There are a lot of images to look at (24) so keep a good pace. Feel free to work together but you must turn in your own work. (paraphrase don't plagiarize!). Also, note that some of the questions ask you to orient the photo in specific ways, and give you the option of answering 1 of 2 options (note which question you are answering and which photos you interpret.

This lab deals with interpreting geologic features, some of you may already be familiar with the terminology. I would strongly encourage you to look though a introductory geology text or find a good resource for information online prior to turning in your lab write up. Sketches, diagrams and neat work are strongly encouraged. Read the questions carefully and be sure to answer the questions completely. This is a 2 week long lab.

1) Coyote Cyn. 1-7 OR Coyote Cyn. 1-9 (11-29-00) (2 mono prints available)
   a. What type of film is this? what type of environment is this? what is the most significant agent of erosion acting on this landscape? is it episodic or continuous?
   b. In the braided drainage channel visible in this photo there are scattered large yellow trees, approximately how wide is the biggest tree you can find? given their size you can infer that these trees are well adapted to this environment, what adaptations would be successful in type of environment?

2) 990065 2-9 OR 990065 3-16 (4-22-99) (2 mono prints available)
   a. Given this is an agricultural area, what type of water loving crop is most likely grown in the plowed fields? the soils range from light to dark according to their mineral composition, organic matter content and moisture, which of these factors contributes the most to the tonal difference?
   b. Look closely under magnification at the nonagricultural areas, i.e. the areas that are not plowed, explain the complex pattern you see; what agent of erosion do you believe has contributed the most to the pattern you see? are these areas potentially productive agriculturally? why or why not?

3) PW SLO 7-19A-1 AND PW SLO 7-19A-2 (11-6-92) (only one stereo pair available)
   - orient the photos with the date/frame info facing towards you so that north is up on the photo
   a. Do these two photos have 60% overlap? will this influence your ability to see stereo?
   b. What prominent geologic formation is visible in these photos? what is it made of? what agent of erosion is responsible for this? which direction is it growing?
   c. Look closely within the formation under magnification, what are the little interconnected structures? (hint: this is military owned land just north of Point Arguello)
d. Around any of these structures is their evidence of any recent activity? has man's activity in this area perhaps influenced erosion? how so? (look closely at the part of the network closest to shore)

e. There are large exposed non-vegetated areas within the formation, why doesn’t vegetation grow in these areas? which direction are these patches spreading?

4) C6001-002-023 (11/02/00) (only one stereo triplet available)

a. These three photos have 60% overlap, will this increase or decrease your ability to see stereo? is the stereo better for these photos than in the 11-6-92 photos of this area?

b. Look closely at the formation under magnification again, have many of the little interconnected structures been altered? is there evidence of any recent construction activity? (again, look closely at the part of the network closest to shore)

c. The perimeter of the exposed areas within the formation closest to the shore have undergone significant changes since 11-6-92, look at the vegetation surrounding the inland parts of these exposed areas between these two years, has it changed? is there more or less green vegetation visible? do you think this vegetation is natural? how will this vegetation influence the shape of this formation in the long term?

5) PW 64905-Spot (4-8-98) (2 mono prints available)

a. Is this a low, medium, high, or ridiculously high income neighborhood? why was this photo taken? (look closely, it is obvious) what caused this to happen?

b. Granted we do not have stereo, can you use other depth ques to tell if this area has steep slopes? would you say that this area is geologically stable? Given that there are slopes with multimillion dollar homes on them can you think of some ways which this hazard could be mitigated?

6) 11114 Cielo Estates 3-1/4-1 AND 11114 Cielo Estates 3-2/4-2 (1-31-01)
- there are two stereo pairs of this area, only interpret one of the stereo pairs

a. These photos have high relief, how does this influence stereo? Given the association with golf courses and the relatively large houses, do you think this is a is this a low, medium, high, or ridiculously high income neighborhood?

b. Along the ridge of the mountain visible in these photos in stereo there is a peculiar stair stepped pattern that has apparently been carved out of the mountain, what is this area being prepared for?

c. Compare the lot sizes between those on top of the ridge with those in the areas adjacent to the golf course down below, are the lots of the mountain top bigger, smaller or about the same average size? (hint: think about the geometry)
7) **PW VEN2-150** *(5-16-78) (there are 5 mono prints of this photo available)*

a. The light toned cleared area is being prepared for construction, do you think the top soil you see has been trucked in from another location or is it the natural soil of this area that has been graded flat? (think of the weathering products of the rock formation)

b. A noticeable feature in this image adjacent to the rock formation is the very large partially closed white-gray bending strip, what could this enclosed area be? (look at the markings on the surface, this area is probably not being prepared for construction)

c. There are areas of black standing water visible near the southern termination point of the wide strip, why is it black? do you think this is natural seepage?

8) **PW SB 10-117** *(4-14-97) (there is only one mono print of this photo available)*

a. This section of the 101 freeway should be familiar to you; this is the 101 freeway just north of Goleta after the freeway turns away from the coast. In the lower left part of this photo there is a rest stop and a tunnel visible along the northbound side. Which direction do the bedding planes of this rock formation go? (is it north-south or east-west) what type of rock makes up these mountains? (is it hard or loose) what direction is this rock formation oriented? (is it dipping northward or southward)

9) **PW SB 10-285** *(7-5-97) (there are three mono prints of this photo available)*

a. This is a section of the 101 freeway north of the tunnel and rest area section noted in the PW SB 10-117, what drainage pattern is visible in this area? what does this tell you about the underlying soils? (is it uniform? is the variable? are there any rock outcrops visible?)

b. What is a major agent of erosion at work on this landscape? (besides cattle) how does cattle ranching influence the erosion rate of this area?

10) **PW SLO 7-14-3 AND PW SLO 7-14-4** *(11-12-92) (one stereo pair available) AND GS4470-S2 (11-14-00) (one mono print available)*

- get all three photos, be sure to return them after you are finished

a. These are photos of the northern portion of San Luis Obispo Bay. In these photos you can see forested areas and non forested areas, what are the dominant agents of erosion in this area? which area will be subject to the greatest amount of erosion? (forested or nonforested) do you see any areas in the mountains which show signs of erosion? what type?

b. What drainage pattern dominates the mountainous areas?

c. Compare the 11-12-92 photos with the portion of the area shown in the 11-14-00 photo. What significant changes have taken place? note the areas where new construction has taken place, are these areas at risk for landslides or erosion? why or why not?
11) **Stereogram - Red Fish Pass No. 110**

a. Are the tidal deltas shown here erosional or depositional features?

b. Is the extension of Little Captiva Island from B.2 - 1.7 to C.1 - 2.1 a permanent land feature?

c. Give the coordinates of the delta lobe being built by the active inlet toward Little Captiva Island.

d. Does the bar sand which forms the tidal deltas originate inside Charlotte Harbor or outside?

12) **Stereogram - Rattlesnake Ridge No. 124**

a. Describe the prominent geologic formation visible in this image in terms of drainage pattern, structure and form.

b. Are there areas that are composed of fertile soils in this photo?

13) **Stereogram - Rangley No. 171 OR Stereogram - Muddy River No. 145**

a. What types of drainage patterns are visible in this image? What type of rock makes up the underlying strata in this area based on the drainage patterns you see?

14) **Stereogram - Cove Mountain No. 108**

a. Why does the river narrow at B.2 - 3.6? What is this feature called?

b. What is the direction of flow of the Susquehanna River?

c. What causes the rows of parallel rapids in the river at B.2 - 3.5?

d. Observe the light-toned streak in the river along its left side. How can such a streak of suspended material be used to determine the portion of the river channel having the greatest flow velocity?

15) **Stereogram - Kuparuk Delta No. 187**

a. What are the mosaic-looking areas called at B.8 - 2.2 and what are the dividing ridges between them composed of?

b. Why is this area totally devoid of trees and higher orders of vegetation?

c. If 2.8 inches equals one mile on this stereogram, about how long would the large island on Kuparuk Delta be? Please answer in meters.
16) Stereogram - La Perouse Glacier No. 179

a. How was the lake at D.8 - 2.4 formed?

b. Estimate the speed (meters per year) of the glacier near B.0 - 2.0 using the average of multiple measurements (Hint: The light and dark bands, termed “ogives”, are annual features created as the glacier leaves the mouth of the canyon.) Show your work.

c. Which moves faster, the center or the edges of the glacier?

d. Why has the glacier started to separate?

17) Stereogram - Owens Valley/ Sierra Nevada No. 197

a. At least four geomorphic agents are responsible for the landforms seen here. List two-to-five features associated with each (Tectonic, Fluvial, Glacial, and Gravity)

b. What is the dark feature at C.9 - 3.2 (generic name or geomorphic)?

c. Why is it partly white on the right photo only?

18) Stereogram - Cinder Cone No. 155

a. What is the large feature at C.9 - 2.6 (specifically)? Explain why it is called that.

b. Lava flows are classified as aa or pahoehoe according to their surface-characteristics. Aa lava is a jumble of rough, angular lava blocks, whereas pahoehoe develops a crust as it cools so that it and appears ropy or billowy. How would the lava issuing from this vent be classified?

c. What is the prominent topographic feature located at C.0 - 3.6? Is it relatively old or young?

19) Stereogram - Shiprock No. 4

a. Shiprock is the eroded neck of a volcano. What are the principal agents of erosion reducing this volcanic region?

b. What are the lines radiating from Shiprock and how were they formed?

c. What is the small conical feature seen at the lower right of Shiprock? How did it form?

20) Stereogram - Sink No. 133 OR Stereogram - Inkspot No. 134

a. How were the depressions or kettles probably formed? Are they concentrated mainly in the uplands or lowlands?

b. Why are most of the areas under cultivation irregularly shaped?
c. Notice that some fields are only cultivated in concentric bands around the outer margins. Why?

d. Based on the vegetation types, would the knobs or the kettles have a higher percentage of rocks and gravel in the soil? Explain. a. Limestone is the bedrock of the lowlands and sandstone is the bedrock in the forested area. Does the nature of the bedrock have any influence on land use and topography? c. How is this area drained of runoff water?

21) Stereogram - Moses Lake No. 137

a. What is the embankment running from A.9 - 3.4 to C.0 - 3.3?

b. Why are the dunes smaller but more abundant in the lower part than near the top?

c. Why are there no dunes east of Moses Lake: A.0 - 3.6, A.6 - 3.4?

d. Why is vegetation almost totally absent east of Moses Lake: 3.5 to 5.0?

e. Locate and identify 3 types of dunes and what factors cause their appearance.

22) Stereogram - Teardrop No. 109

a. The feature at B.1 - 1.7 is the result of Continental Glaciation, what is it called?

b. Why has very little erosion of the features slopes occurred?

c. In which direction did the glacier move, as shown on the stereogram?

d. If 3.25 inches equals one mile on the stereogram, what is the approximate length of the feature at B.2 - 2.2? Please answer in meters. Show your work.

23) Stereogram - Hammonton No. 302

a. What made the pattern you see in this image?

b. Was it fluvial, eolian, or glacial?