

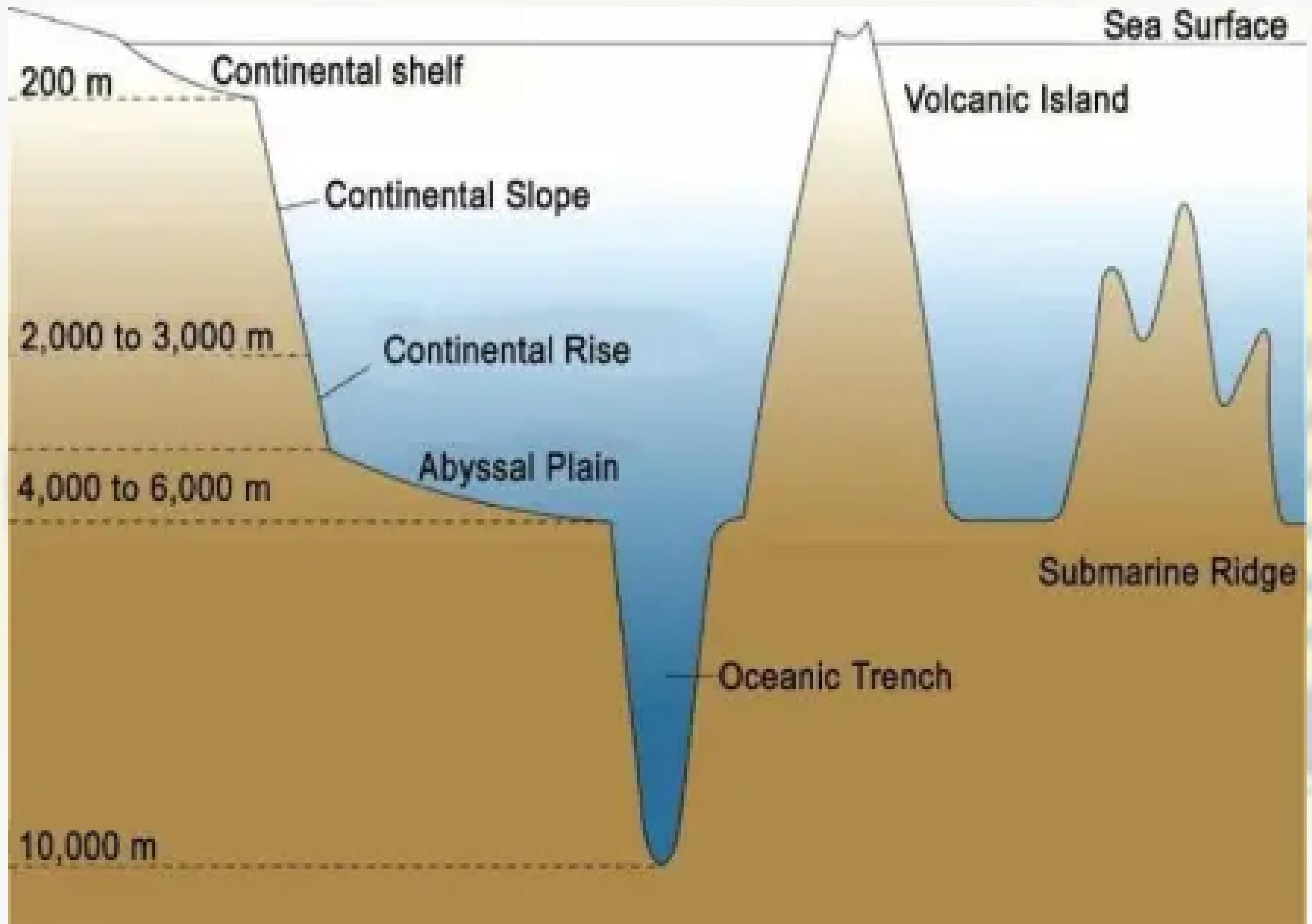
# Ocean floor

## What is an Ocean Floor?

Also known as the seabed, the structure of all ocean floors in the world is decided by plate tectonics. Most of the oceans is very deep and that section is known as abyssal plain. Seafloor spreading creates mid-ocean ridges along the center line of major ocean basins, where the seabed is slightly shallower than the surrounding abyssal plain. From the abyssal plain, the seabed slopes upward toward the continents and becomes, in order from deep to shallow, the continental rise, slope, and shelf. The depth within the seabed itself, such as the depth down through a sediment core, is known as the "depth below seafloor." The ecological environment of the seabed and the deepest waters are collectively known, as a habitat for creatures, as the "benthos."

An oceanic basin is the land surface under an ocean that includes the topography under the water.

- Ocean Relief.
- Ocean relief is largely due to tectonic, volcanic, erosional and depositional processes and their interactions. Ocean relief features are divided into major and minor relief features. The ocean floors can be divided into four major divisions.



- An oceanic basin is the land surface under an ocean that includes the topography under the water. The ocean floors can be divided into four major divisions:
- *The Continental Shelf*
- *The Continental Slope*
- *The Deep Sea Plain*
- *The Trenches*

## Continental Shelf

- The continental shelf is the stretched margin of all continent occupied by comparatively shallow gulfs and sea.
- It is the shallowest part of the ocean
- The shelf normally ends at a very steep slope which is called the shelf break.
- The average width of continental shelves is about 80 km.
- The Continental shelves are very narrow or almost absent along certain margins like the Coasts of Chile, The west coast of Sumatra
- The Siberian shelf in the Arctic Ocean is the largest in the world  
Enormous sedimentary deposits received over a long time by the continental shelves, turn out to be the source of fossil fuels

## Continental Slope

A continental shelf is a portion of a continent that is submerged under an area of relatively shallow water known as a shelf sea. Much of these shelves were exposed by drops in sea level during glacial periods. The shelf surrounding an island is known as an insular shelf.

The continental margin, between the continental shelf and the abyssal plain, comprises a steep continental slope, surrounded by the flatter continental rise, in which sediment from the continent above cascades down the slope and accumulates as a pile of sediment at the base of the slope.

- The continental slope links the continental shelf and the ocean basins.
- It starts where the bottom of the continental shelf abruptly drops off into a steep slope.
- Canyons and trenches are seen in this region.

## Deep Sea Plain

Also known as Abyssal Plains, it is an underwater plain on the deep ocean floor, usually found at depths between 3,000 metres and 6,000 metres.

Lying generally between the foot of a continental rise and a mid-ocean ridge, abyssal plains cover more than 50% of the Earth's surface. They are among the flattest, smoothest, and least explored regions on Earth.

Abyssal plains are key geologic elements of oceanic basins (the other elements being an elevated mid-ocean ridge and flanking abyssal hills).

The creation of the abyssal plain is the result of the spreading of the seafloor (plate tectonics) and the melting of the lower oceanic crust.

- Deep-sea plain is gently sloping areas
- These are the flattest and flattest areas
- These plains are completely covered with fine-grained deposits like silt and clay.

## Oceanic Deeps or Trenches

Oceanic trenches are prominent long, narrow topographic depressions of the ocean floor. They are typically 50 to 100 kilometers wide and 3 to 4 km below the level of the surrounding oceanic floor, but can be thousands of kilometers in length. There are about 50,000 kilometers of oceanic trenches worldwide, mostly around the Pacific Ocean, but also in the eastern Indian Ocean and a few other locations.

- Trenches are the deepest parts of the oceans.
- The trenches are comparatively steep-sided and have narrow basins.
- They are some 3-5 km deeper than the adjacent ocean floor.
- They are found at the bases of continental slopes and along island arcs
- Trenches are associated with active volcanoes and strong earthquakes.
- That is why they are very important in the study of plate movements.

There are also major and minor relief features in the ocean floors like:

- Ridges
- Hills
- Seamounts
- Guyots
- Trenches
- Canyons

## Mid Ocean Ridges

- A mid-oceanic ridge is an underwater mountain range, formed by plate tectonics.
- It is composed of two chains of mountains divided by a large depression.
- The mountain ranges can have peaks as high as 2,500 m and some even reach above the ocean's surface.
- Examples for Mid-oceanic ridges:
  - Mid-Atlantic Ridge, Atlantic Ocean
  - East Pacific Rise
  - Pacific-Antarctic Ridge

## Seamount

- Seamounts are mountains with pointed peaks, mounting from the seafloor, and that do not reach the surface of the ocean.
- They are volcanic in origin.
- Seamounts can be 3,000-4,500 m tall.
- An extension of the Hawaiian Islands in the Pacific Ocean which is known as The Emperor seamount is an example of the seamount.

## Submarine Canyons

- Submarine Canyons are a kind of narrow steep-sided valleys.
- It originates either within continental slopes or on a continental shelf.
- Congo Canyon is regarded as the largest river canyon.
- The Hudson Canyon is the best-known submarine canyon in the world.
- The largest submarine canyon in the world is Zhemchug Canyon.

## Guyots

- It is a flat topped seamount.
- It is also known as a table mount.
- They show evidence of slow subsidence through stages to become flat-topped submerged mountains.
- It is expected that more than 10,000 guyots and seamounts occur in the Pacific Ocean only.

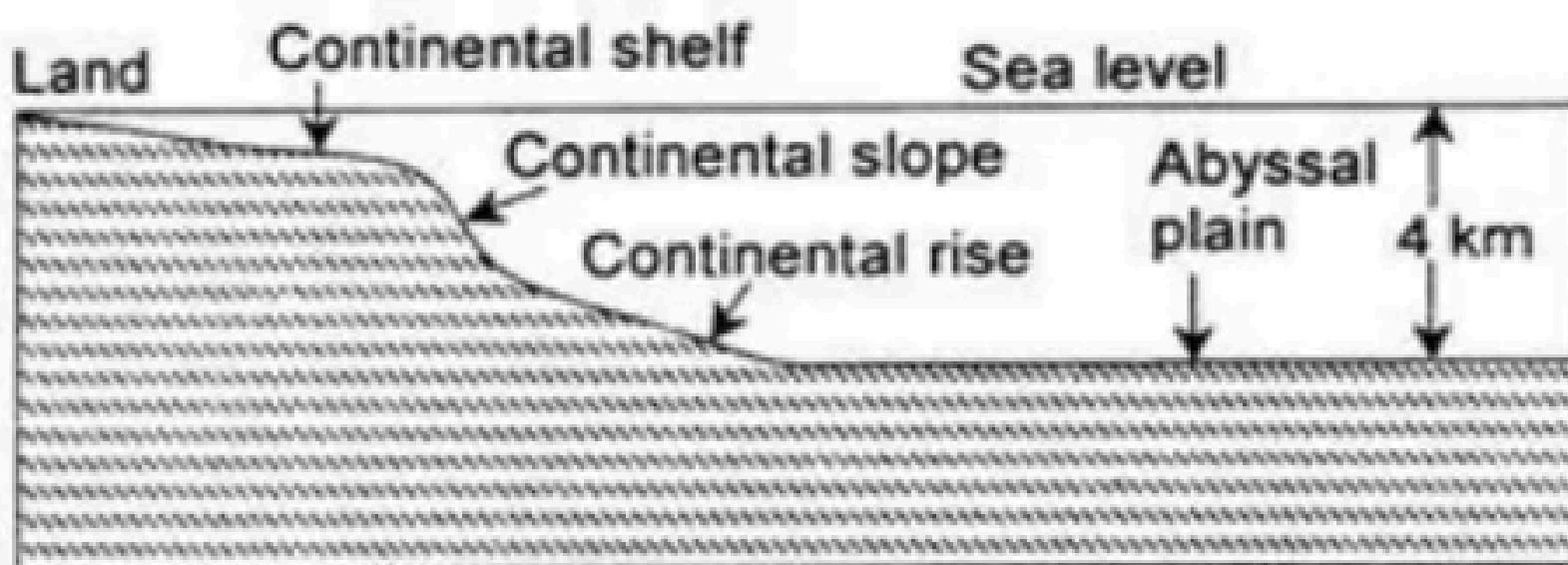
## Atoll

- It is a ring-shaped coral reef containing a coral rim that encompasses a lagoon incompletely or completely.
- These are low islands found in the tropical oceans.
- It may be a part of the sea (lagoon), or occasionally form encircling a body of brackish, fresh, or highly saline water.

## Reefs

- A reef is a predominantly organic deposit made by living or dead organisms that form a mound or rocky elevation like a ridge.
- Coral reefs are a characteristic feature of the Pacific Ocean where they are associated with seamounts and guyots.
- The largest reef in the world is found off the Queensland coast of Australia.
- Since the reefs may extend above the surface, they are generally dangerous for navigation.

**Passive continental margin**



**Convergent active continental margin**

