



Landforms Part-II

What is the Landform Made by Wind?

- Wind is a **geomorphic agent in all terrestrial environments**. It is more active in arid regions with fine-textured soils and sediments and little or no vegetation.
- Wind can **erode desert rocks in two ways**:
 - **Deflation**: The removal of fine, loose particles from the surface of rocks.
 - **Abrasion**: Small particles being carried by the wind scrape off particles from the rock surface. It then transports the eroded material by three processes:
 - **Suspension**: Very small particles (<0.15mm) are picked up and carried by the wind.
 - **Saltation**: Small particles (0.15-0.25mm) are temporarily lifted from the ground and bounce along the surface.
 - **Surface Creep**: Larger particles (>0.25mm) are hit and pushed along the ground by particles being moved by saltation.
 - **Attrition**:
 - Sand particles carried by winds **start a friction process within itself and because of this their size reduces**. This is known as attrition.
 - **Erosion process of high speed winds** is also fast.
 - **Soft rocks break down easily** but on the other hand the erosion process is long in case of hard rocks.

Erosional Landforms formed by Wind

- **Deflation Hollows and Caves**:
 - **Deflation Hollows**:
 - Deflation basins, called blowouts, are hollows **formed by the removal of particles by wind**.
 - Blowouts are generally small, but may be up to several kilometers in diameter. [//](#)



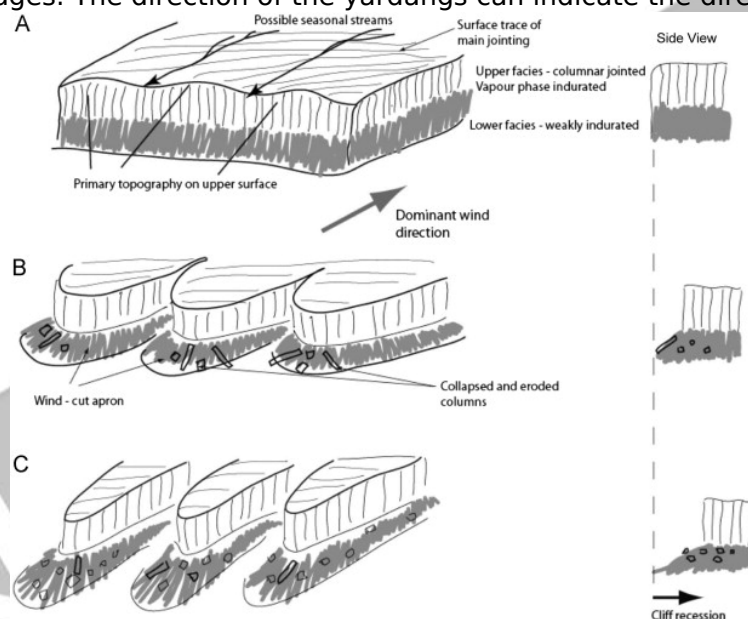
- **Caves:**

- As wind-borne sand impacts the rock faces, **some of the blow-outs become deeper and wider and fit to be called caves.**



- **Yardangs:**

- Yardangs are **parallel troughs cut into softer rock** running in the direction of the wind, separated by ridges. The direction of the yardangs can indicate the direction of the prevailing wind. A



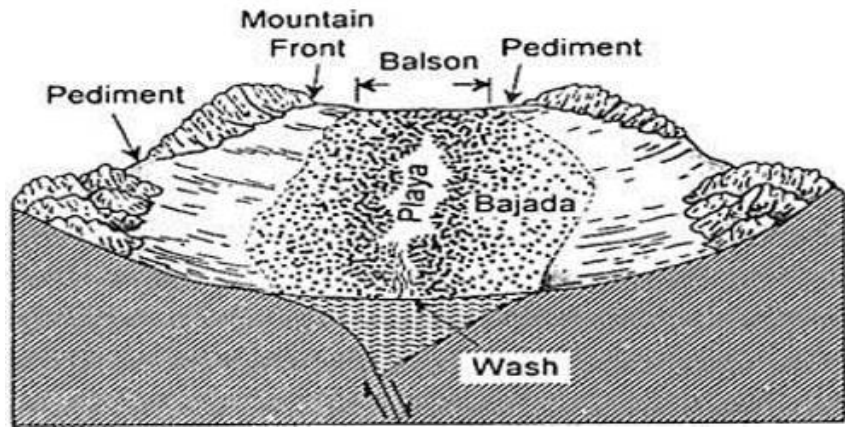
- **Zeugen:**

- A zeugen is a **tabular mass of resistant rock**, standing prominently in the desert.
- It is **usually composed of alternating layers** of hard and soft rocks.



- **Playas:**

- Playa is a **flat-bottom depression found in interior desert basins** and adjacent to coasts in arid and semiarid regions, periodically covered by water.
- It slowly **filtrates into the groundwater system or evaporates into the atmosphere**, causing salt, sand, and mud deposition along the bottom and around the depression's edges.



Depositional Landforms formed by Wind

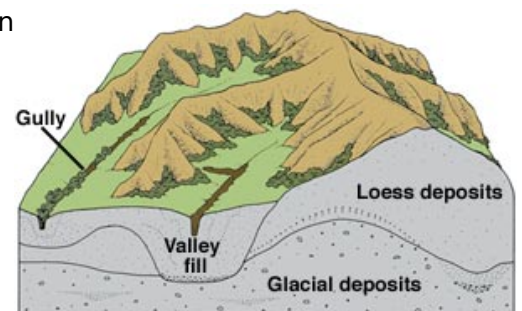
▪ Ripples:

- They are regular, **wavelike undulations lying at right-angles** to the prevailing wind direction.



▪ Loess:

- Loess is **terrestrial sediment composed largely of windblown silt particles** made of quartz. Loess **requires three things**:
 - A source of silt
 - Wind to transport the silt
 - A suitable site for deposition and accumulation

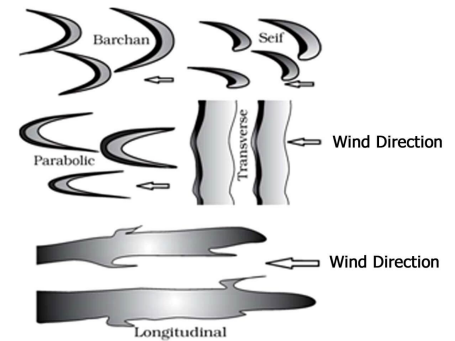


▪ Dunes:

- Dunes are **collections of loose sand built piecemeal by the wind**.
- It is **usually composed of quartz**, which is extremely hard and doesn't easily decay.
- **Most Common types of Dunes**:
 - **Barchans**:
 - Barchans have **crescent-shaped points or wings** that face away from the wind, or downwind, and where sand is moving over an almost uniform surface from where the wind is constant.



- Seif:
 - It is also called **linear dunesis similar to barchans** with a small difference as it has only one wing or point.

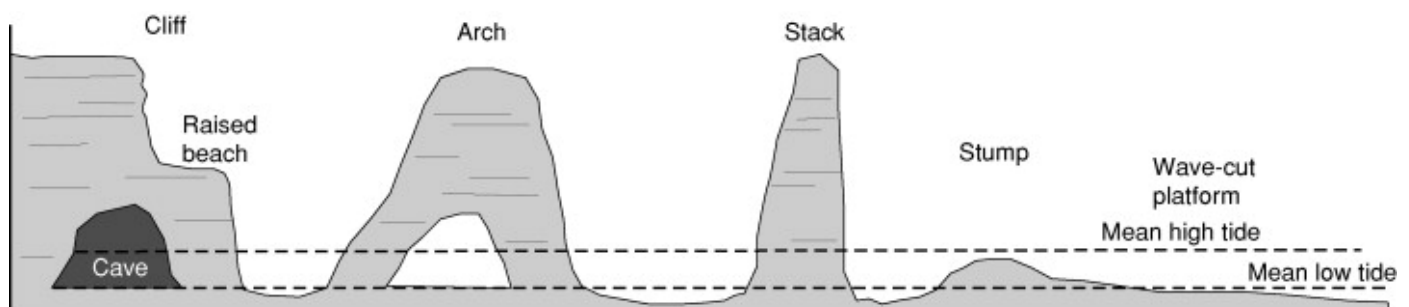


What are the Coastal Landforms?

- Coastal processes are among the most dynamic geologic processes since changes in the morphology of many coasts can be seen on an annual (or shorter) timescale.
- Other than the action of waves, the coastal landforms depend upon:
 - The configuration of land and sea floor
 - Whether the coast is advancing (emerging) seaward or retreating (submerging) landward.

Erosional Coastal Landforms

- **Cliffs, Terraces, Caves and Stacks:**
 - **Cliffs:**
 - A sea cliff is a **vertical precipice created by waves** crashing directly on a steeply inclined slope. Hydraulic action, abrasion, and chemical solution all work to cut a notch at the high water level near the base of the cliff. Constant undercutting and erosion causes the cliffs to retreat landward.
 - **Sea Caves:**
 - Sea caves **form along lines of weakness in cohesive** but well-jointed bedrock. Sea caves are prominent headlands where wave refraction attacks the shore.
 - **Sea Stacks:**
 - A **sea arch forms when sea caves merge from opposite sides** of a headland. If the arch collapses, a pillar of rock remains behind as a sea stack.
 - **Sea Terraces:**
 - It is a **rock terrace formed where a sea cliff, with a wave-cut platform before it, is raised above sea level.**



Depositional Coastal Landforms

▪ Beaches:

- Beaches are **deposits of loose sediment adjacent to a body of water**. In addition to sand, beaches around the world have a remarkable diversity of sediment size, from boulders to fine silt.

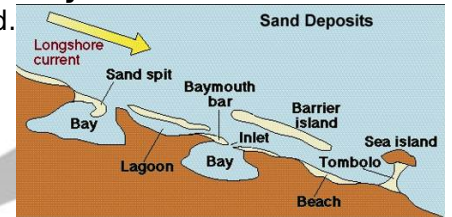
▪ Spits and Bars:

◦ Spits:

- A sand spit is a **linear accumulation of sediment** that is attached to land at one end.
- They **usually develop where the coastline bends inland** from the longshore drift direction. The spit follows the **longshore direction of the updrift coast**.

◦ Bars:

- Sandbar, also known as Offshore Bar, is a **ridge built by waves offshore from the beach**, usually submerged or partially exposed.



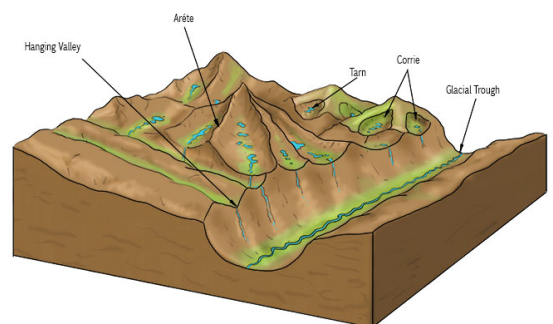
What are the Landforms Formed by Glaciers?

- Glaciers have played a **major role in the shaping of landscapes in the middle and high latitudes** and in alpine environments. They are remarkably **effective at eroding soil and rock**, transporting sediment, and depositing sediment.
- A **glacier is a mass of ice that moves over land as sheets** (continental glacier or piedmont glacier) or as linear flows flowing down slopes of mountains into valleys (mountain and valley glacier).

Erosional Landforms formed by Glaciers

▪ Glacial Valleys/Troughs:

- These valleys are **trough-like and U-shaped with broad floors** and relatively smooth, and steep sides.
 - The valleys may contain littered debris or debris shaped as moraines with swampy appearance.
 - **Very deep glacial troughs filled with sea water** and making up shorelines (in high latitudes) are called fjords/fiords.



▪ Cirques:

- Often found at the **heads of glacial valleys**, these are the most common of landforms in glaciated mountains.
 - 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.

- **A lake of water can be seen quite often** within the cirques after the glacier disappears. Such lakes are called **cirque lakes or tarn lakes**.

▪ **Horns and Serrated:**

- **Ridges 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 form**.

Depositional Landforms formed by Glaciers

▪ **Glacial Till:**

- The **unassorted coarse and fine debris** dropped by the melting glaciers is called glacial till.
 - **Some amount of rock debris small enough to be carried** by such melt-water streams is washed down and deposited.
 - **Such glaciofluvial deposits** are called outwash deposits.
 - The outwash deposits are roughly stratified and assorted.

▪ **Moraines:**

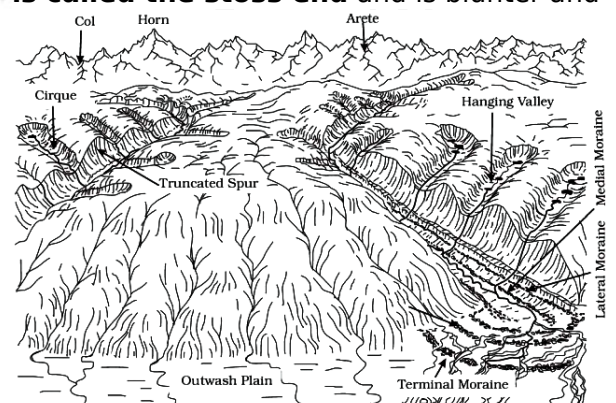
- They are **long ridges of deposits of glacial till**.
 - Terminal moraines are **long ridges of debris deposited at the end (toe) of the glaciers**.
 - Lateral moraines form along the sides parallel to the glacial valleys.
 - Many valley glaciers retreating rapidly leave an irregular sheet of till over their valley floors called ground moraines.
 - The **moraine in the centre of the glacial valley flanked** by lateral moraines is called medial moraine.
 - They are **imperfectly formed as compared to lateral moraines**.
 - Sometimes medial moraines are indistinguishable from ground moraines.

▪ **Eskers:**

- These are **ridges made of sands and gravels**, deposited by glacial meltwater flowing through tunnels within and underneath glaciers, or through meltwater channels on top of glaciers.
 - Over time, the **channel or tunnel gets filled up with sediments**. As the ice retreats, the sediments are left behind as a ridge in the landscape.

▪ **Drumlins:**


- They are **smooth oval shaped ridge-like features** composed mainly of glacial till with some masses of gravel and sand.
 - The long axes of drumlins are parallel to the direction of ice movement.
 - They may measure up to 1 km in length and 30 m or so in height.
 - The **drumlin end facing the glacier is called the stoss end** and is blunter and steeper than the other end called tail.



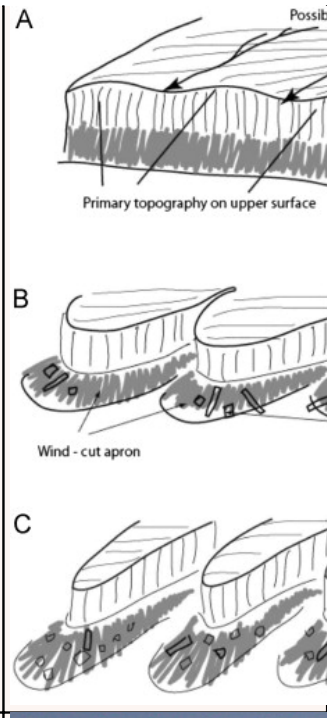
Landforms made by Winds

Erosional Landforms formed by Wind

Deflation Hollows	<ul style="list-style-type: none"> ▪ Formed by the removal of particles by wind. 	
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Caves	<ul style="list-style-type: none">▪ Formed when blowouts formed by winds become deeper and wider and fit to be called caves.	
Yardangs	<ul style="list-style-type: none">▪ Parallel troughs cut into softer rock running in the direction of the wind, separated by ridges.	

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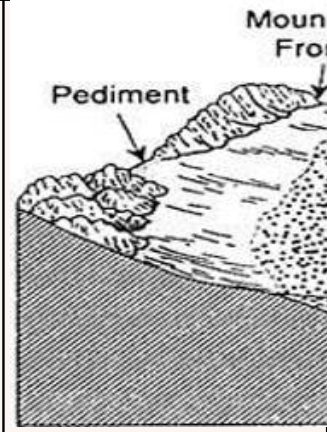
Zeugen

- Tabular mass of resistant rock, standing prominently in the desert.



Playas

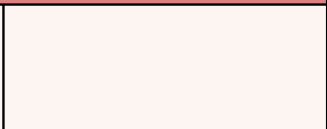
- Flat-bottom depression found in interior desert basins and adjacent to coasts in arid and semiarid regions, periodically covered by water.





Depositional Landforms formed by Wind

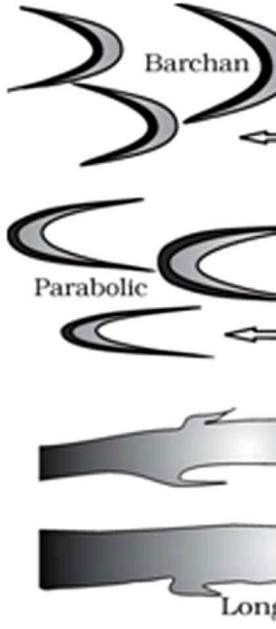
Ripples

- Regular, wavelike undulations lying at right-angles to the prevailing wind direction.

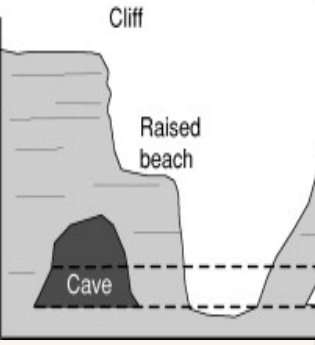


		
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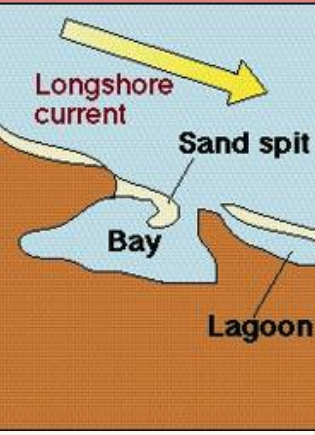
Loess	<ul style="list-style-type: none"> ▪ Terrestrial sediment composed largely of windblown silt particles made of quartz. 	
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Dunes	<ul style="list-style-type: none"> ▪ Collections of loose sand built piecemeal by the wind. 	
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Coastal Landforms
Erosional Coastal Landforms

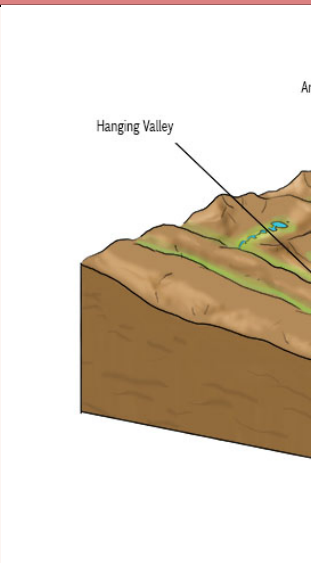
Cliffs	<ul style="list-style-type: none"> ▪ Vertical precipice created by waves crashing directly on a steeply inclined slope. 	 <p>The diagram shows a cross-section of a cliff. At the top, a horizontal line is labeled 'Cliff'. Below it, a flat area is labeled 'Raised beach'. At the base of the cliff, a dark, irregular shape is labeled 'Cave'.</p>
Sea Caves	<ul style="list-style-type: none"> ▪ Form along lines of weakness in cohesive but well-jointed bedrock. 	
Sea Stacks	<ul style="list-style-type: none"> ▪ Forms when sea caves merge from opposite sides of a headland 	
Sea Terraces	<ul style="list-style-type: none"> ▪ Forms where a sea cliff, with a wave-cut platform before it, is raised above sea level. 	

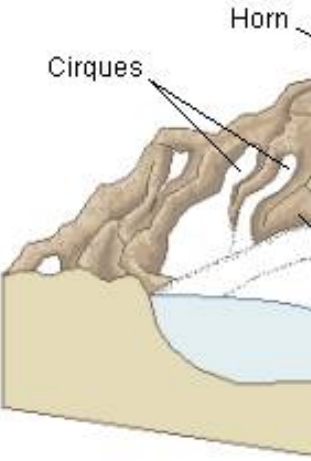
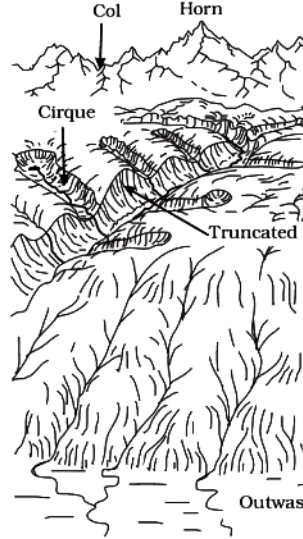
Depositional Coastal Landforms

Beaches	<ul style="list-style-type: none"> ▪ Deposits of loose sediment adjacent to a body of water. 	 <p>The diagram shows a cross-section of a bay. A yellow arrow labeled 'Longshore current' points from left to right. A narrow strip of land labeled 'Sand spit' extends from the left side into the bay. The bay is labeled 'Bay' and the area behind the spit is labeled 'Lagoon'.</p>
Spits	<ul style="list-style-type: none"> ▪ Linear accumulation of sediment that is attached to land at one end. 	
Bars	<ul style="list-style-type: none"> ▪ It is a ridge built by waves offshore from the beach, usually submerged or partially exposed. 	

Landforms Formed by Glaciers

Erosional Landforms formed by Glaciers

Glacial Valleys/Troughs	<ul style="list-style-type: none"> ▪ Trough-like and U-shaped with broad floors and relatively smooth, and steep sides 	 <p>The diagram shows a cross-section of a mountain range. A main valley is shown with a wide, flat floor. A smaller valley, labeled 'Hanging Valley', is shown branching off from the main valley. The hanging valley is higher than the main valley floor, and its floor is also flat. The main valley floor is labeled 'Avalanche'.</p>
Cirques	<ul style="list-style-type: none"> ▪ They are deep, long and wide troughs or basins with very steep concave to vertically dropping high walls. 	

		 <p>A cross-sectional diagram of a mountain peak. At the top, a sharp, pointed peak is labeled 'Horn'. Below it, several bowl-shaped depressions are labeled 'Cirques'. The mountain is shown with a light brown color, and a blue lake is visible at the base of one of the cirques.</p>
Horns and Serrated	<ul style="list-style-type: none"> ▪ Ridges 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 form. 	
Depositional Landforms formed by Glaciers		
Glacial Till	<ul style="list-style-type: none"> ▪ Formed when unassorted coarse and fine debris dropped by the melting glaciers. 	 <p>A detailed line drawing of a mountain range. At the top, a sharp peak is labeled 'Horn'. Below it, a saddle-shaped depression is labeled 'Col'. A bowl-shaped depression is labeled 'Cirque'. A ridge that has been partially eroded is labeled 'Truncated'. At the bottom right, a fan-shaped area is labeled 'Outwash'.</p>
Moraines	<ul style="list-style-type: none"> ▪ They are long ridges of deposits of glacial till. 	
Eskers	<ul style="list-style-type: none"> ▪ These are ridges made of sands and gravels, deposited by glacial meltwater flowing through tunnels within and underneath glaciers. 	