

**Geology 41: Environmental and Solid Earth Geophysics**  
**Study Questions: Quiz #3**

The following questions are intended to help you study for the second quiz. The questions relate to material covered between March 11 and April 10.

The third quiz will be taken IN CLASS on 11 AM on Friday April. The quiz will be closed book/closed notes- HOWEVER, you may bring one page (single-sided handwritten) of notes with you to the exam.

- 1) What can we infer about the physical properties of the mantle and core from P-wave velocities? From S-wave velocities?
- 2) The Soviet nuclear threat was a very important motivating factor in the development of global seismic networks. Can we use seismology to distinguish between nuclear explosions and earthquakes? If so how?
- 3) Refraction seismology has been used extensively to “image” the layered structure of the earth. What types of subsurface geological structures can be determined by seismic refraction studies? What specific information do we get about the subsurface geology from seismic refraction studies? Are there any types of subsurface geological structures that cannot be imaged by refraction seismology?
- 4) We have many good images of the crust from reflection seismic studies. How does reflection seismology differ from refraction seismology? Do the seismic waves follow similar ray paths in refraction and reflection seismic studies? What geological features produce seismic reflections? Refractions?
- 5) Reflection seismology relies heavily on “processing” to enhance the signal and to remove noise. What is “signal”? What is “noise”? Describe the types of “corrections” are commonly applies to reflection seismic data. How do these corrections affect the results?
- 6) From seismic stations in North America, we can locate earthquakes anywhere in the world and determine their size. How are earthquakes located? How do we quantify the size of an earthquake from seismic records?
- 7) Describe how we can use seismic records to help constrain the slip direction of an earthquake. What uncertainties exist in a slip direction determined from seismic information alone? What other information (if any) is needed to determine the slip direction?
- 8) Describe the seismic velocity structure of the earth. What changes in the composition or material properties of the earth (if any) are associated with the major changes in seismic velocity?

- 9) What is seismic tomography? What (if anything) does seismic tomography tell us about the deep structure of subduction zones?
- 10) What types of geological structures can we recognize from the first arrivals reversed seismic refraction surveys? What types of structures are impossible to detect by this type of refraction seismic study?
- 11) What is the delay time? How is it useful in interpreting complex subsurface geology?