Chapter 9 :

Coastal relief :

Its development is mainly due to the action of the sea on the continent, both through erosion on the coast and through the sediments it carries to the coast. These processes result in either erosion or deposition, creating different types of coastal landforms. The formation of the coastal landscape depends on many factors, including the type of rock on which these processes act, the amount of energy in the system, ocean currents, waves, and tides.

1/ Coastal Environments:

Ocean currents

A littoral current runs parallel to the coast. These currents occur when waves are refracted, meaning they change direction slightly when they hit shallow water. They "gnaw" away at the shoreline, eroding soft materials such as sand and depositing them elsewhere.

A tidal current is a type of ocean current generated by tides. Its strength and direction change with the time of the tide. It is noticeable near the coasts bordering the tide-influenced seas. The tidal current is more pronounced when the topography of the coast and seabed forces the waters under the influence of the tide to transit in a narrow area.

Wave:

A wave (Listen) is a deformation of the surface of a body of water, most often due to the effect of the wind. At the interface of the Earth's two main fluids, the wind creates waves on the oceans, seas and lakes. These irregular movements disperse across the surface of the water and are collectively referred to as sea state.

Vague se brisant sur la côte sauvage de l'île d'Yeu.

Waves can erode materials in a variety of ways:

Abrasion In this case, the sand carried by the wave wears away the solid rock like sandpaper.

Attrition This phenomenon is often confused with abrasion, with the difference that in the case of attrition, the particles collide and disintegrate.

This is the classic action of waves, whereby the force of the water itself, when it collides with the coast, breaks the rock.

Solution Chemical weathering: Chemicals in water dissolve certain types of coastal rocks.

Tides:

That is, the rise and fall of sea level, are regular movements of water that are influenced by the gravitational forces of the moon and sun.

There are 3 types of tides:

1. Micro-tides (less than 2 m).

2. Meso-tides (2-4m).

3. Macro-tides (more than 4 m).

The first two contribute to the formation of landforms by:

1. The input of massive amounts of sediment that erodes the bedrock.

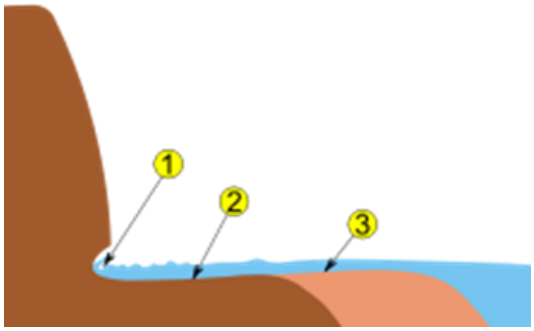
2. Changing the depth of the water, shaping the coastline.

2/ Erosive coastal landforms:

The erosion landscape is dominated by destructive waves in high-energy environments. A coastline formed of stronger materials such as chalk gives rise to coastal landforms such as arches, chimneys, and stumps. A combination of hard and soft materials gives rise to the formation of bays and headlands.

Cliff:

Cliffs take shape as a result of weather and erosion. Some cliffs have a gentle slope because they are made up of soft rocks, which erode quickly, while others are steep because they are made up of hard rocks, which take longer to erode.



côtière d'une falaise : 1) encoche littorale ; 2) Plate-forme d'érosion ; 3) Plate-forme d'accumulation.

Falaise sableuse du North Norfolk

Falaise à ressaut résultant d'une érosion différentielle sur une couche de roches indurées et une couche de roches tendres.

The base of the cliffs is formed:

• Either by the action of horizontal erosion on a raised bank, or

• Either by a vertical digging action on a bedrock8, or

• Or by differential erosion on two types of rocks, one being more sensitive than the other.

Falaise calcaire avec des écoulements dans des fractures et des niches de décrochement dont les oxydes de fer colorant en brun ces anfractuosités sont les témoins.

Wave Cutting Platform:

A wave-carved platform is a flat area in front of a cliff. Such a platform is created, as the name suggests, by the waves cutting (eroding) the cliff, leaving behind a platform. The bottom of a cliff often erodes the fastest, resulting in a platform carved out by the waves. Wave-shaped notch If a wave-cutting notch becomes too large, it can cause the cliff to collapse.

Arch:

When a cave forms on a narrow promontory and erosion continues, it can become a complete opening, with only a natural rock bridge at the top. The cave then becomes an arch.

Batteries:

When erosion causes the arch bridge to collapse, isolated chunks of rock remain, called piles.

3/ Depositional Coastal Landforms:

Deposition refers to the deposition of sediments. Sediments such as silt and sand are deposited when a body of water loses its energy, which deposits it on a surface. Over time, new landforms are created by this sediment deposit.

A deposit is made when

• Waves enter a shallower area.

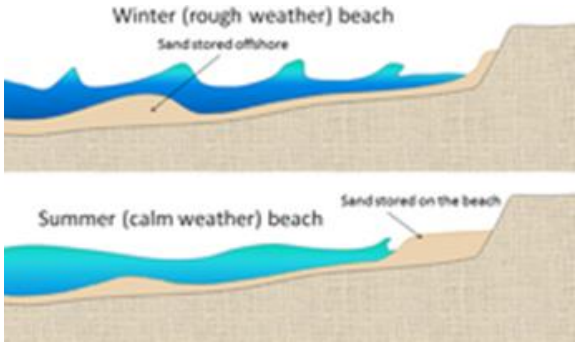
• Waves hit a sheltered area such as a bay.

• The wind is light.

• The amount of material to be transported is good.

Beach:

Beaches are made up of material that has been eroded elsewhere and then transported and deposited by the sea. For this to happen, wave energy needs to be limited, which is why beaches often form in sheltered areas such as bays. Sandy beaches are most often found in bays, where the water is shallower, which means the waves have less energy. On the other hand, sandy beaches are most often found in bays, pebble beaches most often form at A beach is a gently sloping or very gentle shoreline or shoreline that is an expanse of sand, gravel or cobble that continues below water level the foot of eroding cliffs, where wave energy is much higher.



Variation saisonnière du profil de plage. Selon le cycle sédimentaire du littoral, le sable redescend vers l'avant de la plage (amaigrissement ou dégraissement dû aux tempêtes hivernales) ou migre vers le haut de la plage

Bars & Raffles:

A bar is formed when an arrow has developed into a bay, connecting two headlands. The tombolo is the small isthmus that forms between an offshore island and the mainland. Shallow lakes, called lagoons, can form behind tombolos and bars. Lagoons are often short-lived bodies of water, as they can fill up again with sediment.

Salt marshes:

A salt marsh can form behind an arrow, creating a sheltered area. With this shelter, water movement slows down, resulting in more material and sediment being deposited. They are found along submerged coasts, i.e. partly submerged, often in estuarine environments.

A beach sandstone or beach-rock:

Is a sedimentary rock that forms in the littoral zone, by rapid cementing of sand or shell or coral debris on a beach, parallel to the shore, at the level of the wave breaking or tidal swinging zone. This consolidated beach sediment, in more or less thick slabs, is frequently found in coral seas.

grès de plage au Petit Police, à Mahé, Seychelles (le grès de plage se situe dans la zone de déferlement des vagues, au premier plan il s'agit de roches granitiques).