LAB 11: Glacial Geomorphology & Landscapes

A glacier is long living body of ice that moves under the influence of gravity and its own weight. It develops on land as compacted snow is transformed into ice. There are two main types of glaciers. Glaciers that are confined to valleys are called valley or alpine glaciers. Such glaciers are relatively common in the NW United States and in Alaska. Those glaciers that are not restricted to a valley but cover large areas of continents are called continental glaciers. On a global basis, glaciers cover 1/10th of the Earth’s surface, and store over 75% of the world’s freshwater supply. If all of the global supply of land ice locked up in glaciers were to melt, then sea level would rise ~70 meters.

All glaciers consist of two parts. The upper part is perennially covered with snow, and is referred to as the zone of accumulation. In contrast, in the lower part calving, melting, and evaporation occur. The lower part is called the zone of wastage. The boundary between the zone of accumulation and the zone of wastage is the snow line, a line marking the highest point at which the glacier’s winter snow cover is lost during a melt season.

If, over a period of time, the amount of snow a glacier gains is greater than the amount of water and ice it loses, then the glacier will expand. If the amount of water and ice a glacier loses is greater than the amount of snow it gains, then the glacier will shrink.

1. What is the zone of accumulation?
2. What is the zone of wastage?
3. Using your smart device, where are the two largest continental glaciers in existence today?
4. Using your smart device, name two countries where alpine glaciation is actively modifying the landscape today.

One of the fastest moving glaciers, The Jakobshavn Glacier in Greenland, moves at a rate of 12.5-16.4 kilometer per year.

5. How fast is the Jakobshavn Glacier moving per day assuming that on average it is moving 14km per year?
**Alpine Features**

Below are six common features found in an alpine environment during glaciation. Please define each term so that you can identify them later.

a- Horn

b- Cirque

c- Arête

d- Medial Moraine

e- Truncated Spur

**Post Glaciation Alpine Features**

Now let’s discuss features found after glaciation, and discuss how they function. Many new features become more prominent after the ice has melted, as well as a few repeat features from the diagram above. Label the features on the diagram provided.

a- Horn

b- Tarn

c- Cirque

d- Paternoster Lakes

e- Hanging Valley

f- Arête

g- Trough

h- Truncated Spur

i- Moraine (Terminal & Recessional)

j- Neve

k- Col
Moraines

The glacier toe is the lowest end of a glacier and alternatively called as glacier snout or terminus. There is a general assumption that glacial erosion ends near the toe of a glacier where moraine deposition begins. The glacier toe fluctuations are also representative of the glacier’s advance or retreat. Upon retreat of the toe, both depositional and water features are left behind, many of which can be quite large (several hundred feet). The most seen features are moraines. There are four types of moraines; Lateral, Medial, Terminal and Recessional. Although similar in function, the name change depicts the location of their deposition.

Valley Floor Features

Other features left behind are pictured in the diagram below—let’s discuss their names and how they function.

a- Drumlins

b- Kettle Lake

c- Terminal Moraine

d- Outwash Plain

e- Recessional Moraine

f- Kames

g- Esker

Questions On In Class Model Activity

6. What type of moraines are present in this model?

7. What is a moulin?

8. Is this glacier advancing or retreating? Why?
Landforms Carved by Alpine Glaciers

Label and define all features on the following next two diagrams.
**In Class Model Activity**

Please complete the following model, and then you will answer the questions on the bottom of page 3 of this lab regarding the model.
What you will need:

1. Base: cut out the curve in the middle of the base, it's easier if you push a pen tip through it first. Fold along the thick black lines and glue tabs to make-up the model like a box lid with the buried ice corner as a cutaway. Allow to dry.
2. Glacier snout: fold the tabs backwards.
3. Glue the glacier snout to the base as per the image below. This is the tricky bit! Glue the top to the back before gluing the bottom to the base.