

Outreach: Highlights over this past year & Upcoming opportunities

Laurie Kovalenko & the TO team



A major objective of the Tectonics Observatory (TO) is to develop an Education & 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

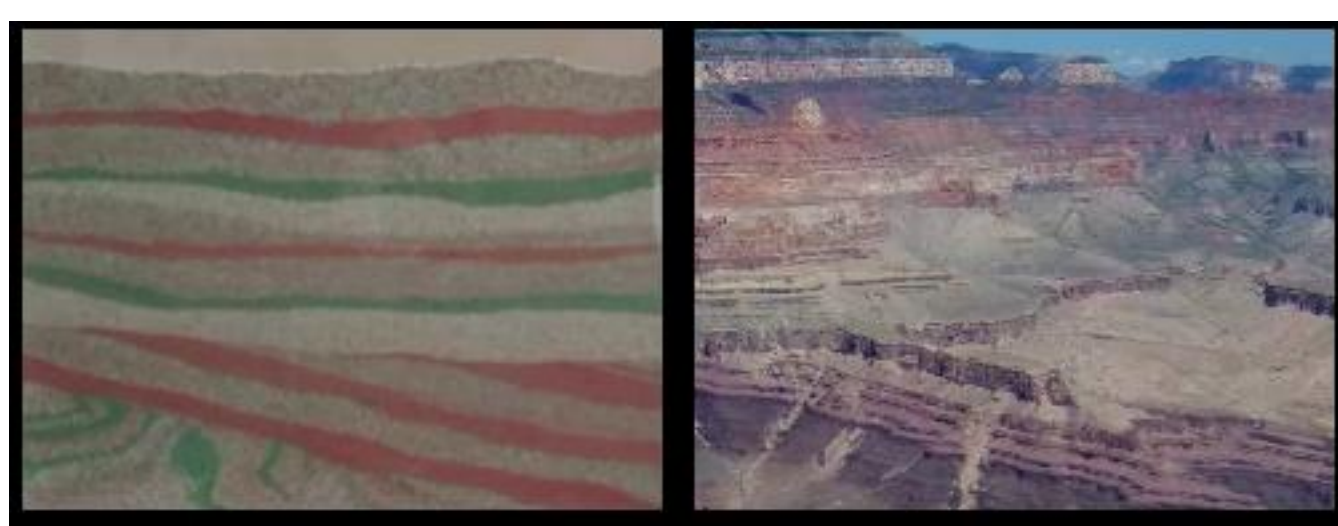
Approaches

- Partner with local schools
 - Karen Jain, PUSD Science Coordinator
 - James Maloney, Caltech Classroom Connection and Summer Research at Caltech
- Partner with Caltech outreach programs
 - Science Saturday, REEL Science, Watson Lectures
- Partner with National Association of Geoscience Teachers (NAGT)
- Partner with GameDesk, Inc.

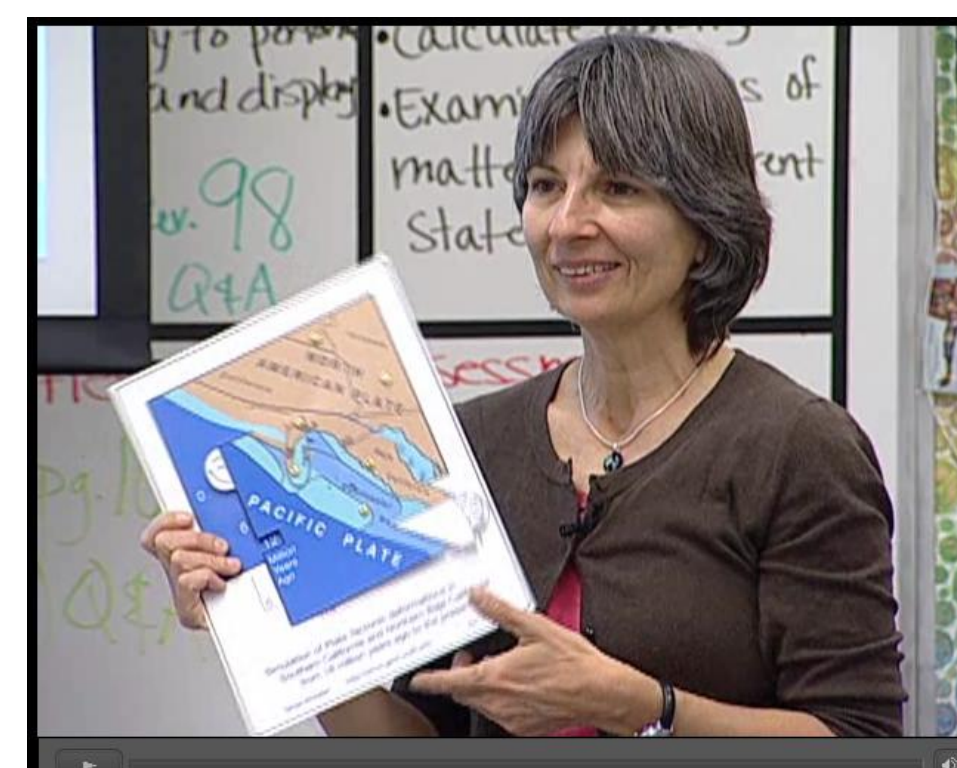
Public Lectures this Past Year

- Caltech Watson Lecture**
 - Professor Jennifer Jackson (April 2011) Good Vibrations Inside the Earth
 - In addition, Jennifer led a group of high school students on a tour of her lab and then joined them for dinner, as part of Caltech's Jr. Watson Program
- Caltech Science Saturday (for children 8 years old and up, and their families)**
 - Grad Student Joel Scheingross (Oct 2011) Journey of a River from Mountain to Sea
 - Grad Student Nina Lin (May 2011) The Wave that Shook the World
 - Grad Student Michelle Selvans (December 2010) Earth Story: the Colossal Forces that Shaped our Planet
 - Grad Student Steve Kidder (April 2011) How did the Grand Canyon get so Deep?
- Caltech REEL Science (for school groups in grades 5 – 12)**
 - Postdoc Tim Raub (February 2011) Inside Planet Earth
- Caltech Alumni Day (for children of alumni)**
 - Grad Student Michelle Selvans (May 2011) Earth Story
- Public lecture at the White Mountain Rescue Station in Bishop, CA**
 - Professor Jason Saleeby (Oct 2011), "Epirogenic transients related to mantle lithosphere removal in the southern Sierra Nevada region"
 - Jason also led a field trip for the Tejon Ranch Conservancy in Frazier Park, CA, "Geology of the northern Mojave Desert and Tehachapi Mountains"
- Presentations in Nepal at US embassy**
 - John Galetzka (March 2011), "Earthquake science and safety"

New Outreach Resources



Video of a sandbox demonstration:
Formation of the Grand Canyon's layers
Created by Steve Kidder
Edited and music by Tim Pyle (IPAC)



Video of 6th grade teacher workshop: How plate tectonics shaped southern California
Leader: Joann Stock

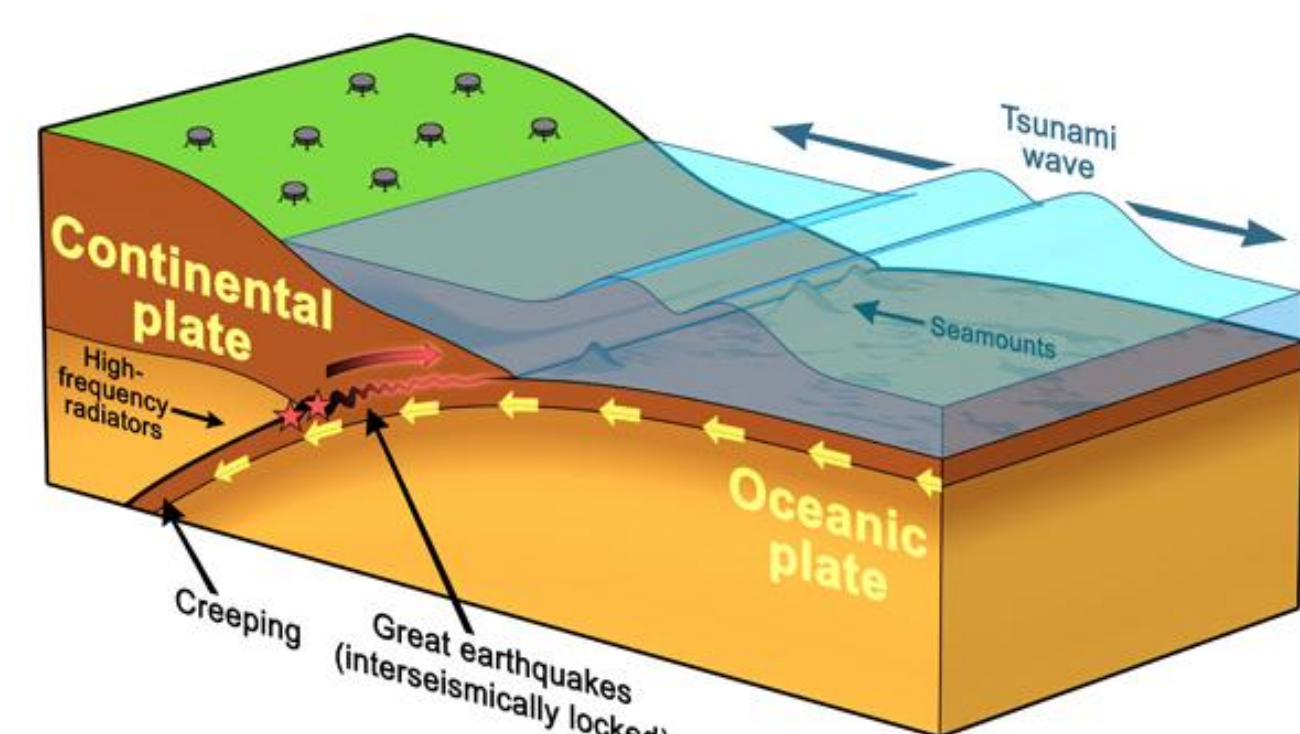


Image of Japan 2011 earthquake:
Credit: Mark Simons and Tim Pyle (IPAC)

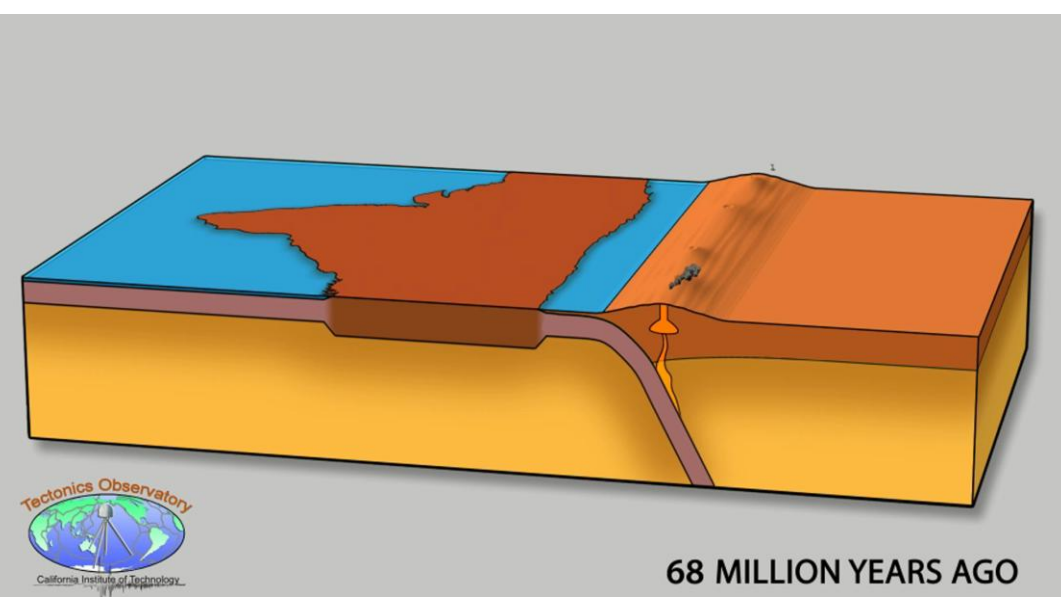
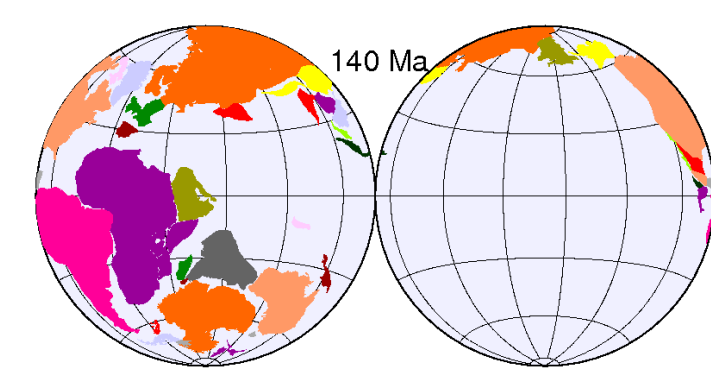
More outreach resources are listed on the TO website's Outreach pages, as well as on the Member pages:
- Member pages also list past outreach activities and include advice by the activity leaders

Click on "For Members"

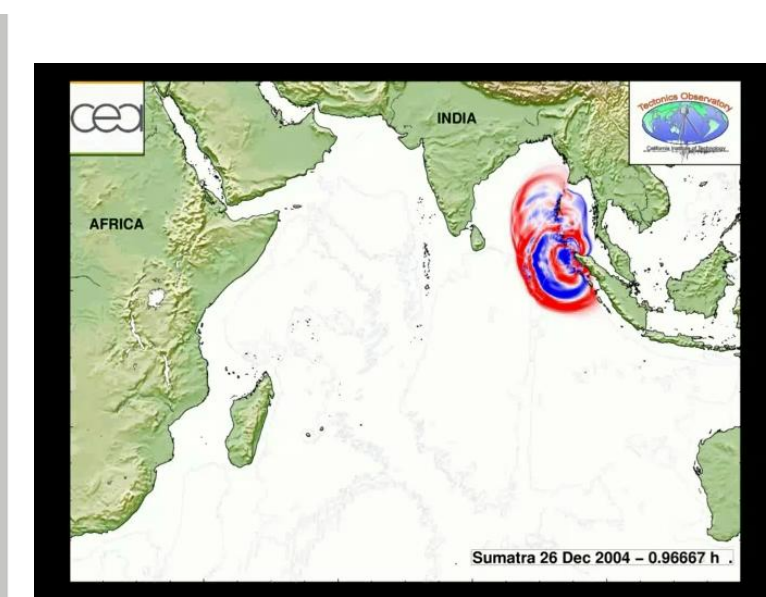
Then log in with:
ToMember
GPS.tomember



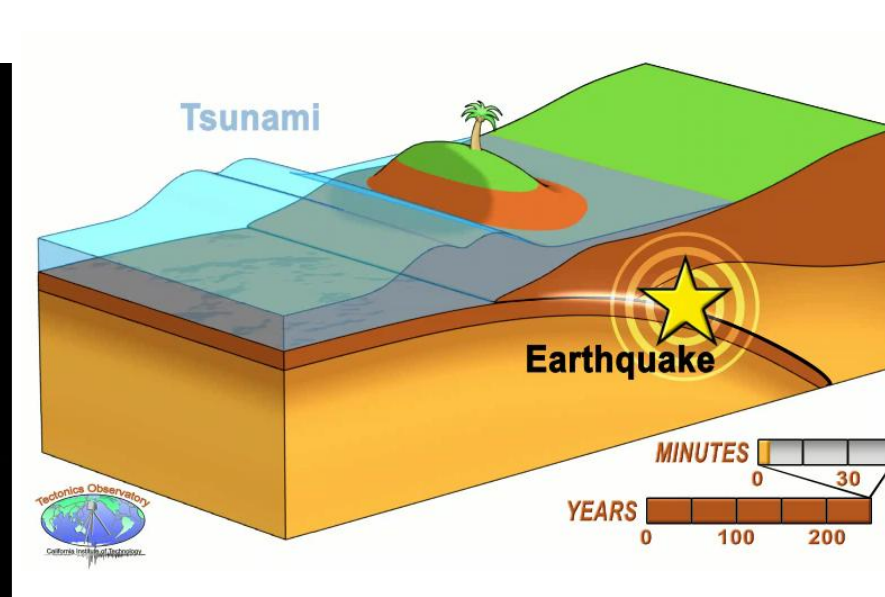
Plate motion, Ashley Kennard, Jessica Kim, Lindsey Stancliff, Alex Copley, Mark Turner



Mountain building -
Krystal Chanard, Tim Pyle (IPAC)



Tsunami propagation -
Anthony Sladen



Seismic cycle -
Tim Pyle (IPAC)

Outreach in Local Schools this Past Year

- Tours of the TO**
 - Scientists led about 350 sixth-grade students on tours of the TO this past year
 - Visiting schools:
 - San Marino Unified School District
 - American Martyrs Catholic School
 - Pasadena Unified School District's Robotics Club
 - Topics included:
 - How earthquakes and landslides shape the landscape
 - What is the asthenosphere like?
 - Subducted-plate dynamics
 - Origin of earthquakes and tsunamis in Sumatra
 - Minerals in everyday life & how to get water from rock
 - Sylvain Barbot, Erin Burkett, Jamshid Hassanzadeh, James Hollingsworth, Yihe Huang, Junle Jiang, Nina Lin, Belle Philibosian



James Hollingsworth – what honey, corn starch, chocolate, and the asthenosphere have in common



Yihe Huang – the physics of earthquakes



Sylvain Barbot-Plate tectonics globally and in your own backyard



Nina Lin – making your own landslide out of flour, sugar, and coconut



Junle Jiang – tsunami research

Visiting Local Schools

- Scientists went to classrooms**
 - Schools visited:
 - Blair Middle and High Schools
 - Gilford Middle School, New Hampshire
 - High Point Academy
 - Pasadena High School
 - Washington Elementary

- Topics included:
 - The periodic table in everyday life
 - Seismic waves and resonant frequencies
 - Earthquakes, tsunamis, and plate tectonics
 - Erosion and weathering
 - What it is like to be a scientist

Jean-Philippe Avouac, Erin Burkett, Jamshid Hassanzadeh, Steve Kidder, Ajay Limaye, Nina Lin, Belle Philibosian



Belle Philibosian—with the earthquake machine



Jamshid Hassanzadeh—showing HS students how to get water from a rock

Scientists brought hands-on activities to family science nights, in partnership with Iridescent Learning

- Willard Elementary School & Wilson Middle School
- Topics included: Viscosity, Lift
- Joel Scheingross, Laurie Kovalenko

Scientists served as judges at local science fairs

- David Case, Jena Johnson, Erika Swanson



Joann Stock—showing teachers Atwater's SoCal tectonic model

Working with teachers

- Scientists partnered for the academic year with two 6th grade teachers
 - helping in the classroom once or twice a month
 - Joel Scheingross, Erin Burkett
- Joann Stock led a PUSD 6th grade teacher workshop
 - on How Plate Tectonics shaped southern California
 - video available on DVD & on TO website under Outreach Materials
- Joann led a similar teacher workshop at the California Science Teacher's annual conference here in Pasadena, Oct 2011
 - as part of a field course put on by the Caltech Seismo Lab



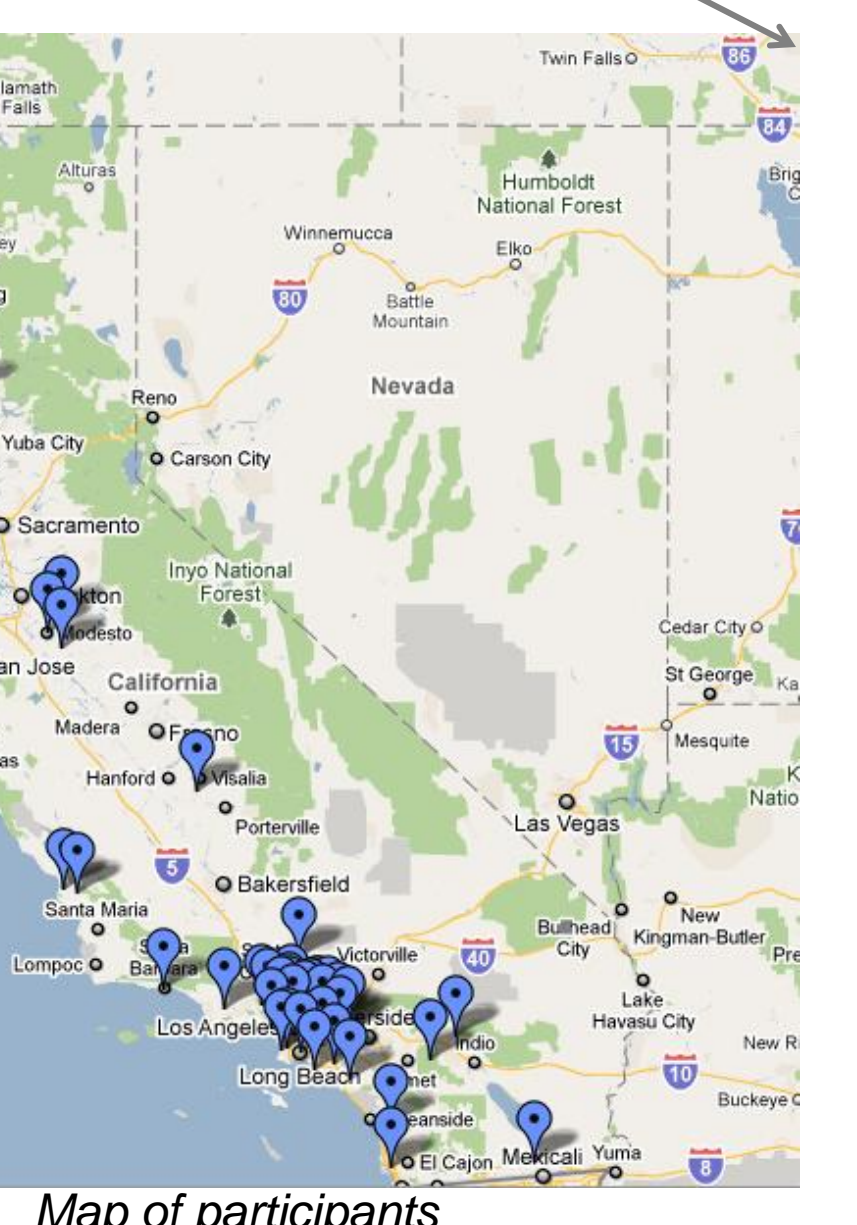
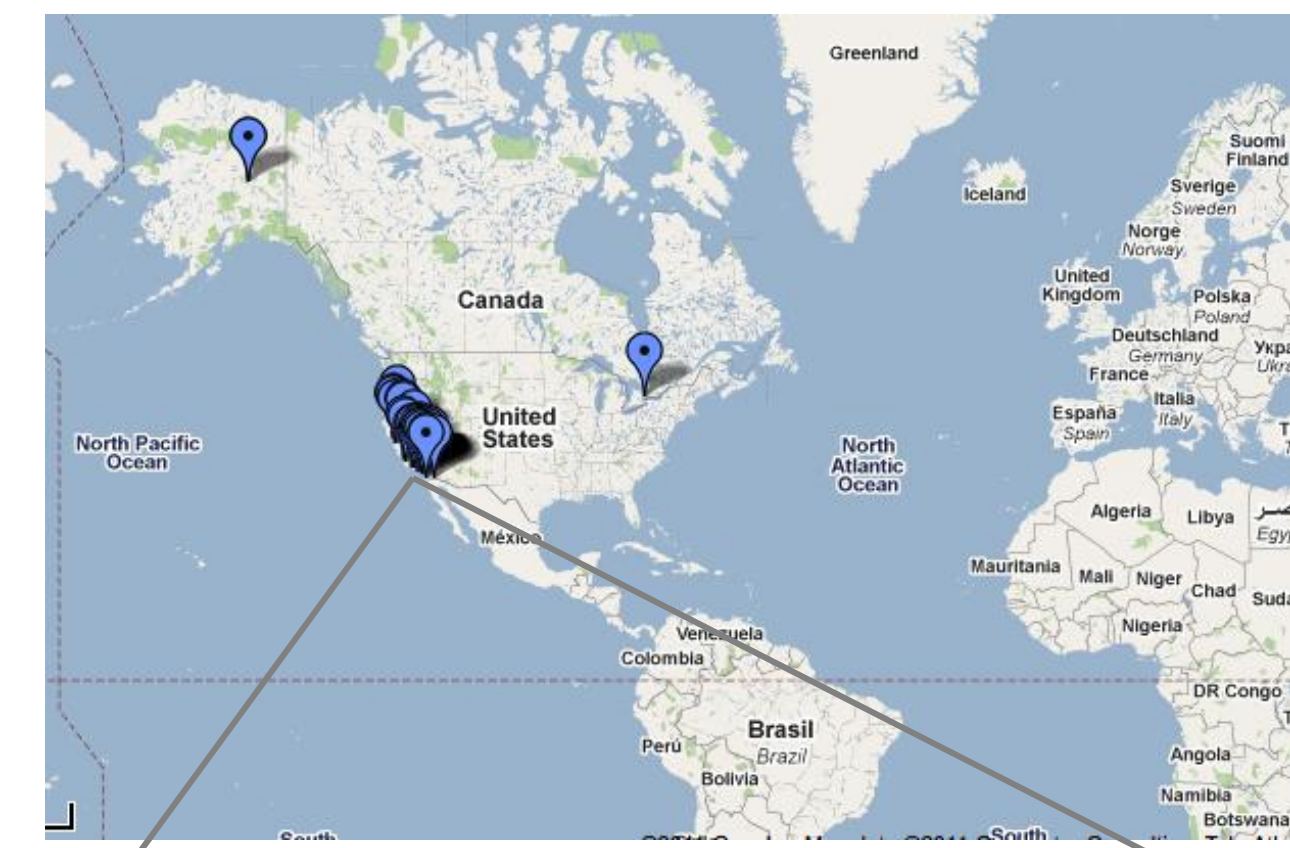
Erin Burkett—leading an activity on resonance using spaghetti and raisins



Joel Scheingross—calculating tectonic plate speed

The TO hosted the Spring 2011 Meeting of the National Association of Geoscience Teachers (NAGT) - Far West Section

- Weekend of March 25 – 27**
 - 117 participants (including mostly community college and four-year teachers, as well as high school teachers, K-8 teachers, college students, and 25 volunteers who led field trips and workshops and gave presentations)
- Our Goal**
 - For teachers to learn/experience current research, and in turn share this with their students
- Schedule:**
 - Friday night - socialize, Seismo Lab tour, SCEC display, presentations
 - Saturday - field trips, workshops, banquet with presentation
 - Sunday - originally half-day of workshops, but extended to full day by popular demand!
- Workshops:**
 - Ken Farley, John Eiler, & Brian Wernicke, "Low-T thermometry and thermochronometry and applications (including dating the formation of the Grand Canyon)"
 - Elisabeth Nadin (UA/Fairbanks) & Belle Philibosian "Historical Earthquakes and Uplift/Subsidence of Sumatra from Coral Growth Rings"
 - Joann Stock - "Earthquake Magnitude, Energy, and Focal Mechanisms (beach balls)"
 - Tom Heaton, "Operations of Community Seismometer Network (How your laptop can help scientists better understand earthquakes)"
 - Tanya Atwater (UCSB), "Plate Tectonic Rotation of the Transverse Ranges: what happened, how we know it happened, and how it created Southern California's unique geography, climate, ocean currents and biological richness"
- Field trips:**
 - Mike Lamb & Jeff Prancevic, "Erosion and Sediment Transport in Steep Mountain Terrain, San Gabriel Mountains"
 - Elisabeth Nadin (UA/Fairbanks) & Rebecca Walker (MtSAC) "Vasquez Rocks"
 - Bruce Carter (PCC), "San Gabriel Anorthosite and San Andreas Fault"
 - Donald Prothero (Occidental College), "Devil's Punchbowl and Red Rocks Canyon"
- Presentations:**
 - Tom Heaton, "Recent earthquake in Japan"
 - Jennifer Jackson, "Good Vibrations Inside the Earth"
 - Jesse Adkins, "Journey to the bottom of the sea: How deep-sea corals calcify and why we care"
- Tours/displays:**
 - Margaret Vinci & Anthony Guarino (Seismo Lab tour)
 - Bob de Groot, (SCEC display)



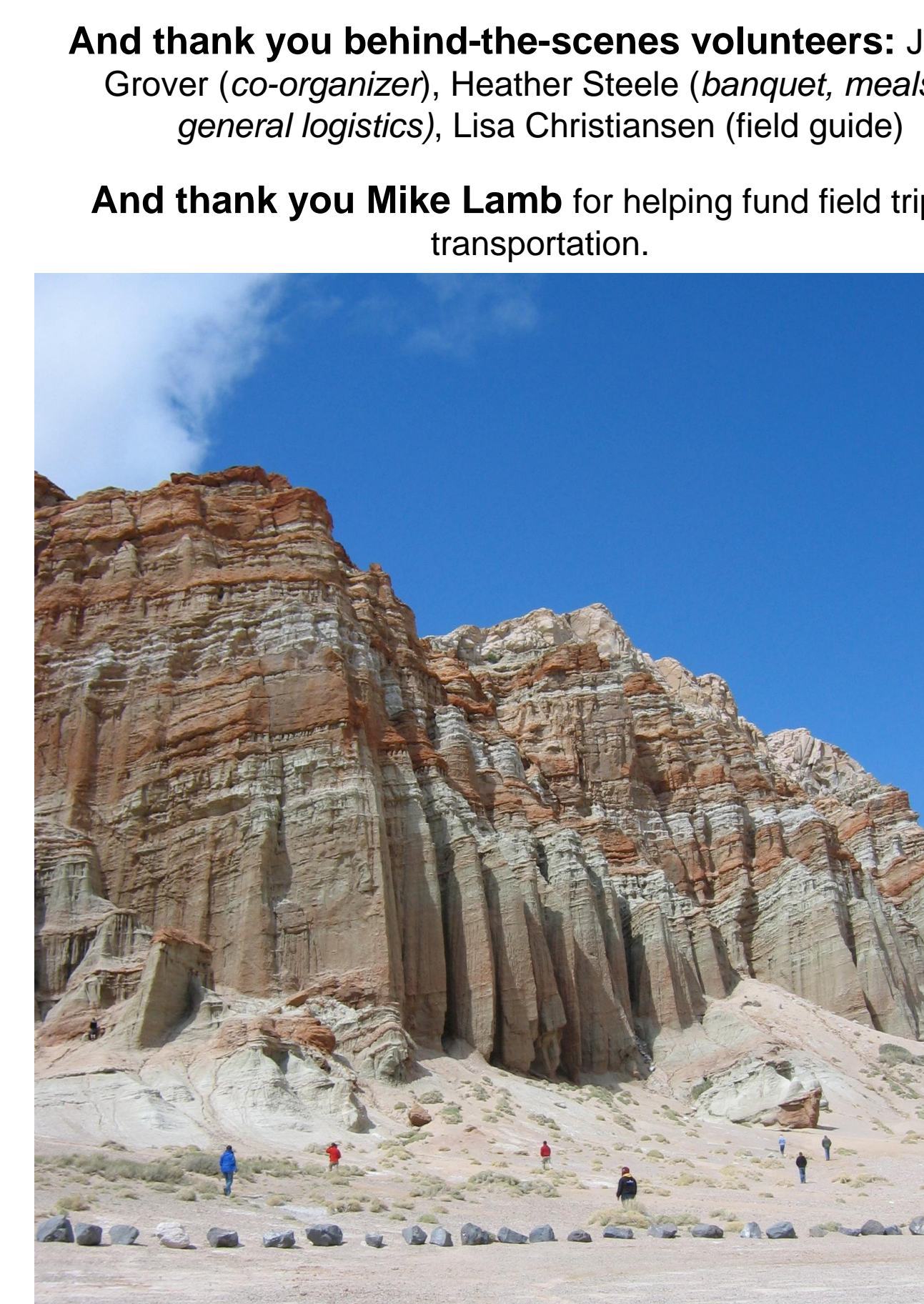
Map of participants



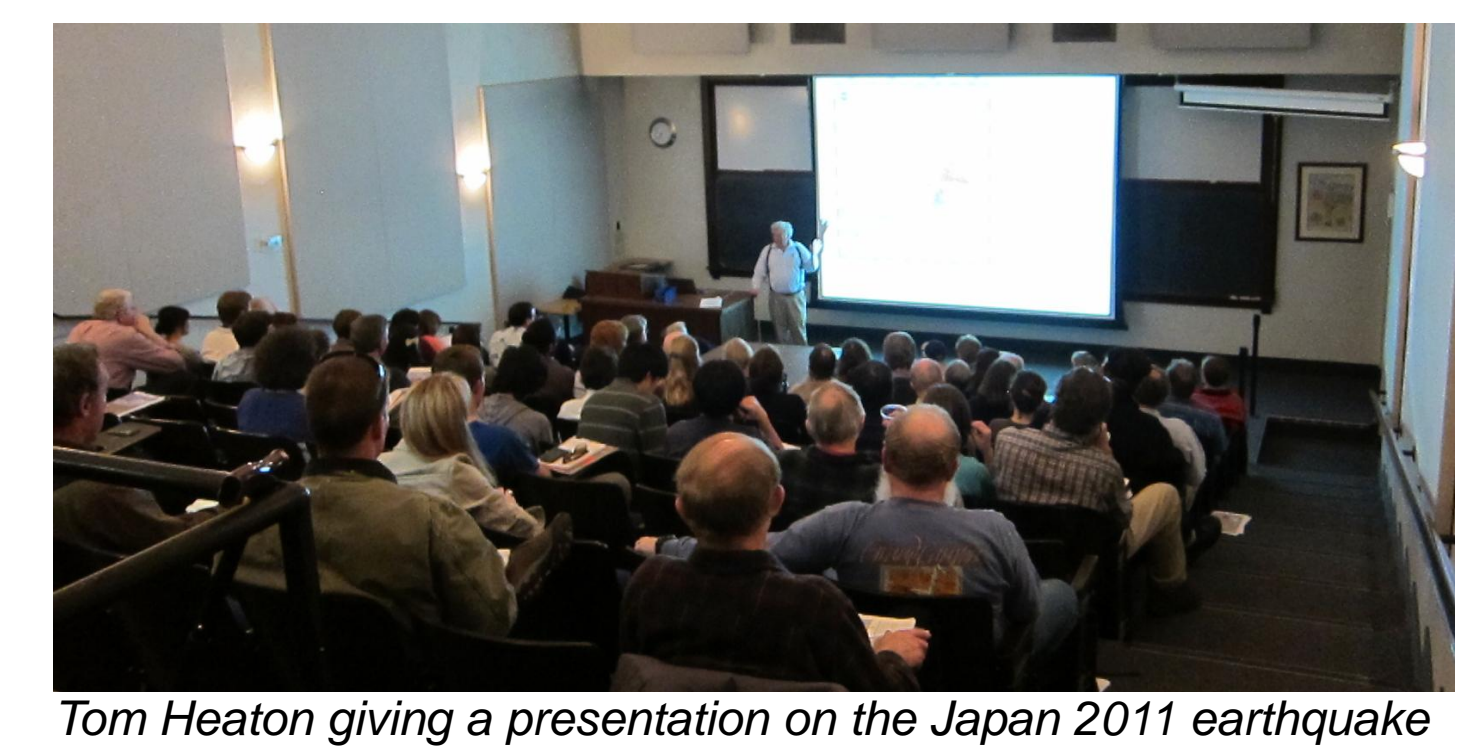
Anorthosite field trip, led by Bruce Carter (PCC)



Using seismic waves from global stations to construct a first-motion focal mechanism, in Joann Stock's beach ball workshop



Red Rock Canyon and Devil's Punchbowl field trip, led by Donald Prothero (Occidental)



Tom Heaton giving a presentation on the Japan 2011 earthquake



Ken Farley, John Eiler, and Brian Wernicke leading a workshop on low-temperature thermometry

Upcoming Outreach Opportunities

- Visit classrooms**
 - High school Earth Science classes (Marshall HS)
 - 6th grade classes
 - Lead 4th grade classes on a tour of the TO**
 - Hamilton Elementary, PSUD
 - Sometime after the new year – not scheduled yet
 - Help create educational Earth Science video games**
 - Partner with GameDesk, Inc.
- Let me know if you are interested in any of these! (lauriek@gps.caltech.edu)



Steve Kidder - what it's like to be a geologist

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