

## UK Evolving Physical Landscape



### Uplands and Lowlands

In the **north and west** of the UK the rock types (geology) are **more resistant igneous and metamorphic rock** such as **granite**. This creates **upland areas** such as mountains and moorland which have a **mountainous/hilly topography**. Upland areas are usually **colder than lowland areas** because of **exposure to wind** as well as for **every 100m gained in altitude there is a decrease in temperature of 1 degree Celsius**.

In the **south and east** of the UK the rock types (geology) are **less resistant sedimentary rock** such as **chalk or mudstone**. This creates **lowland areas** which have a **flatter topography**.

### Tectonic and Glacial activity shaping the landscape

Although the UK is not on a major plate boundary it has still been affected by continental drift. **Continental drift** means that we have been drifting away from the tropics over millions of years. This has led to buckling and folding of the land. This is how the mountains in Scotland were formed.

**Glaciers** had a big impact on the UK landscape during the last ice age approx. 10,000 years ago. Glaciers act as giant scourers which carve out the landscape as they slowly move downhill under the force of gravity. This creates distinctive **'U-shaped' valleys**. Unlike rivers which create 'V-shaped' valleys.

## UK Evolving Physical Landscape and Coasts Memory Organiser

Human impact on the UK physical landscape-DARTMOOR, Devon

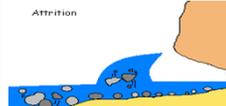
Human Activity	Evidence on the landscape
Agriculture – Farming	<ul style="list-style-type: none"> <li>Clearance of woodland to allow grazing</li> <li>Dry stone walls called 'reaves' were made to divide up the land for <b>farming</b> purposes. Remains still present today.</li> </ul>
Settlements	<ul style="list-style-type: none"> <li>Circular stone hut remains from the Bronze Age, 3,000 years ago found scattered across the moorland</li> </ul>
Mining	<ul style="list-style-type: none"> <li>Dry river beds in the landscape are a result of tin streaming which was very common. This consisted of altering river/stream paths which then eroded into the landscape</li> </ul>

### Coasts

**Erosion** is a term used to describe a wave removing material from the coastline

#### Attrition

Small rocks that the waves are carrying, collide in to one another. The rocks break up, becoming smaller and rounder. This continues to occur until the rock becomes sand.



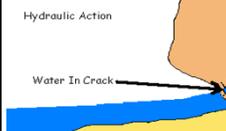
#### Abrasion

Rocks that the wave is carrying are thrown against the coastline. This wears away at the coastline overtime.



#### Hydraulic Action

Large waves break against the cliff. The cliff will often have faults/cracks in. The water is forced into these faults/cracks in the cliff, which causes immense pressure. When this pressure is released, it produces a force that makes the crack larger.



#### Solution

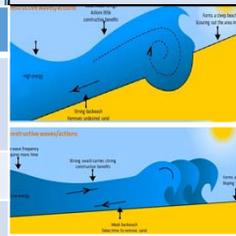
Sea water has lots of different chemicals in, and these can sometimes react with the rock, causing the rock to dissolve. This occurs most frequently with limestone.



### WAVES

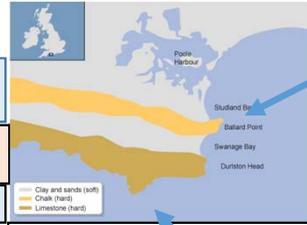
As a wave reaches the beach: The water running up the beach is called the **swash**. As the wave loses energy, the water begins to run back down the beach to the sea, and is called the **backwash**.

#### Two types of waves!



**Destructive Waves:** Strong winds, powerful waves and cause coastal erosion. They are tall and steep. The backwash is stronger than the swash, so material is carried out to sea.

**Constructive Waves:** Light winds, not powerful and cause deposition, rather than erosion. Stronger swash, so material is carried up the beach and deposited.



**Discordant Coastline:** Bands of differing rock run perpendicular to the coastline. Along this coastline, a mixture of clay (less resistant), chalk and limestone (resistant) run perpendicular to the coastline.

**Concordant Coastline:** Bands of rock run parallel to the coastline. Along this coastline, limestone (resistant rock) runs along the entire length of the coast.

#### So what does this have to do with headlands and bays?

#### Headland – discordant coast

Along a discordant coastline, the rocks of higher resistance erode at a slower rate to the rock of lower resistance. As a result, the high resistant rocks protrude out from the coastline, producing headlands.



#### Ballard Point, Swanage. Discordant coast

#### Bays – Discordant coast

Along a discordant coastline, the rocks of lower resistance erode at a faster rate than the rocks of higher resistance. This results in the rock eroding back more quickly to produce bays. Constructive ways often bring sediment to form a beach.



Swanage Bay, South Coast of England – Discordant coast

### Cliffs

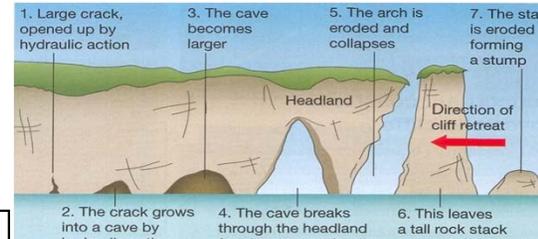
Cliffs are produced through the process of hydraulic action and abrasion, where destructive waves erode the cliff between the high and low tide marks to create a wave cut notch. As this notch is eroded, the cliff above becomes unstable, collapses and is removed by waves.

#### Wave Cut Platform

Below the wave cut notch, an area of exposed rock is left, which is visible during low tide. The surface is not smooth, as erosional processes such as abrasion, and weathering, continue to erode the rock face.



#### Erosion of a headland



### Sub-aerial

#### Mechanical (freeze thaw)

Water enters cracks, and in cold climates, freezes, expanding by around 10%. This increased pressure weakens the cliff face. This process repeats, until the rock is weak enough to fragment..

#### Chemical

Rain water contains a chemical called carbonic acid, which when comes into contact with certain rocks such as limestone, can react and weaken the rock as it dissolves.

#### Biological

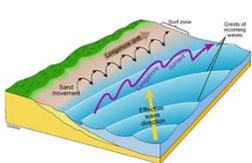
The roots of plants and trees, burrowing animals and nesting birds can all help to weaken the rock.

#### Mass Movement

This term refers to the downwards movement of rocks and soil under the influence of gravity

**Longshore Drift**

Waves approach the beach at an angle. Material is moved up the beach at an angle (swash), returning perpendicular to the coast. Along the south coast of the UK, the prevailing wind is from the South West, moving material from west to east.



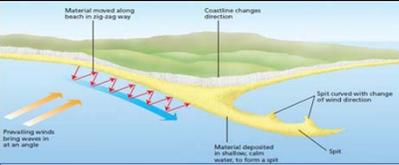
**Beaches**

Formed when eroded material is transported by longshore drift and deposited by constructive waves.



**Spit**

A spit is a narrow ridge of sand or shingle, that stretches out from the coastline, into a gap in the coastline. A spit forms due to longshore drift. Sediment moves along the coastline until a change in coastline occurs. This results in material being deposited. This builds up overtime until the spit extends out further into the gap. Saltmarshes begin to form being the spit due to it being enclosed. A spit may begin to curve due to wind and waves from other directions.



**Dawlish Warren Sand Spit, Devon.**

**Bar**

A bar is a ridge of sand or material that extends across a bay or river mouth, creating an enclosed water body. A bar forms in the same way as a spit. Behind the bar, fresh or slightly salty water becomes contained to form a lagoon. In the image to the right, a bar extends across the river mouth, with a lagoon behind.



**Slapton Sands, Devon**

How do humans affect the coastline?	
<b>Settlement</b>	Over 20 million people in the UK live near to the coast. In the past sewage was discharged into the sea
<b>Tourism</b>	Coastal tourism is BIG business! 13% of jobs at Dawlish are in tourism. Coasts are often managed for tourists, such as building groynes to trap sediment for beaches.
<b>Infrastructure</b>	Roads, railways, shipping ports and oil refineries are just some of the infrastructure found at the coast. The Esso oil refinery at Southampton sees 2000 ships dock each year.
<b>Construction</b>	Dredging the sea to construct ports can have adverse effects to wildlife.
<b>Agriculture</b>	Sea level rise and increased coastal erosion will impact farmland .



**Bournemouth Beach.**  
Tourism, settlement and infrastructure.



**Southampton Port.**  
Settlement, infrastructure and construction.



**Holderness Coastline.**  
Agriculture, settlement.

**What challenges do coastal landscapes present?**

Many people choose to live near the coastline in the UK due to the economic (jobs), environmental (and social (communities) benefits it brings. Coastal erosion removes material from the coastline, with many areas in the UK at risk of this. The Holderness Coast in north-east Yorkshire is a great example of this. It is primarily made of boulder clay which is an extremely weak geology. Also due to 'terminal groyne syndrome' as a result of management in place at Mablethorpe, settlements down-drift have experienced increased erosion due to sediment starvation.



**Rising Sea Level**

Sea level in the English Channel is expected to rise by 15cm by 2030 due to global warming. A warmer climate causes water to expand, and ice sheets and glaciers to melt.



**Could we see London looking like this in the future?**

**Can we protect our coastline?**

Planners must try to find sustainable ways of managing the coastline, and do this using a process called Integrated Coastal Zone Management (ICZM).

<b>No Intervention 'Do Nothing'</b>	No investment in flood defences.
<b>Hold The Line</b>	Maintain the existing coastline with defences.
<b>Managed Retreat</b>	Allow the shoreline to change naturally, but manage this process and the impacts.
<b>Advance The Line</b>	Build new defences on the seaward side.

**Winter UK 2013 Storms**

In December 2013, the UK was hit by a series of low pressure systems, bringing heavy rainfall and extremely strong winds. The south east of England was worst hit, with 7m storm surges. Two people lost their lives, 1400 homes were flooded. Insurers estimated the damage to cost £100 million.

**What are the advantages and disadvantages of coastal defences?**

Defence System	Advantages	Disadvantages
<b>Sea Wall</b>	Protects base of cliff. Made of resistant concrete that deflects energy.	Expensive and unattractive. Restricts access.
<b>Groynes</b>	Maintains a wide beach and attracts tourists	High cost of maintenance. Can impact other areas of the coastline.
<b>Beach Replenishment /nourishment</b>	Looks natural, attracts tourists and is cheap.	Material is easily eroded. Needs constant replenishment.
<b>Cliff Stabilisation</b>	Prevents mass movement, and is safer for people using the beach.	Difficult to install and is very expensive.

