

Glacial features explained

Glaciers

The snow which forms temperate glaciers is subject to repeated freezing and thawing, which changes it into a form of granular ice called névé. Under the pressure of the layers of ice and snow above it, this granular ice fuses into denser firn. Over a period of years, layers of firn undergo further compaction and become glacial ice. The lower layers of glacial ice flow and deform plastically under the pressure, allowing the glacier as a whole to move slowly like a viscous fluid. Glaciers usually flow down a slope, although they do not need a surface slope to flow, as they can be driven by the continuing accumulation of new snow at their source, creating thicker ice and a surface slope. The upper layers of glaciers are more brittle, and often form deep cracks known as crevasses as they move.

Erosion

Rocks and sediments are added to glaciers through various processes. Glaciers erode the terrain principally through two methods: abrasion and plucking.

As the glacier flows over the bedrock's fractured surface, it softens and lifts blocks of rock that are brought into the ice. This process is known as plucking, and it is produced when sub-glacial water penetrates the fractures and the subsequent freezing expansion separates them from the bedrock. When the water expands, it acts as a lever that loosens the rock by lifting it. This way, sediments of all sizes become part of the glacier's load.

Abrasion occurs when the ice and the load of rock fragments slide over the bedrock and function as sandpaper that smooths and polishes the surface situated below.

John Muir, Earth - Planet, Universe: Pupil Activity Support Notes

Glacial valleys

Before glaciation, mountain valleys have a characteristic 'V' shape, produced by downward erosion by water. However, during glaciation, these valleys widen and deepen, forming a 'U'-shaped glacial valley. Besides the deepening and widening of the valley, the glacier also smooths the valley due to erosion. In this way, it eliminates the spurs of earth that extend across the valley.

Lochans or tarns

At the 'start' of a classic valley glacier is the cirque, which has a bowl shape with escarped walls on three sides, but open on the side that descends into the valley. In the cirque, an accumulation of ice is formed. These begin as irregularities on the side of the mountain, which are later augmented in size by the coining of the ice. Once the glacier melts, these corries are usually occupied by small mountain lakes called lochans in Scotland or tarns in England.

Arêtes and pyramidal peak

An arête is a narrow crest with a sharp edge. The meeting of three or more arêtes creates pointed pyramidal peaks.

Both features may have the same process behind their formation: the enlargement of cirques from glacial plucking and the action of the ice. Peaks are formed by cirques that encircle a single mountain.

Arêtes emerge in a similar manner; the only difference is that the cirques are not located in a circle, but rather on opposite sides along a divide. Arêtes can also be produced by the collision of two parallel glaciers. In this case, the glacial tongues cut the divides down to size through erosion and polish the adjacent valleys.

Source: dictionary definitions