Problem Set 3: Lake Mead Field Trip Report

Due: Thursday, April 29th

Write a report based on your observations, measurements, and interpretations during the field trip to the Lake Mead region. Your report should be between 5-10 pages in length, 11 pt font, 1.5 line spacing, 1-inch margins all round.

The report should NOT be a field log of everything you saw or did in the field over the 3-day trip. Rather, it should be a summary of what you learned thematically. In other words, you could comment on what you learned about the process of structural analysis, what you learned about tension cracks, what you learned about faults, what you learned about folding, and what you learned about how these things fit into a broader tectonic context. In each case, you can elaborate upon how you were able to apply the concepts of geometric, kinematic, and mechanical approaches to describing and interpreting structural features.

Your report should include:

- The tracing paper/sketch used on day 1 at Valley of Fire State Park to trace the en echelon deformation bands.
- The topographic maps you took with you to Pinto Ridge (day 2) and Lovell Wash (day 3). Feel free to add color and highlight the features you observed (e.g., stratigraphic contacts, faults, bedding strikes and dips, etc.).
- The stereonets plotted on day 3 along Lovell Wash.

Required elements that should be incorporated into your paper from each field trip day are as follows:

Day 1: How do faults progressively evolve from preexisting joint zones?
Day 2: How can fault-zone fractures along the Pinto Ridge fault be used to determine the fault kinematics and causal stress field?
Day 3: How can the observed features be interpreted to explain the history of motions along the Las Vegas Valley Shear Zone?

You are welcome to examine published papers to assist you with your report (not required); however, these must be referenced within the text and a full list of citations listed at the end of the report.

You may include as many figures as you wish at the end of the text. They will not count towards the 5-10 page limit. Each figure must have an associated caption.

Alternative Homework Exercise

If you were unable to attend the field trip, you are still required to submit a report of equivalent length. You will be working in Google Earth to examine and describe the three areas visited during the field trip: Valley of Fire State Park (day 1); Pinto Ridge (day 2); and Lovell Wash (day 3). Use the kmz files on the course homework web page to go to each area. For each region, you will need to create a map of observable features (joints and faults), plus any obvious stratigraphic contacts. For day 1, map directly off the Google Earth image. Discuss the implications of your map in the context of the following paper: “The evolution of faults formed by shearing across joint zones in sandstone,” by R. Myers and A. Aydin.
(Journal of Structural Geology, v.26, p.947-966). For days 2 and 3, map off the respective topographic maps. Use the 3D view capabilities in Google Earth to describe what appears to be occurring in each area. You are welcome to discuss these areas with students who attended the field trip to gain their perspective, but your report must be based on what you can describe from Google Earth observations.