



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. [//](#)

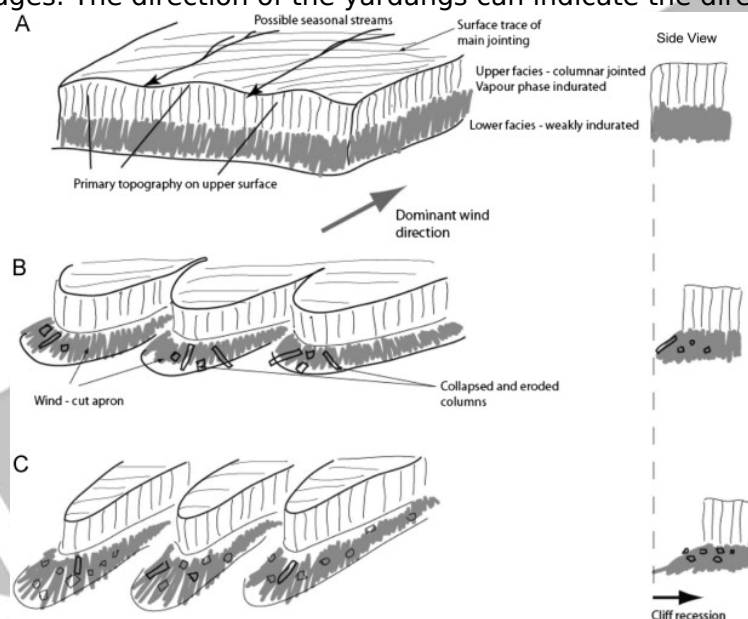
- **Caves:**

- 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



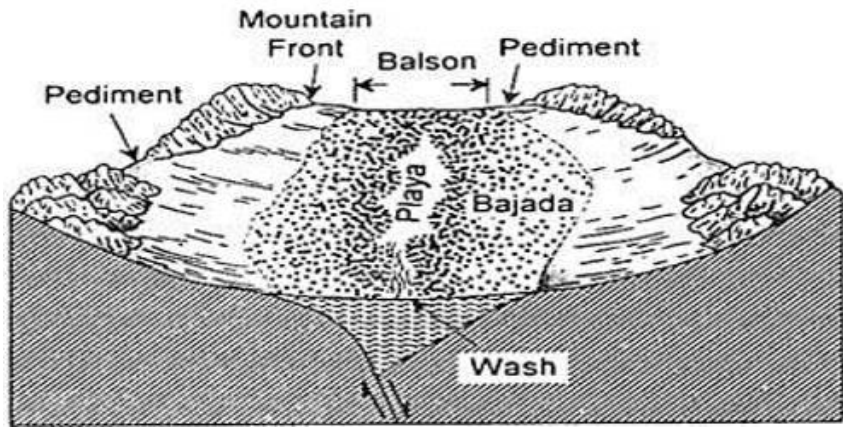
- **Zeugen:**

- 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

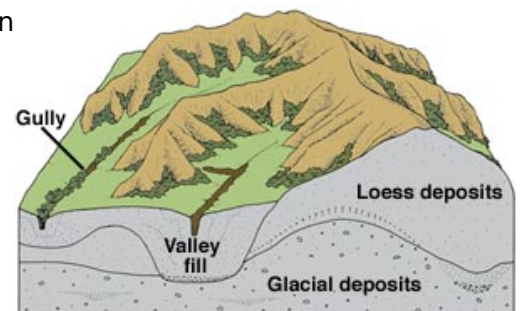
▪ Ripples:

- 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

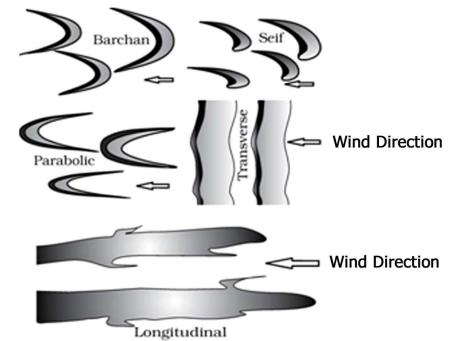


▪ Dunes:

- 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.

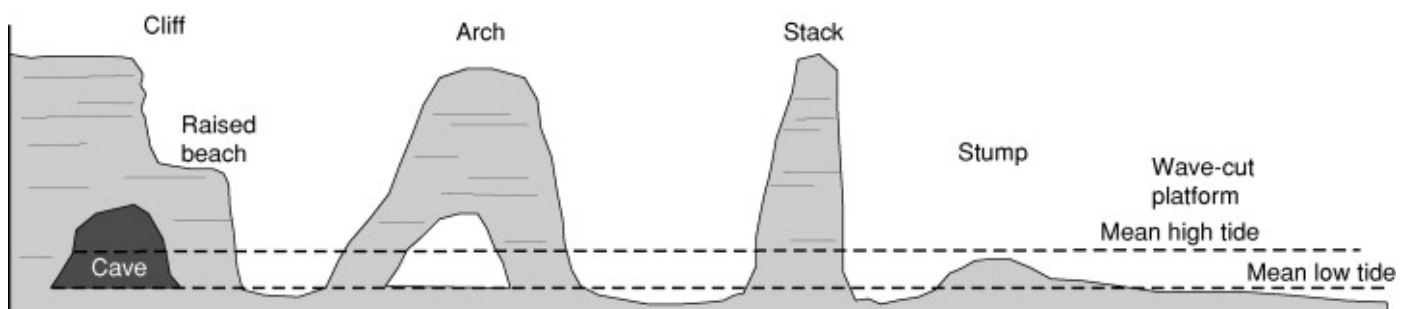


What are the Coastal Landforms?

- 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.

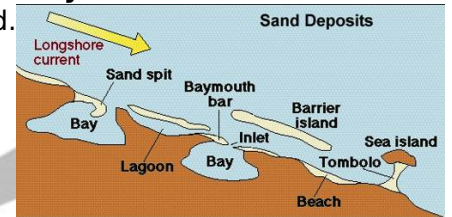
▪ Spits and Bars:

◦ 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.



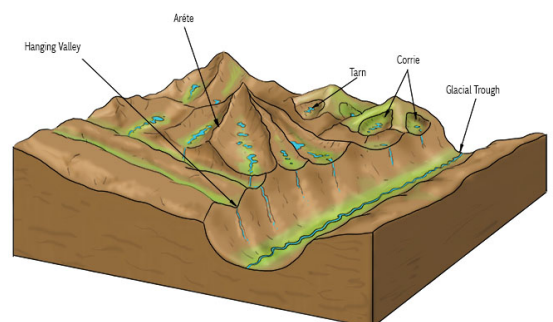
What are the Landforms Formed by Glaciers?

- 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:**

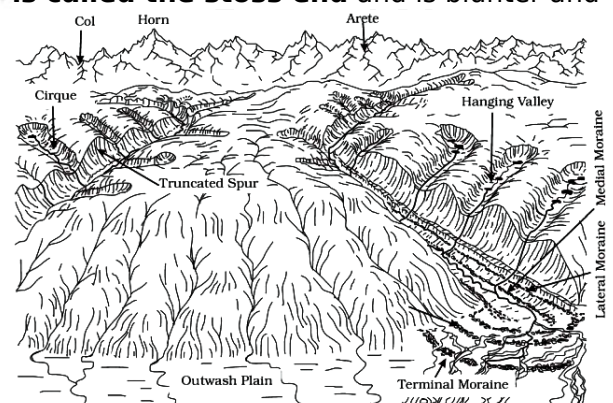
- They are **long ridges of deposits of glacial till**.
 - Terminal moraines are **long ridges of debris deposited at the end (toe) of the glaciers**.
 - Lateral moraines form along the sides parallel to the glacial valleys.
 - Many valley glaciers retreating rapidly leave an irregular sheet of till 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.



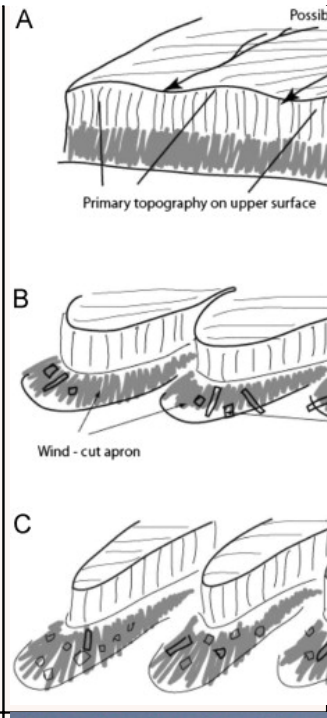
Landforms made by Winds

Erosional Landforms formed by Wind

<p>Deflation Hollows</p>	<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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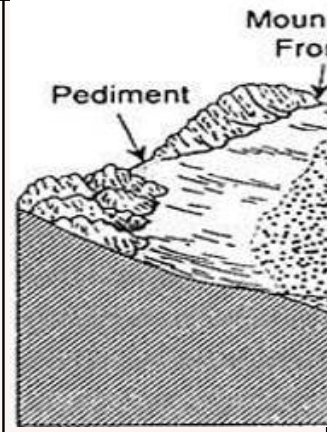
Zeugen

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



Playas

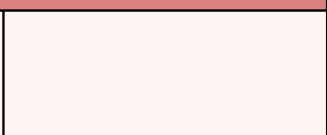
- Flat-bottom depression found in interior desert basins and adjacent to coasts in arid and semiarid regions, periodically covered by water.





Depositional Landforms formed by Wind

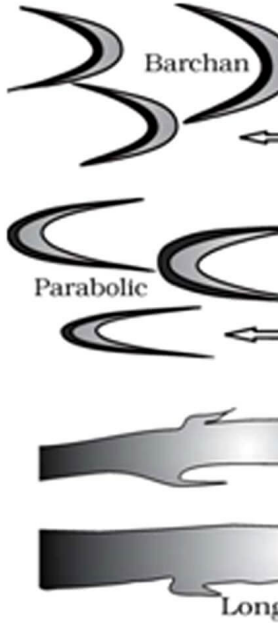
Ripples

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



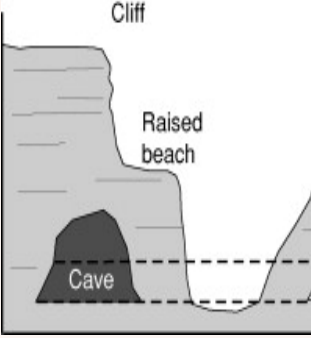
		
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Loess	<ul style="list-style-type: none"> ▪ Terrestrial sediment composed largely of windblown silt particles made of quartz. 	
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Dunes	<ul style="list-style-type: none"> ▪ Collections of loose sand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

Erosional Coastal Landforms

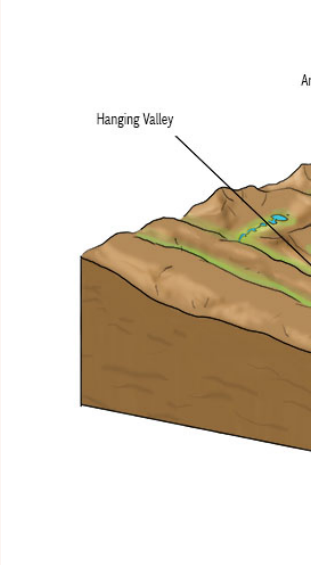
Cliffs	<ul style="list-style-type: none"> ▪ Vertical precipice created by waves crashing directly on a steeply inclined slope. 	 <p>The diagram shows a cross-section of a cliff. At the top, a horizontal line is labeled 'Cliff'. Below it, a sandy area is labeled 'Raised beach'. At the base of the cliff, a dark, hollowed-out area 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. 	

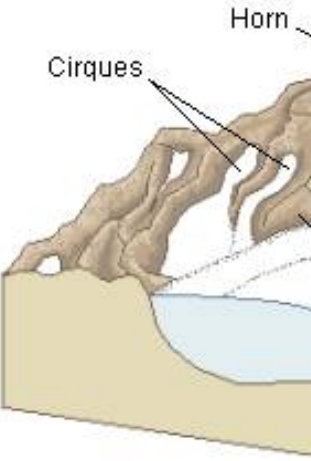
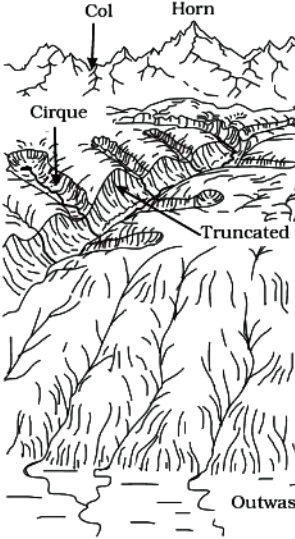
Depositional Coastal Landforms

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 has a much higher floor than the main valley, and its floor is shown to be above the level of the main valley's floor.</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. 	

		
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. 	
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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. 	