

Erosive landforms



LO: be able to define and describe the formation of erosive landforms and understand the mechanics behind them.

Key works: headlands, bays, wave refraction, cliffs, wave cut platforms, caves, arches and stacks.

Headlands and bays

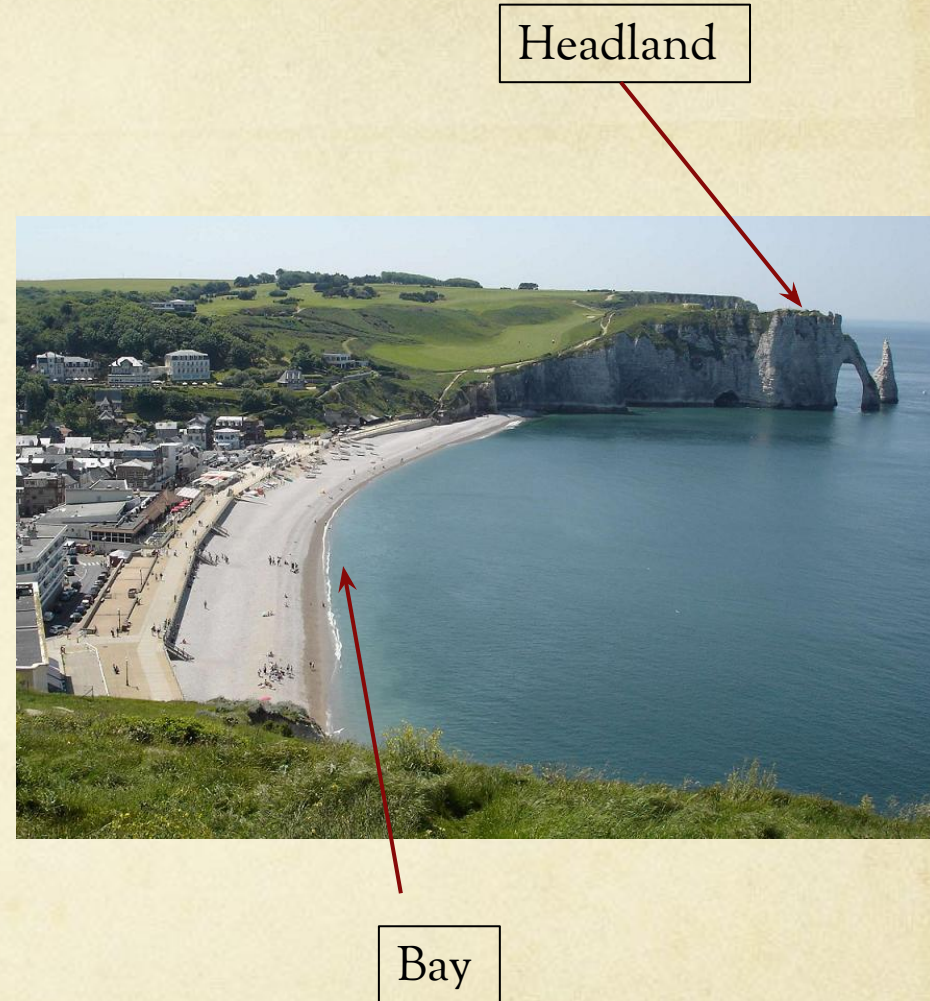
The geology of a coastline affects how the coastline is shaped. A discordant coastline results in the formation of headlands and bays.

Characteristics of a headland

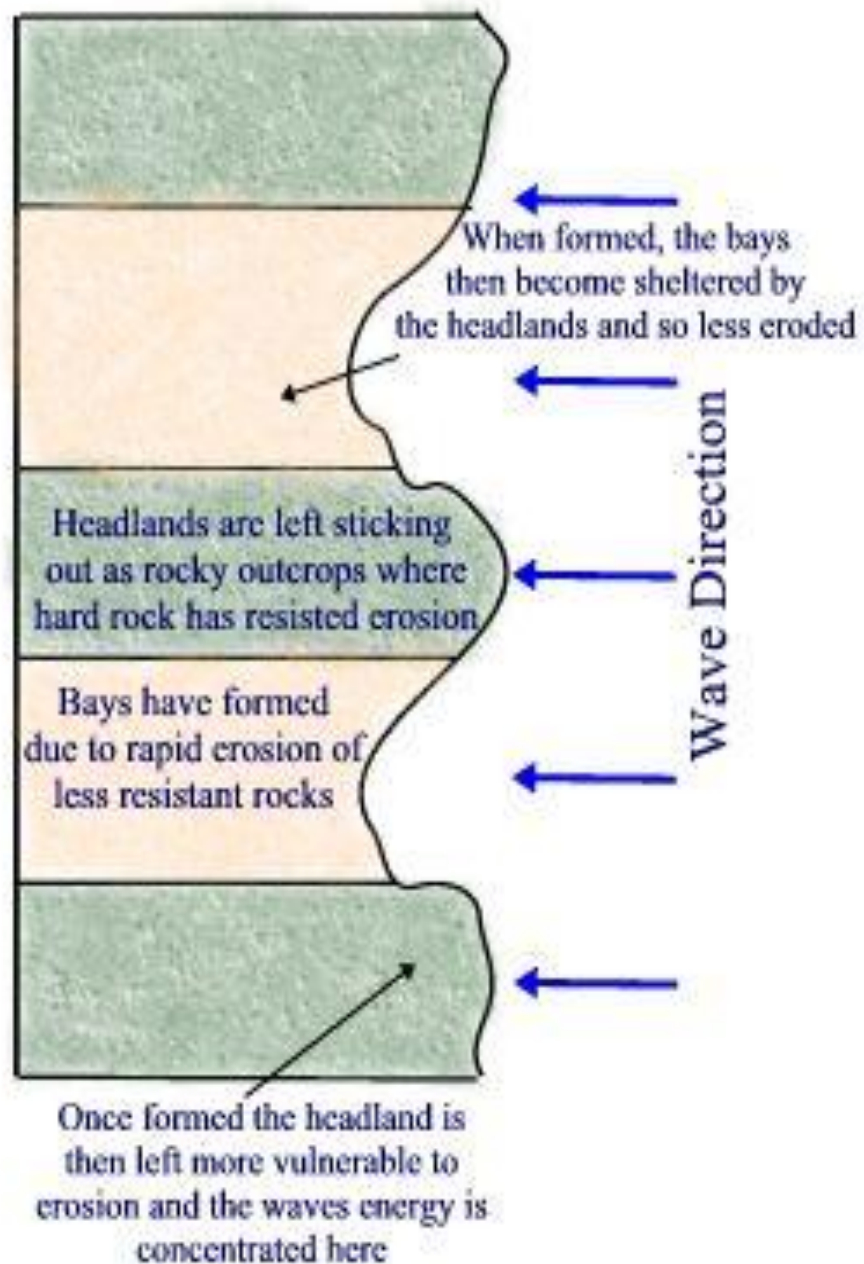
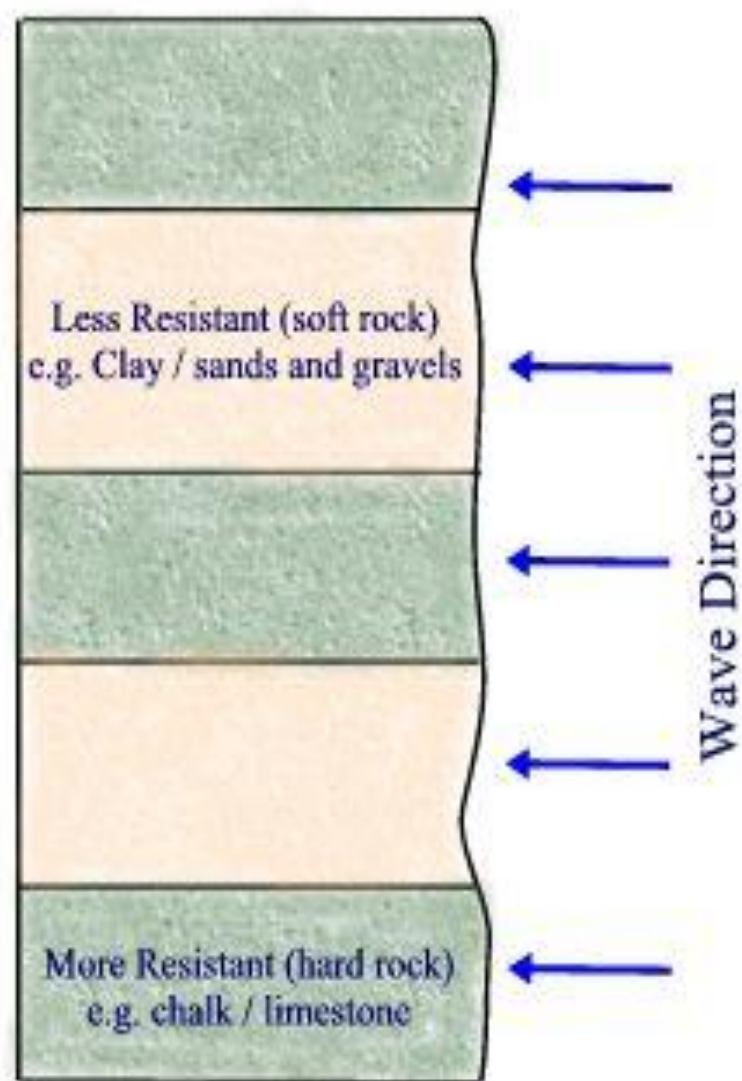
A headland is a cliff that juts out into the sea. Headlands are composed of hard rock (granite) which is difficult to erode. They are being acted upon by high energy waves.

Characteristics of a bay

A bay is a crescent shaped indentation in the coastline found between two headlands. They are made up of soft rock (sandstone). They have low energy constructive waves which cause the accumulation of sand (beaches)

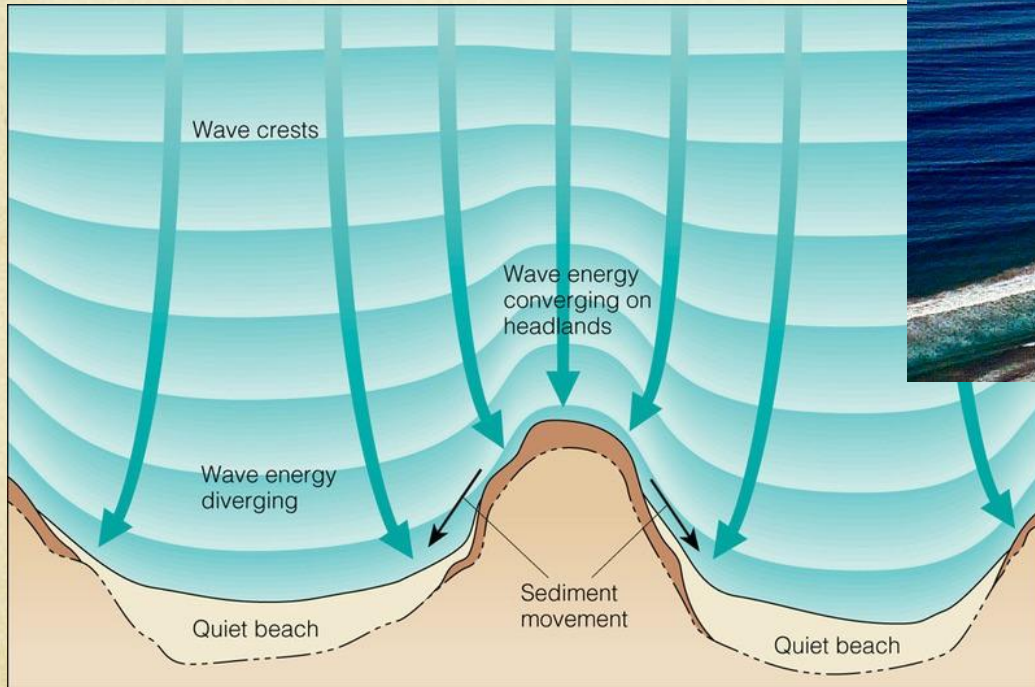


The Formation of Headlands and Bays



Wave refraction at a headland

Using the textbook page 127 summarise how refraction happens.

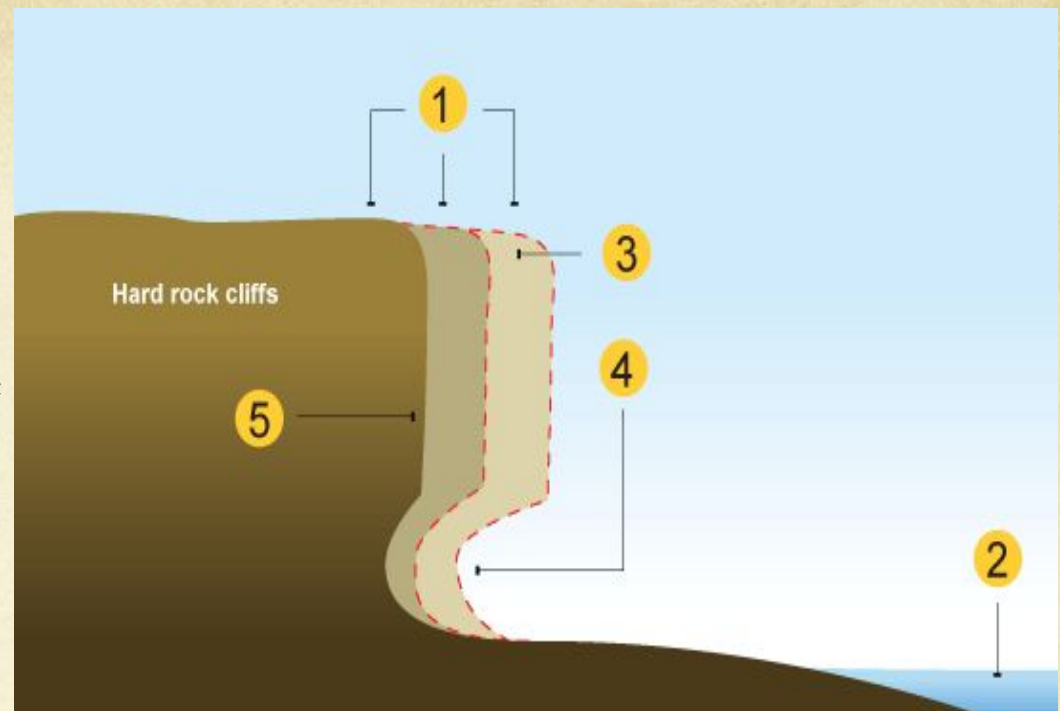


Cliffs and wave cut platforms

The rate at which a cliff recedes depends on the hardness of the rock. Soft rocks are prone to slumping creating gentle cliffs whilst hard rock is more resistant erodes slowly and create high cliffs and wave cut platforms .

The process of cliff erosion

- Weather weakens the top of the cliff (freeze thaw).
- The sea attacks the base of the cliff (hydraulic action and abrasion) forming a wave-cut notch.
- The notch increases in size causing the cliff to collapse.
- The backwash carries the rubble towards the sea forming a wave-cut platform.
- The process repeats and the cliff continues to retreat.



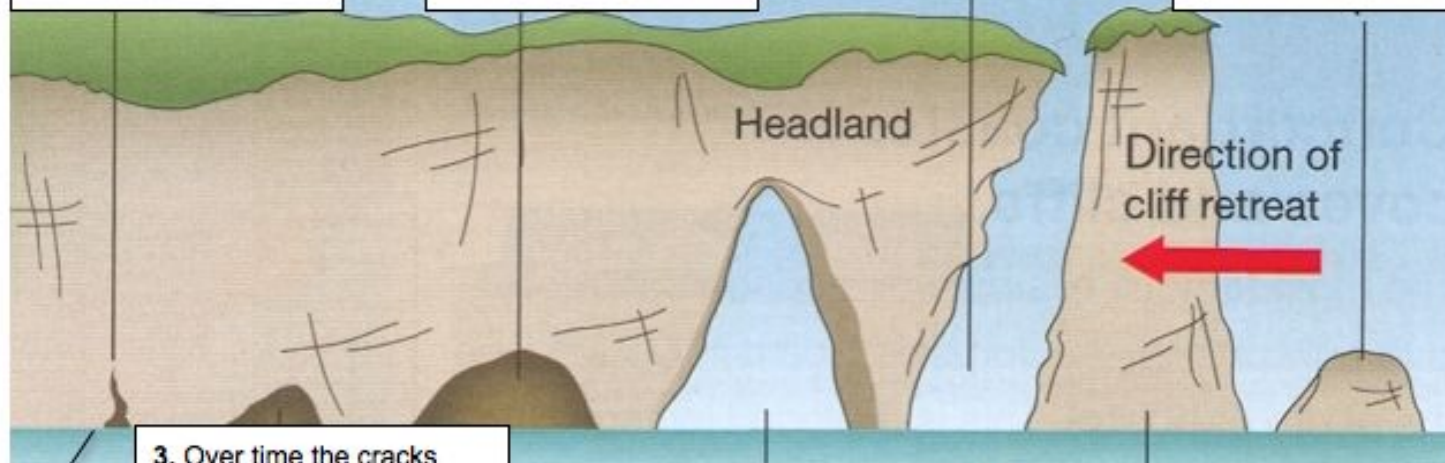
Caves, arches and stacks

1. Cracks at the base of the headland within the inter-tidal zone become exposed through hydraulic action, which pressurizes air, forcing the crack to widen

4. As a result of wave refraction, which distorts the wave direction, destructive waves concentrate their energy on the sides. This deepens the cave.

7. Over time the arch becomes unstable and collapses under its own weight to form a pillar of rock, called a stack. A good example is Old Harry along the Dorset coast.

9. Eventually the exposed stack will collapse to form a stump. The broken material is further eroded through attrition and transported away to be deposited within the bay



3. Over time the cracks widen and develop as wave-cut notches. Further processes of abrasion and hydraulic action will deepen the notch to form caves

2. Cracks are further widened by weathering processes such as salt crystallization and wet and dry weathering that affects chalk.

5. Wave refraction effects all three sides of the headland. If two caves are aligned the waves may cut through to form an arch. Wave-cut notches widen the base of the arch.

8. The stack is further eroded at its base creating new wave-cut notches. Sub-aerial processes continue to weaken the stack from above

6. Vertical joints are exposed by tall breakers associated with destructive waves. Joints can also be weathered from above such as through carbonation in limestone. Here blowholes may form.

Caves, arches and stacks

