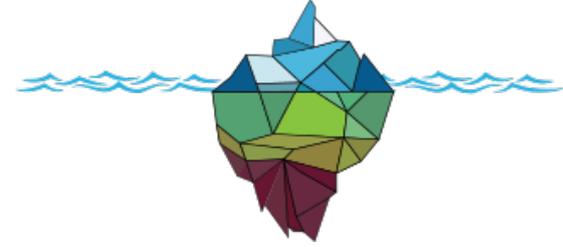


Glacial Erosion and Depositional Landforms

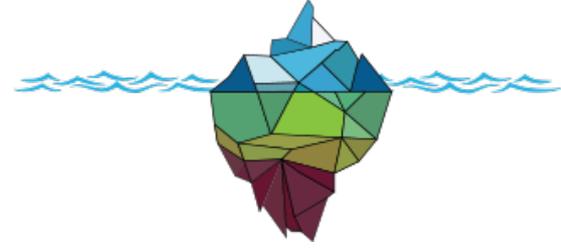


Erosion

- Glaciers are powerful shapers of the landscape
- They erode through two key processes:
 - Plucking
 - Abrasion



Tian Shan Glacier, Himalayas. Wikimedia.org

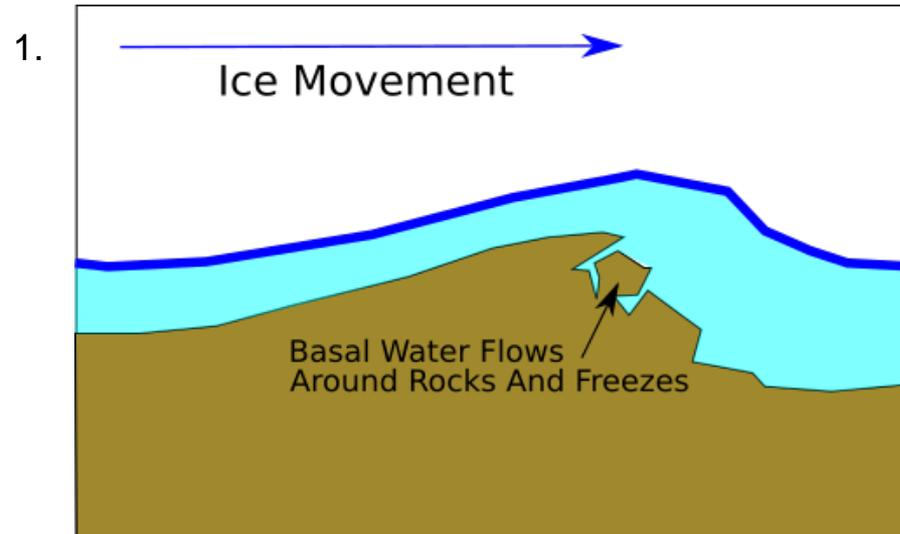


Erosion - Plucking

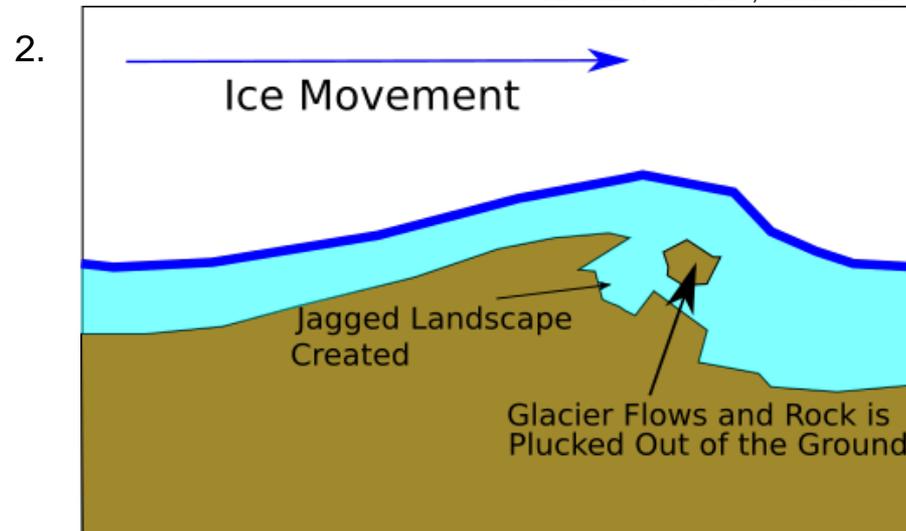
- Plucking occurs when rocks or stones are frozen into the base and sides of the glacier
- This debris is pulled from the ground as the glacier flows downhill
- This leaves behind a jagged and rough landscape!

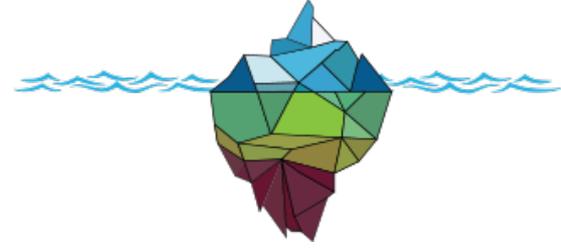


Erosion - Plucking



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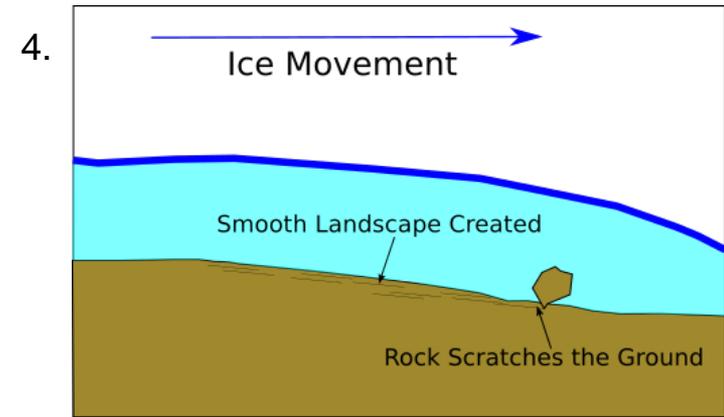
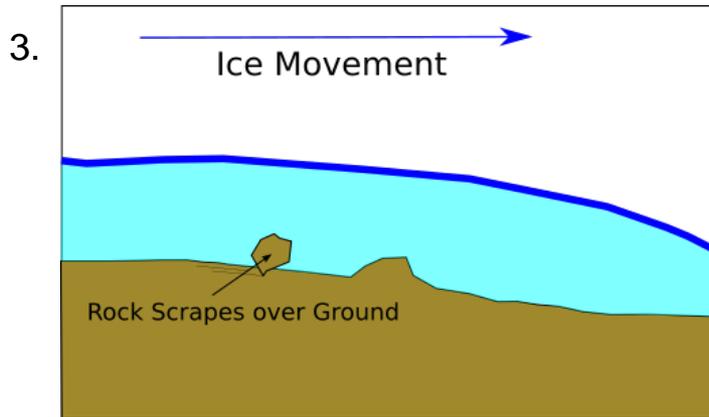
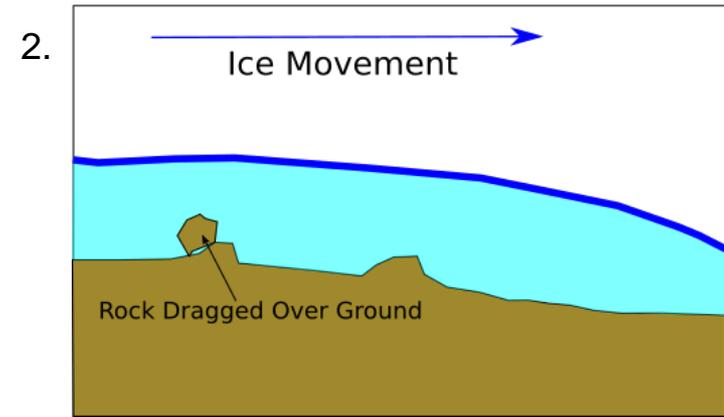
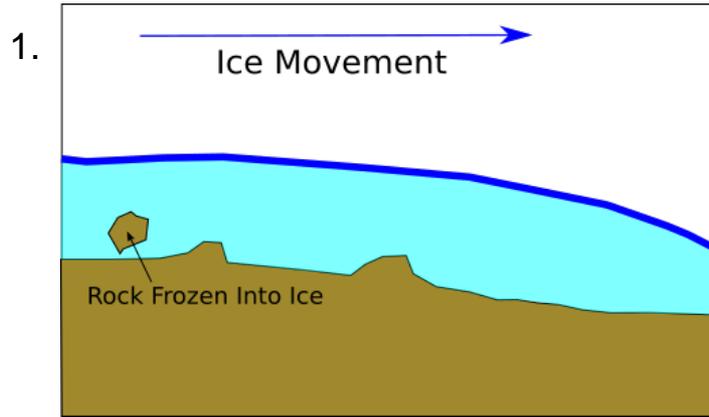
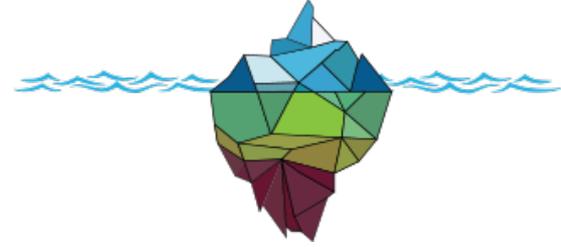


Erosion - Abrasion

- Abrasion Occurs when rocks or stones which are embedded into the glacier scrape against the surrounding landscape
- This can happen at the base or sides of the glacier
- This scraping acts like sandpaper to wear down the landscape and leaves behind a smooth surface!



Erosion - Abrasion



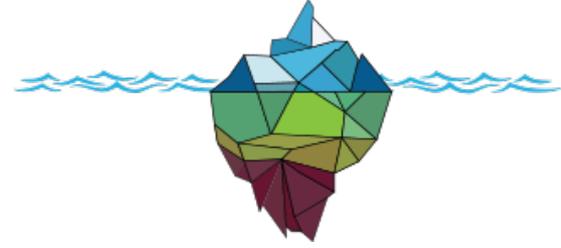


Erosion - Striations

- Striations are scratches in the landscape which form during Abrasion, when debris scrapes over rock
- These scratches can be big or small, and can still be seen today!



Striations on Granite, Whistler, Canada. Wikimedia.org

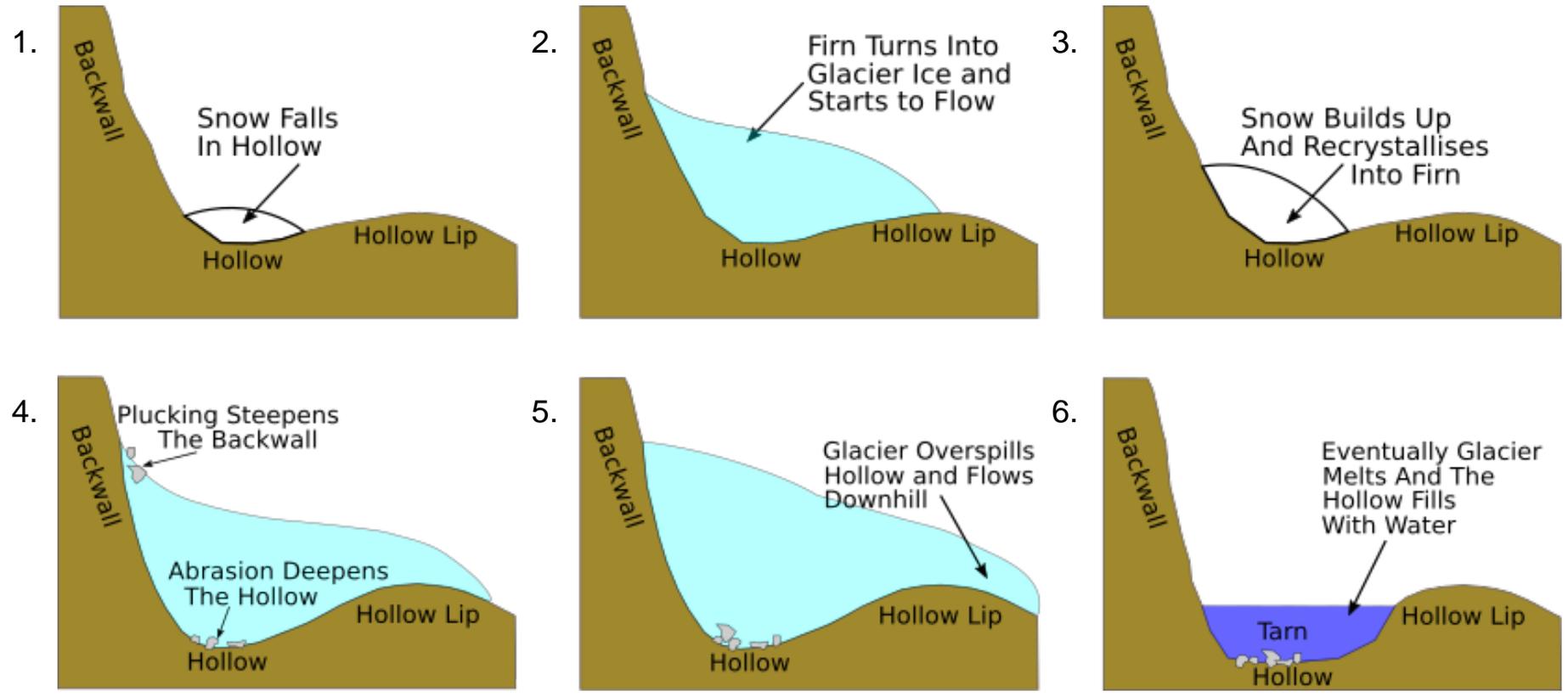


Erosion - Corrie Formation

- Corries, also named “Cirques”, are the starting points of glaciers
- Snowflakes collect in a hollow and, if they do not melt, are compressed by more layers of snow piling up in the future
- This build up of snow is called “*Accumulation*”
- As more compression occurs over thousands of years the snow will recrystallise into snow and later glacier-ice
- As the glacier-ice flows downhill, the hollow is steepened and deepened by plucking on the back wall and abrasion at the base
- The resulting large hollow is called a “*Corrie*”. Often, these Corries fill with water leaving behind a “*Corrie Lochan*” (also called a “*Tarn*”).



Erosion - Corrie Formation



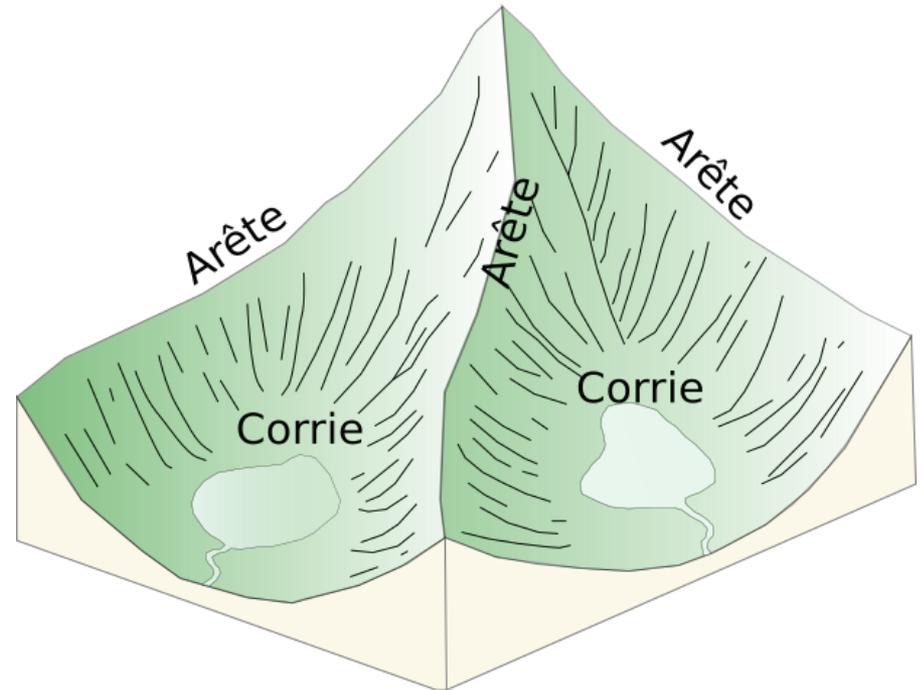


Erosion - Arête Formation

- An “**arête**” is a sharp ridge which forms between two Corries
- As a glacier erodes the corrie deeper, the arête becomes steeper and the ridge becomes narrower



Carn Mor Dearg Arete, Ben Nevis. Walkhighlands.co.uk



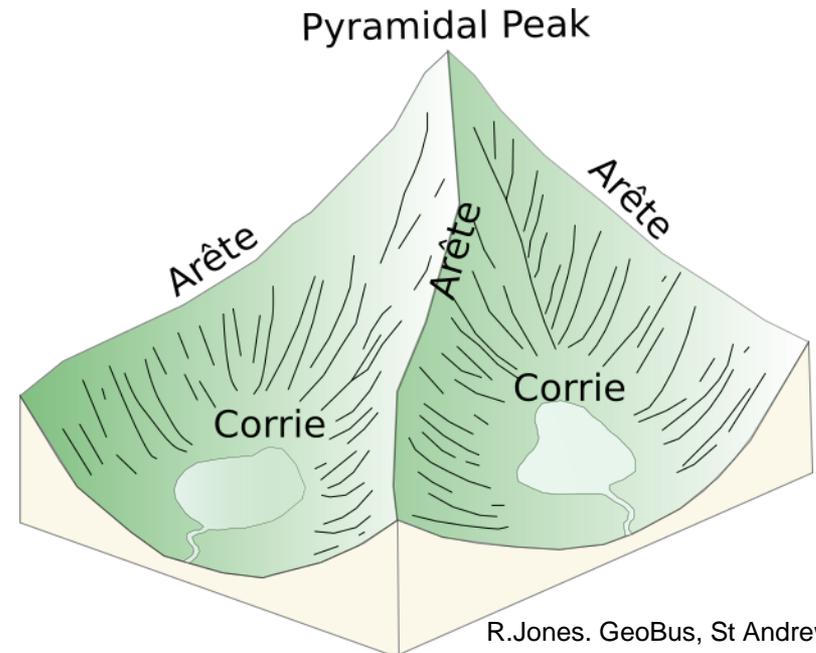


Erosion - Pyramidal Peak Formation

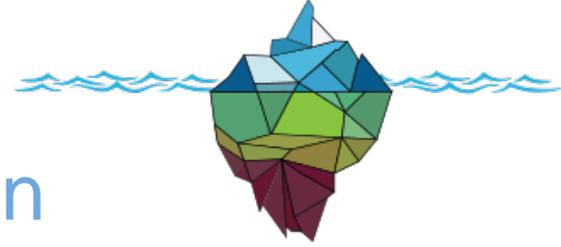
- A “Pyramidal Peak” forms when three or more corries or arêtes meet
- The meeting of the ridges creates a sharp peak in the shape of a pyramid
- Famous examples of this include Mont Blanc, the Matterhorn and Everest!



Buachaille Etive, Scotland.
Walkhighlands.co.uk

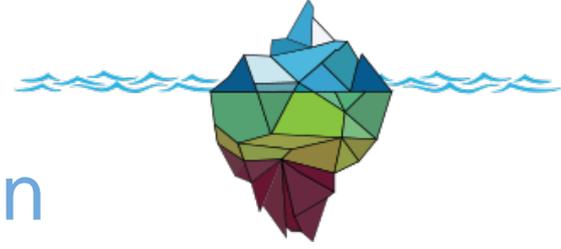


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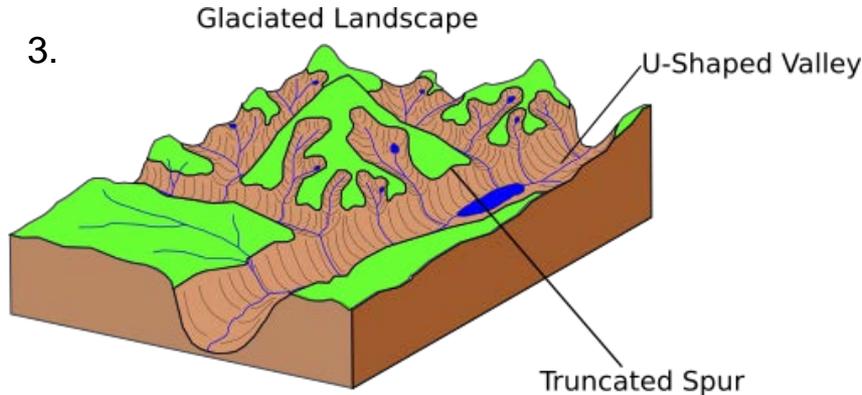
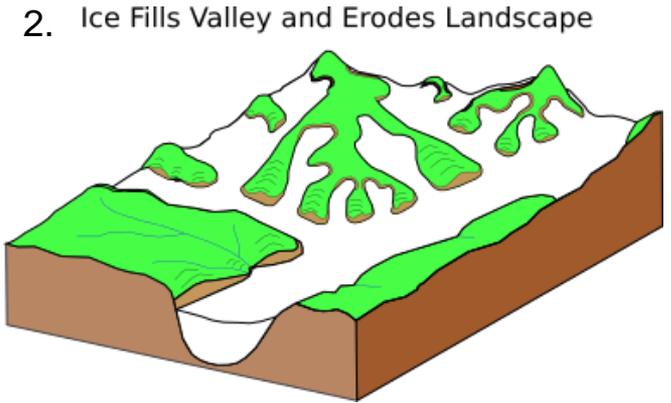
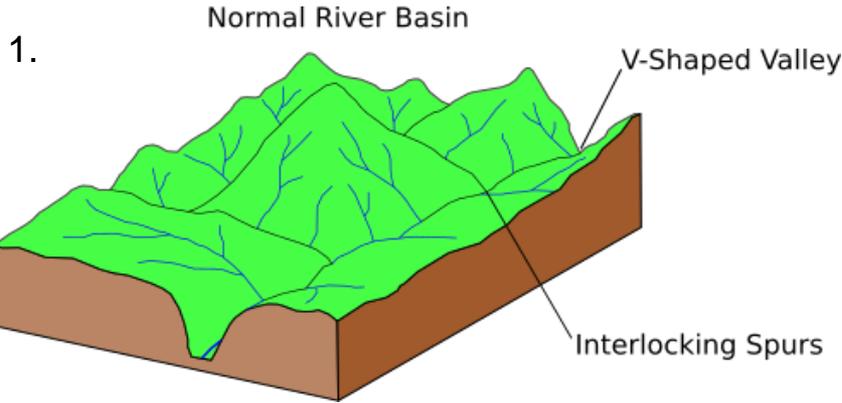


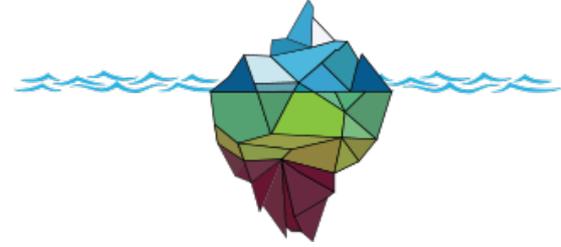
Erosion - U-Shaped Valley Formation

- When a glacier flows through a V-Shaped river valley, it does not zig-zag round corners like the river does
- Instead, the glacier erodes the valley *deeper* and *wider* through abrasion and plucking
- Any land within the V-Shaped valley which the river had to flow around, such as “*Interlocking Spurs*”, the glacier erodes out of the way and produces “*Truncated Spurs*”.
- This creates a wide glacial trough with steep sides and a flat base called a “*U-Shaped Valley*”.



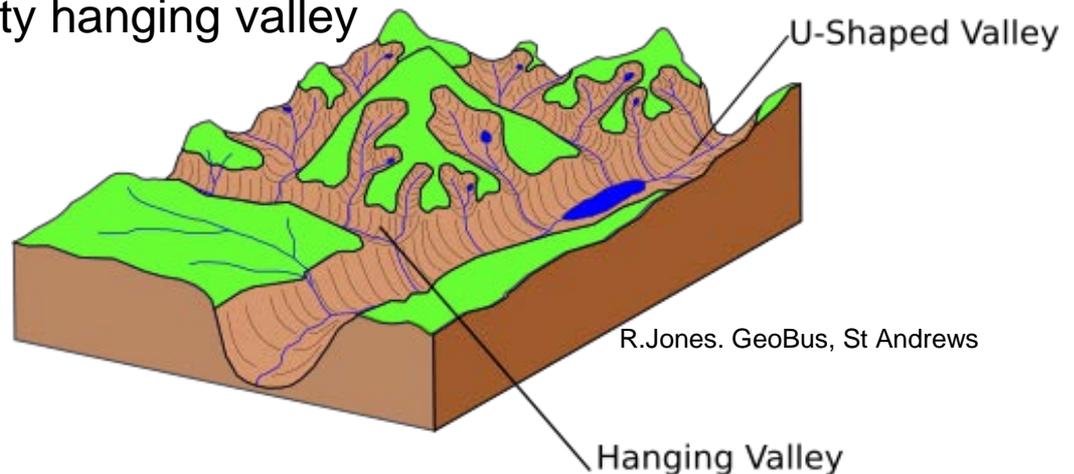
Erosion - U-Shaped Valley Formation

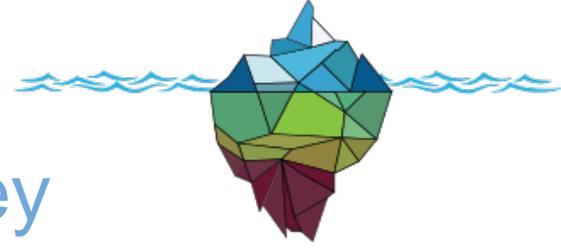




Erosion - Hanging Valley Formation

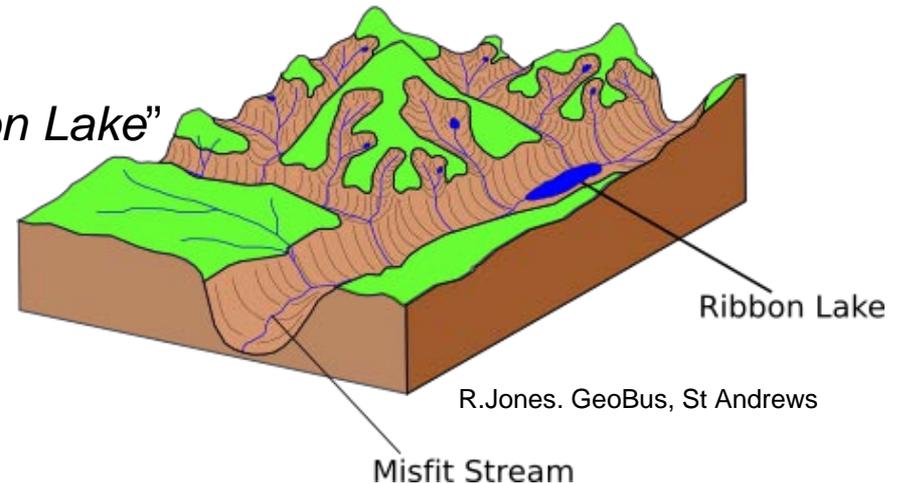
- How deeply a glacier erodes the landscape can depend on how large the glacier is
- Much like stepping on sand, the heavier you are the further you sink in!
- When a smaller tributary glacier with a shallow trough meets a large glacier with a deep trough, the small trough is left “hanging” above it
- When the ice melts, the empty hanging valley is left visible
- This is known as a “*Hanging Valley*”





Erosion - Water in a U-Shaped Valley

- After a glacier has melted the U-Shaped Valley is left behind
- If the stream that originally flowed down the V-Shaped Valley before the glacier came along comes back, it is known as a “*Misfit Stream*”
- This is because the stream is out of place in such a big valley!
- If the glacier erodes a hollow in the valley in less-resistant rock, this hollow can fill up with water
- This long, thin lake is called a “*Ribbon Lake*”



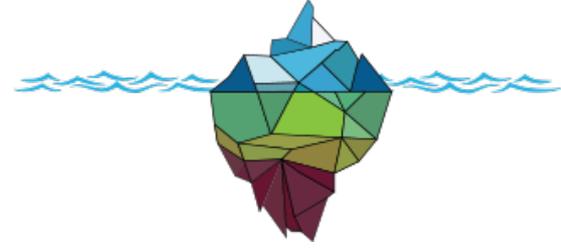


Transportation of Debris

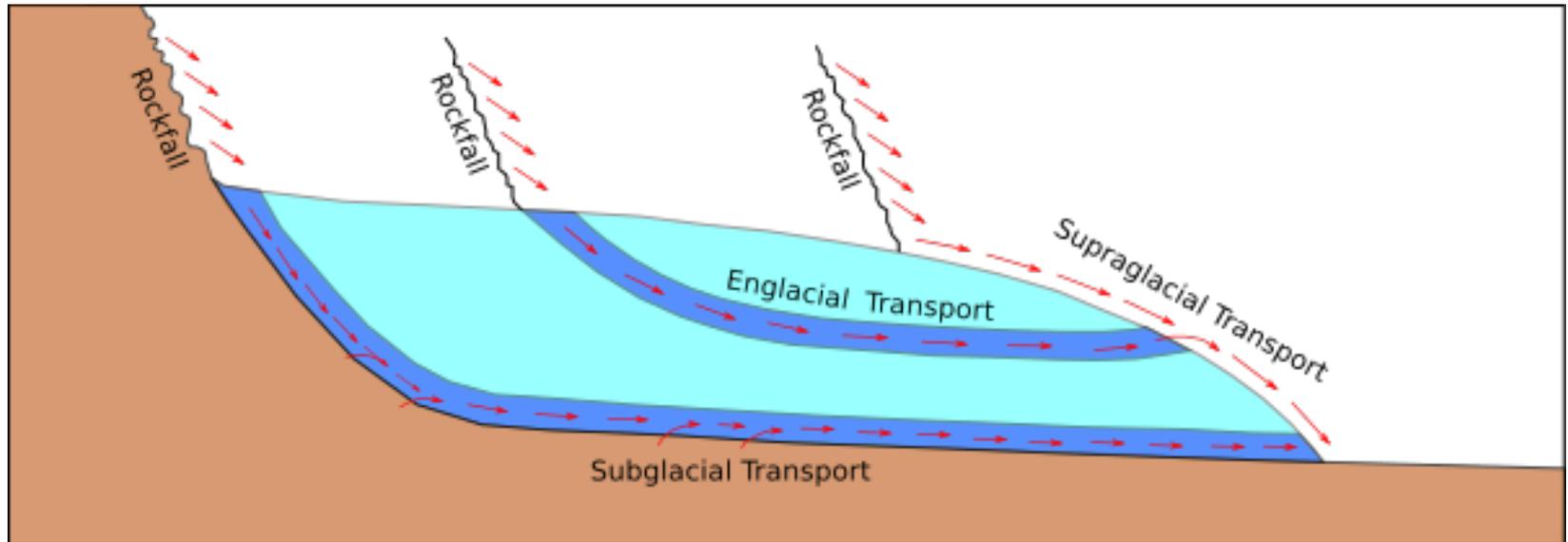
- Glaciers transport large amounts of debris
- This debris can be from rock-falls onto the glacier from the valley sides or scraped up from the valley floor
- It can be transported on the surface of the glacier, called “*Supraglacial Transport*”
- Or buried within the ice, called “*Englacial Transport*”
- Or along the base of the glacier, called “*Subglacial Transport*”
- The debris left behind by a glacier is called “*Till*”.



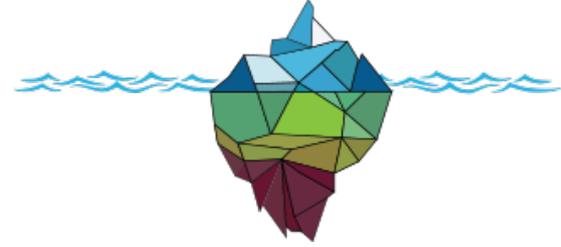
Sólheimajökull glacier, Southern Iceland. blogs.staffs.ac.uk



Transportation of Debris

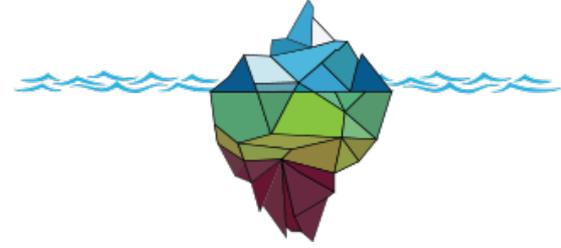


But what happens to this debris?



Deposition - Moraine Formation

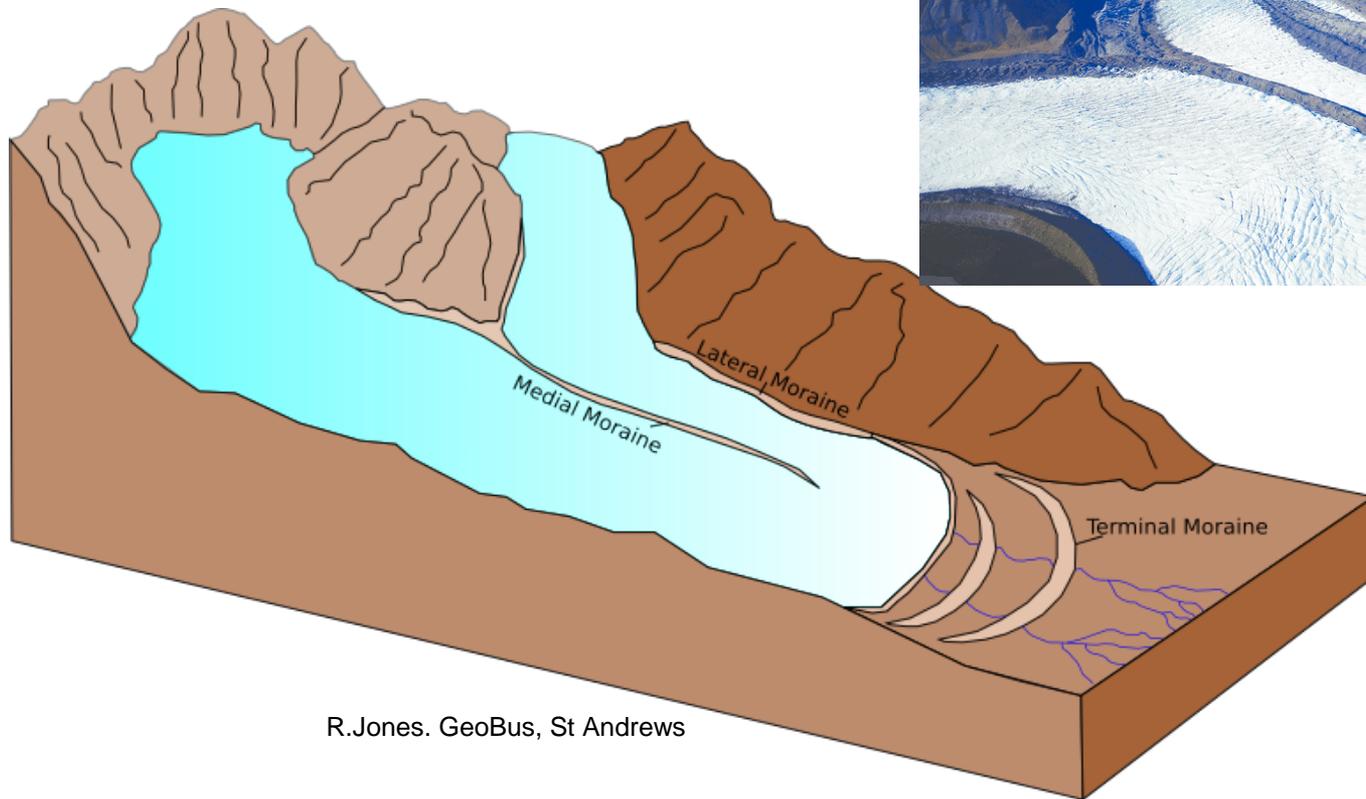
- As a glacier erodes the landscape it bulldozes large volumes of till out of its way
- The resulting mounds of debris created around the glacier are called “*Moraines*”
- The debris at the front of the glacier is called a “*Terminal Moraine*”
- The debris at the side of the glacier is called a “*Lateral Moraine*”
- When two glaciers join together into one their Lateral Moraines merge on the inside, leading to a line of debris running down the middle of the new larger glacier. This is called a “*Medial Moraine*”



Deposition - Moraine Formation



Alaska. Researchgate.net

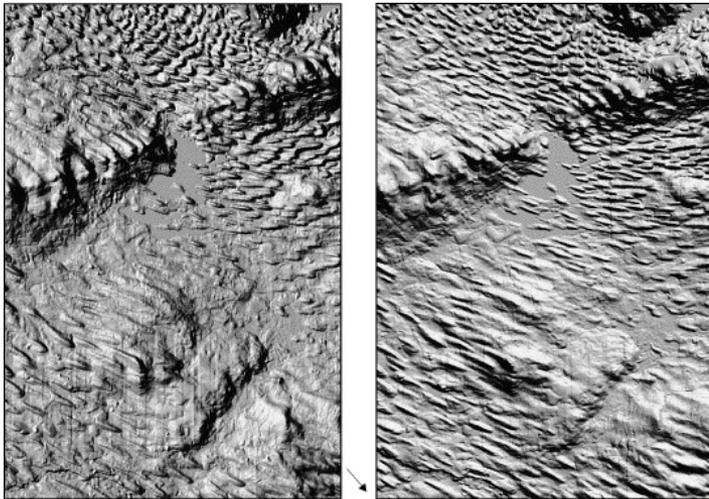


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Deposition - Drumlin Formation

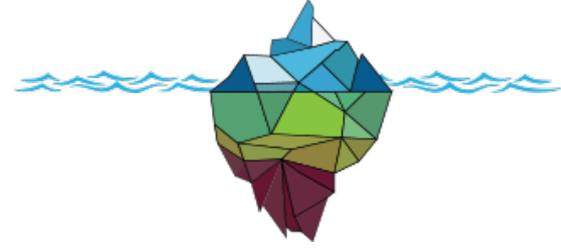
- A “*Drumlin*” is a streamlined ridge of sediment which is shaped beneath the glacier
- When a glacier flows, it moulds and deforms its bed and creates regular patterns
- These mounds that are created are called Drumlins, and resemble ripples in the sand you see at a beach



Satellite image of Drumlins. Smith and Wise, 2007.

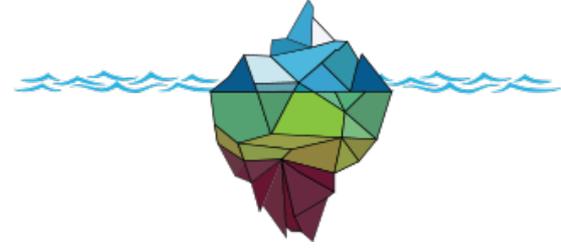


Sand Ripples.
Depositphotos.com

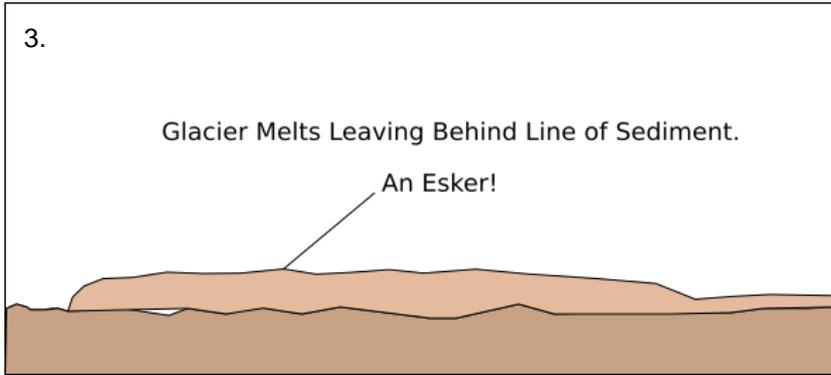
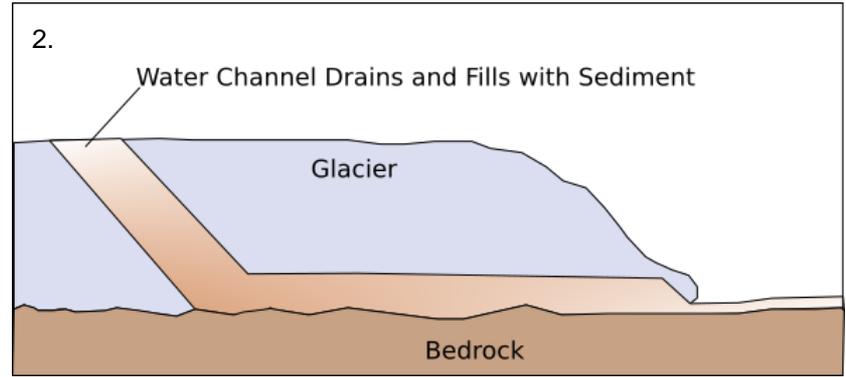
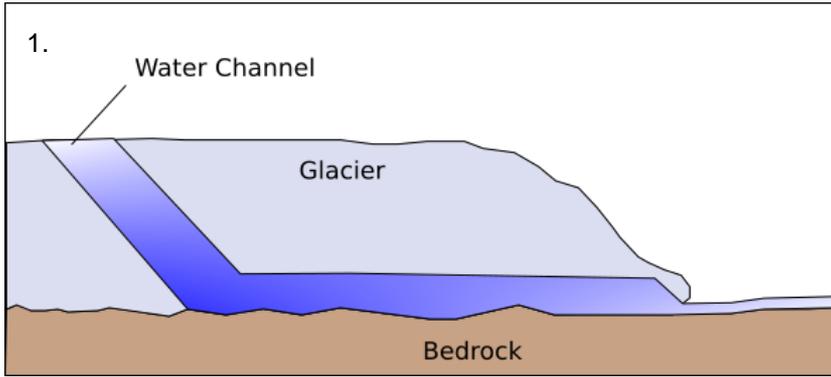


Deposition - Esker Formation

- An “*esker*” is a long thin mound of sediment deposited by a glacier
- These form when melt-water channels within a glacier fill with sediment
- When the glacier melts, the channel of sediment is left behind
- Some of these channels are on the surface of the glacier, some within the glacier itself and some at the base
- Eskers can be several kilometres in length



Deposition - Esker Formation



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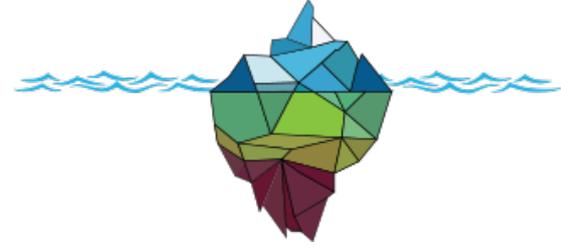
Esker in South Dakota. Alaskashoretours.com

True or False



When a lake forms inside a corrie, it is called a Ribbon Lake.

True or False

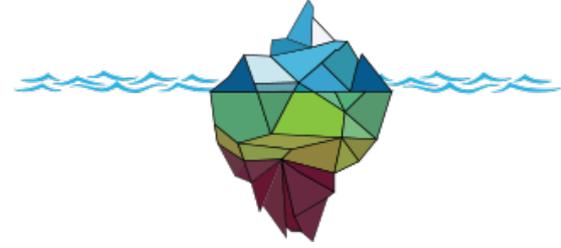


True or False

When a lake forms inside a corrie, it is called a Ribbon Lake.

True or False

False! When a lake forms inside a corrie, it is called a Tarn.

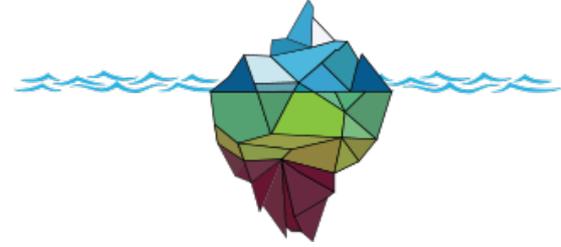


True or False

An esker is a long line of sediment which used to fill a water channel within a glacier.

True or False

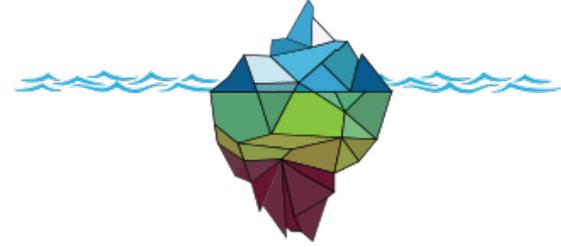
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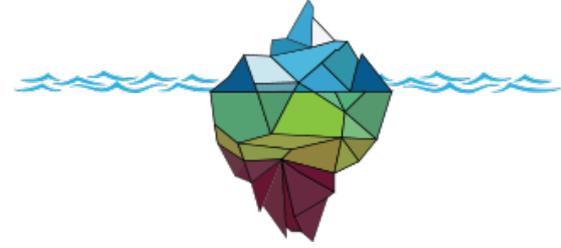
True or ~~False~~

True or False



Scrapes over a land scape left behind by glacier abrasion are called hanging valleys.

True or False



True or False

Scrapes over a landscape left behind by glacier abrasion are called hanging valleys.

True or False

False! Scrapes over a landscape left behind by glacier abrasion are called Striations.

