

Morphology Of Ocean

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Presentation outline

_ Introduction

_ Profile of Global elevations

_ Morphology of the Ocean Floor

A - Continental Margins

B - Ocean Basin morphology

C - Oceanic Ridges and Rises

D - Ocean Trenches

E – Island Arcs

F – Marginal Ocean Basin

G – Plateau

_ Conclusion

_ References

Introduction

** Oceans make up 70% of the earth's surface .

• There are hundreds of seas and oceans in the world. Among them, the five major oceans are:

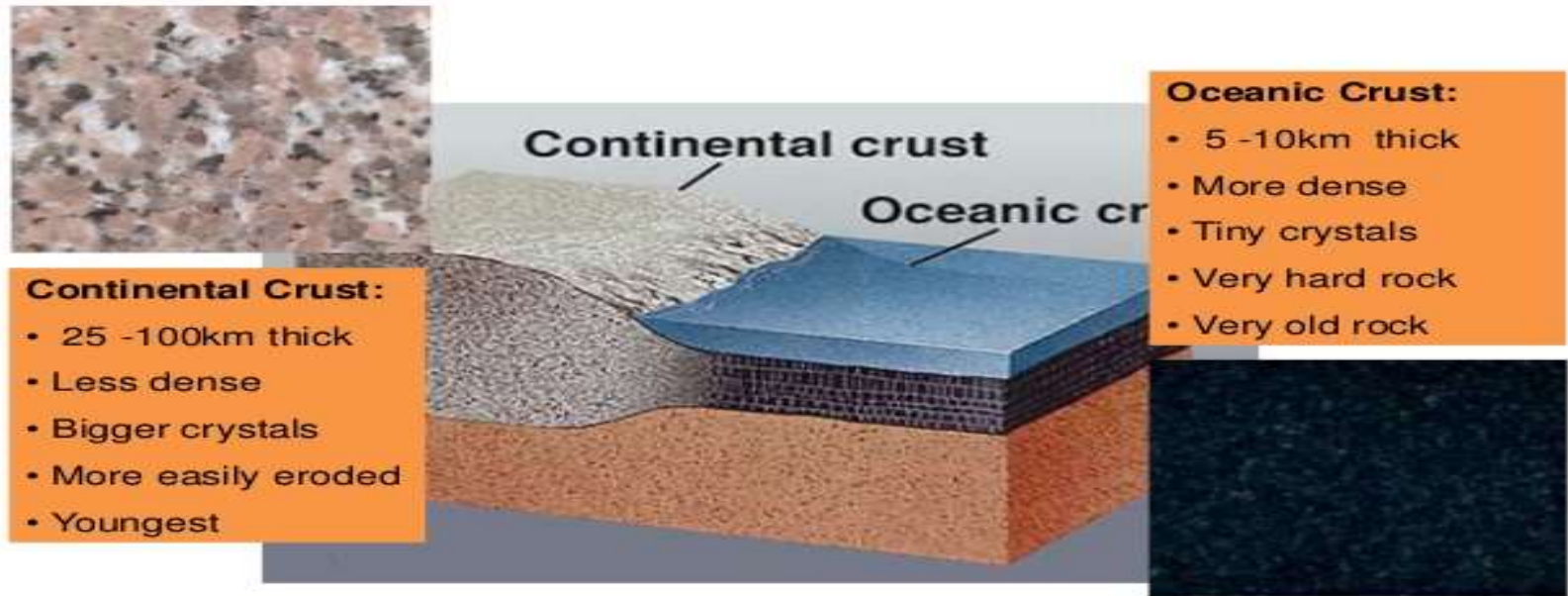
- Atlantic
- Pacific
- Indian
- Arctic
- Southern



Lithospheric Crust

- Earth's crust is divided into continental and oceanic crusts.
- The oceanic crust is thin and the continental crust is thick.

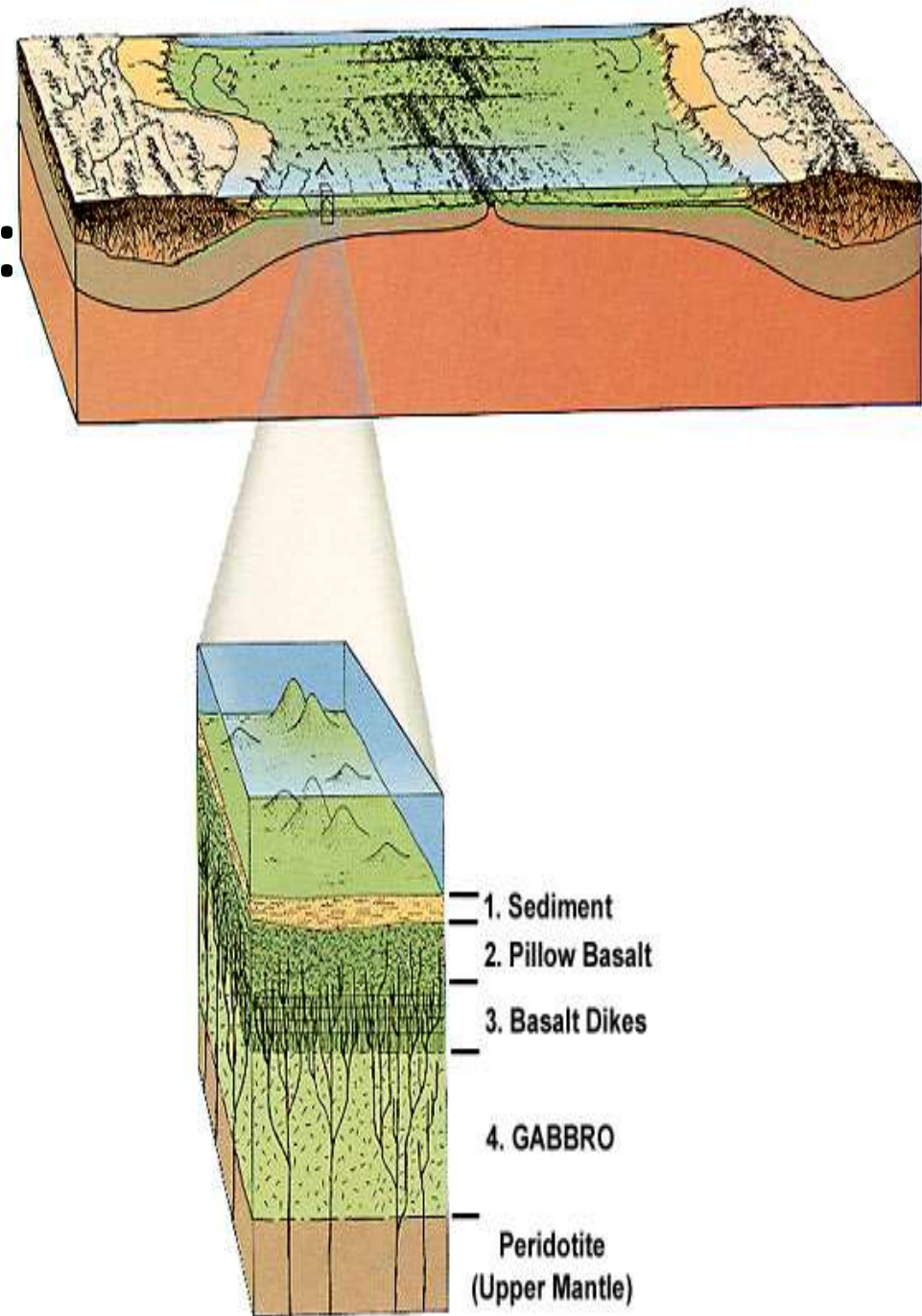
Oceanic and Continental Crust



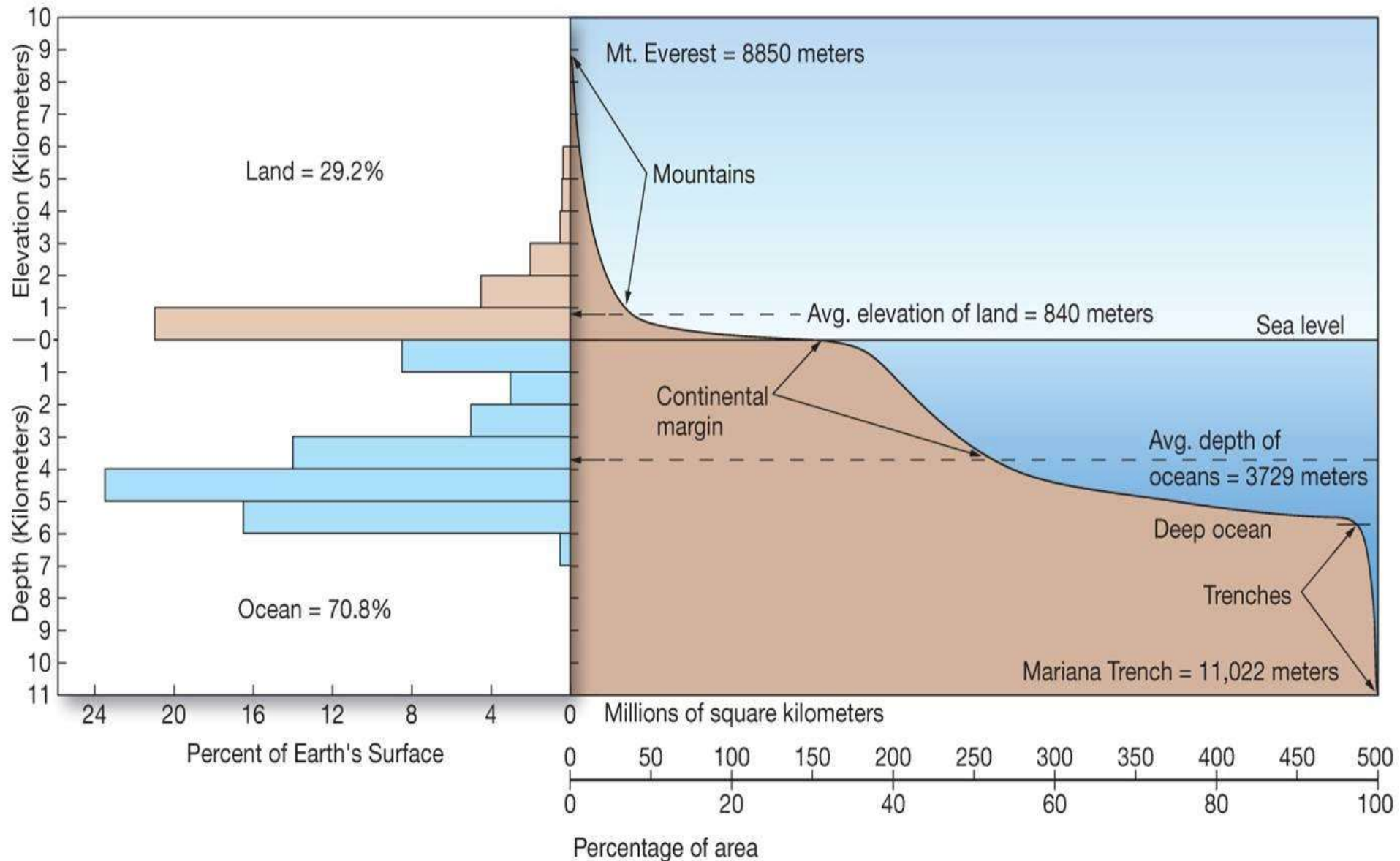
The Oceanic Crust :

Structure and Composition

Of Ocean Floor



Profile Of Global Elevation

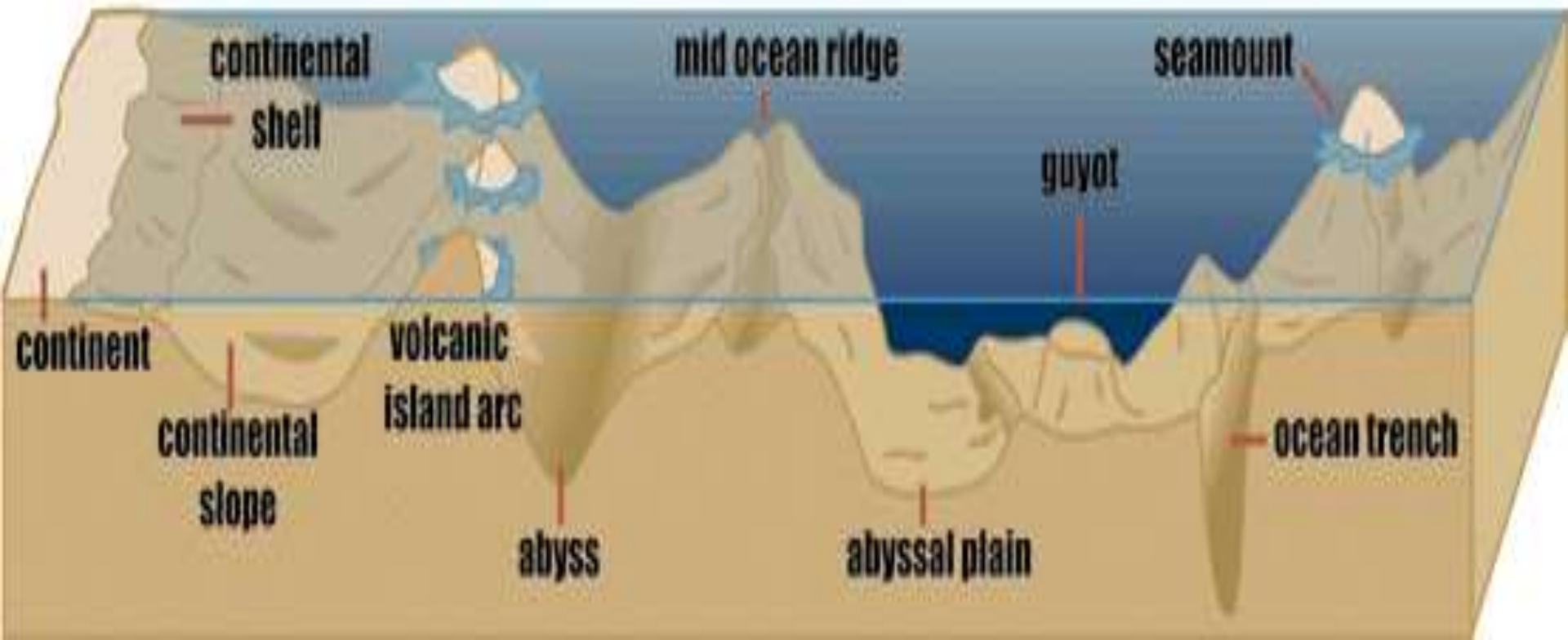


The Hypsometric Curve of Surface of the solid Earth

Morphology of Ocean Floor :

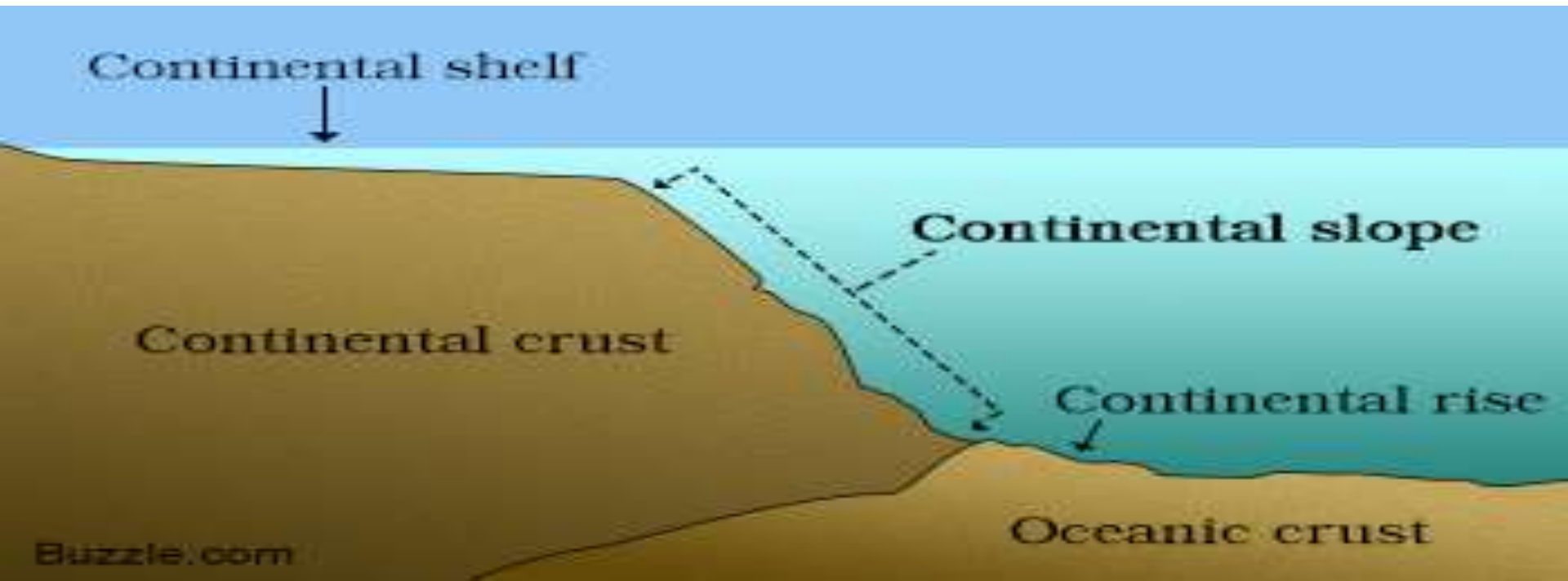
- The major features of the ocean floor are :

Features of the Ocean Floor



Continental Margins :

1. Continental Shelf
2. Continental Slope
3. Continental Rise



* *Continental shelf* :

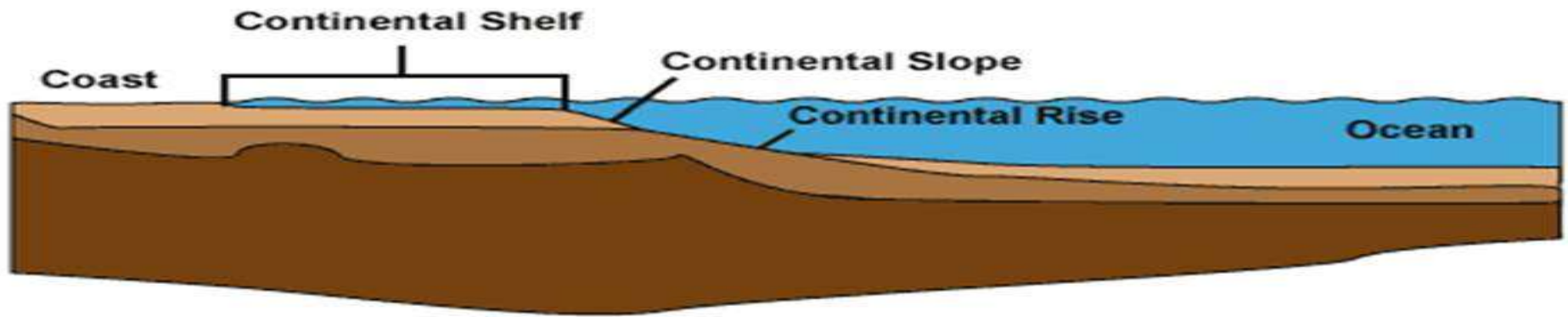
The zone around the continents, extending from the low-waterline to the depth at which there is a marked increase in slope to greater depth.

* *Continental slope* :

The declivity from the outer edge of the continental shelf into greater depths.

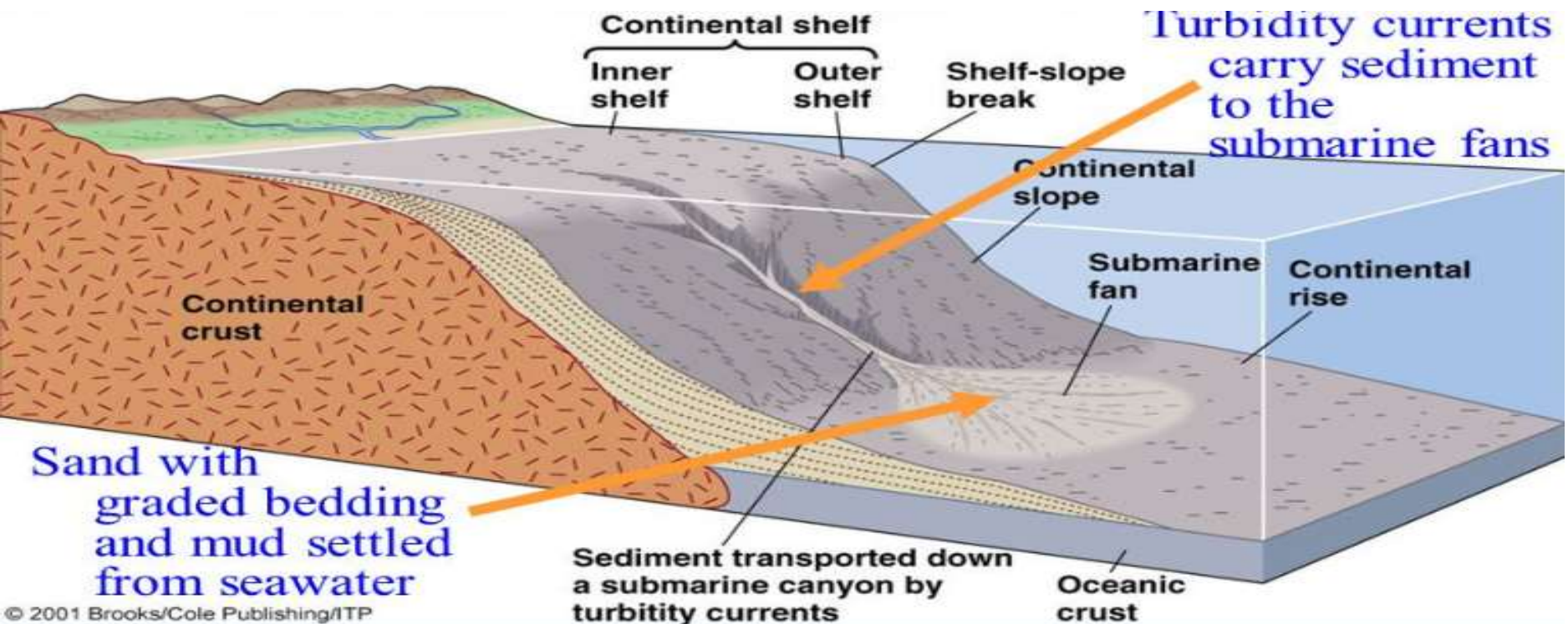
* *Continental rise* :

At the base of continental slopes , the steep gradients of the slope decreases to 1 degree or less continuing into the abyssal hills or plains.



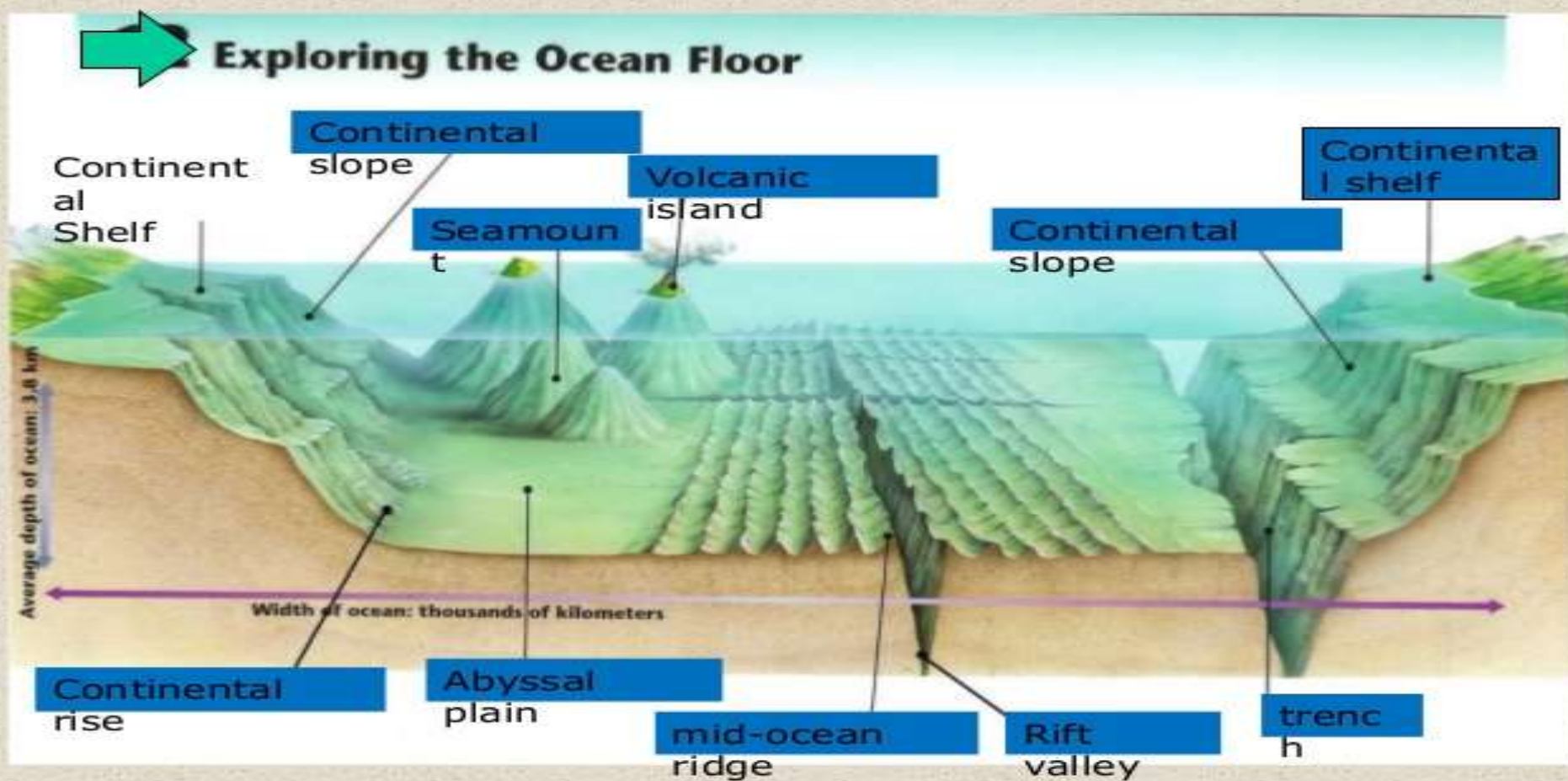
Submarine Canyons

- The continental shelf and slope regions are characterised by the presence of
- A) Submarine canyons
- B) Alluvial fans
- C) Deep cut valleys.



The Ocean Basin Floor

1. Abyssal floor
2. Seamounts and Guyots

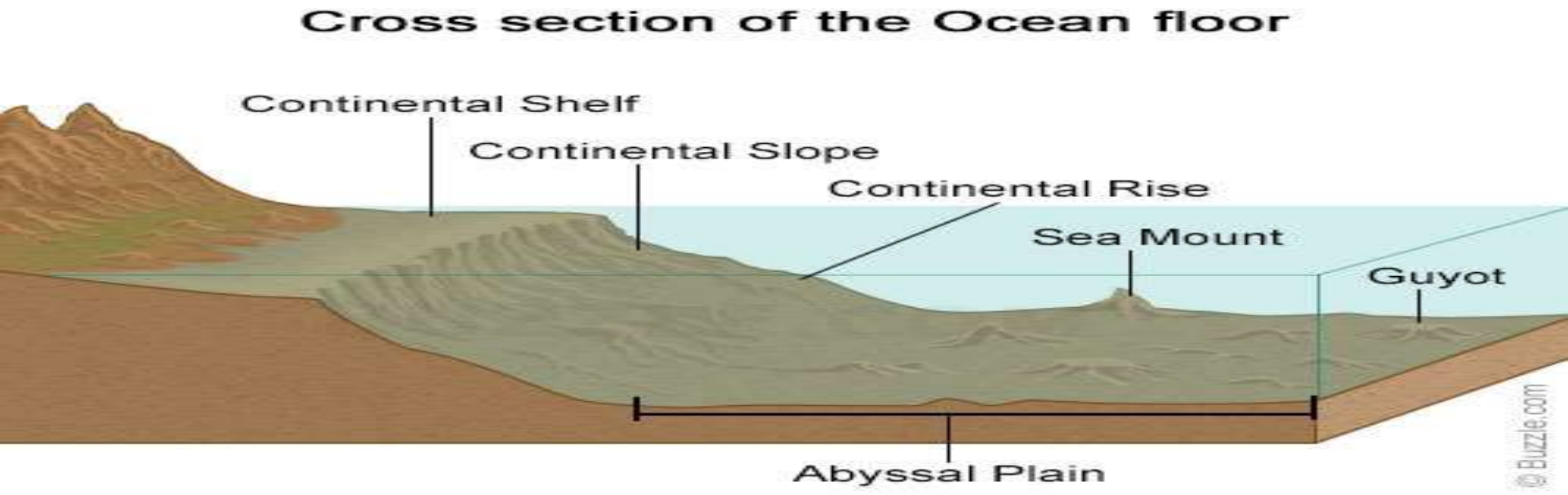


1. Abyssal floor :

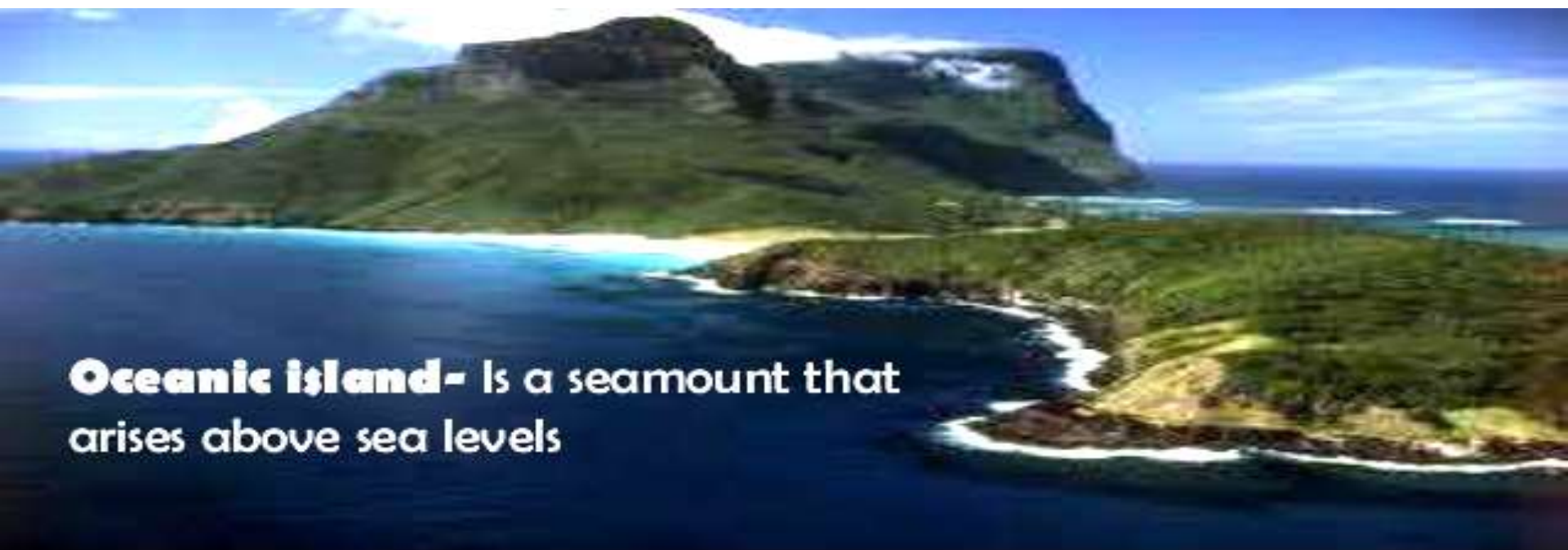
Abyssal floor are broad ,relatively smooth surfaces and consist of two sections :

(i) Abyssal plains : The abyssal plain is the flattest of all Earth 's surface areas. They are composed of sediments , most of which came from continents and can be more than one km thick.

(ii) Abyssal hills : The abyssal hills are small, rolling hills often occurring in groups near to ocean ridge systems.

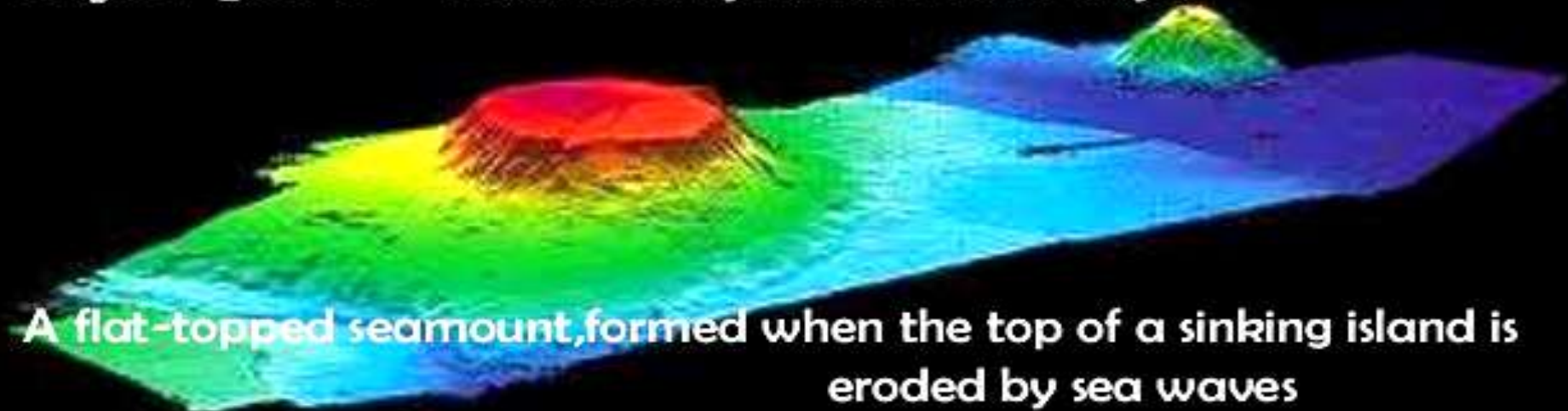


2. Seamounts and Guyots



Oceanic island- Is a seamount that arises above sea levels

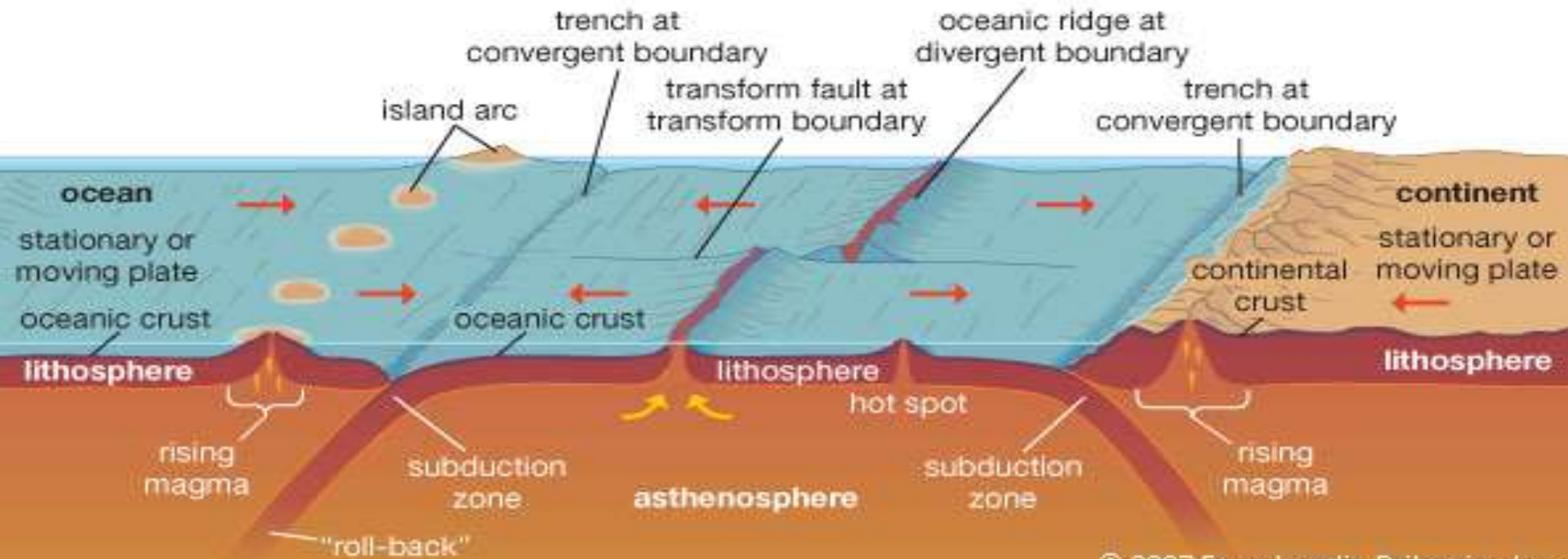
Guyot "gee-o"- illustrated by Arnold Henri Guyot



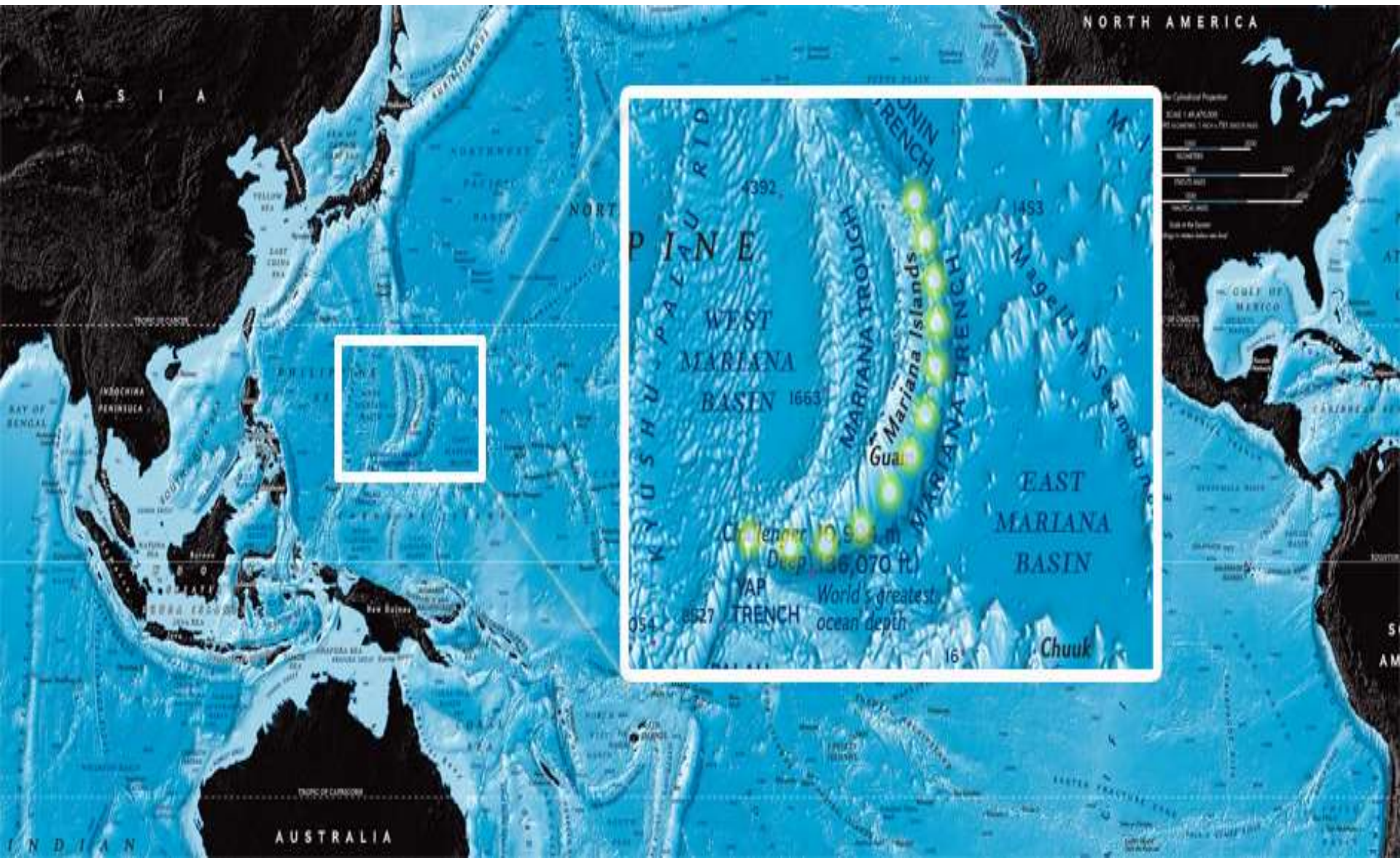
A flat-topped seamount, formed when the top of a sinking island is eroded by sea waves

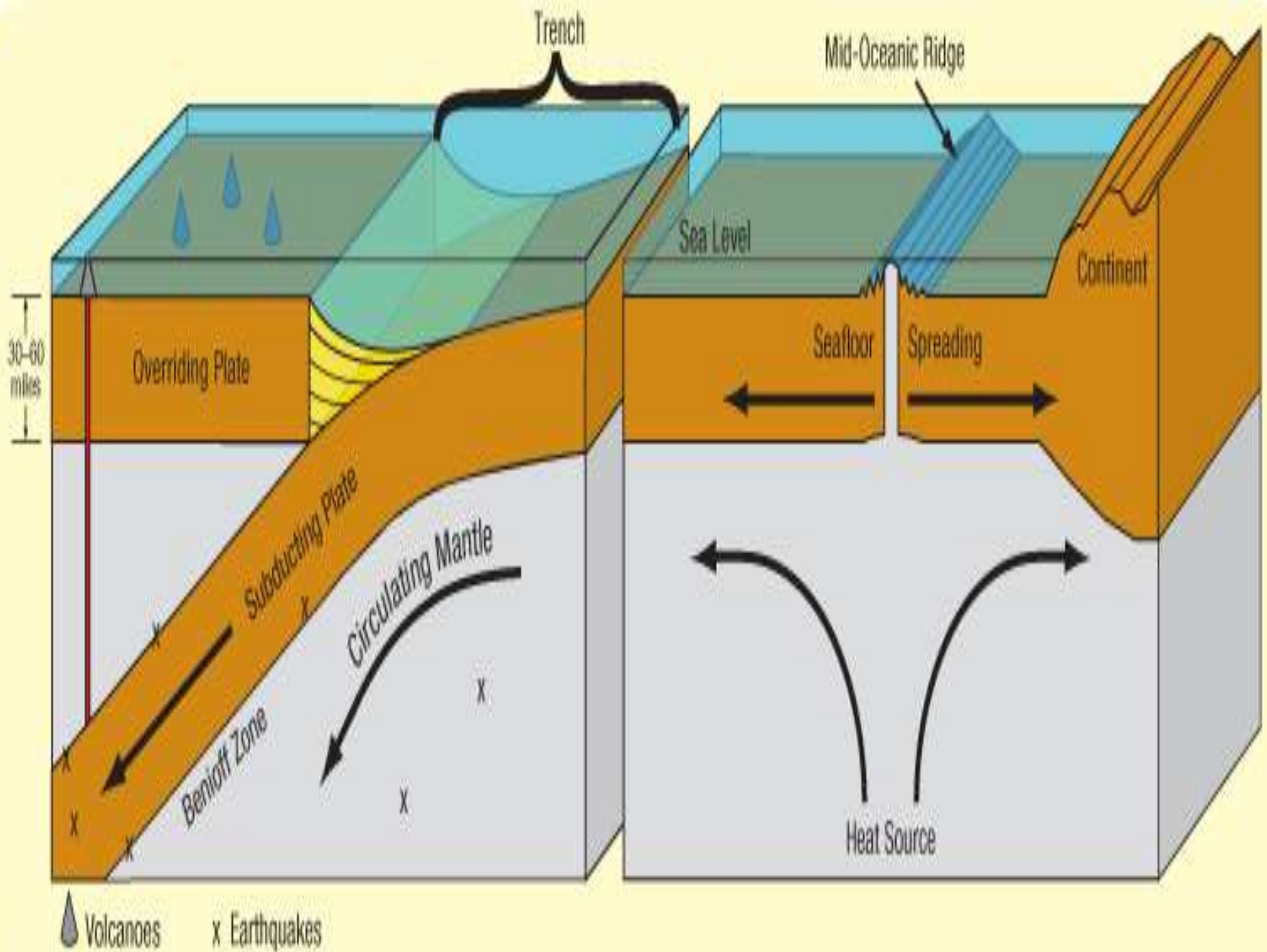
Ocean Trenches

- **Ocean trenches** are steep depressions in the deepest parts of the **ocean** [where old **ocean** crust from one tectonic plate is pushed beneath another plate, raising mountains, causing earthquakes, and forming volcanoes on the seafloor and on land.



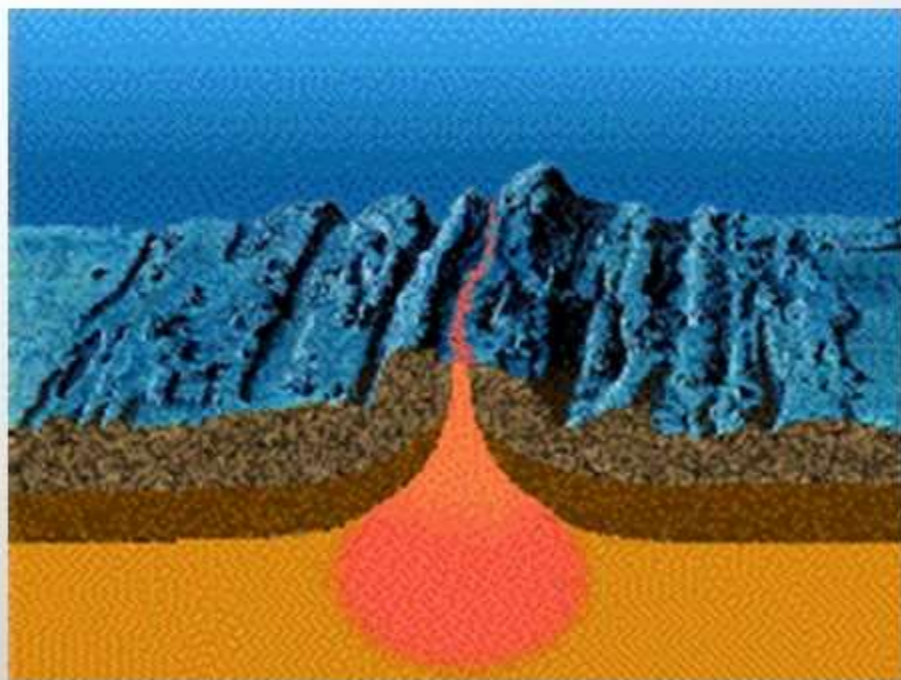
Marianas Trench



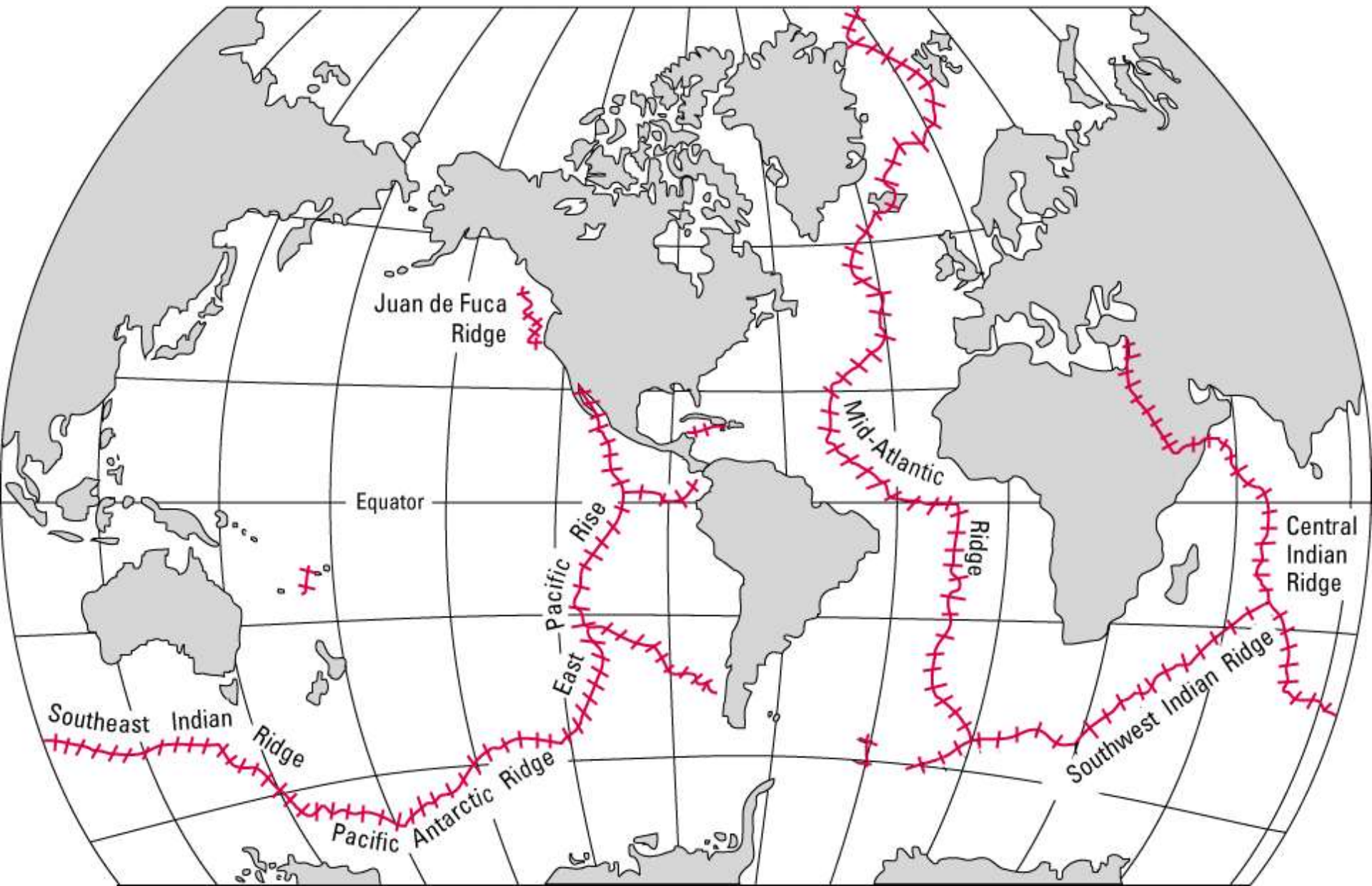


CONVECTION AT MID-OCEAN RIDGE

- **AT A MID-OCEAN RIDGE, MOLTEN MATERIAL RISES FROM THE MANTLE AND ERUPTS.**
- **THE MOLTEN MATERIAL SPREADS OUT, PUSHING THE OLDER ROCK AWAY ON EITHER SIDE OF THE RIDGE.**
- **THIS PROCESS CONTINUALLY ADDS TO THE OCEAN FLOOR**

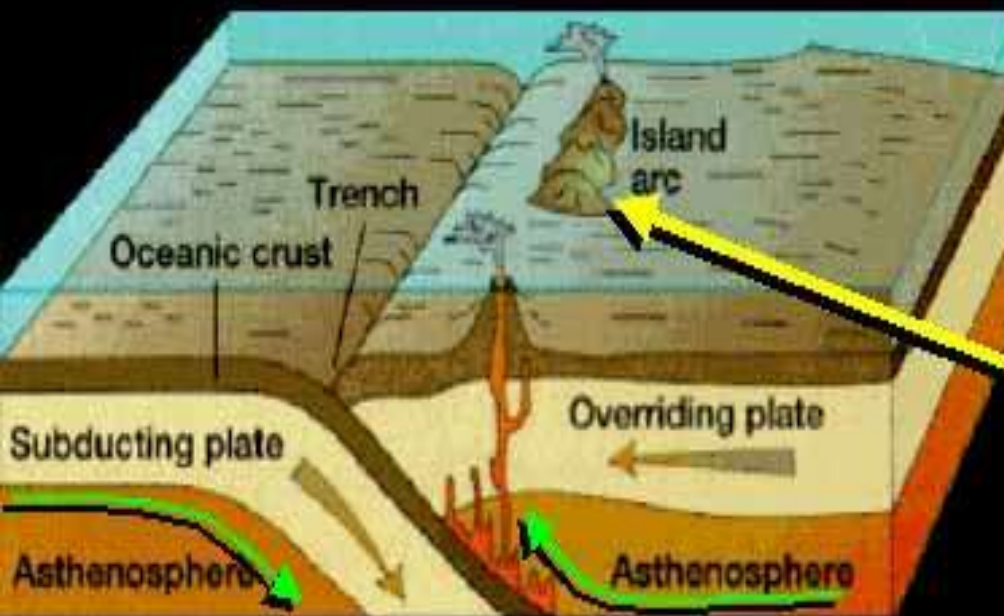
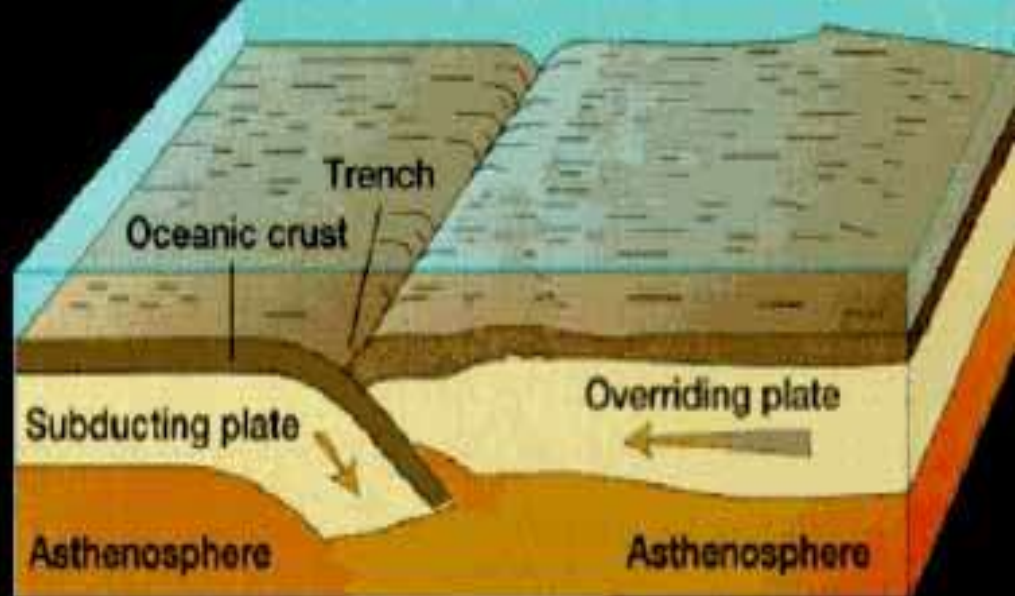


Distribution of Ridge of the world



Island Arcs

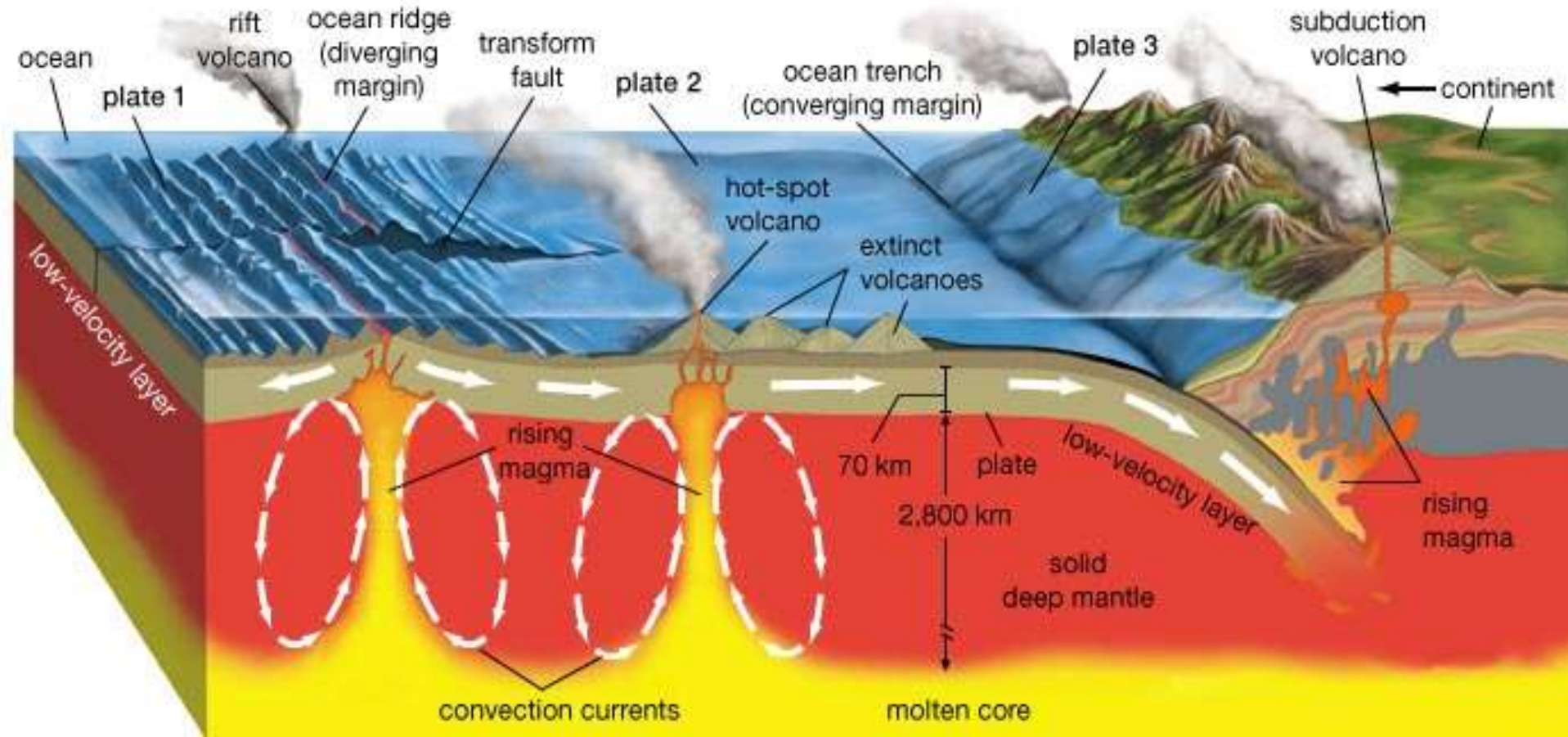
Plate begins to
dive into
asthenosphere



- Molten material rises upward from asthenosphere
- Island arcs begin to form

Marginal Ocean Basins

The Marginal ocean Basins are depression in the ocean bottom lying between either island arcs and continents (Sea of Japan , Sea of Okhotsk) or between two separate parallel island arcs (Philippines Sea).

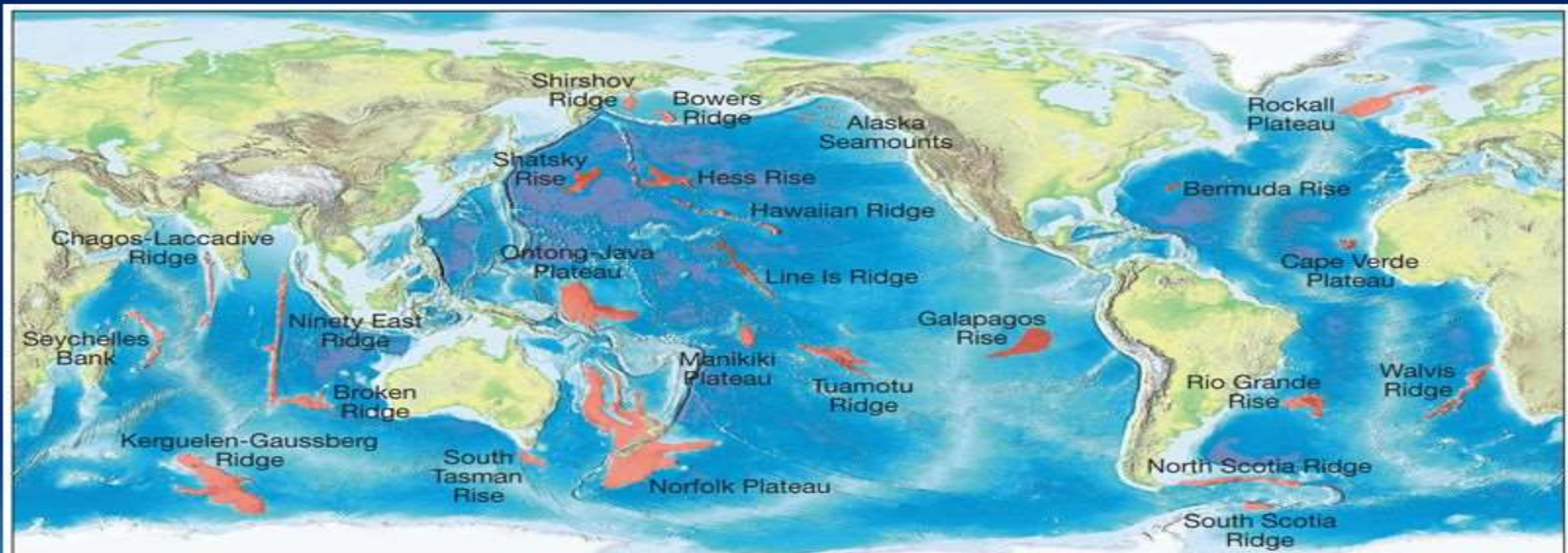


Plateaus

Plateau also called micro-continental are submarine elevation of considerable extent with relatively flat tops.

They rise upto 1 or 2 km but do not reach the ocean surface.

Distribution of modern-day oceanic plateaus and fragments



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Figure 10.16
Oceanic plateaus

Conclusion

The ocean basins vary in size , shape and topographic features.

These differences tell much about the age and evolution of each individual ocean basin.

The purpose of understanding these issues is, that there is a continuing crustal deformations due to plate tectonics. A detailed study of ocean morphology is needed.

References

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Thank You

