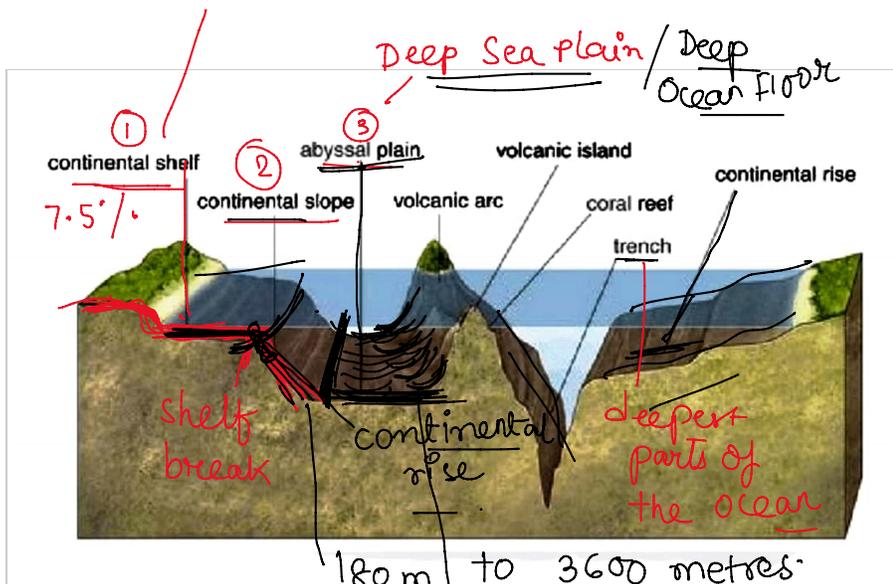


gently sloping seaward extension of the continental plate
④ Oceanic Deeps.



④ Features of Oceanic Basin

60 - 70 million years old

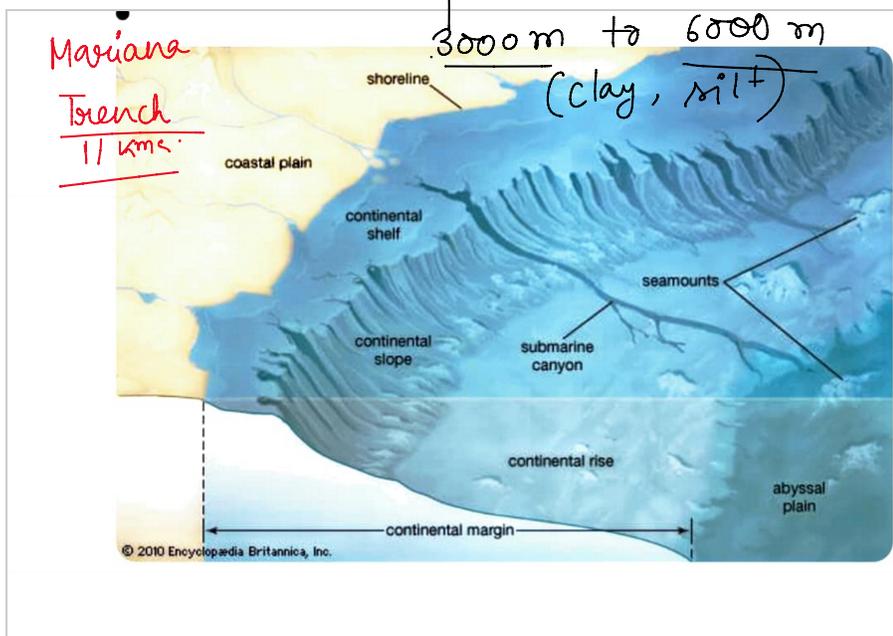
1 billion years old - continental features

oceanic-continent convergence

Radar soundings
electrical echo

Seas, bays, gulfs, inlets.

3 km - 6 kms.

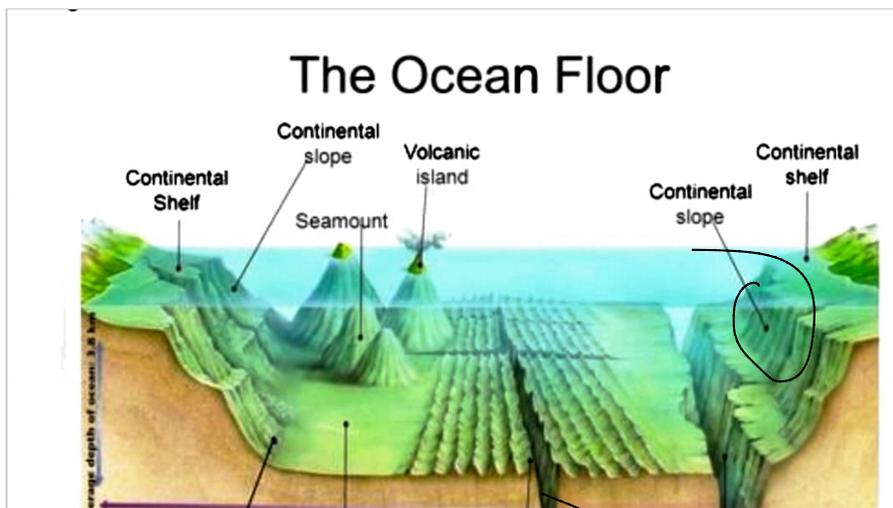


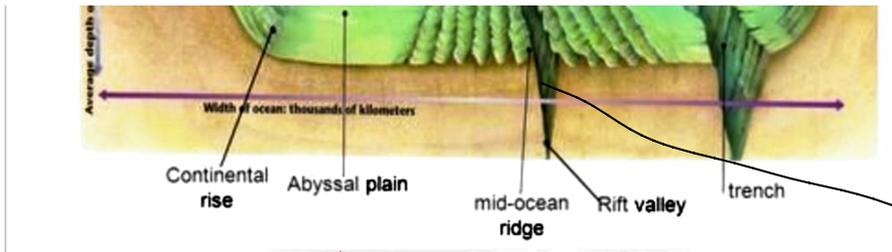
mid oceanic ridges

↳ seafloor mountain system

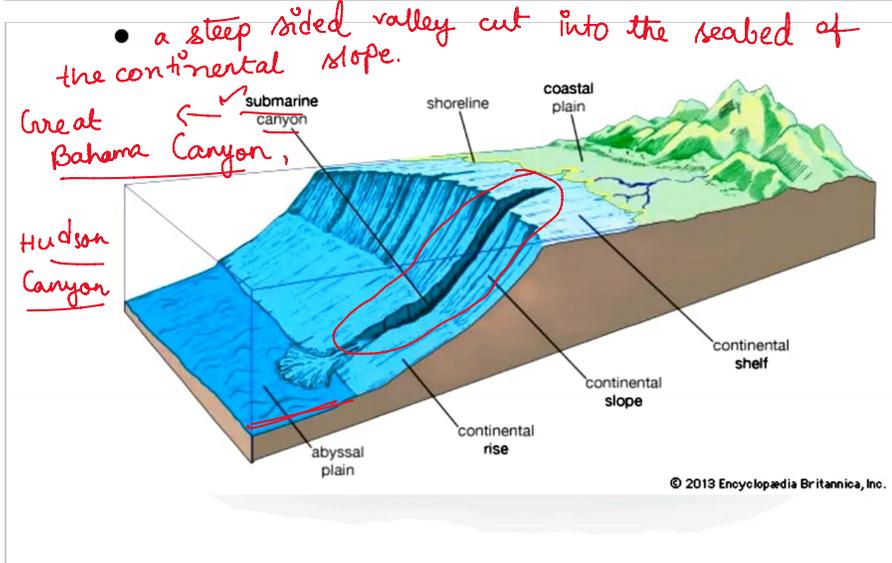
(2600 metres)

2000 metres (rise).



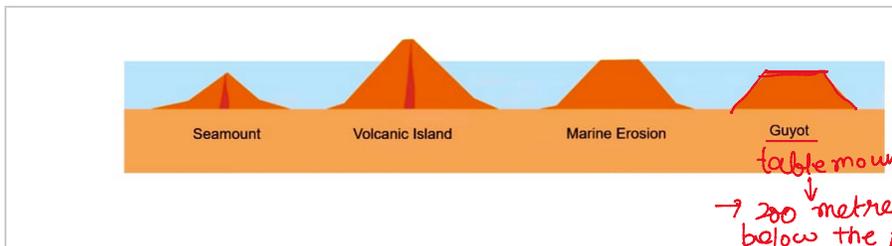


divergent plate boundary.



Sea mount
 ↳ volcanic activity.
 ↳ 3000 - 4000m deep.

E.g. - Emperor Seamount
 ↳ Hawaii Islands [Pacific Ocean]



↳ Continental shelf → sediments, glaciers.

↳ fossil fuels - petroleum.

E.g.

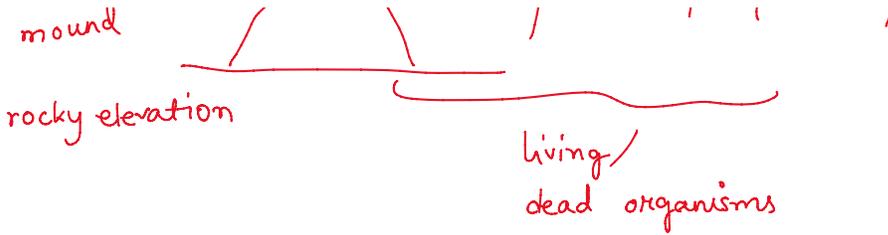
→ ① South East Asia.

② Great Banks of Newfoundland.

③ submerged region between Australia and New Guinea.

• Coral reef mound



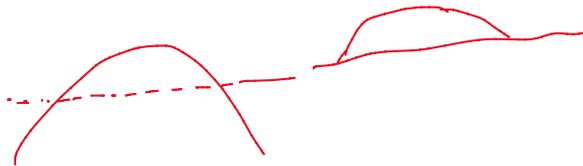


- Pacific Ocean
- Seamounts
- guyots

Coast of Queensland, Australia

Shoal:

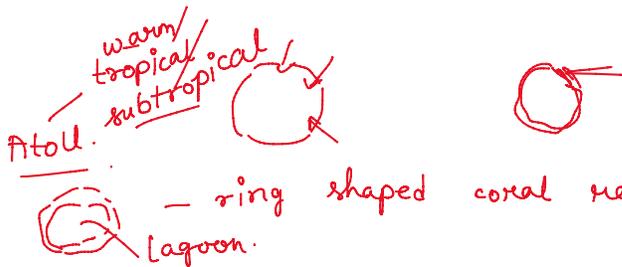
detached elevation with shallow depths.



Banks:

↳ result of erosional or depositional activity in the continental margins.

- ↳ Dogger Bank → North Sea
- ↳ Grand Bank → Newfoundland.



NOTES

The Pacific, Atlantic, and Indian are known as the three major oceans

Oceans are a source of food (fish, mammals, reptiles and other marine foodstuffs),

Tides can be harnessed to provide power.

Oceanography is the branch of science that studies the physical and biological properties and phenomena of the sea

Radar soundings and electrical echo devices are used to find the precise depths of ocean floors and map the relief of oceans

Ocean Relief Features

Geographers have divided the oceanic part of the Earth into five oceans: Pacific, Atlantic, Indian, Southern, and Arctic

Seas, bays, gulfs, and other inlets are parts of these oceans

The ocean floors are rugged, with the world's largest mountain ranges, deepest trenches, and largest plains

These features are formed by tectonic, volcanic, and depositional processes, similar to those of the continents

Major Ocean Relief Features

The ocean floors can be divided into four major divisions: the Continental shelf, the Continental Slope, the Deep Sea Plain and the Oceanic Deeps

Continental Shelf

The continental shelf is a gently sloping seaward extension of the continental plate

These margins are occupied by relatively shallow seas and gulfs

The continental shelf of all oceans covers 7.5% of the total area of the oceans.

The gradient is usually around 1" or even less

The shelf typically ends at a very steep slope, called the shelf break.

The continental shelves are covered with variable thicknesses of sediments brought down by rivers, glaciers, etc.

Massive sedimentary deposits received over a long time by the continental shelves become the source of fossil fuels, such as petroleum.

Examples of continental shelves include South-East Asia, the Great Banks around Newfoundland, and the submerged region between Australia and New Guinea.

The shelf is formed mainly due to submergence of a part of a continent, relative rise in sea level and sedimentary deposits brought down by rivers

Various types of shelves exist based on different sediments of terrestrial origin- glaciated shelf (surrounding Greenland), coral reef shelf (Queensland, Australia) shelf of a large river (around Nile Delta), shelf with dendritic valleys (at the mouth of the Hudson River), and shelf of young mountain ranges (shelves between Hawaiian Islands)

Continental Slope

A continental slope is the slope between the outer edge of the continental shelf and the deep ocean floor.

The continental slope is cut by submarine canyons in many locations marks the seaward edge of the continental shelf.

It extends between the depth of 180 to 3600 metres.

Due to their steepness and increasing distance from the land, continental slopes have very little sediment deposits and fewer sea life compared to the shelf.

Along the base of the continental slope is a deposit of sediments forming the continental rise.

The width of the continental rise can vary, ranging from narrow to up to 600 km in some regions

Continental Rise

The continental slope gradually loses its steepness with depth it is referred to as the continental rise

With increasing depth, the rise becomes virtually flat and merges with the abyssal plain.

Deep Sea Plain/Abyssal Plain

Deep sea plains are gently sloping areas of the ocean basins.

They are the flattest and smoothest regions of the world due to the terrigenous (marine sediment eroded from the land) and shallow water sediments that buries the irregular topography

These plains cover nearly 40% of the ocean floor.

The depths vary between 3,000 and 6,000 m

Fine-grained sediments like clay and silt cover these plains.

They have extensive submarine plateaus, ridges, trenches, beams, and oceanic islands that rise above sea level in the midst of oceans

Examples of oceanic islands are the Azores and Ascension Island

Oceanic Deep Trenches

Trenches are narrow, steep-sided basins in the oceans
They are the deepest parts of the oceans and are of tectonic origin, formed during ocean-ocean and ocean-continent convergence
They are 3-5 km deeper than the surrounding ocean floor
Trenches are located at the basis of continental slopes and along island arcs
They are common in the Pacific Ocean and form a ring along the western and eastern margins of the Pacific The Mariana Trench in the Pacific Ocean is the deepest trench, with a depth of over 11 km.
Other ocean deeps include the Mindanao deep, Tonga trench, and Japanese trench
Trenches are associated with active volcanoes and strong earthquakes, making them significant in the study of plate movements
57 deeps have been explored so far, with 32 in the Pacific Ocean, 18 in the Atlantic Ocean, and 6 in the Indian Ocean

Minor Ocean Relief Features

Apart from the above mentioned major relief features of the ocean floor, some minor but significant features predominate in different parts of the oceans

Mid-oceanic ridges

A mid-ocean ridge is a seafloor mountain system formed by plate tectonics
,it typically has a depth of about 2,600 meters and rises about 2,000 meters above the deepest portion of an ocean basin.
This feature is where seafloor spreading takes place along a divergent plate boundary.

Seamount

A seamount is an underwater mountain formed by volcanic activity.
seamount does not reach the surface of the ocean.
Emperor seamount, an extension of the Hawaiian Islands in the Pacific Ocean, is an example.
These can be 3,000-4,500 m tall

Submarine Canyon

A submarine canyon is a steep-sided valley cut into the seabed of the continental slope.
It sometimes extends well onto the continental shelf
It has nearly vertical walls.

Occasionally, it can have canyon wall heights of up to 5 km from canyon floor to canyon rim, such as the Great Bahama Canyon The Hudson Canyon is the best-known submarine canyon in the world

Guyots

Guyot or tablemount is an underwater volcanic mountain with a flat top.

It is more than 200 meters below the surface of the sea Guyots show evidence of gradual subsidence through stages to become flat-topped submerged mountains More than 10,000 seamounts and guyots exist in the Pacific Ocean alone.

Atoll

An atoll is a ring-shaped coral reef enclosing a lagoon The coral rim of the atoll surrounds the lagoon partially or completely,
Coral islands or cays may exist on the atoll's rim
Atolls are found in warm tropical or subtropical oceans and seas where corals can grow.

Bank:

Banks are formed as a result of the erosional and depositional activity in the continental margins
They are flat-topped elevations located in shallow waters that are navigable.
Dogger Bank in the North Sea and Grand Bank in the north-western Atlantic, Newfoundland are famous examples of banks
Banks are known for their productive fisheries

Shoal

A shoal is a detached elevation with shallow depths.
Since they project out of water with moderate heights, they are dangerous for navigation

A reef is a mound or rocky elevation formed by living or dead organisms. Coral reefs are common in the Pacific Ocean and associated with seamounts and guyots
The largest reef in the world is off the coast of Queensland, Australia.
Reefs can extend above the surface and can be dangerous for navigation

Significance of Study of Oceanic Relief

Ocean relief controls the motion of sea-water.

The oceanic movement in the form of currents, in turn, causes many variations in both oceans and in the atmosphere.

The bottom relief of oceans also influences navigation and fishing