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Goh Cheng Leong Chapter 10: Coastal Landforms YouTube Lecture Handouts

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Goh Cheng Leong Chapter 10: Coastal Landforms [<https://www.youtube.com/watch?v=12ufyL5IGdQ>]

Detailed Lecture –

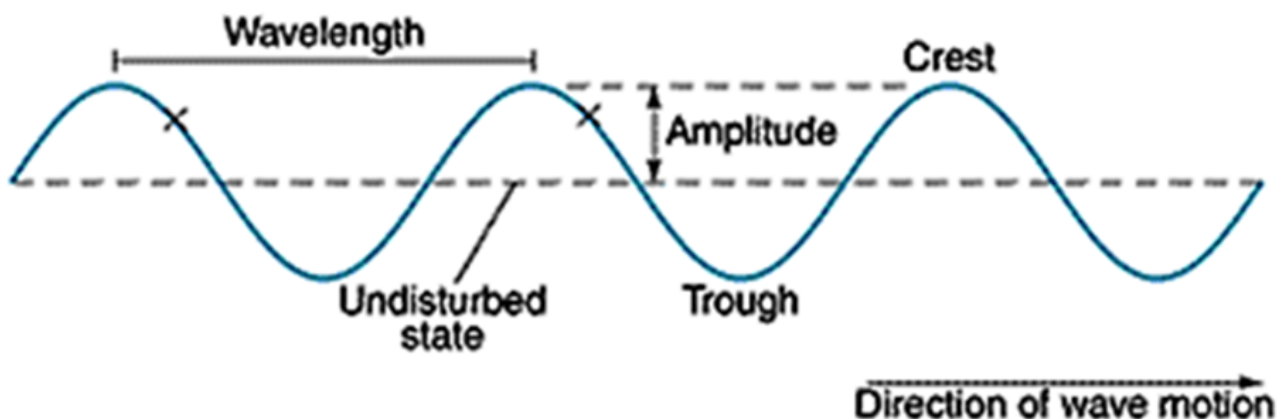
[Coastal Landforms \(By Waves & Currents\) : 18 Erosional & 18 Depositional Features](https://www.youtube.com/watch?v=nd72XVWGaYE) [<https://www.youtube.com/watch?v=nd72XVWGaYE>]

- Action of waves, tides and currents
- Average pressure of Atlantic waves is 600 lb per square foot in summer and treble in winter
- During storms pressure is more than 6000 lb per square foot
- Tides extend line of erosion into zone of erosion – this zone is between low water level and high water level
- Currents move eroded debris and deposit it as silt, sand and gravels

Mechanism of Marine Erosion

Waves – surges swell forward – become higher and swifter

Normal wave – 20 feet high (height between crest and trough) & 400 feet long (wavelength – distance between two crest)



Near shallow waters – speed is reduced & waves are refracted against alignment of coast

Waves curl over and a break is called as *breakers* (shallow water when it is less than the height of waves) . Water rushes up the beach against land and is called as *swash*, when retreats it is called as *backwash*.



Undertow – element of offshore drift – flows near bottom away from shore – exerts a pulling effect which is dangerous to sea bathers

Corrasion – waves against cliffs

Attrition – fragments collide against one another

Hydraulic Action – waves splash against coast and enter joints. When waves retreat, air expands

Solvent Action – On calcium carbonate sets up chemical changes in rocks – limited to limestone coasts

Rate of erosion depends on

Nature of rocks

Amount of rocks exposed to sea

Effect of tides

Human interference in coast protection

Erosional Landforms

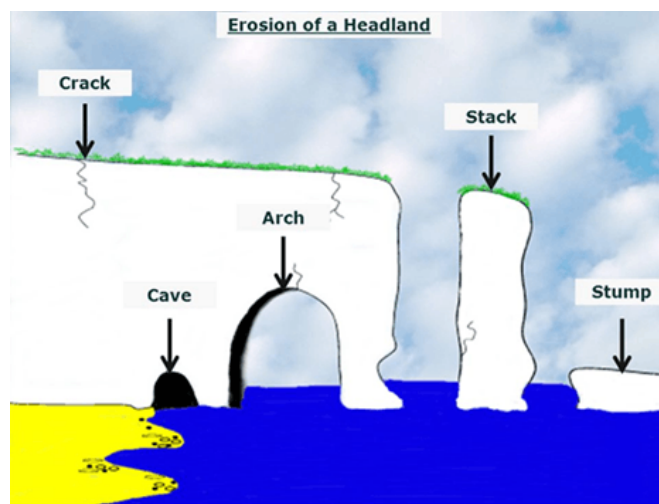
Capes and Bays: Soft rock worn as inlet, coves and bays while hard rock persists as headlands, promontories or capes. Example, Dorset coast of southern England, Swanage Bay and Durlston Head. Penang Island (granite) has many bays and headlands



Cliffs and Wave cut platforms: Cliff is steep rock facing the adjoining coast. Rate of recession depend on geological structure (stratification, jointing and resistance to wave attack) . If it dips landward, cliff will be more resistant to land erosion. Example, English Channel cliffs (including Beachy Head) ; Seven sisters at mouth of Cuckmere and White Cliffs of Dover. At base of cliff there is notch. As cliff recedes – wave cut platform (Strandflat off Western Norway) is formed. Eroded material are deposited on offshore terrace.



Caves, Arch, Stack and Stump: caves at Flamborough Head, England. Caves unite to form arch (Needle Eye near Wick, Scotland) . Arch collapse as pillar stack (Old Man of Hoy in Orkneys & Needles, Isle of Wight) . Finally stump remains just visible above sea level (*St* . Kilda, off Outer Hebrides, Scotland)



Geos and Glopups: Waves splash against roof of cave when compressed air is trapped inside. Water forces out as gloup (gurgling water) or blow hole (Holborn head in Caithness Scotland) . Roof collapses and creek develops as geos (Wife geo, near Duncansby Head, Scotland)



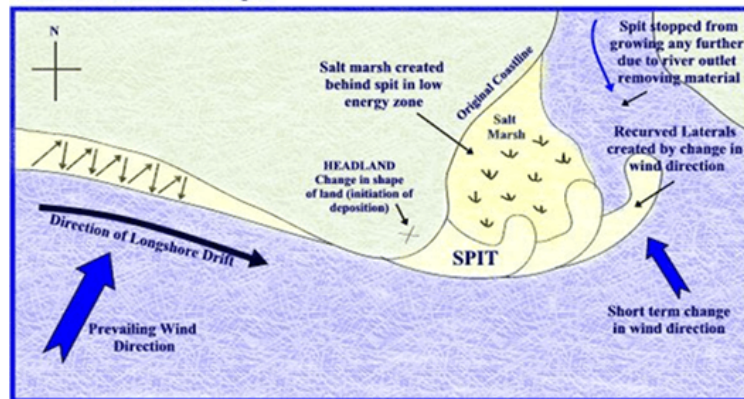
Depositional Landforms

Beaches: sand and gravels that are loosened from land are deposited. Eroded material is transported. Longshore drift comes obliquely to the coast carries material along shore in direction of dominant wind. Backwash removes material and deposits it on off-shore terrace. Silt and mud are deposited in shallow waters

Coarse material at top of beach and fine material closer to sea. On smooth lowlands, beaches continue for miles – east coast of West Malaysia but in uplands it descends suddenly (Chilean coast – long beaches are absent)

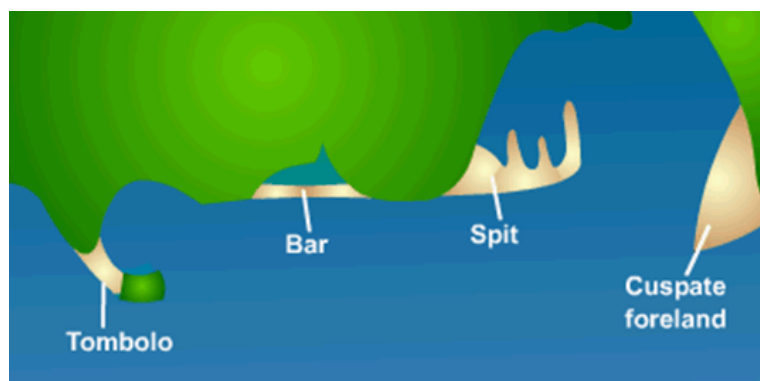
Spits and Bars: material pile up into ridges or embankment of shingle forming spit – one side attached to land (Calshot Spit, Southampton water, England or Kelantan coast) . These can be curved into hook or recurve spit. When formed across mouth of river it is called bar (Chesil beach in Dorset, England link Isle of Portland with mainland and enclose lagoon Fleet)

The Formation of a Spit



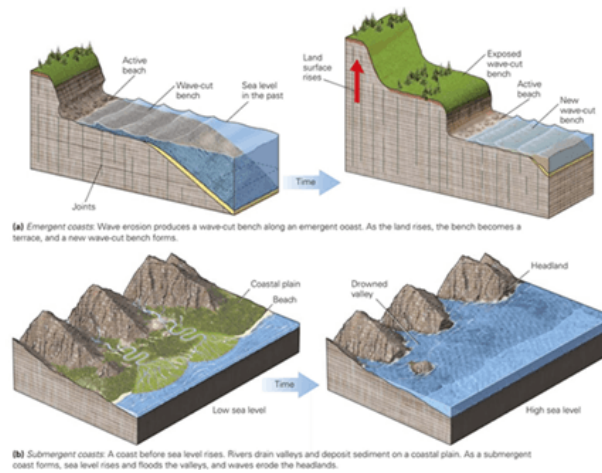
Tombolo: Connecting bar that joins two landmass

Nehrungs: large bodies of water enclosed by long bars to form marshy lagoons (haffs) in Baltic coast of Poland and Germany



Marine Dunes and Dune Belts: coastal sand forms dunes and dune belts large enough to engulf farms, rocks etc. Common in Landes, SW France; Belgium, Denmark, Netherlands. To arrest migration of dunes, *marram grass* and *pines* are planted

Types of Coasts



Coastline of Submergence: Sinking of land or rising of sea. Includes – Ria, Fiord, estuarine and Dalmatian or longitudinal coasts

Ria Coast: During Ice Age, water was locked up as ice. Warm climate melted ice, water level rose and sea level rose. Mountains run at right angle to sea – transverse or discordant to coast. Rise in sea level submerges the lower part of valleys. Long narrow inlets are formed. They differ from fiords as they are not glaciated and depth increases seawards. Seen in Atlantic coast of NW France, NW Spain, SW Ireland, Devon and Cornwall. Rias are backed by highlands and support commercial ports by deep water and offer sheltered anchorage. Used for fishing ports and naval bases such as Plymouth and Brest.



Fjord Coast: Submerged U Shaped *glacial* trough. Have steep walls rising from sea with branches joining main inlet at right angles. Due to high intensity of erosion, fiords are deep for great distances inland but there are shallow sections called as threshold with numerous islands. Confined to higher latitudes of temperate regions which were once glaciated (Norway, Alaska, British Columbia, S. Chile, South Island of New Zealand) . Have mountainous background with poor accessibility and attract few settlements. Agriculture only in deltaic fans. Fishing or market centers are Trondheim



Dalmatian Coast: longitudinal coast where mountain runs parallel or concordant to coast. Name from Dalmatia, Yugoslavia along Adriatic Sea – long narrow inlets with islands parallel to coast. Common in Pacific coast – west coast of North and South America. It is mountainous and hinder communication inland – has deep sheltered harbors with no ports. For example, San Francisco.



Estuarine Coast: In submerged lowlands, mouth of rivers are drowned so that funnel shaped estuarine are formed. If entrance is not silted, they make site for ports (London, Hamburg, Buenos Aires) . Modern dredges help keep the port open all the time.

Coastline of Emergence: Due to uplift of land or fall in sea level. These are less common. Represented as uplifted lowland coast or emergent upland coast.

Uplifted Lowland Coast: smooth, gentle coastal lowland. Offshore waters are shallow with lagoons, salt marshes and mud flats. If deposits are sandy and gravelly, beaches and marine dunes are formed. Ports on former coast become inland towns. Example, SE USA, W. Finland, E. Sweden, coastal Argentina south of Rio de la Plata

Emergent Upland Coast: Faulting leads to uprising – raised beach beyond reach of waves and can have arches, stacks etc. Found in Scotland, western coast of Deccan in India, western Arabian coast facing Red Sea

 Manishika