Erin R. Burkett, Volunteer for hosting part of TO and Seismo Lab tour
February 3, 2011 (10 am – noon) in ARMS rm 267, Caltech
Four 6th grade groups (~15-20 students each group), San Marino Unified School District

(1) Introduced myself, asked if they knew what a 'post-doc' is…explained.

(2) Outlined my career path to present (also on a powerpoint slide):
   a. As a kid: liked outdoors, rocks, exploring
   b. High school: liked physics (great teacher, hands-on experiments: potato guns, trebuchets…)
   c. College: Physics Major (4 yrs)
   d. Graduate school: PhD geophysics (6 yrs)
   e. Now: Post-doctoral researcher at Caltech

(2) Asked kids what they imagine when they think of geologists and showed a slide with pictures to illustrate what a geoscientist might do day-to-day (field work/trips, camping, computer work, teaching, write papers to share research results, conferences (often traveling!)

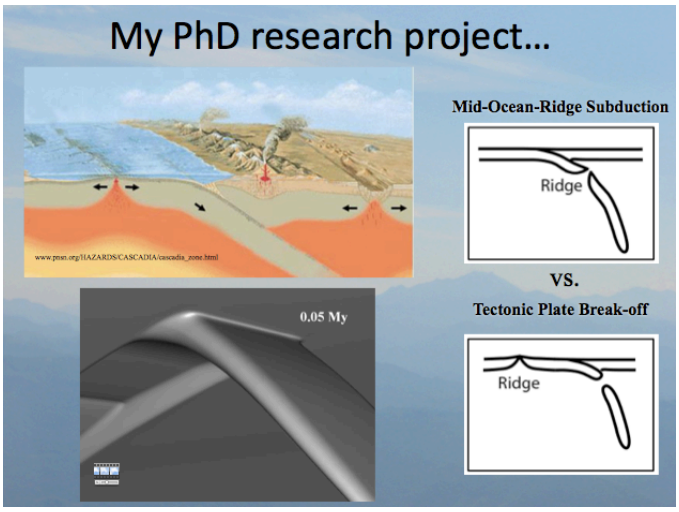
(3) Showed a number of simulations representing results of research by other scientists, particularly at Caltech, which gave an overall view of plate tectonics, leading up to and providing motivation for describing the 'in a nutshell' version of my PhD research:
   a. Continental Drift plate reconstructions
      http://www.tectonics.caltech.edu/outreach/animations/drift2.html
      -Asked students to share their explanations of continental drift/plate tectonics…Point out the timing and ask if they know how fast plates move (point out it's the rate fingernails grow)
   b. Seafloor spreading (first ask them to describe/explain seafloor spreading) , and how that allows the apparent 'drifting' of continents …Point out in particular the collision of India with Asia since the next movie shows a

side/cross-section view
http://www.tectonics.caltech.edu/outreach/animations/seafloor.html

c. Himalayas movie (as a zoom-in of what's going on in cross-section where india collides so rapidly with asia) …good illustration of subduction, and then leading into the newer research field they may not have seen before of the possibilities of pieces of tectonic plates breaking off (leading to my research) http://www.tectonics.caltech.edu/outreach/animations/himalayas_small.html

d. Another scenario related to my research (and plates breaking off) is what happens when the separate processes of ocean spreading and subduction collide (when a spreading ridge meets a subduction zone). Show other version of plate motion reconstructions: http://emvc.geol.ucsb.edu/download/pacnorth.php …pointing out spreading ridge getting closer to subduction zone

e. …then transition to my research (a slide showing my research broken down into a cross-section of cascadia showing a spreading ridge close to the subduction zone, cartoons of possible hypothesized results of the scenario, then a movie result from one of my 3-D models (http://www.gps.caltech.edu/~erb/Movie2_Model3d1zm.mov) that summarizes my PhD work (take time to describe the movie viewpoint from beneath the spreading ridge and subducted plate



(4) Point out the movies/models show rock flowing with time, so take this opportunity to use silly putty (pass out pieces to the kids) to demonstrate that silly putty and rock can both similarly demonstrate viscous, elastic, and brittle behavior! Demonstrate and have the kids quickly pull to break the silly putty (brittle), pull more slowly to demonstrate viscous flow, and bounce the putty (elastic). Ask what they think would happen if it was warmer, for instance….it may flow more easily at higher temperature, like rock inside the earth (Note: kids may get distracted by the silly putty based on the class mood & size, so plan the timing appropriately (near end?) or collect it again before any other more focused attention is expected!).

(5) Sumatra Tsunami simulation (example of a different kind of movie resulting from research by others at Caltech):
http://www.tectonics.caltech.edu/outreach/animations/tsunami.html
…ask students how tsunamis are generated…..where would the earthquake take place to cause a tsunami, and how would the rock need to move (eg, displacing water, not strike-slip)

Some misconceptions/clarifications addressed:
--The plates do not float on magma, but on solid mantle rock, but that flows over time as demonstrated with the silly putty example.

--Pangea was not the only case of the continents being clumped together in a supercontinent….there were other earlier 'collections' of the continents as they've broken apart and re-collided many times…although it is harder to reconstruct farther and farther back in time.

--tsunamis are not just generated just by shaking from an earthquake…the earthquake has to be underwater AND move/break the rock in a way to displace water