Geomorphology Mansfield Field Exercise

Welcome to Vermont! Today's lab will give you the opportunity to climb this state's highest mountain, Mount Mansfield (4393 ft. or 1339 m above MSL). Weather permitting, we will go all the way to the summit.

The main purpose of this lab to observe. We will look for evidence of the presence of glaciers, modern natural and anthropogenic (human) erosion processes, structural features, and anything else we can find. Keep your eyes open and record observations.

Glacial Evidence

Above treeline, look for features in the rock that may indicate the presence of glacial ice. The rock on Mansfield is a metamorphic schist that has experienced significant weathering since retreat of the last glaciers. Striations may not be obvious. Look for other features in the landscape that indicate the direction of ice advance. Using a compass, measure and record the orientation of striations and/or any other features. While at the summit, look for evidence for or against glacial ice moving across the very top of the mountain.

Ice flow Orientations (at least 5):

Weathering Measurements

On the Sunset Ridge trail, exposed rock exhibits differential weathering effects between the schist and the quartz veins within the rock. Assuming that glacial ice left a polished surface about 14,000 years ago (rough estimate based on limited dating), the condition of the rock today tells us something about the weathering rates on the mountain. Using a small ruler, measure the vertical difference between the top of the quartz and the adjacent schist at a minimum of 4 locations. Each person should take his or her own measurements.

Height Differences: 1)

2)

3)

4)

Questions

1. Do you think ice moved over the summit of Mount Mansfield? State evidence for your conclusions?

2. Which direction did glacial ice advance over the area? How did you determine this?

3. What was the average difference between the quartz veins and surrounding schist on the Sunset Ridge trail? Assuming the surfaces were equal 14,000 years ago, and the quartz has not weathered significantly, what is the weathering rate of the schist in millimeters per year (mm/year)? SHOW YOUR CALCULATIONS.

4. As we walk up the mountain, we will be collecting temperature and barometric pressure data as a function of elevation in severall groups. The barometers will resample every 15 minutes so we'll be taking readings at widely spaced intervals. We will provide data sheets along with the gear and then compile the data and post it to the web site. For elevation, we will use GPS locations and read elevation off the topo map since our GPS units are very inaccurate for elevation. For this report:

   A. Graph barometric and temperature data as a function of elevation (attach the graph).
   B. Briefly discuss how temperature and pressure change as a function of elevation.

C. Find out (using whatever sources you can) why temperature, pressure and elevation are related and summarize your findings in a few sentences. HINT: Good places for information include weather sites on the web and textbooks on weather in the library. *Lapse rate* is a key phrase

D. Is the pattern of change similar on the way up the mountain as on the way down? If not, why not?

E. What do you think are the geomorphic implications of the temperature distribution you have observed?