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1 Geography

Date
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* Ria Coast & Fjords

Ria is a coastal inlet formed by partial submergence of unglaciated river valley. It is drowned river valley that remains open to the sea. Mostly Rias are dendritic. This pattern is inherited from the dendritic drainage pattern of the flooded river valley.

* fjords

It is a long narrow inlet with steep sides or ^{cliff} cliffs. It is created by glacier erosion. Norway's coastline is estimated to have 1190 fjords and thus form excellent site for natural harbours.

* Dalmatian Coast → They are common landform along the coast of Norway. A Dalmatian coastline is formed where the geology creates valleys parallel to the coast so that when the sea level rises, a series of elongated islands remain offshore.

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Winds & Aeolian Landform

Erosional Landform

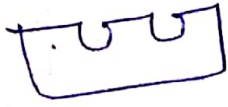
- Mushroom Rock
- Deflation Hollows
- Inselberg
- Yardangs
- Zeugen
- Demoiselles

Depositional Landform

- Sand dunes
- Barchans
- Parabolic dunes
- Seif dunes
- Longitudinal dunes
- Transverse dunes.

Wind is one of the two dominant agents in hot deserts. due to strong moving winds in the deserts wind causes deflation, Attrition (mechanical wear & tear of particle), Saltation (movement of sand & gravels) through the mechanism of bouncing, jumping and hopping etc. Deflation involves the lifting and blowing away loose materials from the ground. The wind action creates number of interesting erosional and depositional feature in the desert.

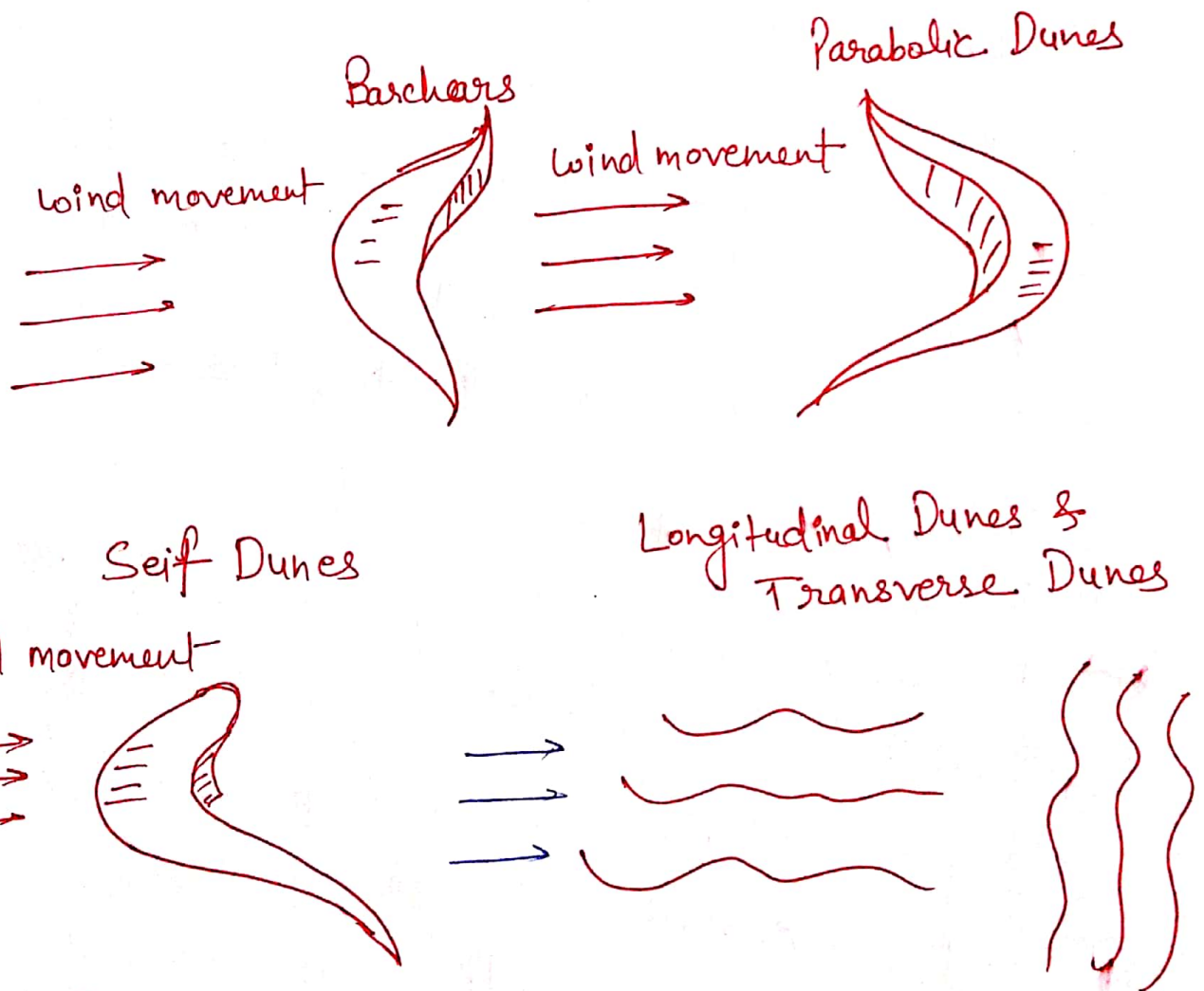
Erosional Landform

1. Mushroom Rock - having broad upper part and narrow base resembling an umbrella and mushroom are called mushroom^m rock or pedestal Rock. They are formed due to abrasive work of the wind.
2. Inselberg
They are sharply rising residual hill above the flat surfaces.
3. Deflation Hollow → Weathered material from over the rocks or bare soil gets blown out by persistence movement of wind current in one direction. This process may create shallow depression called deflation Hollows.
4. Yardangs - A sharp irregular ridge of sand lying in the direction of prevailing wind in exposed desert regions, formed by wind erosion of adjacent material which is less resistant.
5. Zeugen → A table shape area of rock found in arid and semi-arid areas formed when more resistant rock is reduced at a slower rate than softer rocks around it. 
6. Demoiselles - These are rock pillars which stand at resistant rocks above soft rocks as a result of differential erosion of hard & soft rocks.

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Depositional Landforms

When winds slows down or begin to die down, depending upon sizes of grains and their critical velocities, the grains will begin to settle. So In the depositional landform made by the wind, good sorting of grains can be found.



Sand Dunes

Dry hot desert are good places for sand dune formation. Obstacles to initiate dune formation are equally important.

Crescent shape sand dunes are called Barchans with the point or the wing directed away from the wind direction.

Parabolic dunes form when sand surfaces are partially covered with vegetation. Parabolic dunes are reversed Barchans with wind direction being the same.

Seif dunes are similar to Barchans with small difference that it has only one wing or point.

Longitudinal dunes form when supply of sand is poor and the wind direction is constant. They are aligned parallel to wind direction and appear as long ridges of considerable length but low in height.

Transverse dunes are aligned perpendicular to wind direction. These dunes form when wind direction is constant and source of sand is an elongated feature at right angle to the wind direction.

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Glacial Landform

↓
Erosional

↓
Depositional

Mass of ice moving as sheets over the land are called Glacier. The movement of Glacier is slow unlike water flow. The movement could be a few centimeter to a few meter a day or even less. Glacier moves ~~more~~ because of force of gravity.

Erosion by glacier is tremendous because of friction caused by sheer weight of ice. Some of the landforms which get created are -

Erosional

1. Cirque
2. Hanging Valley
3. U-shaped Valley
4. Horns / Arêtes
5. Nunataks
6. Fjords

Depositional

1. Moraines
2. Eskers
3. Drumlines
4. Outwash plains
5. Kames

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Cirque quite often are found at the heads of the Glacial valleys. The accumulated ice cuts these Cirques while moving down the mountain tops. They are deep, long and wide: trips or basins with very steep concave to vertically dropping high walls at its head as well as sides. A lake of water can be seen quite often within the cirques after the glacier disappears. Such lakes are called cirque lake or tarn lake.

Horns / Arêtes - Horns form through Headward erosion of the cirque walls. If three or more radiating glaciers cut headward until their cirques meet, high sharp pointed and steep sided peaks called Horns are formed.

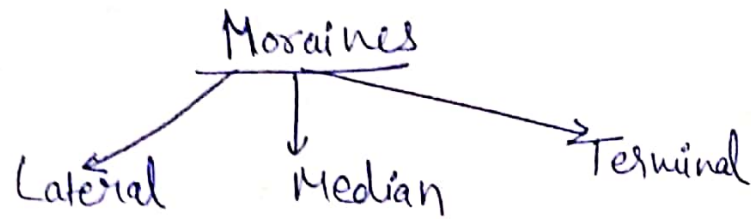
U-Shaped valley - Due to excessive weight of the glacier they may form a U-shaped valley in the mountains. The valley is characterised by concave slopes and broad & flat valley floors.

Nunataks

The higher peaks and mount surrounded by ice from all sides are called Nunataks. They look like scattered small island amid extensive ice masses. Thus they are also called as glacial Islands. They decrease size due to erosion caused by glacial erosion and frost action.

Depositional Glacial Landform

Moraines



It is a general term applied to rock fragment, gravel, sand etc. carried by a glacier depending on its position. The Moraines can be lateral, median or Terminal Moraine. The materials dropped at the end of valley glacier in the form of ridge is called terminal moraine. The material deposited at either of its side is known as lateral Moraine. When two glaciers join, their lateral Moraine also join near their confluence and are called Median Moraines.

Eskers - These are long narrow sinuous ridges of sand and gravel and are situated along the movement of the melting water coming out from the ice glacier.

3. Drumlins → A swarms of rounded hummocks resulting from the deposition of glacial till are called Drumlins. They look like an inverted boat or a spoon. Usually these occur in cluster and regular pattern. Such topography is called basket egg topography.

According to some geomorphologist drumlins are formed due to modification in the terminal Moraines by the Glaciers. Several sequential terminal Moraines parallel to each other are formed due to recession of glaciers during inter-glacial period these Morainic ridges are later modified by advancing glaciers during next glacial period.

The advancing glaciers erode the up-glacier side of pre-existing terminal Moraines and deposit the eroded material on the down glacier side. Thus the up glacier side become steep while down glacial side become smooth and long.

Outwash Plains

The melt water caused due to ^{ablation} ~~ablation~~ of the glacier at its snout descends through the terminal moraine and spreads like sheet water. This spreading water erodes the terminal Moraines and deposits the eroded sediments in front of the terminal Moraines and thus form a plain which is called outwash plain.

Kames - Kames are small hills or irregular mounds of bedded sands and gravels which are deposited by melt water or at the edge of retreating ice sheets.

Karst Landform

Karst topography is a landscape formed from the dissolution of soluble rocks such as limestone, dolomite and gypsum. It is so named after a province of ^{yu} Yugoslavia on the Adriatic sea coast where such formations are most noticeable. It is characterised by underground drainage system with sink hole, caves etc.

* Essential Cond'n for the development Karst Landforms

1. Limestone must be massive, thickly bedded, hard and well jointed.
2. Limestone should not be porous where in permeability is largely controlled by joints and not by mass of rocks because if limestones are porous, the water may pass through the rock mass and thus hole structure would collapse.
3. The limestone should be widely distributed in both arial and vertical dimensions.
4. There should be enough rainfall so that required amount of water is available to dissolve the Carbonate rocks.

- Sink holes are funnel shape depressions having average width of 3-9 meters.
- These holes are developed by enlargement of cracks found in such rocks, as a result of continuous solvent action of the rainwater.
- The surface streams which sink disappear under ground through swallow holes.
- Some swallow holes when further enlarged due to dissolution formed the larger depression called as Dolines.
- Larger forms of Dolines is called as Polje

⑫ while two or more Polje formed Uvalas.

Karst Window

When a number of adjoining sink holes collapse they form an open broad area called karst window.

Stalactite & Stalagmite

The water containing limestone in solution seeps through the roof in the form of continuous chain of drops.

A portion of water hangs on the roof and on evaporation of water, a small deposit of limestone is left behind contributing to the formation of stalactite growing downwards from the roof.

The remaining portion of the drops falls on the floor. This also evaporates, leaving behind a small deposit of limestone helping in the formation of stalagmite, thicker and flatter rising upward from the floor.

Some time stalactite and stalagmite joint together to form a complete pillar known as

Column or cave pillar.

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Lapies - Highly irregular surface and rough surface of limestone mythology characterised by low ridges, pinnacle and narrow clefts is called Lapies.