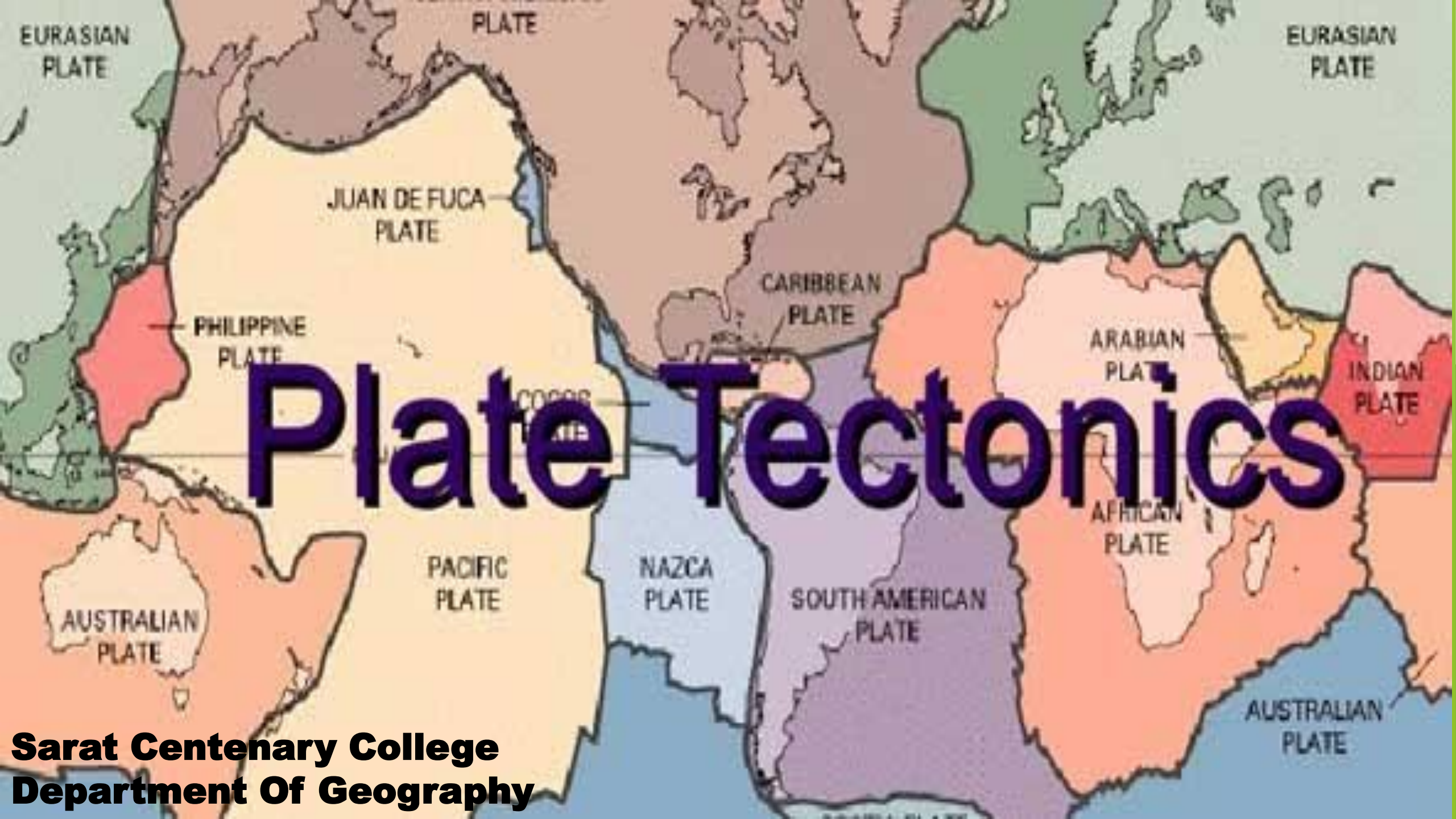


Plate Tectonics

Sarat Centenary College
Department Of Geography

Plate Tectonics

What is plate:

The rigid lithospheric slabs or rigid and solid crustal layers are technically called plate.

What is plate Tectonics:

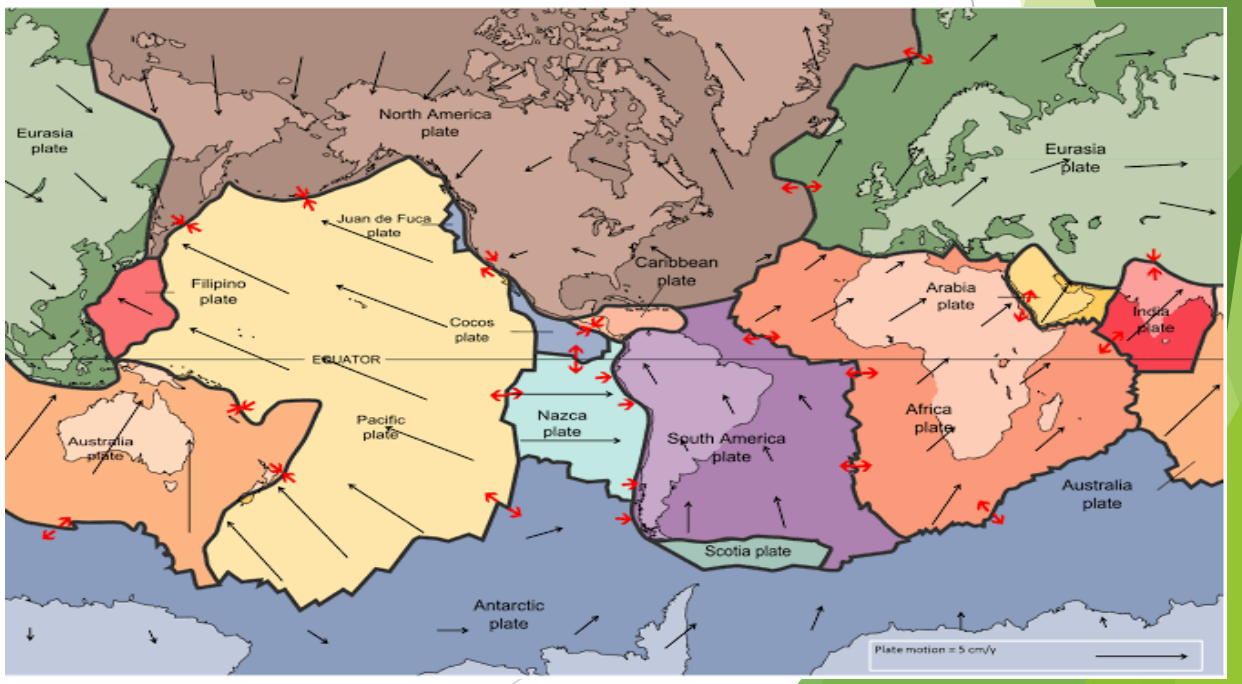
The lithosphere of the earth is divided into a small number of plates which float on and travel independently over the mantle and much of the earth's seismic activity occurs at the boundaries of these plates.

History of plate tectonics:

- The theory of the plate tectonics has largely been developed since 1967 but the history of ideas extend back considerably longer.
- Before the advent of plate tectonics, however some people already believed that the present day continents were the fragmented pieces of preexisting larger landmasses (supercontinents).
- Plate tectonics is the relatively new scientific concept, introduced in the 19^{th} century.
- In 1912, the German meteorologist Alfred Wegener first proposed the theory of continental drift, which state that “parts of the Earth’s crust slowly drift on top of the mobile asthenosphere”.
- Then another theory introduced are Sea floor spreading.
- Plate was first introduced J. T. Wilson in 1965. W. J. Morgan and Le Pichon elaborated the various aspects of plate tectonics in 1968.

Plates:

- There are 7 major plates on the earth that are moving extremely slowly but continuously.
- Major plates: Eurasian, African, Australian-Indian, North America, Pacific, Antarctic and South American.
- Intermediate plates: Caribbean, Cocoas, Nazca, Arabian, Philippine, Juan de Fuca and Scotia.
- Generally 2 main types of plates:
- 1) Oceanic plate
- 2) Continental plate



Causes of plate movement:

Convection Currents: Convection cells in the mantle move the plates.

Hot in the center, less dense magma rises up due to heat. When the magma reaches the surface, it cools and sinks back down creating a circular pattern of movement. This process happens continually

Ridge push: Newly formed plates at oceanic ridges are warm, and so have a higher elevation at the oceanic ridge than the colder, more dense plate material further away; gravity causes the higher plate at the ridge to push away the lithosphere that lies further from the ridge.

Slab pull: Older, colder plates sink at seduction zones, because as they cool, they become more dense than the underplaying mantle. The cooler sinking plate pulls the rest of the warmer plate along behind it.

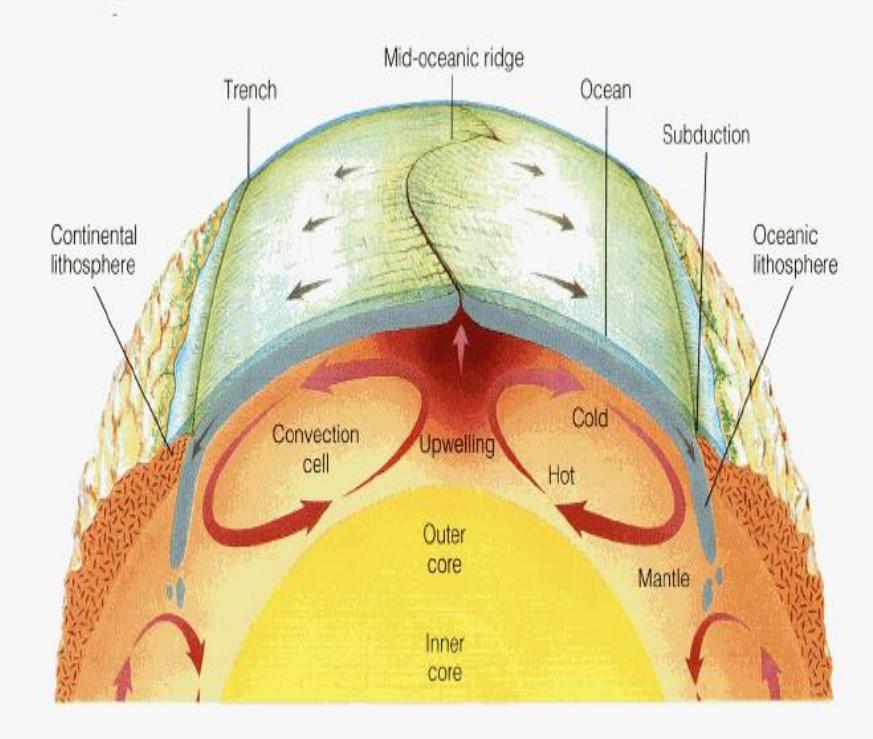


Plate boundaries:

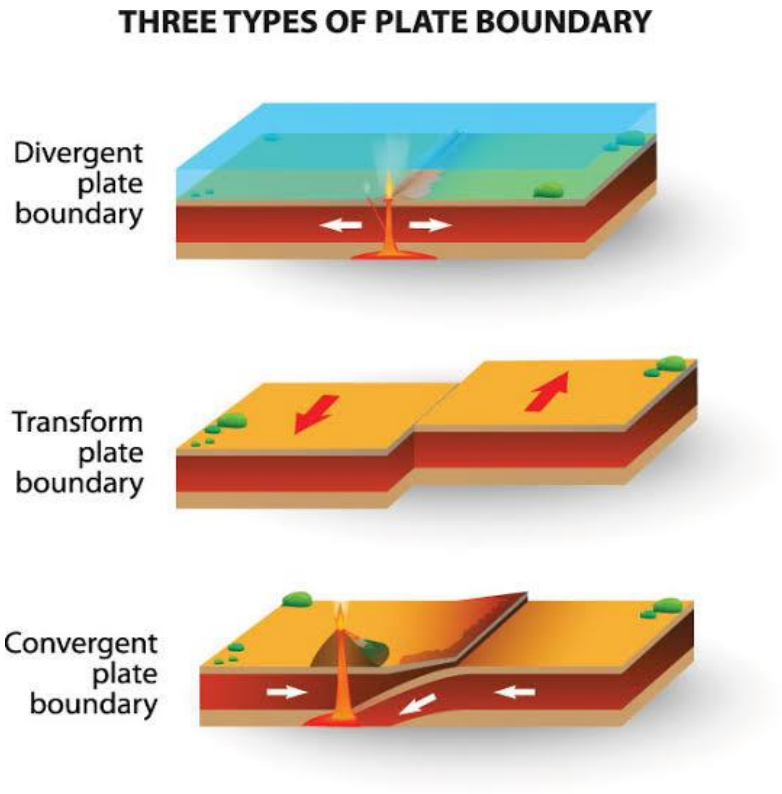
Border of two plates are called plate boundaries.

Three types of plate boundary

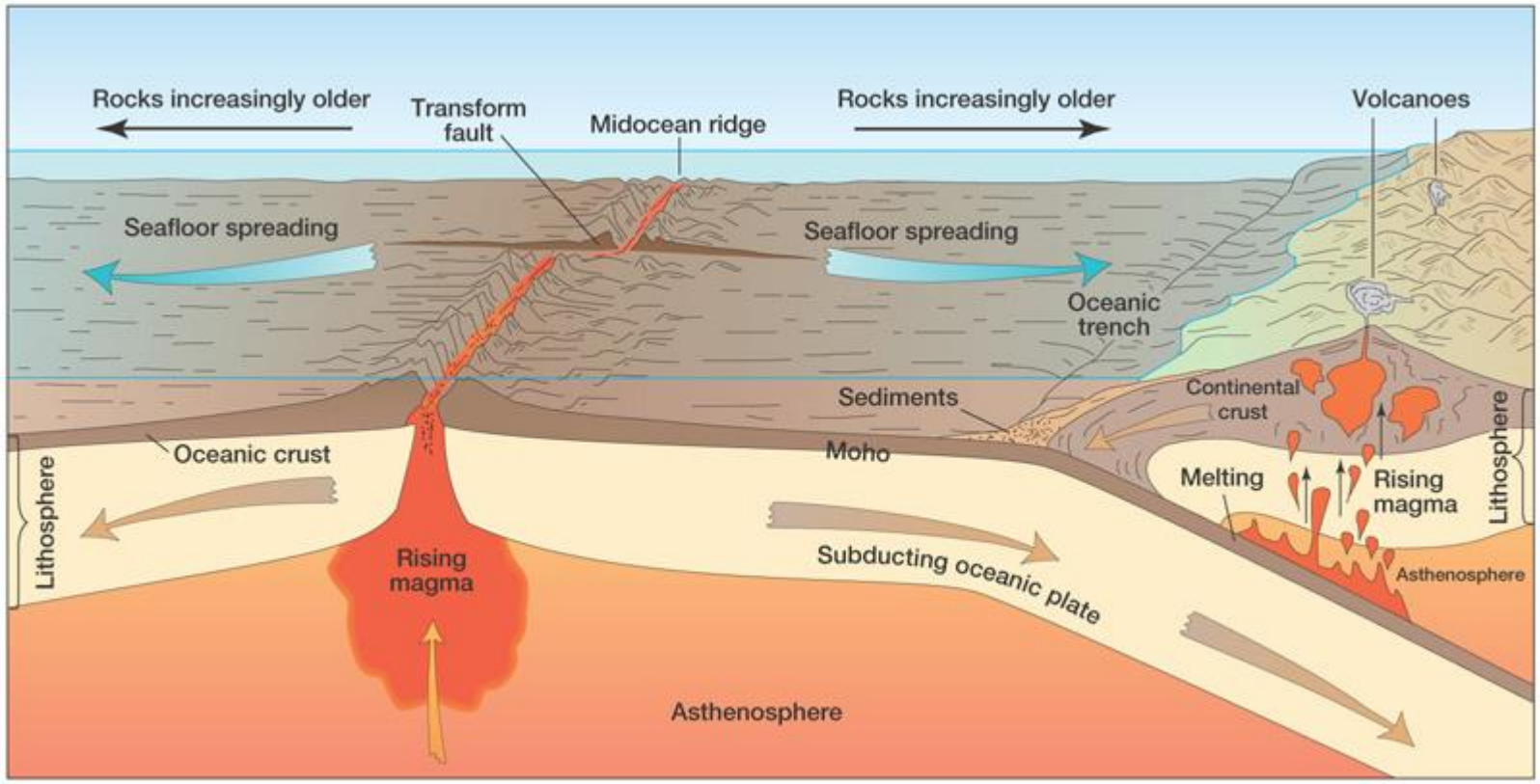
Divergent plate boundary

Transform plate boundary

Convergent plate boundary



Divergent Boundaries:

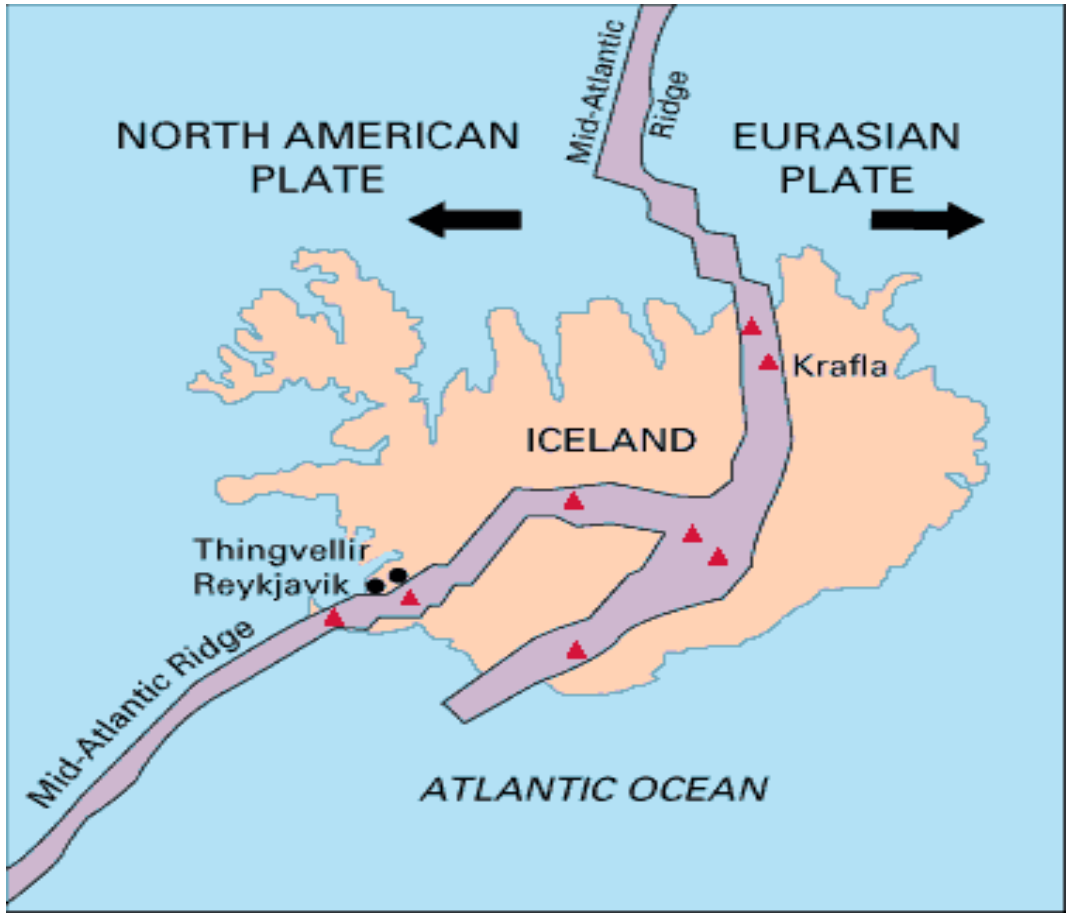


Spreading ridges

- As plates move apart magma fills up the gap.

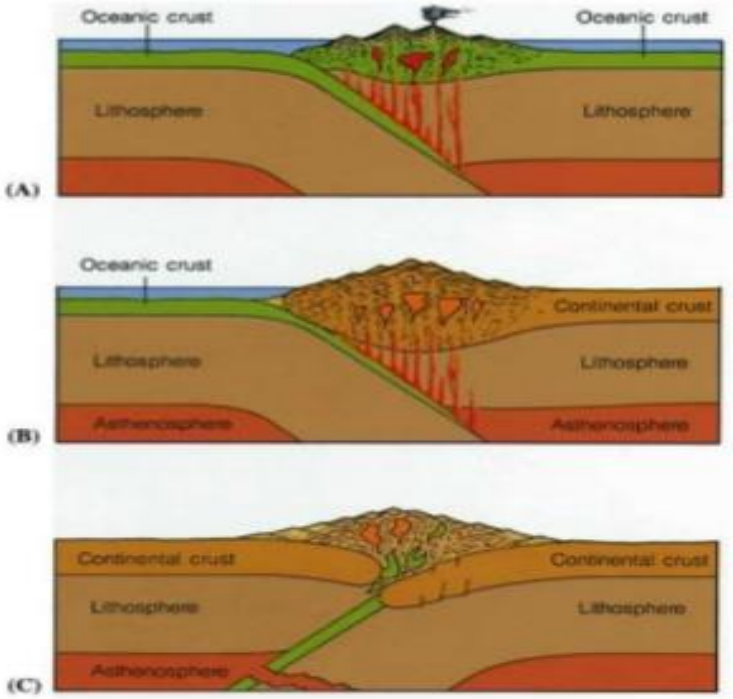
Iceland: An example of continental rifting

Iceland has a Divergent plate boundary running through its middle.



Convergent Boundaries

Three Types of Convergent Plate Boundaries



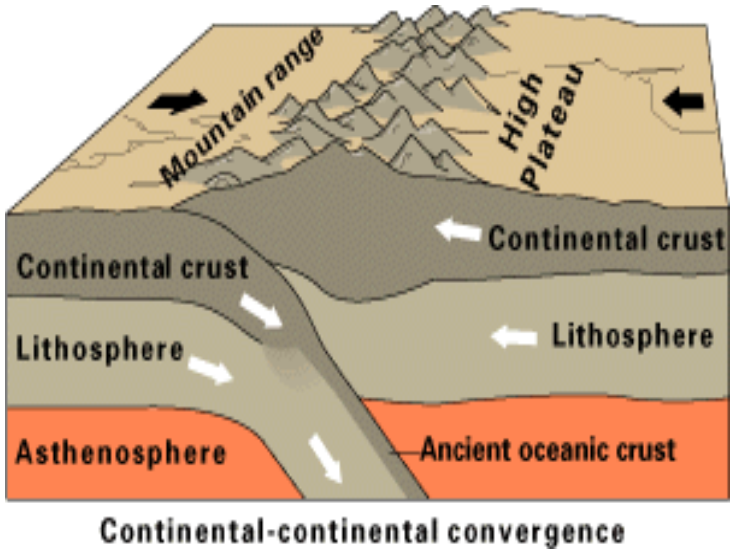
Ocean/Ocean

Ocean/Continent

Continent/Continent

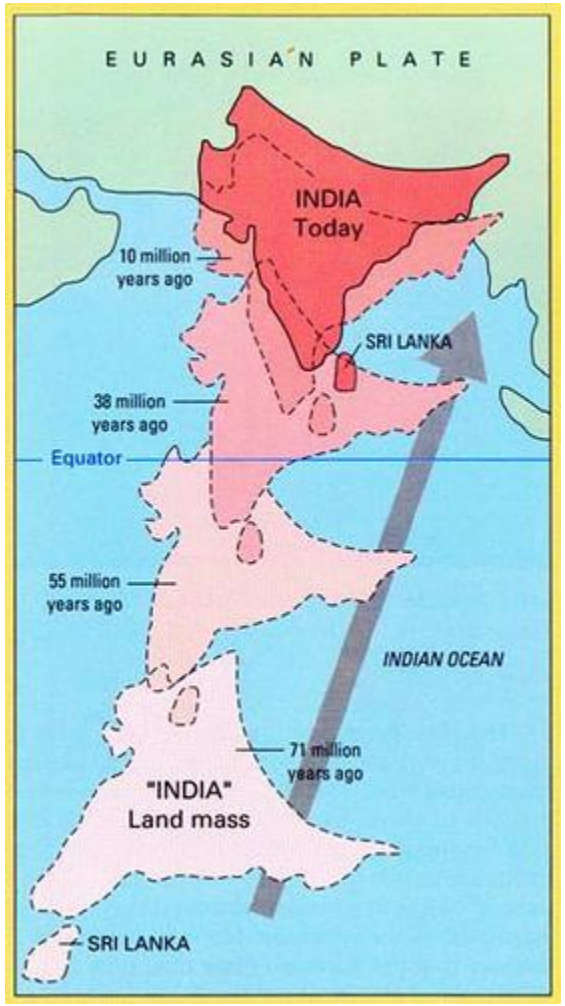
Continent- continent collision

Forms mountains, e.g. European Alps, Asian Himalayas



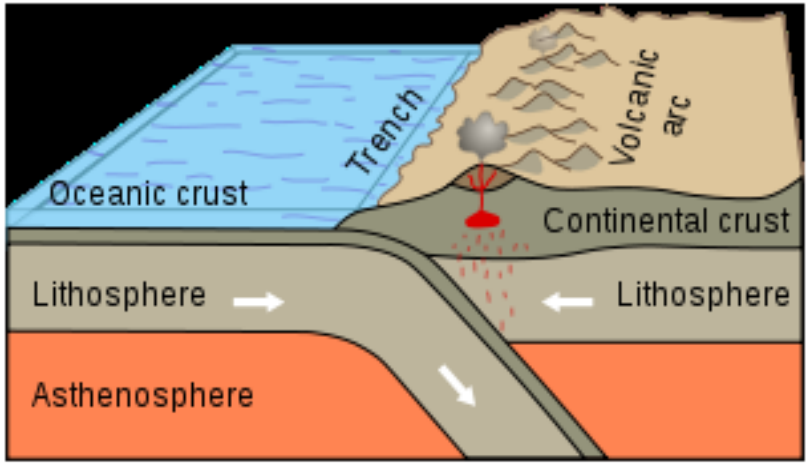
Continental-continental convergence

Indian plate boundary: Himalayas



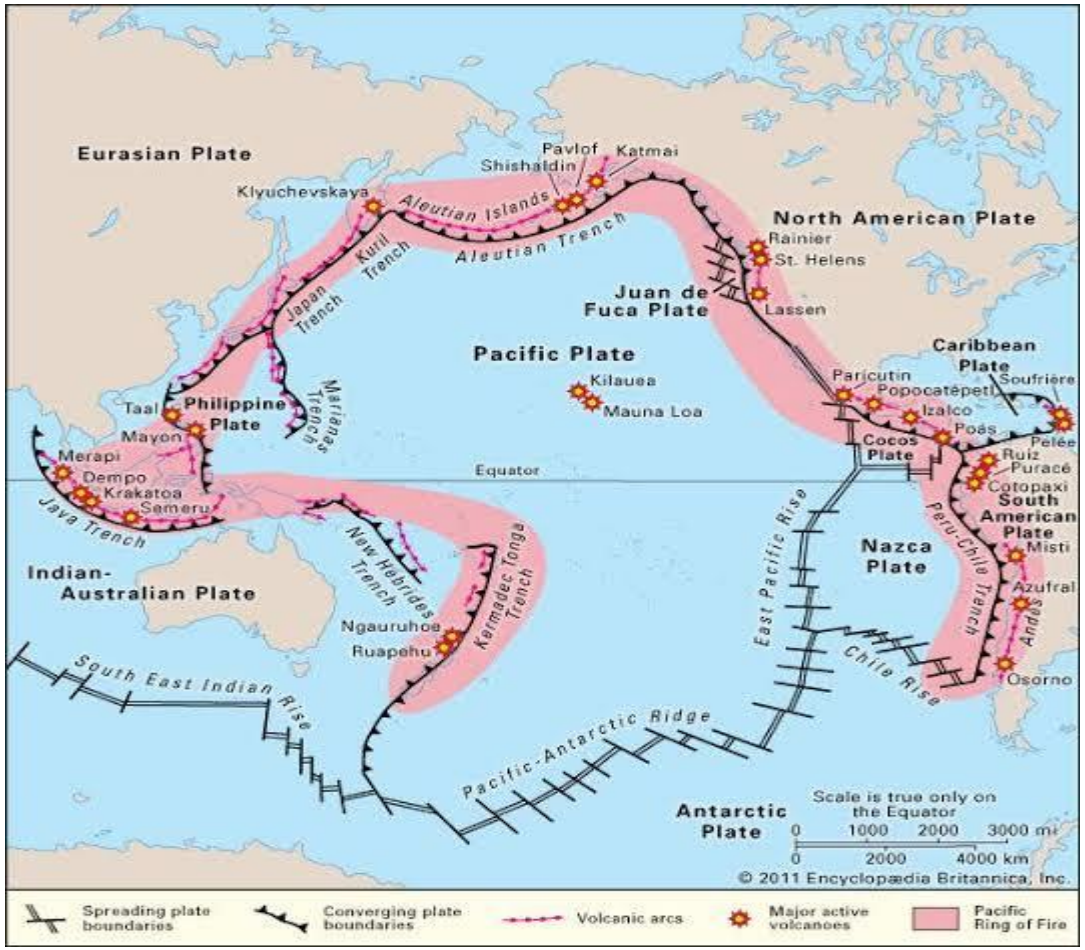
Continent-oceanic crust collision

- Called SUBDUCTION



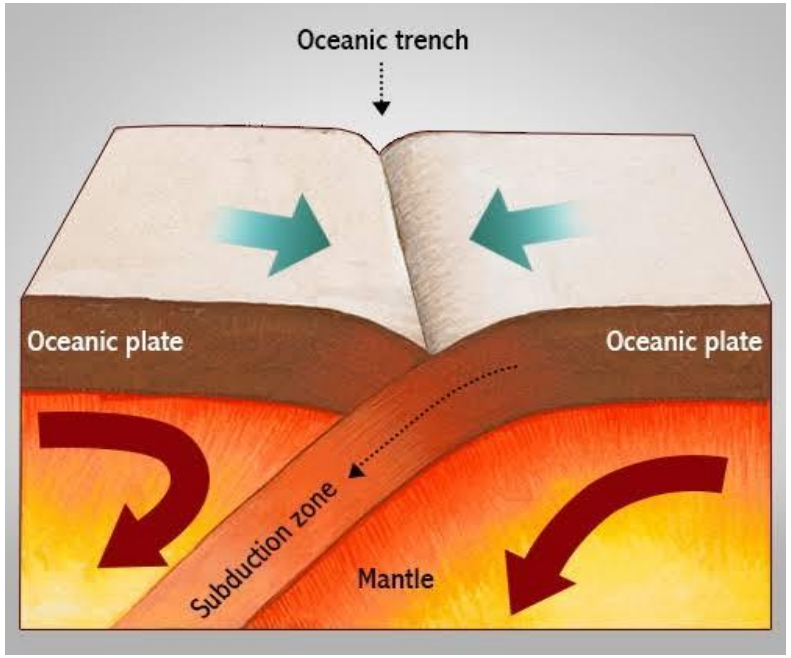
- Oceanic plates subducts underneath the continental plate.
- Oceanic plate heats and melts
- The melt rises forming volcanoes
- E.g. The Andes

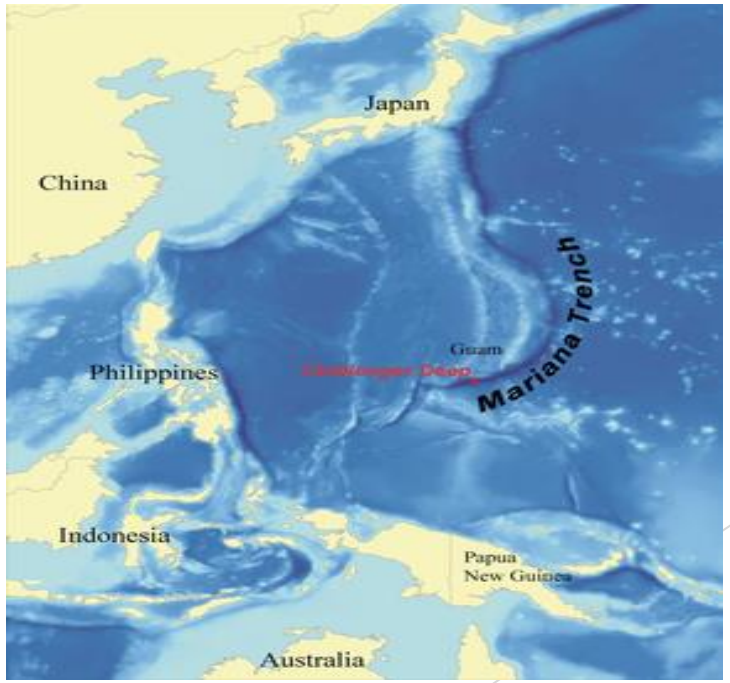
Pacific ring of Fire



Ocean – ocean plate collision

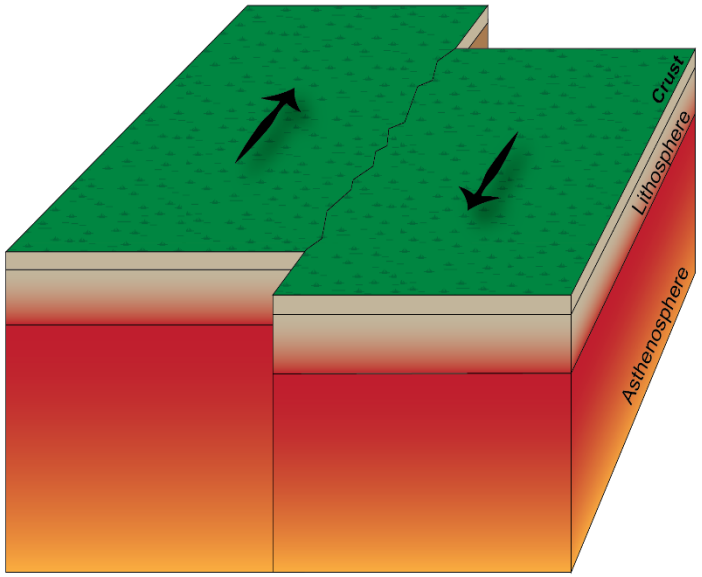
- When two oceanic plates collide, one runs over the other which causes it to sink into the mantle forming a subduction zone.
- The subduction plate is bent downward to from a very deep depression in the ocean floor called a trench.
- The worlds deepest parts of the ocean are found along trenches.
- E.g. The Mariana Trench is 11 km deep!





Transform Boundaries

- Where plates slide pass each other.
  e.g. San Andreas transform fault



Earthquakes:

Earthquake are occur these 3 types of plate boundaries.
e.g. Nepal earthquake, southern Peru earthquake etc.

Tsunami:

Tsunami also created in ocean-ocean plate boundary and ocean-continent plate boundary.
e.g. Indonesia earthquake tsunami (2003), Japan earthquake etc.

The End

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