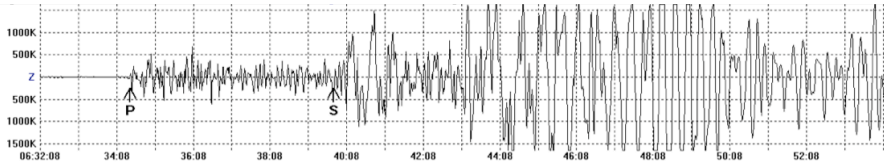


EOSC 256 Earthquakes -- Spring 2009



Instructors:

Elizabeth Hearn, ehearn@eos.ubc.ca, EOS South Room 355 (office hours TBD)

Michael Bostock, bostock@eos.ubc.ca, EOS East Room 220

Graduate Teaching assistants:

Yaron Finzi, yfinzi@eos.ubc.ca, EOS East Room 224

Ali Vaghri, avaghri@eos.ubc.ca, EOS East Room 224

Textbook: Earthquakes (sixth edition), by Bruce Bolt, W. H. Freeman, 2006.

Topics and (tentative!) timing:

Weeks 1-2: Descriptive: earthquake effects, measurements, old and newer ideas about their cause, faults, elastic rebound hypothesis (EHH)

Week 3: Introduction to seismometry and waves, imaging subsurface structure at our plate boundary. (MB)

Weeks 4-5: Plate tectonics and earthquakes, strain, stress. GPS and inSAR. (EHH)

Week 6: Loading fault to its (Coulomb) failure stress, aseismic deformation at depth and the earthquake cycle. (EHH)

Weeks 7-8: Frictional instability - the other ingredient required for earthquakes. (EHH)

Weeks 9-10: Probability (forecasting) and triggering. (EHH)

Weeks 11-13: locating and characterizing earthquakes using seismometers, magnitude-frequency and aftershock statistics, forensic seismology, Cascadia region (local) earthquakes and episodic tremor and slip. (MB)

Learning Goals: At the end of the term, you should be able to:

1. explain why earthquakes occur: forces and failure criteria.
2. explain why the ground shakes, and why shaking intensity varies.
3. explain how earthquakes are used to make images of the subsurface
4. describe the sorts of data we use to characterize and understand earthquakes
5. explain why we cannot predict the actual timing of earthquakes but can predict shaking intensity and probability at a particular location
6. critically assess claims of prediction: understand how theories must be tested against data to hold up
7. determine earthquake location and tell earthquakes from other disturbances like explosions
8. explain how earthquakes provide evidence of plate tectonics and how tectonic plate motion causes earthquakes

In addition: better understand how science is done, and how material taught in your math and physics classes relates to earthquake science.



Grading

“activities” (in class and pre-class) - 10%

Midterm exam - 20%

Final exam - 40%

Homeworks - 30%

HOMEWORK LATE POLICY (strictly enforced!)

0 to 1 week late -10%

1 to 2 weeks late -20%

2+ weeks late -30%

“Activity” marks cannot be made up later. I will drop the lowest two.

Let one of us know *ahead of time* if you will miss an exam.