

Geological Work of Glaciers

(Part-2)

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Types of Glaciers-

There are three main types of glaciers. They are-

1. Mountain or valley, glaciers;
2. Piedmont glaciers;
3. Continental glaciers, or ice sheets glaciers (includes ice caps).

1. Valley glaciers- Valley glaciers are rivers of ice usually found in snow fields of mountainous regions, and their flow patterns are controlled by the topography (i.e, the high relief in those areas). They are also known as Alpine type of glaciers.

i) Cirque glaciers- Cirque is a type of glacial erosional landform. It is also known as a corrie. They are deep, long and wide troughs or basins with very steep concave to vertically dropping high walls at its head as well as sides. They shows hardly any movement.

ii) Transection glaciers- Transection glaciers are a system of interconnected valley glaciers that flow in several different directions, often in a radiating (or web-like) pattern. Transection glacier networks develop where bedrock valleys are deeply dissected, allowing ice to overflow the cols between adjacent valleys or they may form when the glacier increases in thickness and hence flows on either sides of the valley along low lying areas.

a) Galcial avlanches- When huge mass of ice move downhill over a steep slope under the action of gravity at a very high speed is called glacier or ice avalanches. It occurs when ice formation is very high along a steep slope.

b) Hanging glaciers- While the glaciers moving along a slope suddenly encounters a steep scarp face then they resembles as if they are hanging over the bed rock. These types of glaciers are called as hanging g:laciers and they form where there is a sudden change is gradient.

2. Piedmont Glaciers/ Plateau glaciers- It is a type of glacier formed by convergence of the ends of valley glaciers at the base of mountains. It is intermediate in form between valley and continental glaciers.

3. Continental Glaciers- A continental glacier is a vast, expansive body of dense ice covering large and relatively flat landmasses. These glaciers are dome-shaped, with the thickest part located in the centre of the mass, from where it slowly spreads outwards in all directions under its own weight due to Earth's gravity.

Features Associated With Continental Glaciers-

1. **Nunataks-** Nunataks are isolated mountain peak that projects outward to the surface through a continental ice sheet or ice cap. They usually occur near the margin of an ice sheet.
2. **Icebergs-** It is a large floating mass of ice detached from the main body of glacier or ice shelf due to development of cracks in the ice shelf and carried out to sea. They are found to float at the surface of the sea.
3. **Ice-shelves-** Ice shelf (or shelves) are thick mass of floating ice that remains attached to the main glacier towards its surface and to land towards its base. They are formed from and fed by tongues of glaciers extending outward from the land into sheltered waters (sea).

Surface Features of Glaciers-

The most common surface features in glaciers are crevasses. A crevasse is a deep, wedge-shaped opening in a moving mass of ice called a glacier. Crevasses usually form in the top 50 meters of a glacier, where the ice is brittle. Below that, a glacier is less brittle and can slide over uneven surfaces without cracking.

The inflexible upper portion may split as it moves over the changing landscape.

Factors on Which Crevasses Formation Depends-

- (i). Relief of the subglacial bed.
- (ii). Cross-section of the valley.
- (iii). Thickness of glacier ice sheets.
- (iv). Rate of glacial flow.

Types of Crevasses-

1. **Transverse Crevasses-** Crevasses may stretch across a glacier and hence are oriented nearly perpendicular to length of the glacier and hence parallel to the flow direction of glacier. These types of crevasses are called as transverse crevasses and they form due to sudden change in gradient of the glacial valley.

Seracs/ Ice Falls / Ice Pinnacles – When very deep crevasses are developed near the head of the glacier due to sudden change in gradient of valley floor, the former part of the ice gets dislodged from the main body of glacier and falls-off as huge chunks. These are called as ice falls.

2. Longitudinal Crevasses- Crevasses may form that gets oriented along the length of the glacier and hence are oriented parallel to the flow direction of glacier. These types of crevasses are called as longitudinal crevasses and they form due to sudden widening of the glacial valley.

3. Marginal Crevasses- Crevasses also form at the marginal parts of glaciers, as different parts of a glacier move at different speeds. While travelling down a valley, a glacier moves faster in the middle as compared to its sides. Hence the sides of a glacier are slowed down due to friction effect as they scrape against valley walls. As the sections advance at different speeds, crevasses open in the ice at the marginal parts that remains at an acute angle to the flow direction of glacier.

Other Surface Features -

- 1. Dust wells-** Due to the collection of debris on the surface of glacier, the melting occurs and depressions are created that are oval to circular in shapes. These depressions are often of small-scale are called as dust well.
- 2. Baignoire** – It is formed by the unison of two or more dust well. These are larger depression.
- 3. Cauldrons / Moulins/ Glacier mills** - Ice cauldrons are circular or elongated depressions or cavity in glaciers. Ice cauldrons usually occur in areas of subglacial geothermal activity and during volcanic eruptions under glaciers. Ice cauldrons are ice formations within glaciers that cover some subglacial volcanoes Through these cavities within the glacier, glacial streams may be flowing into.
- 4. Bergschrund-** At the head of a glacier, where it begins to leave the snowfield of a corrie, a deep vertical crack opens up called a bergschrund (in German) or **rimaye** (in French). This happens in summer when, although the ice continues to move out of the corrie, there is no new snow to replace it. The bergschrund presents a major obstacle to climbers.