**Assignment 1 5640/6640 Seismology**

**Due:** 9:00 am Tuesday, October 15.

Please email your work to me in the form of ***a single attached document*** (.pdf or .docx!) at Tony.Lowry@usu.edu

1) [10+ points]. Use a search to find properties of five moderate to large (M ≥ 5) earthquakes that have occurred in Utah since 1960. Include the latitude, longitude, depth, and magnitude of the earthquakes. Bonus points if you can provide a focal mechanism!

2) [5]. Plot these 5 earthquakes on a map. It’s your choice how to do so. You may want to make a Google Earth KMZ file, or try Generic Mapping Tools (GMT) (<https://www.generic-mapping-tools.org/>). An on-line interactive mapping tool can be found at <http://www.geomapapp.org/>.

3) [5]. In what tectonic environment do the globally largest earthquakes occur? Why?

4) [5]. How would directions and amplitudes of first particle motions in a mine collapse or nuclear test differ from that of an earthquake?

5) [5]. If a region typically experiences 12 earthquakes per decade between magnitude 5.0 and 6.0, about how many earthquakes would you expect to occur with magnitudes between 4.0 and 5.0?

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6) [5 points]. Stein & Wysession, Page 116, Problem 2.

7) [5]. Stein & Wysession, p116, Problem 3.

8) [5]. S&W p116, Problem 5.

9) [5]. S&W p116, Problem 7.

10) [6]. Using prem.xlsx and the paper by Romanowicz (2008), links to which are posted on the course website:

a) [2] Calculate (using Excel formulas) the pressure expected at 1000 km depth.

b) [1] Where is the largest *relative* jump (i.e., increase or decrease as a percentage change) in *VP* (compressional velocity)?

c) [3] In the paper, what layer of the Earth is imaged in Figure 2, the 2770 km image? Are the amplitudes of shear-velocity variations here smaller or larger than observed in the: mid-mantle (925 km)? or the upper mantle (140 km)? What does this imply about the layer?