For Geology of the Mount Barcroft-Blanco Mountain Area, Eastern California

1:24,000 scale

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We are going to going to do what most geologists do in practice before starting a new project in an area: Look at maps and satellite images of an area. Most geologist will spend a very long time looking over a geological map before starting a project in the area. In fact, the exercise should be “spend about 2 hours looking at the map and about 2 hours on Google Earth”. But, we will be much more directed than that here.

All the plutons in the region are Jurassic and Cretaceous in age. Our goal is to reconstruct what the area looked like *before* the Jurassic. Why? Because we will eventually want to know the geometry that was intruded by Jurassic plutons, to evaluate how much deformation occurred around the plutons. In other words, we need to know the map well enough that we can mentally remove the younger events.

1. There are many minor folds mapped in the Wyman Fm. How do they know they are there?
2. The biggest geological structure on the map is the White-Inyo anticline. You can see it on the south end of the map.
   1. What is the trace of the hinge line?
   2. Does it plunge? How do you know?
   3. Can you trace the hinge of into the area where the Sage Hen pluton currently is? Why or why not? What is your best guess for where it is?
3. If there is an anticline, there must be a syncline somewhere. Shouldn’t there be? Where is it and how major is it?
4. Is there an overall vergence (asymmetry) to the folds?
   1. Large-scale? Small-scale?
   2. What does this vergence tell you?
5. The video said that the entire visible part of the mountain range is sitting on hangingwall of the Last Chance thrust fault. The age of the rocks that are being thrust over are Mississippian?
   1. When did the thrust fault occur? Explain and say why
   2. Where did all this Precambrian and lower Paleozoic strata come from? (make educated guesses)
   3. Why is there no great unconformity here, as opposed to most other places in the world?
6. There are a lot of faults throughout the area. Group the faults based on orientation. For each group:
   1. What are the trends of the faults?
   2. Can you constrain when the faults happened?
   3. What type of faults are there?
   4. Some faults just end in certain units. Why is that?
7. Based on the above, in what units is it hard to see faults? In what units is it easy to see faults? Speculate as to why?
8. The informal “Barcroft break” and Marmot thrust is toward the northern end of the map. What happens to the thick Precambrian-Cambrian stratigraphy in this area? Draw at least to diagrams (perhaps 3D block diagrams?) to explain a permissible interpretation for what occurred there.
9. There are Tertiary basalt flows in the area.
   1. Where they area in the map area?
   2. Where do they outcrop in terms of elevation?
   3. What general interpretations can you make about source of the basalt and the erosion of the basalts?

For this part of the exercise, you will need to use the “*Maps*” data set in Google Earth. The transparency of the map overlays can be toggled via the properties menu (refer to google earth instructions video). NOTE: the georeferencing of the maps is not perfect, resulting in slight discrepancies between the geologic maps and the terrain. Do your best to interpolate as necessary.

1. What formations are relatively resistant to erosion? Give evidence.
2. What formations are relatively erodible? Give evidence.
3. This area of California is famous for the Bristlecone pines. The oldest living thing is a Bristlecone pine in these Mountains. The trees provide one of the most spectacular examples of being able to map by the vegetation, because the trees will only grow on a few geological formations. Use Google Earth and the map to figure out which ones. You might need to use the internet 8to determine where the Bristlecone pine forests are.
4. The Sage Hen granite forms a “flat”. Speculate as to why.