



Developing an Education and Public Outreach (EPO) program for Caltech's Tectonics Observatory

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A major objective of the Tectonics Observatory (TO) is to develop an Education and Public Outreach (EPO) program.

Goals

- Educate the public about TO discoveries
- Inspire kids to learn science
- Provide TO grad students & postdocs with opportunities for outreach in local schools

Approaches

- Web site
- Partner with local schools
- Partner with existing Caltech outreach programs
- Media

Outreach Abroad

Posters, brochures, and GPS station data sheets about earthquake education and safety in Indonesia

- distributed on Mentawai and Batu islands
- explains regional tectonics and purpose of GPS stations (Sieh 2006)

Educational Outreach in Mexico (Professor Xyoli Pérez Campos, MASE)

- Senior engineering students at UNAM make presentations to schools that host MASE instruments (Rob Clayton)

Brochure about Nepal's seismological network

- reference guide used by Nepal government and general public
- in collaboration with colleagues in the Nepal Dept. of Mines and Geology (Avouac 2006)



Web Site (www.tectonics.caltech.edu)

Research Highlights for General Public

Short stories about TO discoveries

- The unusual case of the Mexican subduction zone
- The Science behind the May 12 Earthquake in China
- Earthquakes and Tsunamis in Sumatra: What we have recently learned
- Let me know if you have ideas for more articles!

Podcast and Video links to TO faculty talks

- NPR's Earth & Sky podcast - Avouac
- Caltech Watson lectures - Stock, Wernick, Sieh
- American Natural History Museum, Science Bulletin - Wernicke
- iTunes podcast - Stock



Education module for undergrads or grads in geology or oceanography - MARGINS mini-lesson

- Historical Earthquakes and Uplift/Subsidence of Sumatra from Coral Growth Rings (Elisabeth Nadin and Aron Meltzner)

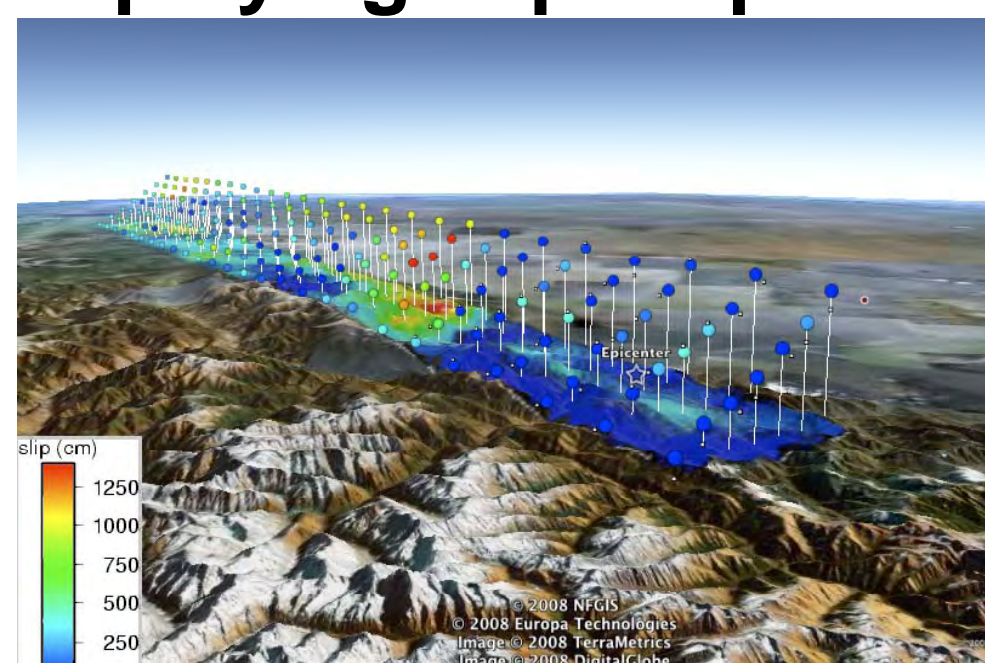
- uses real coral data to reveal the historical record of earthquakes and land deformation in Sumatra over the past century
- can be downloaded in its entirety from website
- two versions:
 - introductory undergraduate
 - advanced undergraduate or graduate



Educational video for High School and College students

- Produced by CIRES, includes TO's Ken Farley

Displaying slip maps in Google Earth



- A new way to display TO model slip maps of large earthquakes (Anthony Sladen and Faria Chowdhury)

- We are working on replacing the ball and stick model with a plane

Additional Public Lectures and Media

- National Geographic's television show America's Wild Spaces: Death Valley - Brian Wernicke (July 20, 2009)
- Thalassa French TV - Aron Meltzner and Anthony Sladen (May 2009)
- TWSoCal Cable News / CNN Headlines - Brian Wernicke (Feb 2009)
- Auduon Societiy Keynote Speaker - Jason Saleeby (May 2009)
- NSF MARGINS Distinguished Lecturer Program - Joann Stock (2006)

Undergrad and Grad Students

Summer Undergraduate Research Fellowship (SURF) program

- Three students in summer 2009

International Field Trips

- Taiwan, 2008
- Tien Shan, 2006

Outreach in Local Schools

We are partnering with local schools and Caltech outreach programs.

- Karen Jain, PUSD Science Coordinator
- James Maloney, Caltech Classroom Connection and Summer Research at Caltech

TO tours

- TO grad students, postdocs, and professors led 6th graders from Hamilton Elementary on a tour of three TO research groups

Topics included:

- how Helium trapped in crystals can tell how long a rock has been on the earth's surface
- how the Himalayan mountains formed
- Origin of earthquakes and tsunamis in Sumatra

- Willy Amidon, Itai Haviv, Jean-Philippe, Aron Meltzner, Michelle Selvans, Carl Tape



Family Science Nights at local schools



- TO grad students and faculty presented hands-on activities at family science nights at

- Hamilton Elementary
- Sierra Madre Middle School
- Washington Elementary

Topics included:

- how mountains are built
- how plate motions cause earthquakes
- locating earthquakes by triangulation
- patterns in mid-ocean ridges
- what volcanic eruptions tell us about the mantle

- Willy Amidon, Alan Chapman, Ravi Kanda, Steve Kidder, Ozgun Konca, Nina Lin, Jason Saleeby, Michelle Selvans

Classroom presentations

- TO scientists visited local school

- 4th grade, Washington Elementary
- 5th grade GATE class, Hamilton Elementary

Presentations included

- slide show of erosion and weathering
- Earthquakes and tsunamis in Sumatra
- earthquake machine (John Galetzka)

- Willy Amidon, Anthony Sladen



Field trips through Eaton Canyon



- TO grad students led field trips through Eaton Canyon

- 6th grade class, Burbank Elementary
- PUSD teachers

- They pointed out geological features

- rocks and their origins
- faults of different scales
- compared granite and gabbro

- Students hammered on rocks

- revealing fresh surfaces
- uncovering hidden garnet

- Alan Chapman, Janet Harvey, Steve Kidder

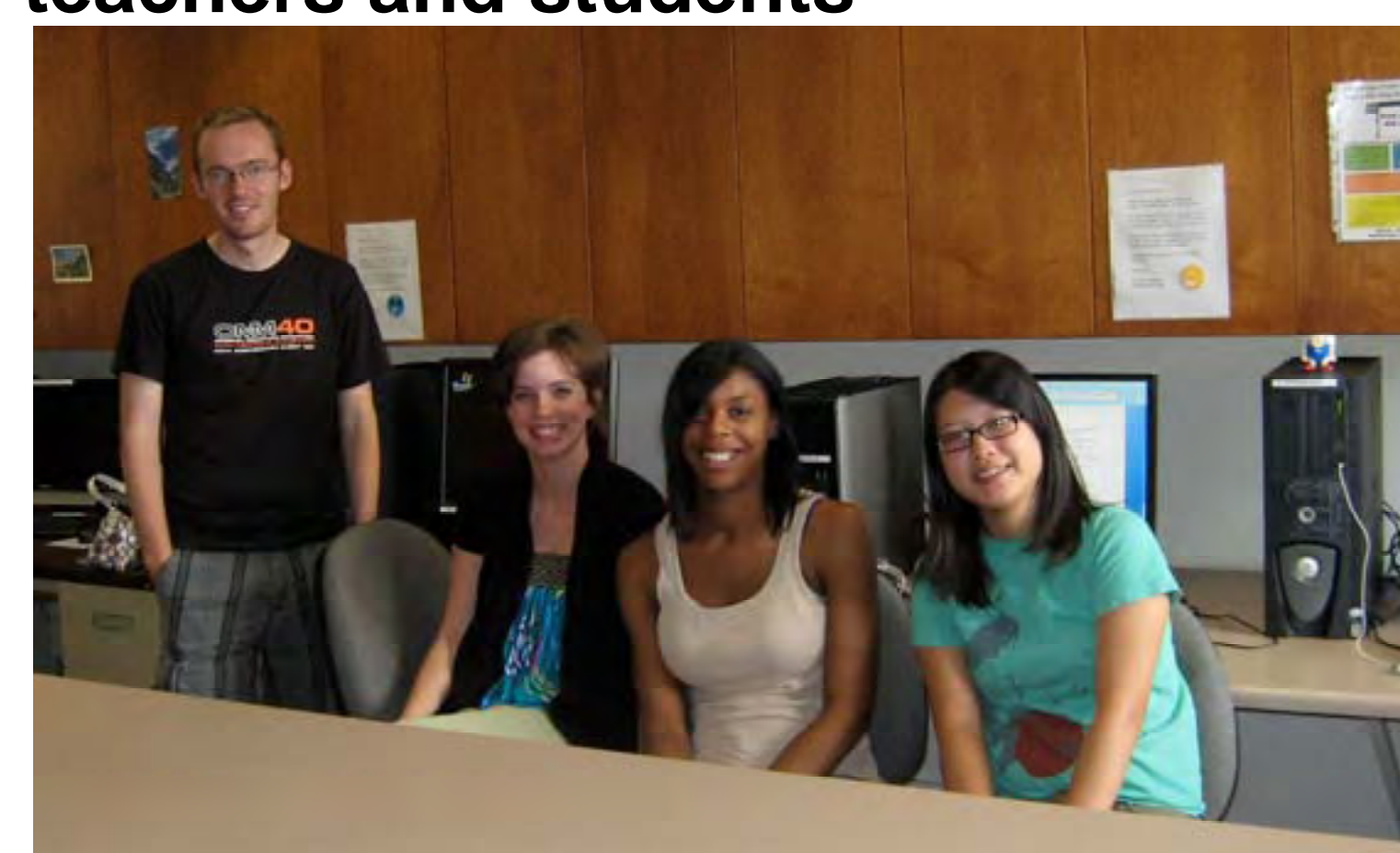
Summer research for High School teachers and students

- Alex Copely mentored two high school students and a teacher for a month of research

- As part of Caltech's Summer Research Connection

- They used GPlates to produce two updated animations of plate motions over the past 140 million years, using the most recently published data

- Thanks also to Mark Turner



Teacher training workshops



- TO scientists participated in three PUSD workshops for 6th grade teachers

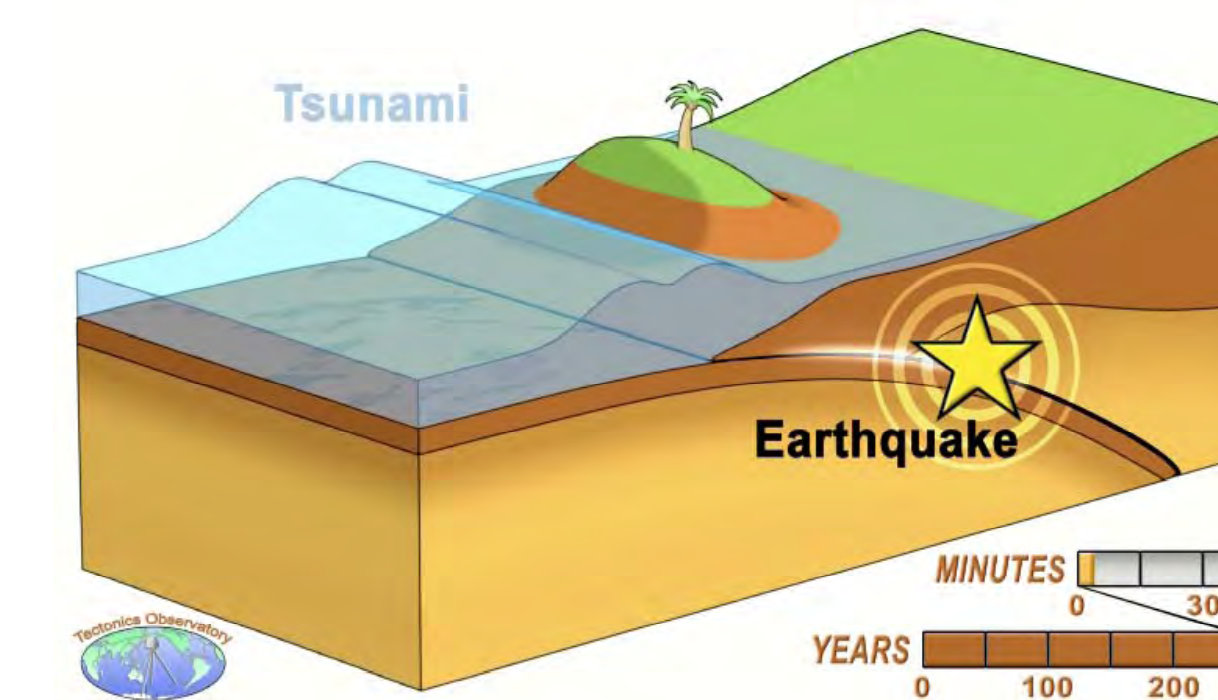
- answered teachers' questions
- demonstrated simple experiments
 - earthquake machine (Galetzka)
 - s, p waves with slinky
 - convection with glasses of water
 - This Dynamic Planet map
- talked about their research

- Jean-Philippe Avouac, Kristel Chanard, Belle Philibosian, Michele Selvans

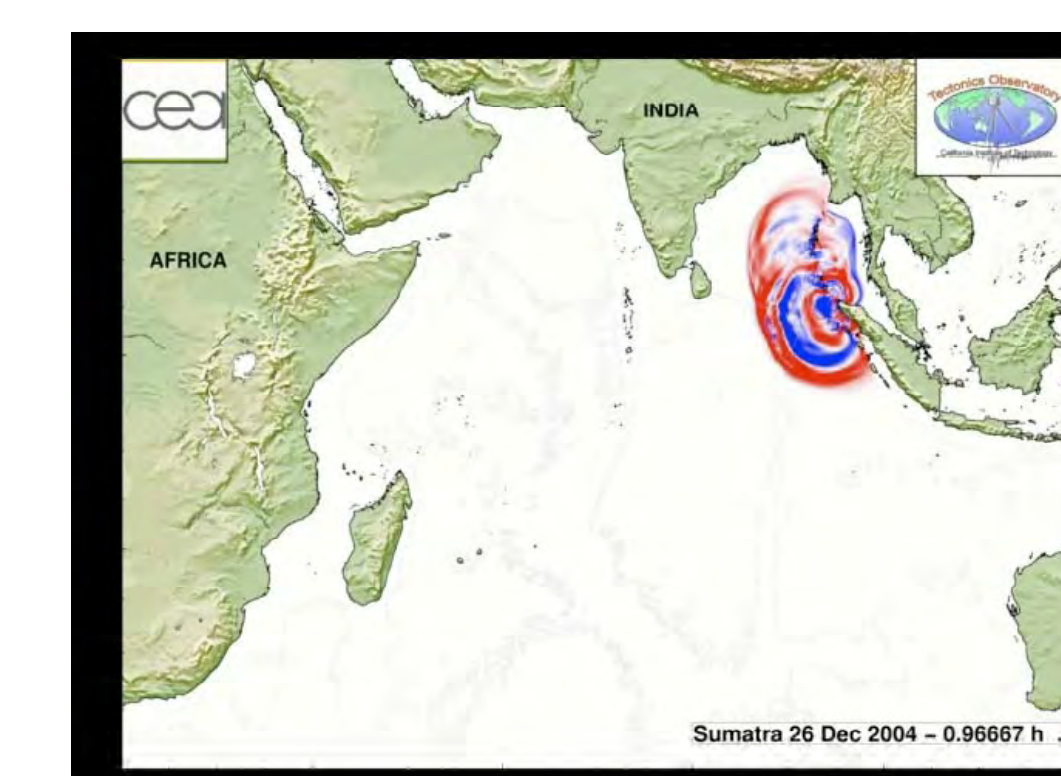
Animations and Graphics

For general audiences

Animations:



Subduction - Tim Pyle



Tsunami propagation - Anthony Sladen

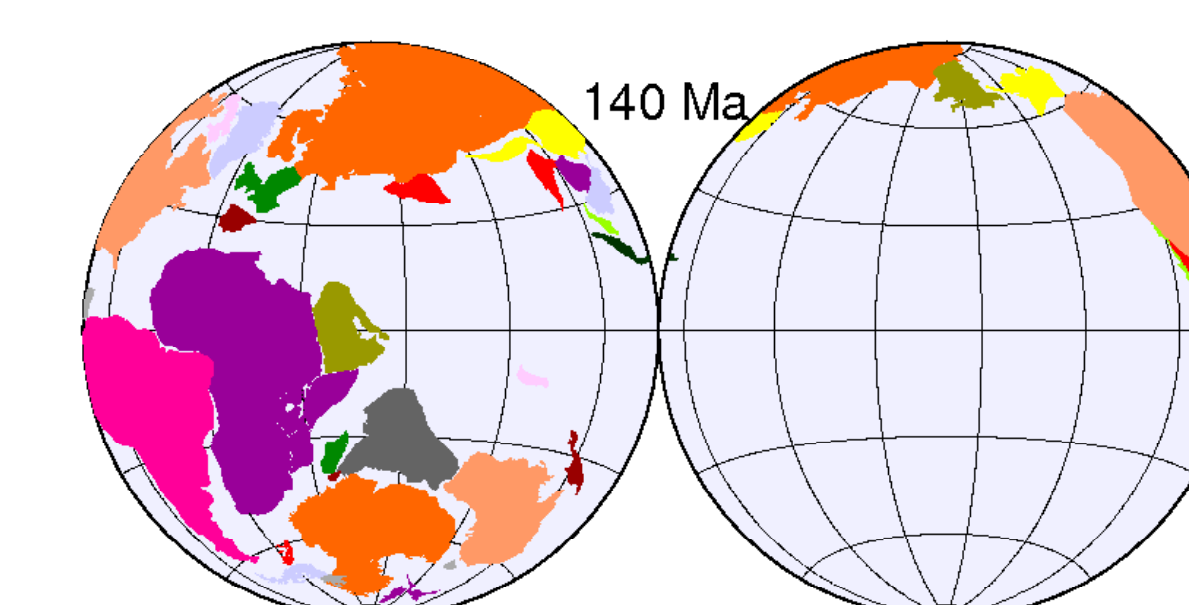
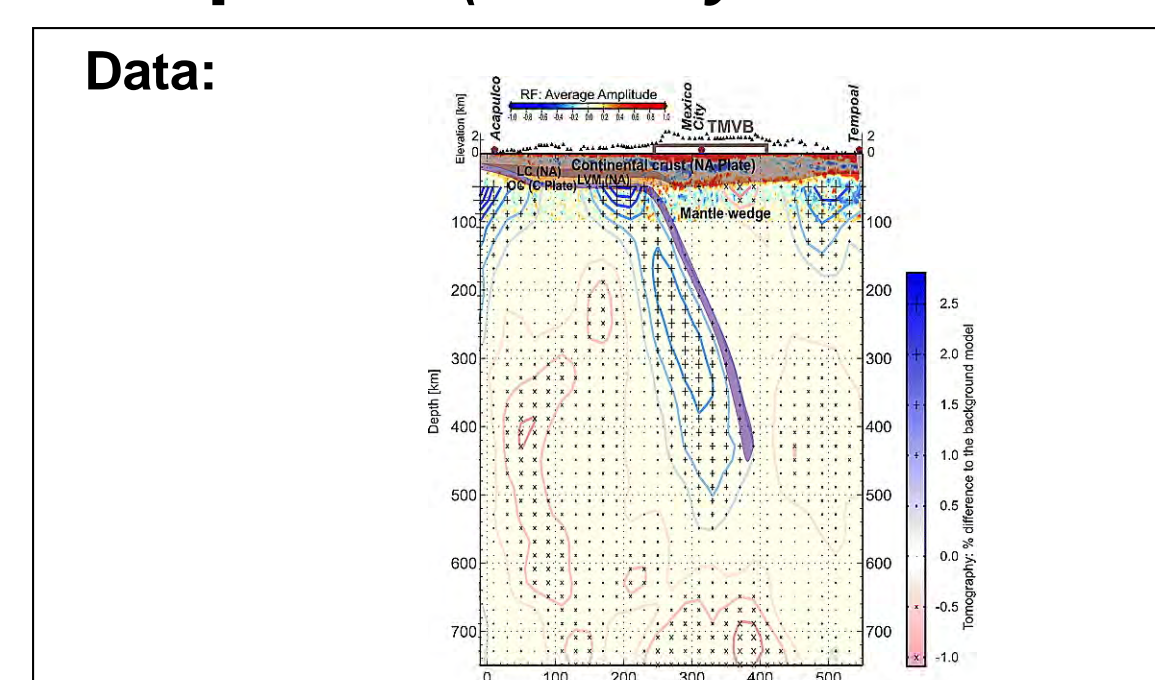
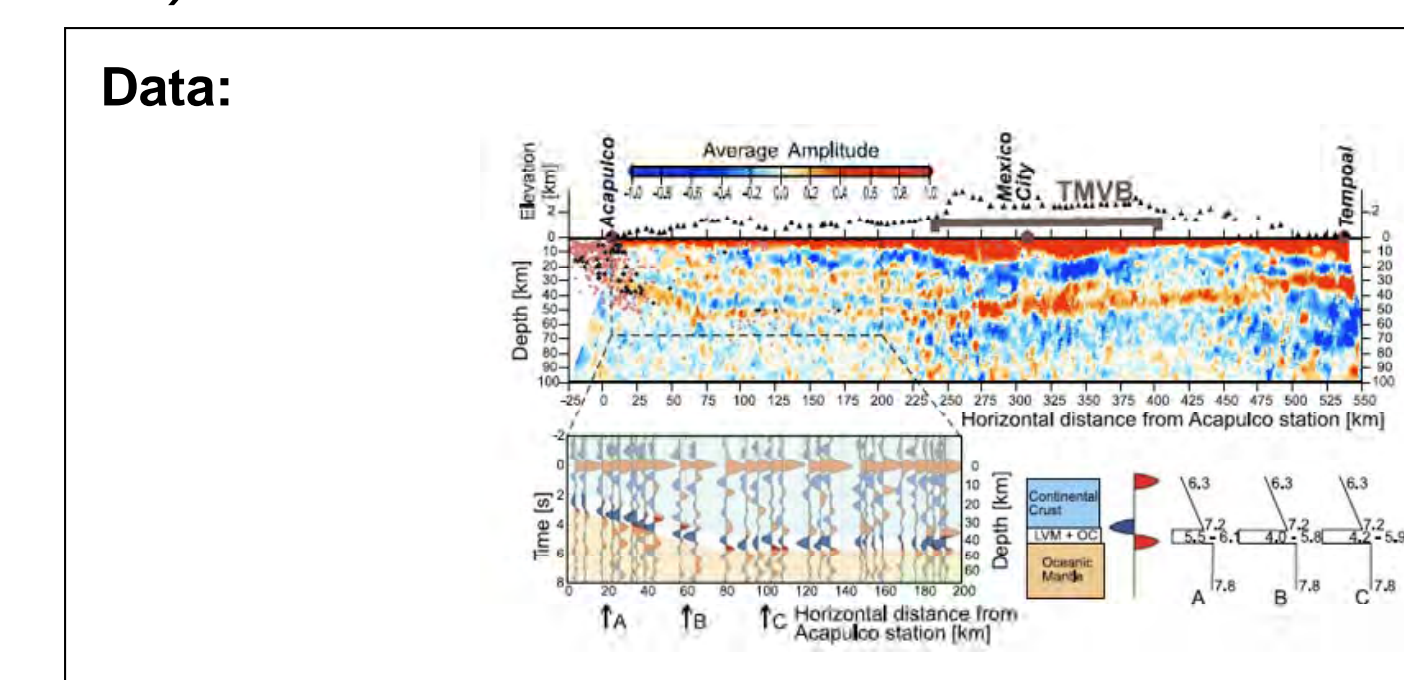
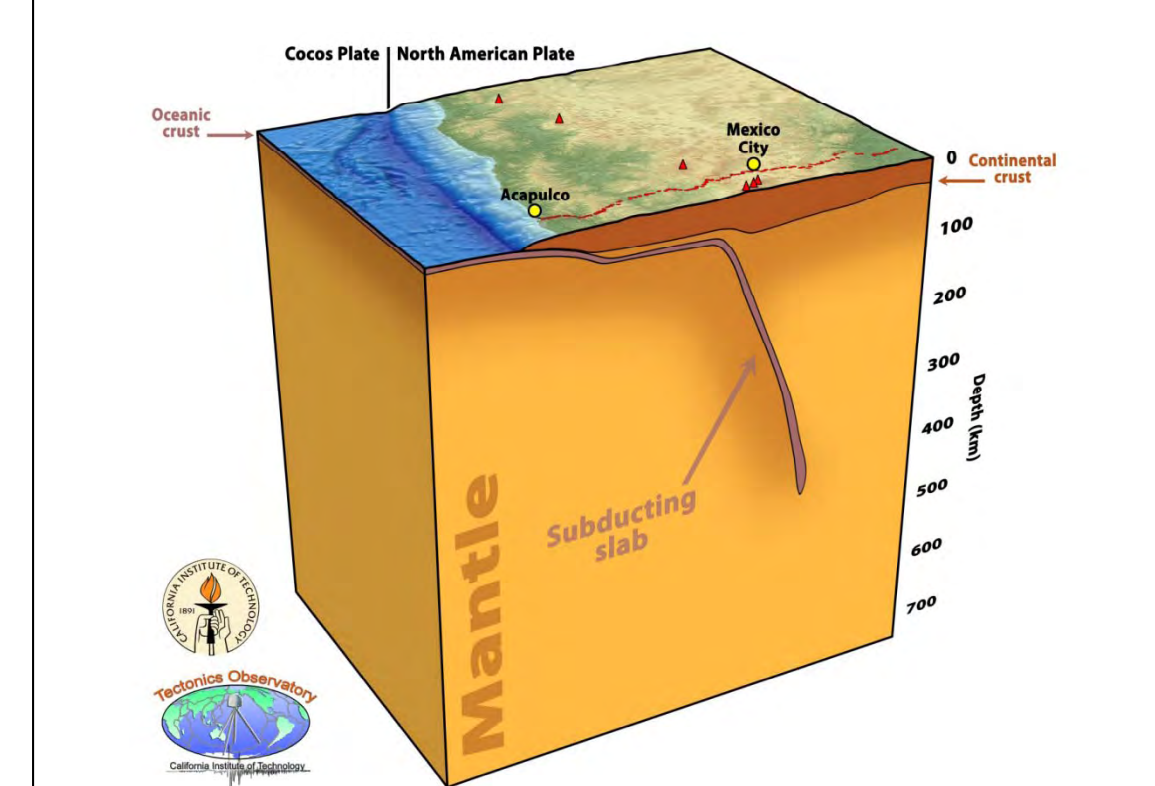
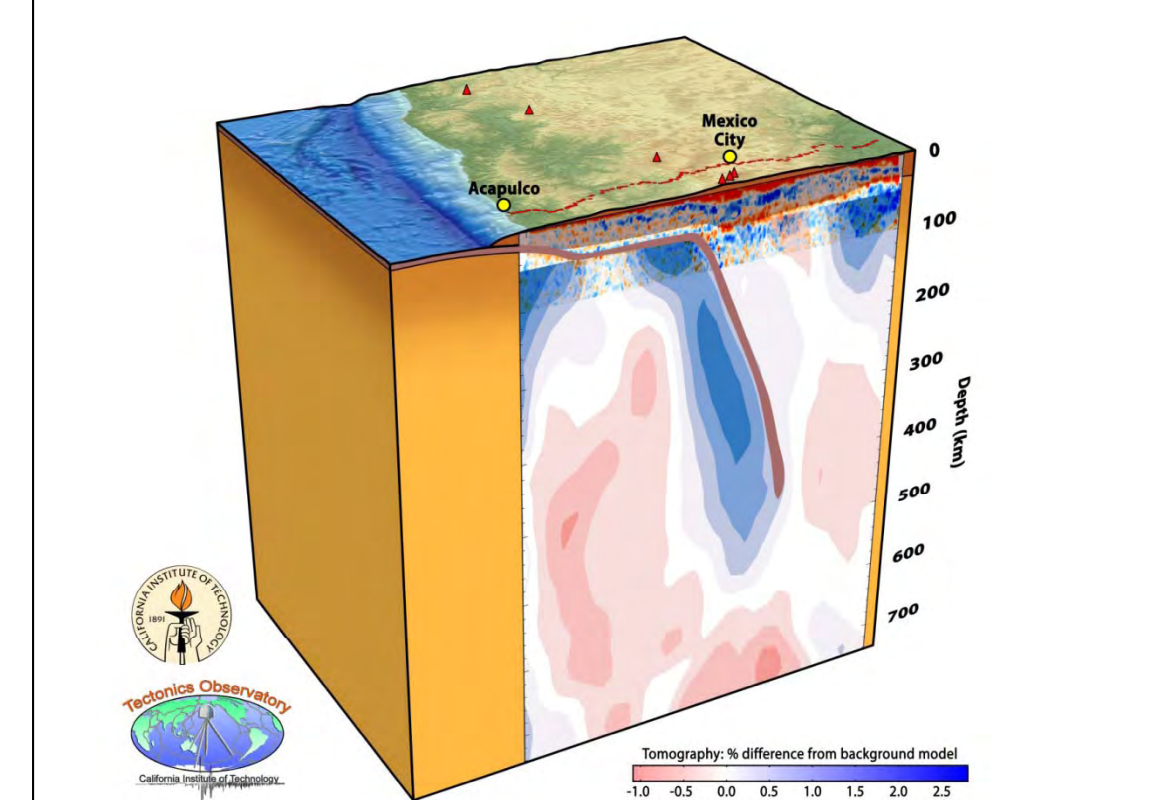


Plate motion - Alex Copley, Mark Turner, Lindsey Stancliff, Ashley Kennard, Jessica Kim

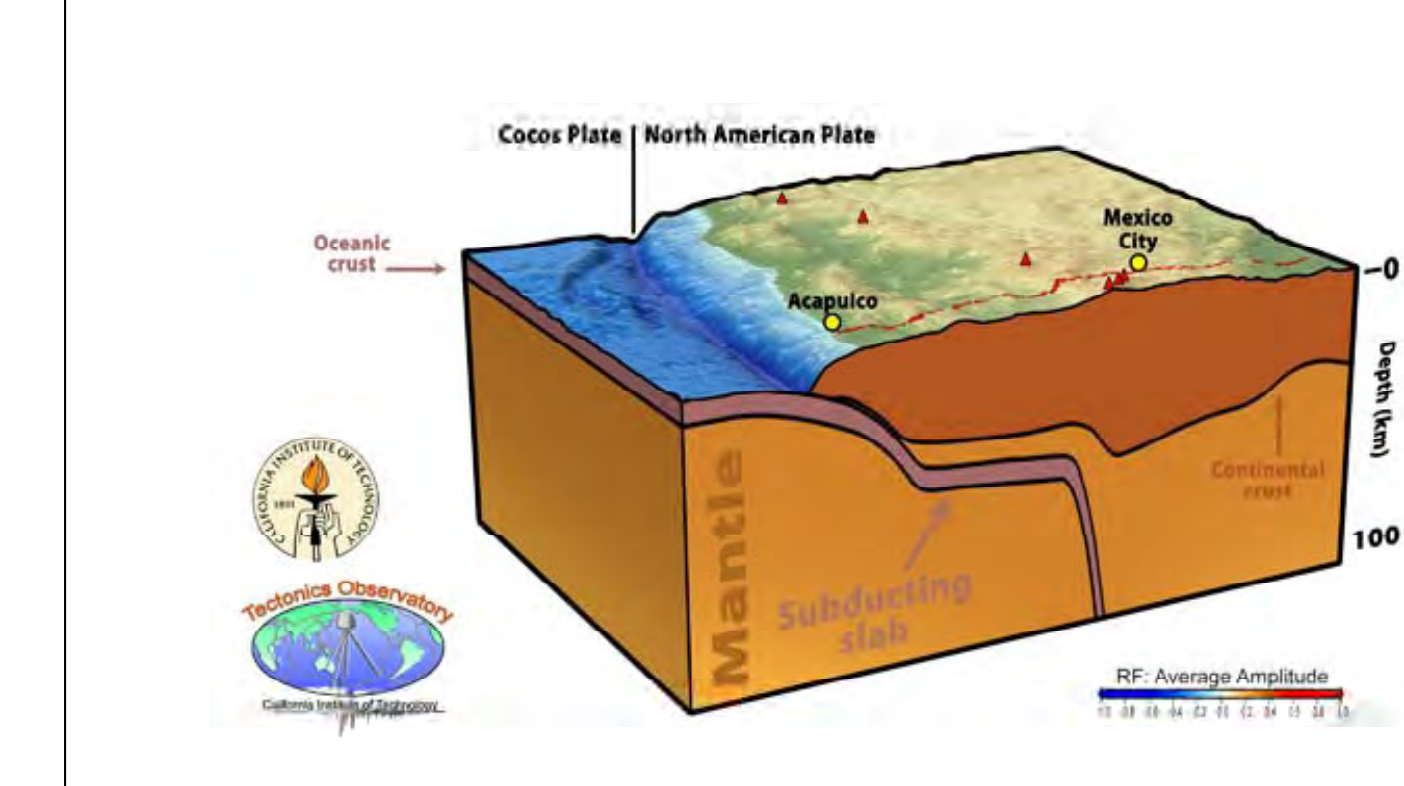
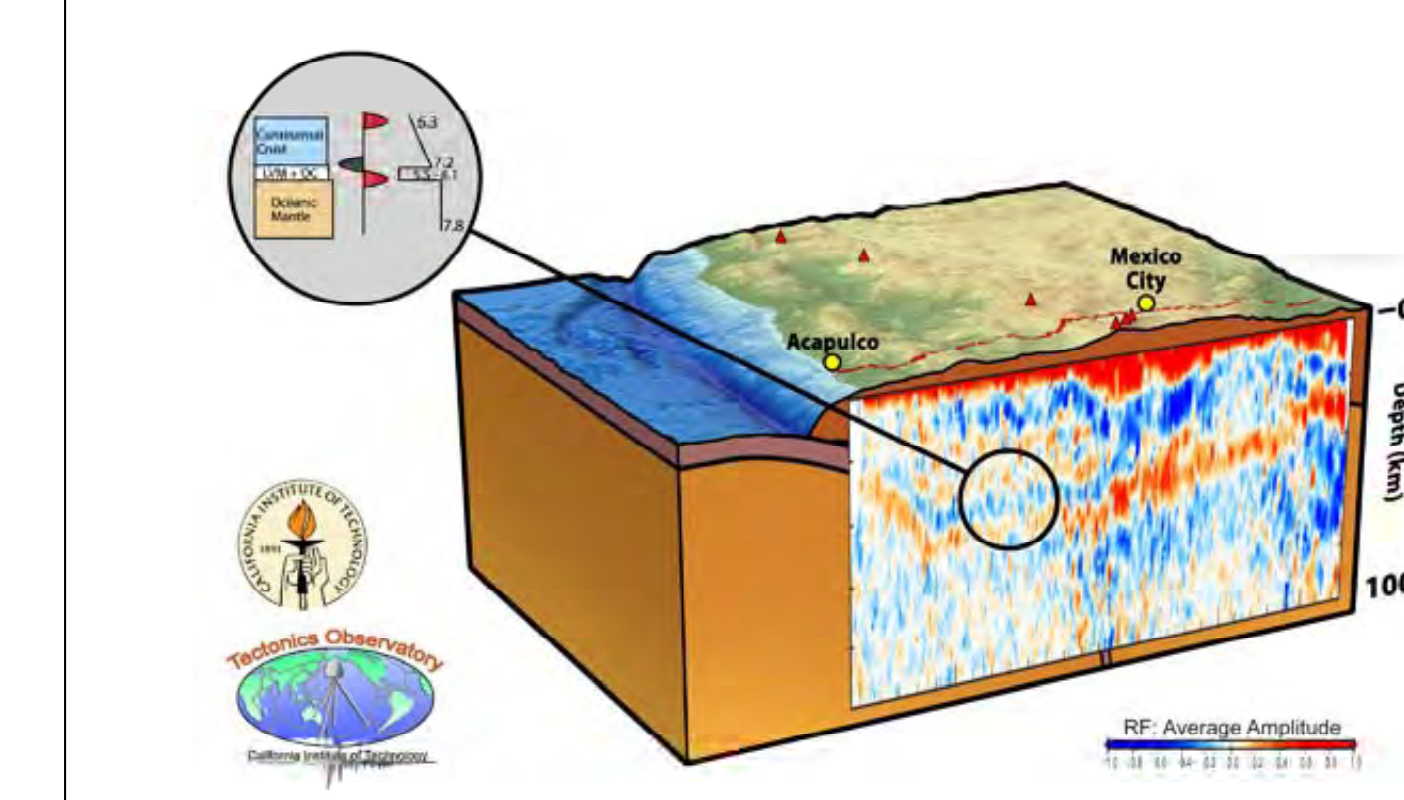
Graphics (Tim Pyle, Lisa Christiansen)



For general public:



For general public:



Upcoming Outreach Opportunities

- Partnering with 6th grade teachers to help with labs
 - Willy Amidon/Michelle Selvans
 - Need three more volunteers
- TO tour for 6th grade class
- Lead field trip through Eaton Canyon
 - 6th grade class
 - High School AP Environmental Science class
- Classroom presentations
 - 7th grade class
 - Tim Raub will lead lab on what rocks can reveal about past climate
 - Need three more volunteers for 2nd, 4th, and 6th grade classes
- Hamilton Elementary Family Science Night (Dec 4, 2009)
- Label PUSD rock collection
 - Jamsheed Hassanzadeh
- Interpretive sign at San Gabriel fault

Ideas for Future

- Partner with more Caltech programs
 - Watson Lectures (free graphics!)
 - Reel Science
 - Science Saturday
 - YES
- Assist faculty with grants
 - Supplemental funding opportunities
 - Proposal preparation
- Establish international Summer School to train students in use of TO equipment
 - Two weeks
 - TO would provide funding for undergrads and grads
 - Postdocs and faculty would come with their own funding

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