

Unit 2: Topic 4 Overview—The UK's Evolving Physical Landscape

How have geology and past processes influenced the physical landscape of the UK?

What are the UK's main rock types?

Rocks can be classified in to three main groups - igneous, sedimentary and metamorphic. These three different rock types can be found in distinct areas of the UK.

Igneous rocks - these are a result of volcanic activity in the past, when Britain was close to a plate boundary. Some of the igneous rocks are due to lava reaching the surface, it cooled and solidified to form basalt rock. An example of this is the Giant's Causeway in Northern Ireland.

Sedimentary rocks - these are made up of small particles of sand and rock, which have been transported by the wind, rivers and ice and are usually deposited on lake or seabed. Over many millions of years the sediments accumulate which are compressed by the weight of the deposits above, into sedimentary rocks formed in layers, known as bedding planes. Compressed sand forms sandstone and compressed mud becomes clay. Limestone and chalk come from the remains of dead plant, animal and marine species and are rich in calcium carbonate and contain fossils.

Metamorphic rocks - existing rocks that are changed by intense heat and pressure at a plate boundary. These rocks start as either igneous or sedimentary rocks and are crystallised to form rocks such as slate and marble.

How did glacial processes influence the physical landscape?

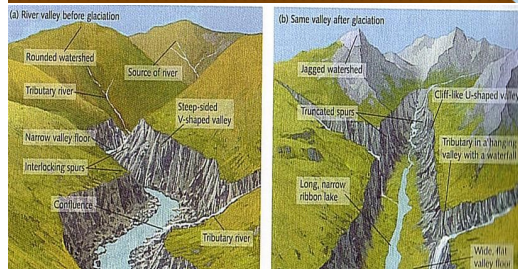
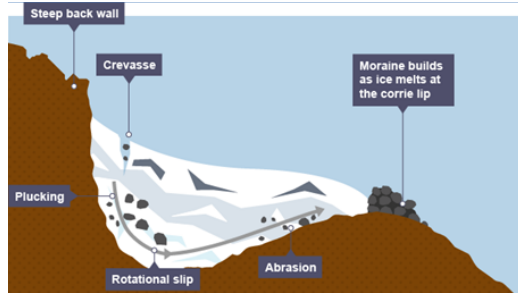
The last ice age in the UK took place around 18,000 years ago. During this time, temperatures remained low throughout the year and ice sheets and glaciers covered the north of the UK and other parts of Europe.

The two main types of glacial erosion are:

Abrasion	as the glacier moves downhill, rocks that have been frozen into the base and sides of the glacier scrape the rock beneath. The rocks scrape the bedrock like sandpaper, leaving scratches called striations behind.
Plucking	rocks become frozen into the bottom and sides of the glacier. As the glacier moves downhill it ' plucks ' the rocks frozen into the glacier from the ground.

The main type of glacial weathering is:

Freeze-thaw weathering	During the day when temperatures are higher, the snow melts and water enters the cracks in the rock. When the temperature drops below 0°C the water in the crack freezes and expands by about 9%. This makes the crack larger. As this process is repeated through continual thawing and freezing the crack gets larger over time. Eventually pieces of rock break off.
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What is Glacial transportation?

Glaciers move very slowly. As they move, they transport material from one place to another: As **freeze-thaw weathering** occurs along the edge of the glacier, pieces of rock which break off larger rocks, fall onto the glacier and are transported in this way. Rocks **plucked** from the bottom and sides of the glacier are moved downhill with the ice.

•**Bulldozing** is when rocks and debris, found in front of the glacier, are pushed downhill by the sheer force of the moving ice.

•**Rotational slip** is the circular movement of the ice in the corrie.

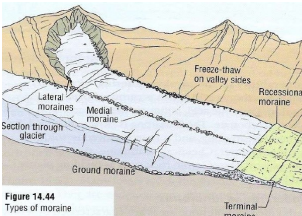


Figure 14.44 Types of moraine

Any material carried or moved by a glacier is called **moraine**. The main types of moraine are:

•**Lateral moraine** - material deposited along both sides of the glacier. This moraine is usually made up of weathered material that has fallen from the valley sides above the glacier.

•**Medial moraine** - material deposited in the middle of the glacier. This is caused by the lateral moraines of two glaciers when they meet.

•**Terminal moraine** - material deposited at the end of the glacier.

•**ground moraine** consists of an irregular blanket of till deposited under a glacier. Composed mainly of clay and sand, it is the most widespread deposit of continental glaciers.

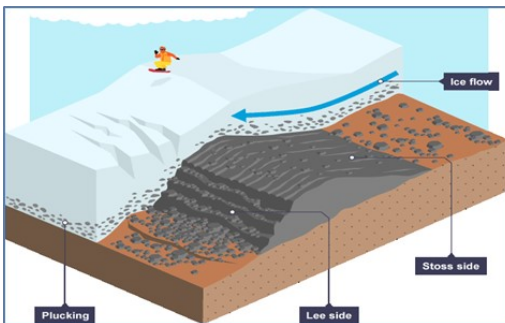
What Glacial landforms are created by deposition?

The name given to all material deposited by a glacier is called glacial till or **boulder clay**. Deposited material creates a range of features such as:

•**Roche moutonnée** - these have a steep and jagged face which has been created by **plucking** on the sloping side (**lee side**). On the steep side, the land is smoothed and polished by the ice through **abrasion**.

•**Erratics** - these are rocks that have been deposited by the glacier. They are usually made of a rock type that would not be found in that area. This suggests that erratics can be carried from an area of different geology.

•**Drumlins** - glaciers can move **moraine** around in unusual ways which produce interesting features. Drumlins are mounds of deposited moraine. They have a steep side and a sloping side. They can be small or large. They are sometimes described as having a 'basket of eggs' topography because of the unusual landscape they create.

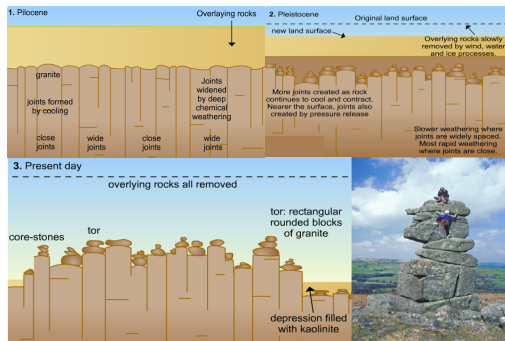


What are Granite Landforms?

The main granite landforms are **tors**, which can be found on moors such as **Dartmoor** and **Bodmin Moor**. Tors are blocks of granite that have weathered slower than the granite around them, because they have less joints and faults.

How are the Tors on Dartmoor formed?

The granite seen on Dartmoor originated as a granite **batolith**, under the surface of the earth. A batholith is an area of molten rock that has cooled very slowly within the crust, creating a rock with large crystals. Over time the material above the batholith was **weathered** and removed by rivers and glaciers. As this material was removed there was a reduction of pressure on the granite as there was less above it. This caused it to crack creating joints (vertical cracks) and bedding planes (horizontal cracks). Where the joints were close together the most rapid weathering occurred, and quickly broke down the rock. However, there were also areas where there were very few joints and so slower weathering occurred. The main form of weathering is freeze-thaw. As this process continued over millions of years, the overlying material was totally removed, leaving behind the tors and valleys seen on Dartmoor.

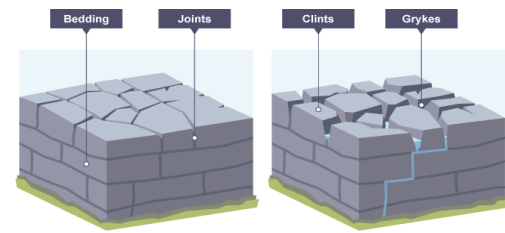


What are Limestone Landforms?

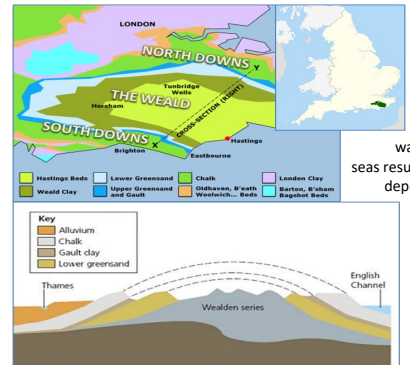
One of the largest areas of limestone in the UK is found in the Yorkshire Dales National Park, near Malham. The structure of limestone is like building blocks, with joints (vertical) and bedding planes (horizontal) separating the blocks. Most weathering takes place between the blocks where the acidic rainwater can penetrate: limestone is a pervious rock.

How is the Limestone pavement at Malham formed?

Where limestone has been exposed during periods of glaciation and the top soil has been scraped away to **expose the bare rock** underneath. Limestone is a sedimentary rock that is made up of **horizontal cracks called bedding planes** and **vertical cracks called joints**. Limestone is made of **Calcium Carbonate** which is **dissolved** by rainfall which is a weak acid. This process is called **chemical weathering**. A limestone pavement is formed when rain water seeps through the joints and dissolves the limestone on each side **making the joint wider**. The cracks are called **grykes** and the blocks are called **clints**.



What is the landscape of the North and South Downs?



About 75 million years ago, during the creta-ceous period, Britain was covered by warm, tropical seas resulting in the deposition of

marine deposits that created the chalk foundations of the North and South Downs. The Weald is an area of

upland landscape in lowland southern Britain, in Kent and Sussex. It is about 250m above sea level and was originally an anticline of folded rocks that has been exposed to much weathering. This weathering has resulted in different layers of strata being exposed, with more resistant rocks such as chalk being exposed as escarpments. This gives a scarp and vale landscape between the North and South Downs.

How has human activity helped create distinctive UK Landscapes?

85% of the NP is farmed with approx. 1100 farms. Chalk grassland is ideal for grazing sheep because the grass is short whereas the clay grassland is more suitable for dairy cows because the grass is long. The south facing slopes are suitable for arable farming e.g. Wheat.

What are the advantages and disadvantages of farming in the S. Downs?

Advantages	Disadvantages
Income supports the economy and provides 6% employment in the NP	Arable farming decline and changes in practices have damaged wildlife habitats
Arable farming has supported rare bird species e.g. skylark, partridge	Extensive sheep grazing has led to scrub encroachment
Hedgerows provide wildlife corridors for bats	Decline in chalk grassland due to the use of chemicals

What are the advantages and disadvantages of forestry in the S. Downs? Deciduous and coniferous woodland unevenly covers a total of 23.8% of the NP with the west having significantly more than the east.

Advantages	Disadvantages
Provide habitats for a diverse range of wildlife	Removal of woodland for new development threatening ancient large-leaved lime woodland
Timber is a valuable sustainable product for construction and fuel.	Lack of management is resulting in a decline in the quality of the woodland and its biodiversity.

What are the impacts of settlements in the South Downs?

Spring-line settlements were built on the naturally formed south slopes, which afforded them shelter. The South Downs is the most populated National Park in the UK with around 120,000 people living there. A large proportion of these people live in urban areas and villages that surround the NP including the UK's largest market towns, Lewes, Petersfield and Midhurst. The character of the area originates from the use of local building material. In recent years new developments do not reflect the original traditional character. Some of the original features have been replaced such as wooden signage with metal ones as well as a decline in local community facilities such as post offices, shops, pubs and schools.