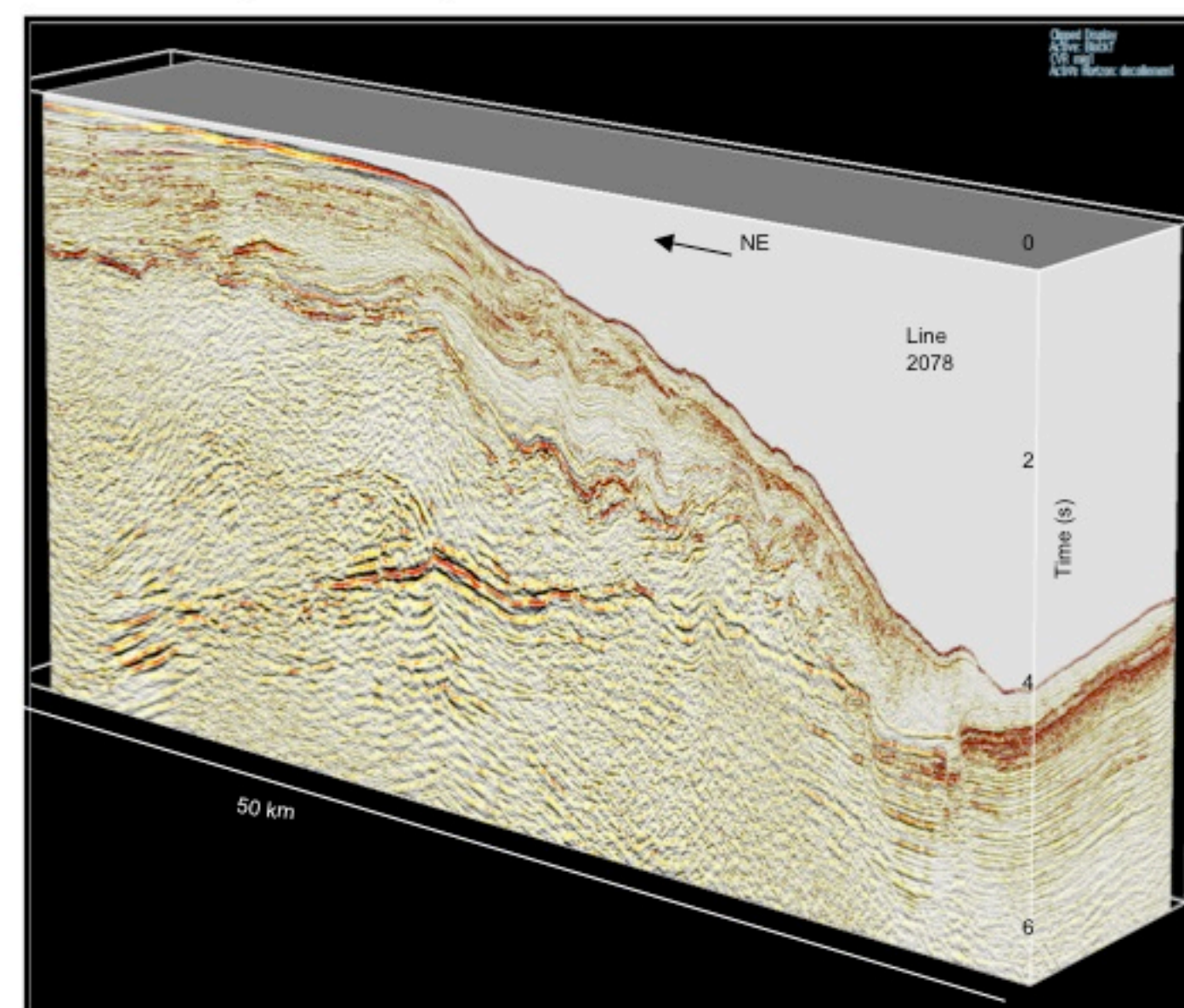


3D SEISMIC DATA

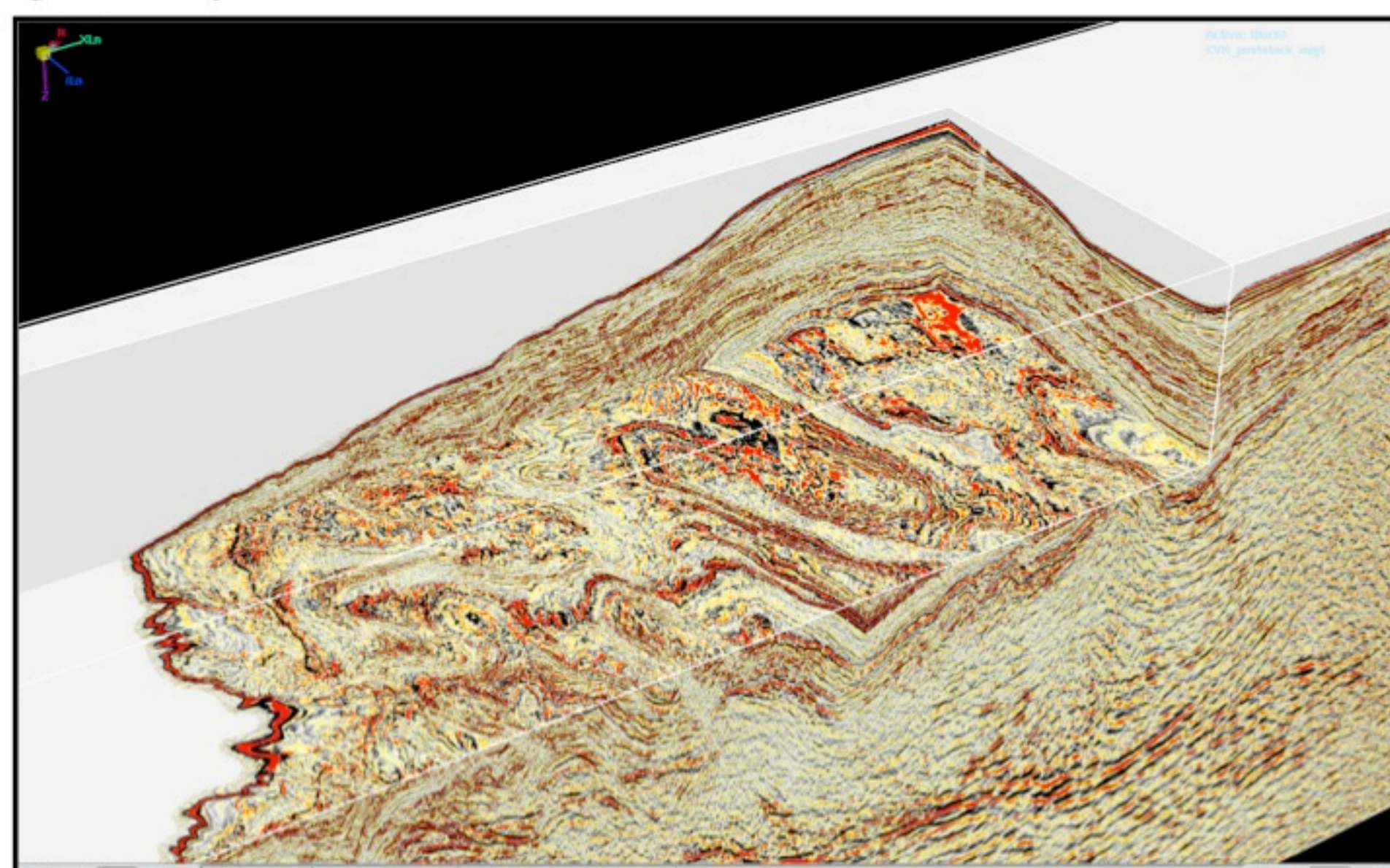
A 3D look into the Costa Rica Subduction Zone from the 2011 CRISP 3D seismic survey on the *R/V Marcus G. Langseth*. Images courtesy of Nathan Bangs.



Topographic and bathymetric map of the Costa Rica subduction zone margin showing the location of the CRISP 3D seismic survey. The gray ovals are recent earthquake slip areas.



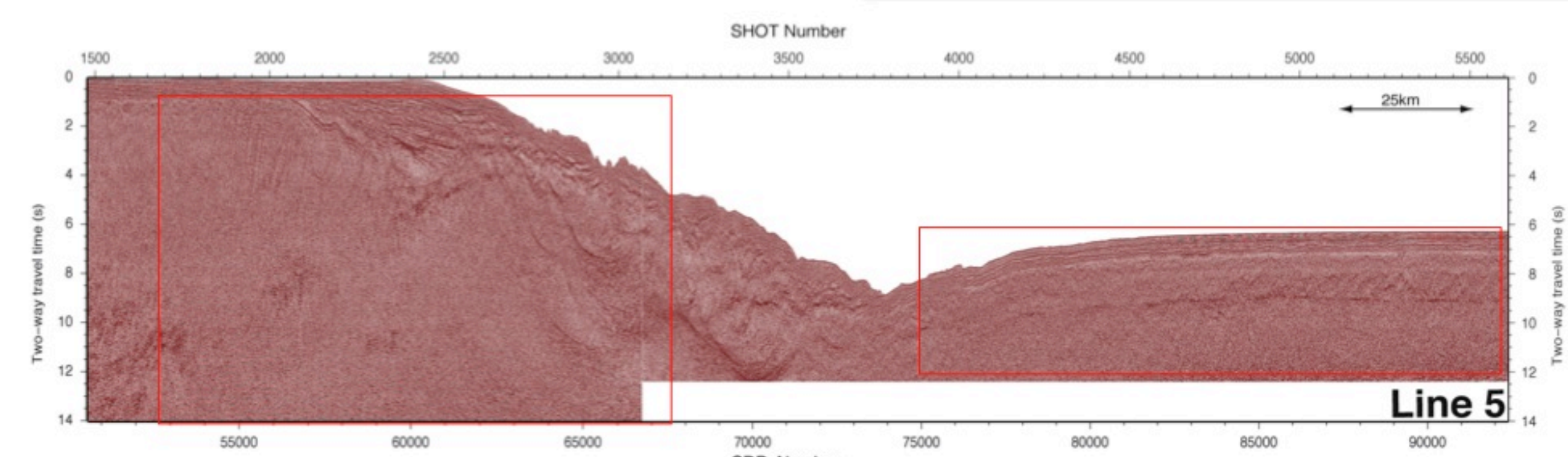
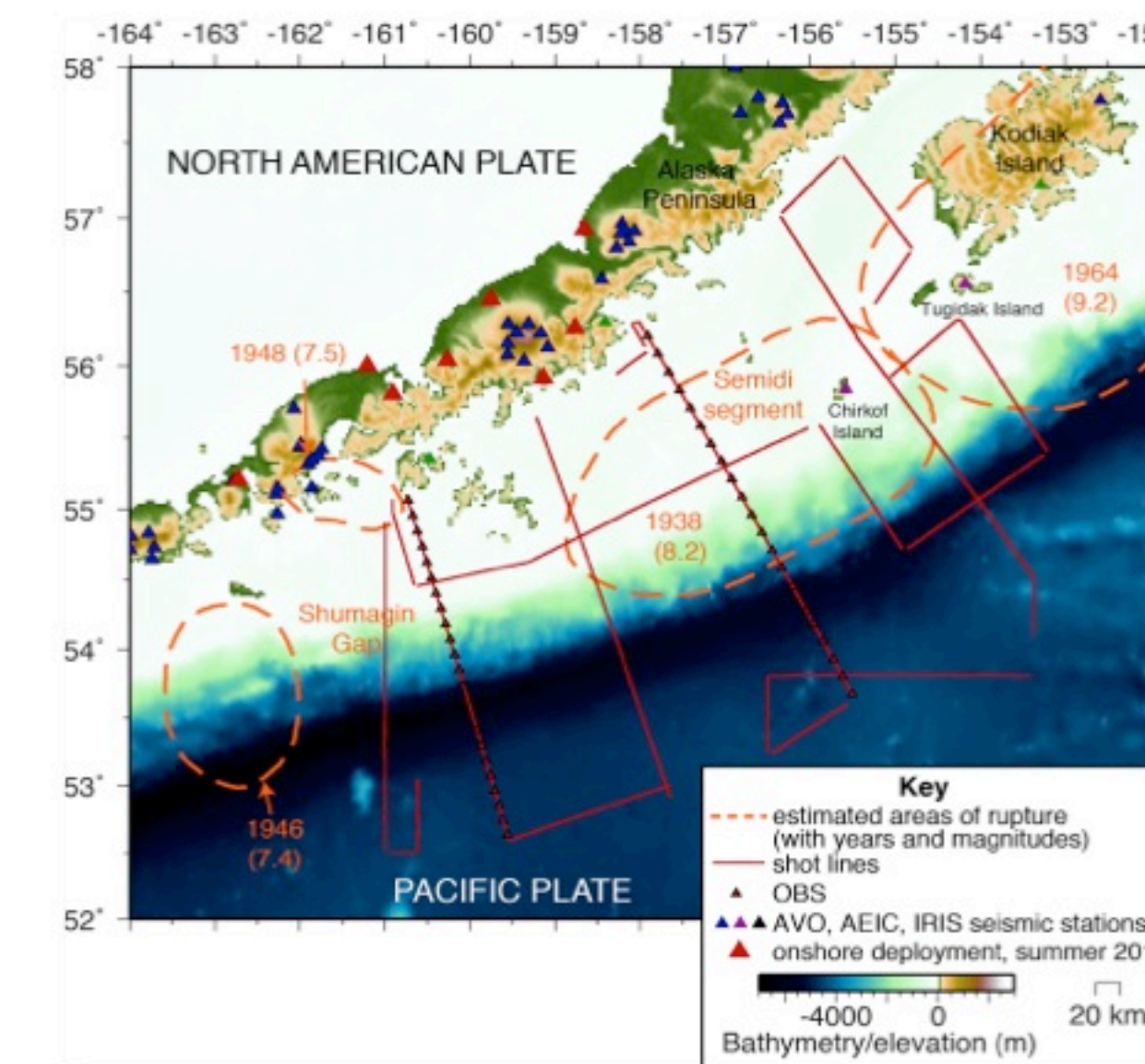
Regional 3D seismic profile through the Costa Rica margin from the shelf to trench. Low-amplitude values are in blue and high-amplitude values are from green to yellow.



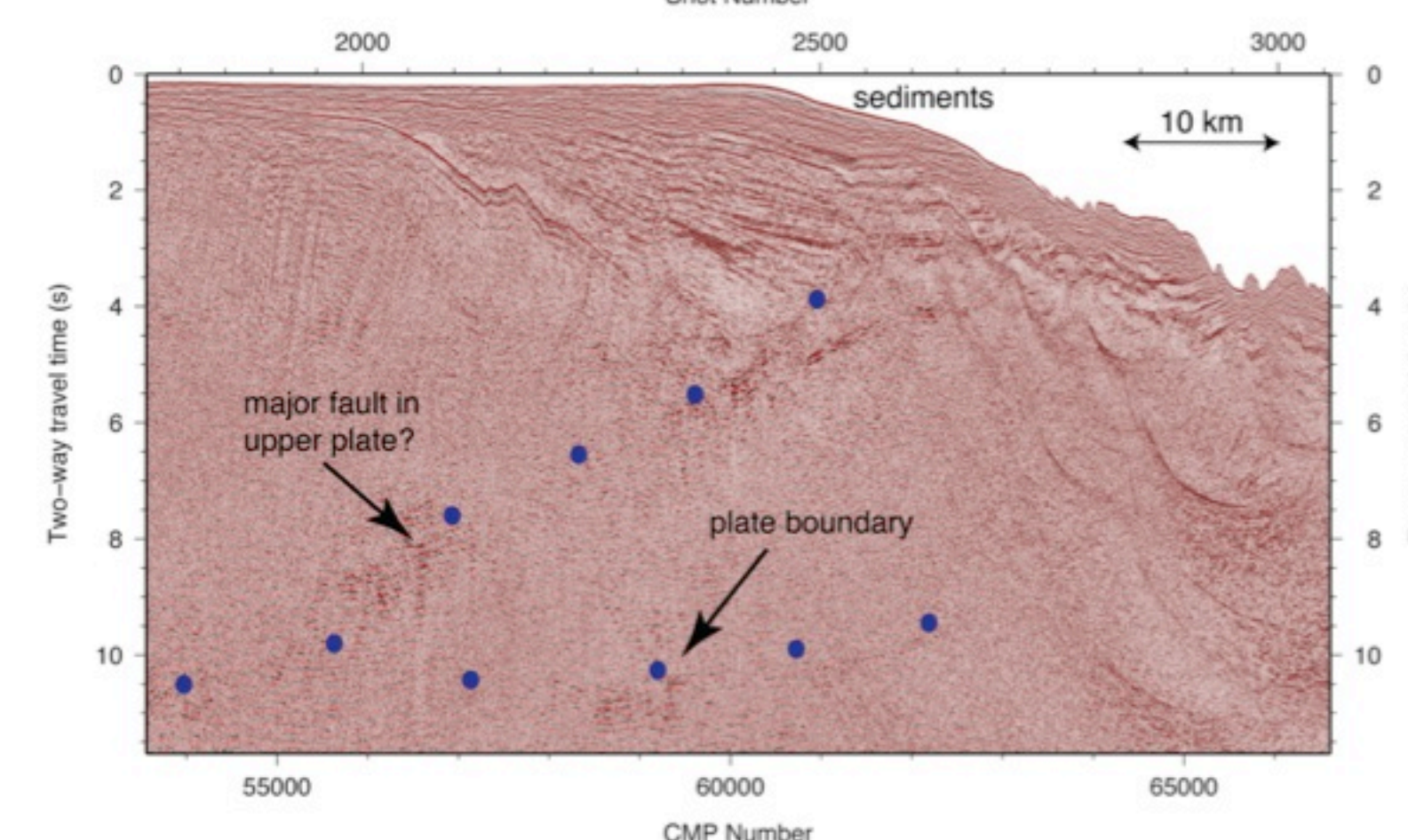
Subsurface '3D cube' of data with a horizontal time slice showing high-amplitude anomalies.

2D SEISMIC DATA

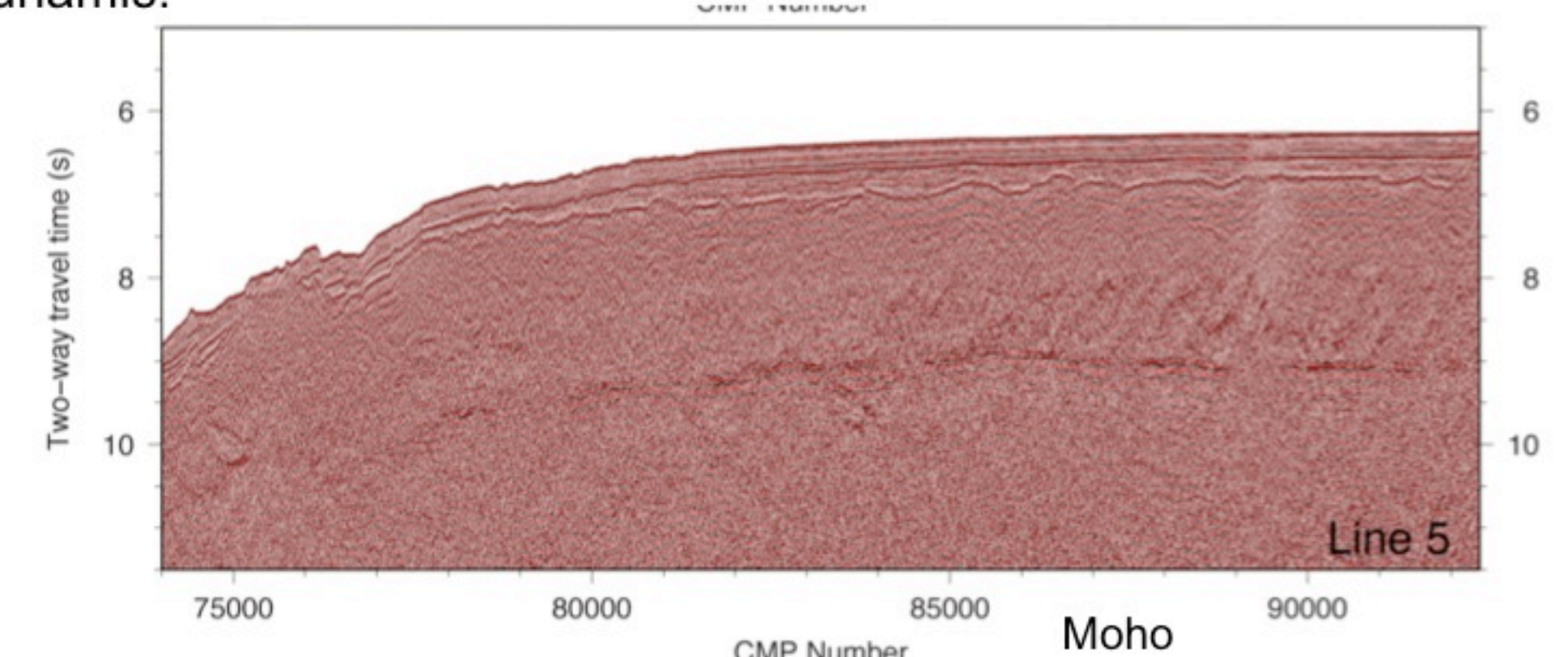
Deep imaging of the subduction zone off the Alaska peninsula during a cruise aboard the *R/V Marcus G. Langseth* in July-August 2012. This study spans a section of the subduction zone that exhibits along-strike variations in earthquake history and modern day locking of the plate boundary. Images courtesy of Donna Shillington.



A profile across the entire subduction zone in Shumagin Gap. Unlike most other parts of the Alaska-Aleutian subduction zone, this region has not ruptured in a great earthquake in over 200 years.



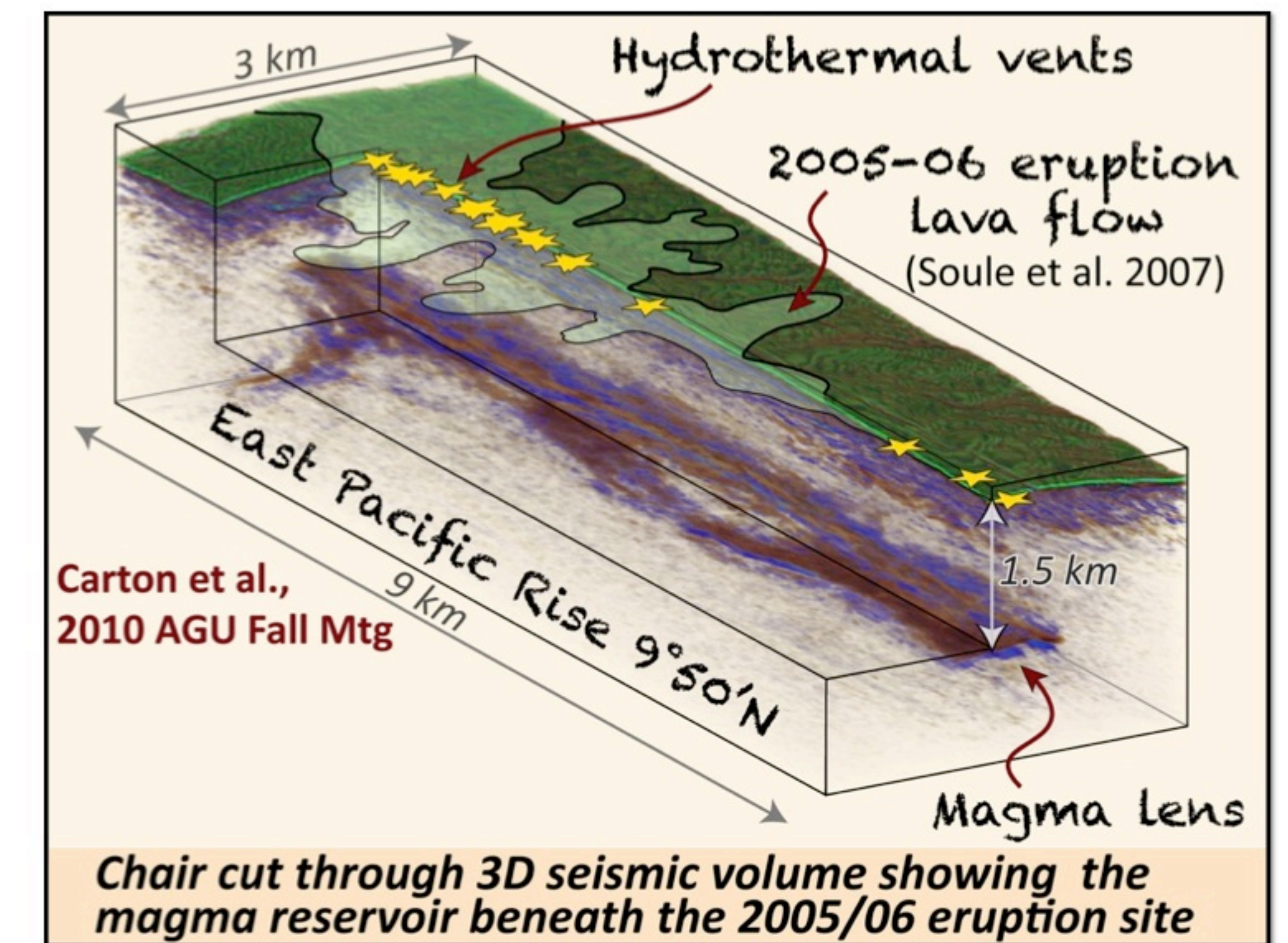
A close-up of a large fault that was imaged in the overriding plate, which is associated with a large basin and may connect to the megathrust. If this feature is active and connected to the plate boundary, it could be very important for understanding the potential for this region to produce tsunamis.



A close-up of the incoming oceanic plate, where we image extensive bending-related faulting as the plate subducts (left edge of the image). These faults are thought to be important for hydrating the oceanic lithosphere and bring water into the subduction zone. We also imaged interesting structures in the oceanic crust prior to subduction, including a bright Moho and dipping reflections in the lower crust (right portion of the image).

3D SEISMIC DATA

A 3D multichannel seismic reflection study along the East Pacific Rise, equatorial Pacific, on the *R/V Marcus G. Langseth*, 2008. Image courtesy of Helene Carton.

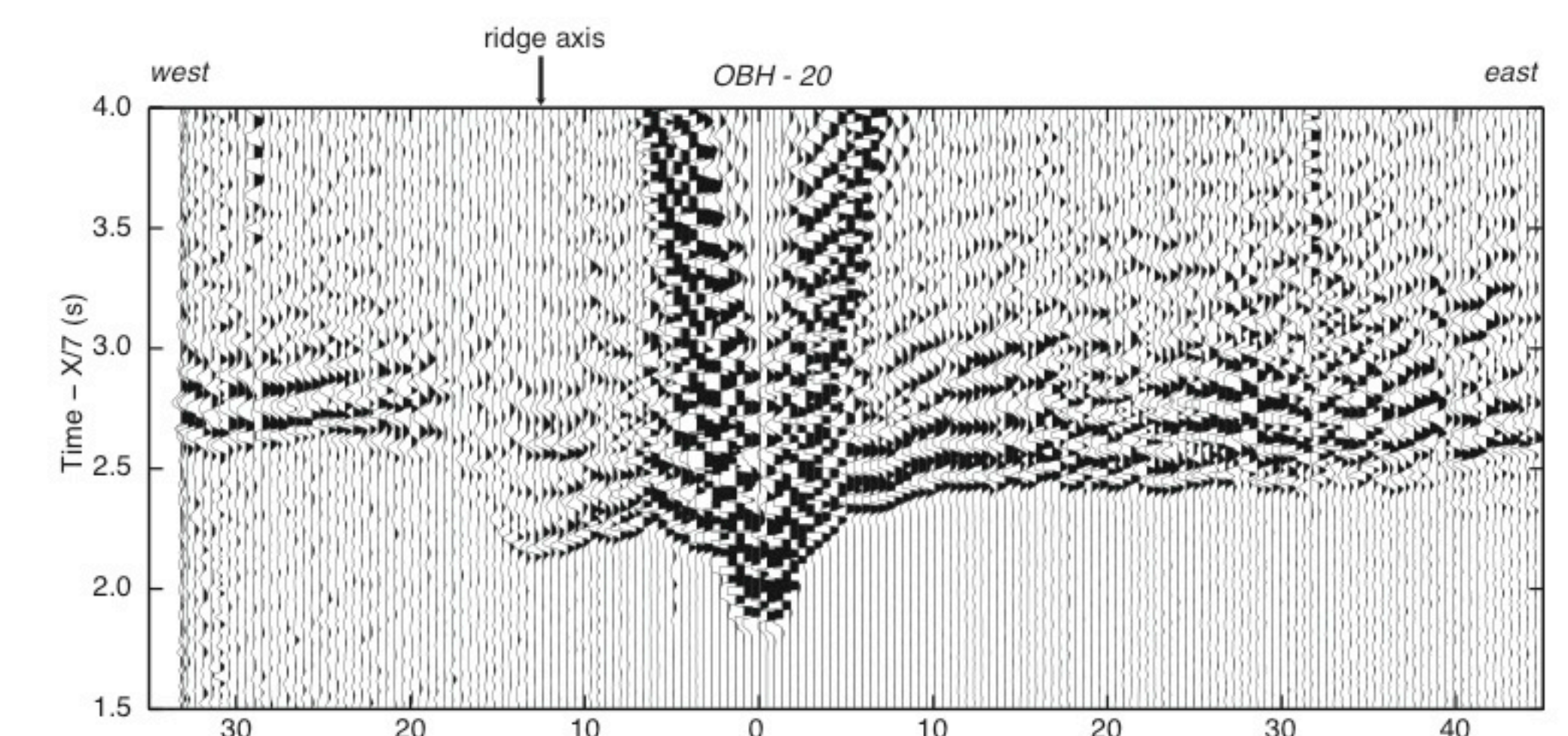


Carton et al.,
2010 AGU Fall Mtg

Chair cut through 3D seismic volume showing the magma reservoir beneath the 2005/06 eruption site

OCEAN BOTTOM SEISMOGRAPHS

An ocean-bottom seismometer (OBS) is a seismometer that is designed to record the earth motion under oceans, in this case from the *R/V Langseth*. Example of ocean bottom hydrophone record section. Vertical axis is reduced travel time (7 km/s), and horizontal axis is distance between sources and receivers. Image courtesy of Helene Carton; published in Canales et al., 2012.



CONTACTS

Director Sean Higgins sean@ldeo.columbia.edu
 Technical Manager Jeff Rupert jeff@ldeo.columbia.edu
 Additional technical support from David Martinson, Jay Johnstone, Robert J. Steinhaus, Lisa Hawkins.
 Special thanks to: Nathan Bangs, Donna Shillington, and Helene Carton.