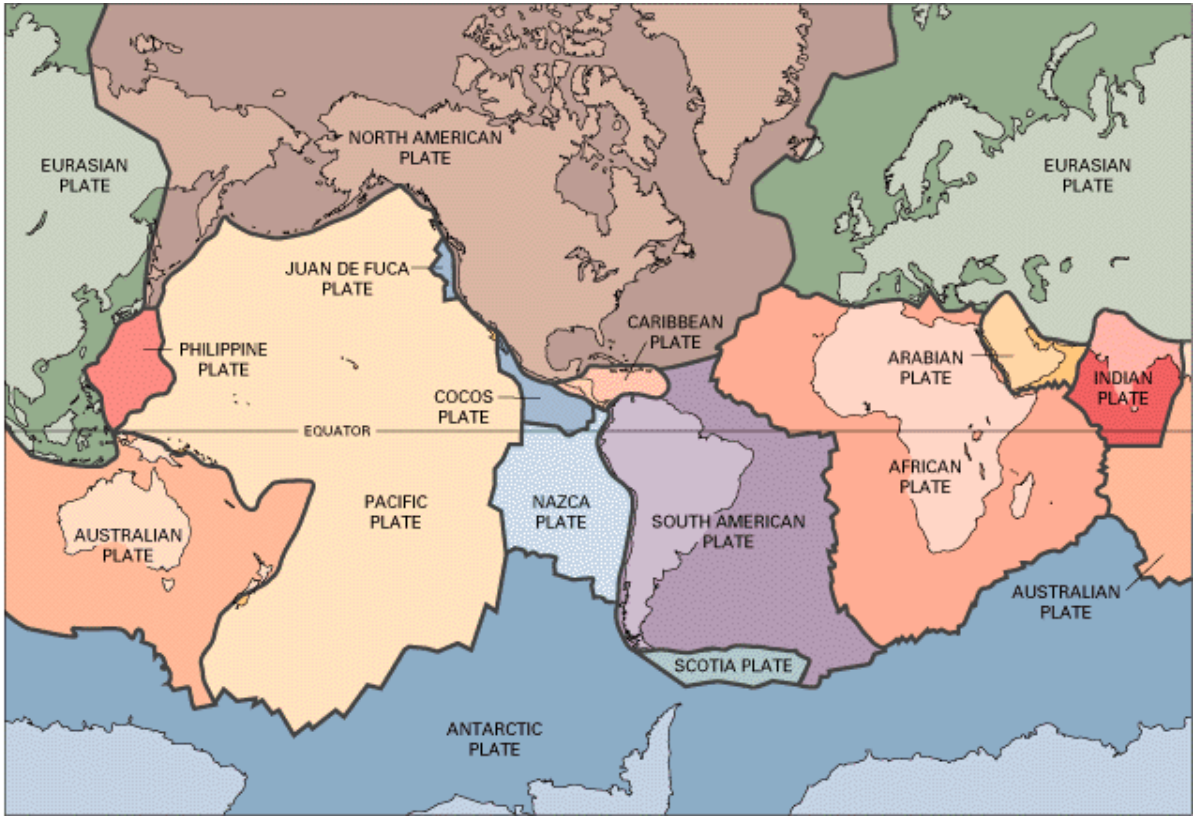
# PLATE TECTONICS

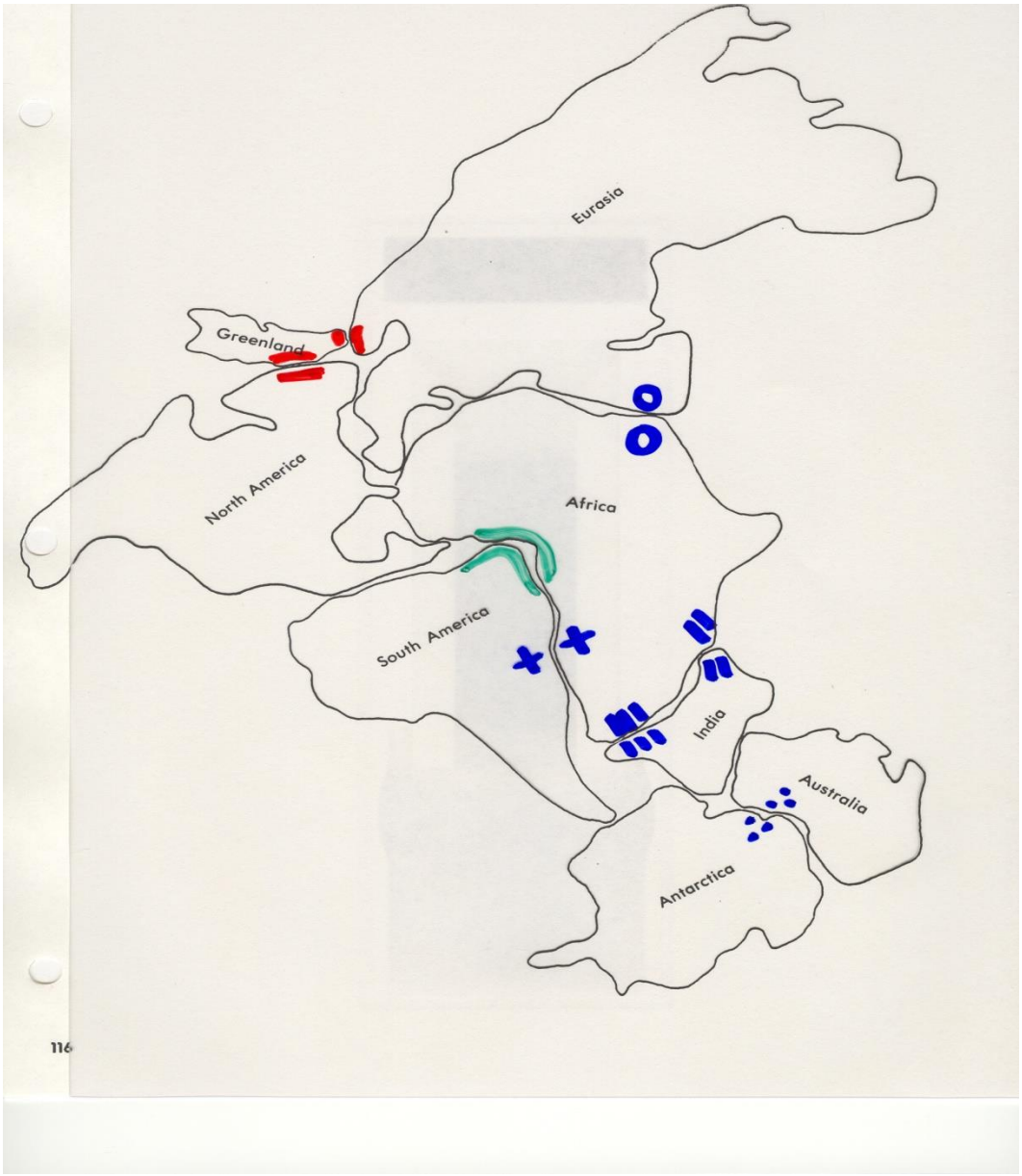


# WHAT IS TECTONICS?

- Tectonism is the faulting or folding or other deformation of the outer layer of a planet. It happens very slowly, on the scale of millions of years. Tectonic activity is caused by heat loss(cooling).
- As they have cooled, they have formed a strong outer layer — the lithosphere. Continued movement of hot material in the interior of the planet causes the surface to deform. The lithosphere may rise up or it may break and ride over itself.
- Large planets, such as Venus, Earth, and Mars, are large enough to have remained hot inside and still have active tectonism.
- The result is continents and ocean basins.

# Continental Drift

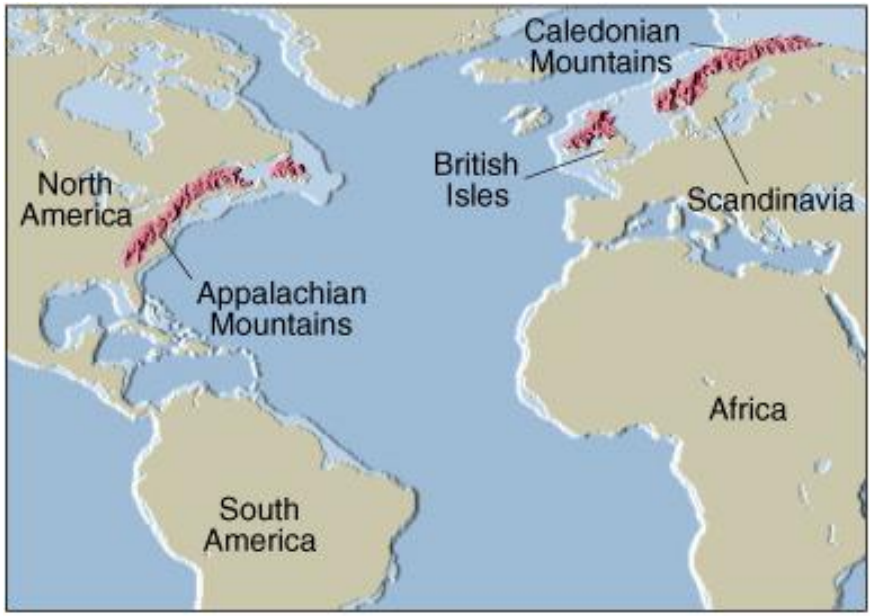
Wegener *theory* that the crustal plates are moving and once were a super continent called Pangaea.




This was supported by:

- Glaciers
- Mountain ranges
- fossil evidence
- rock type evidence
- matching of coastline shapes.

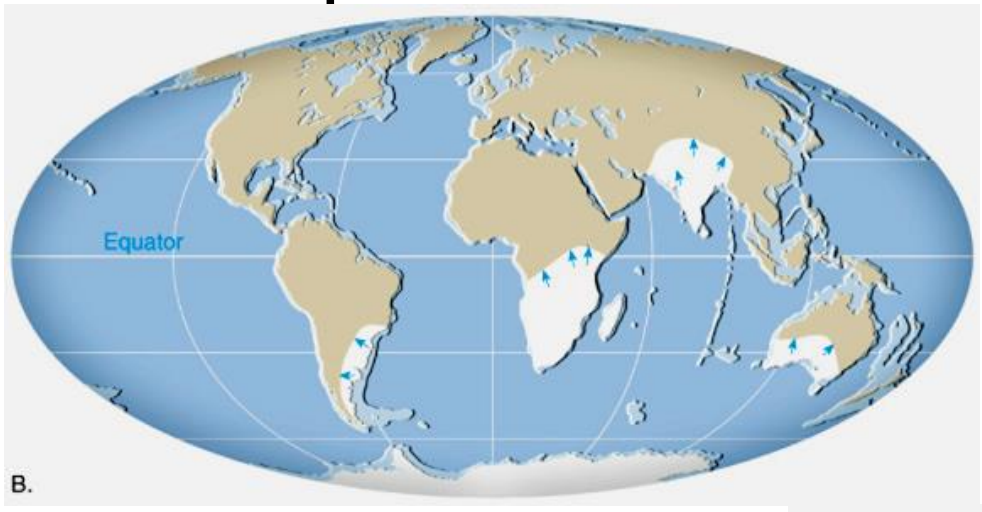
- Mountain ranges in North America (Appalachians), in Europe (Caledonians), matched or lined up

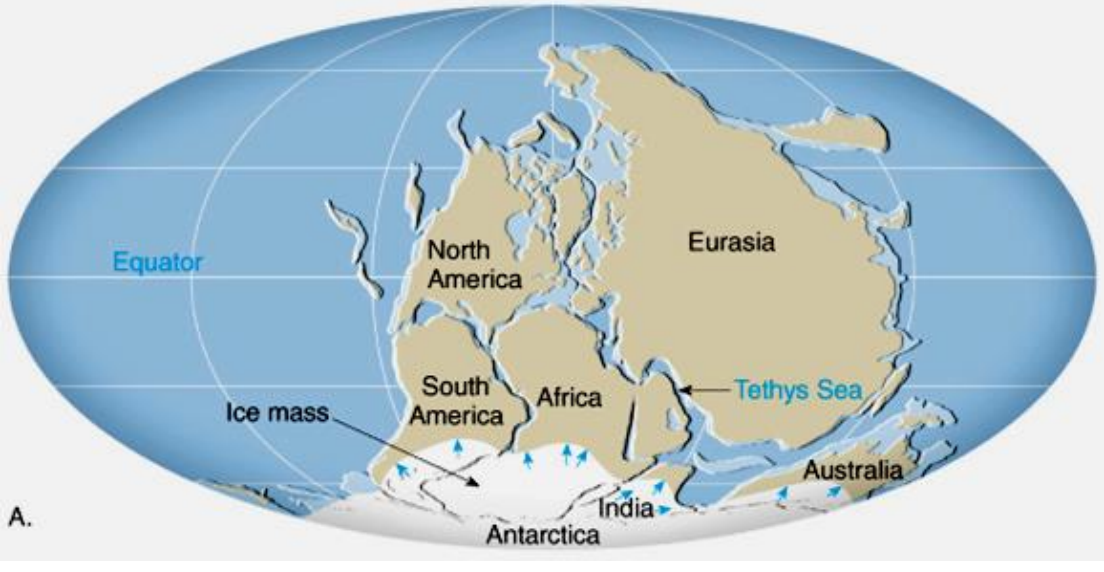




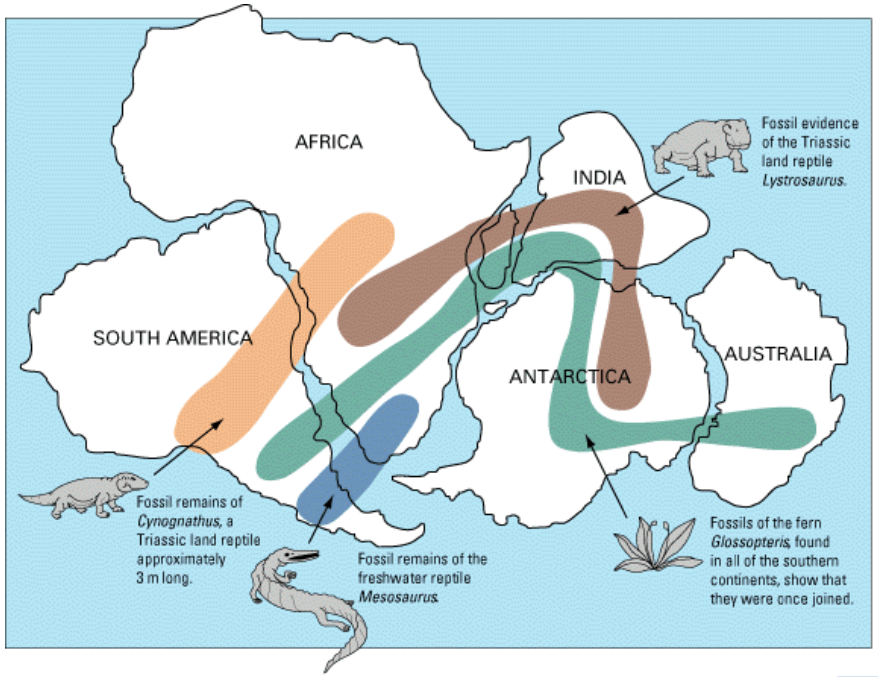
Alfred Wegener thought that the landmasses fit together like a jigsaw puzzle. He called the land mass “Pangaea”.

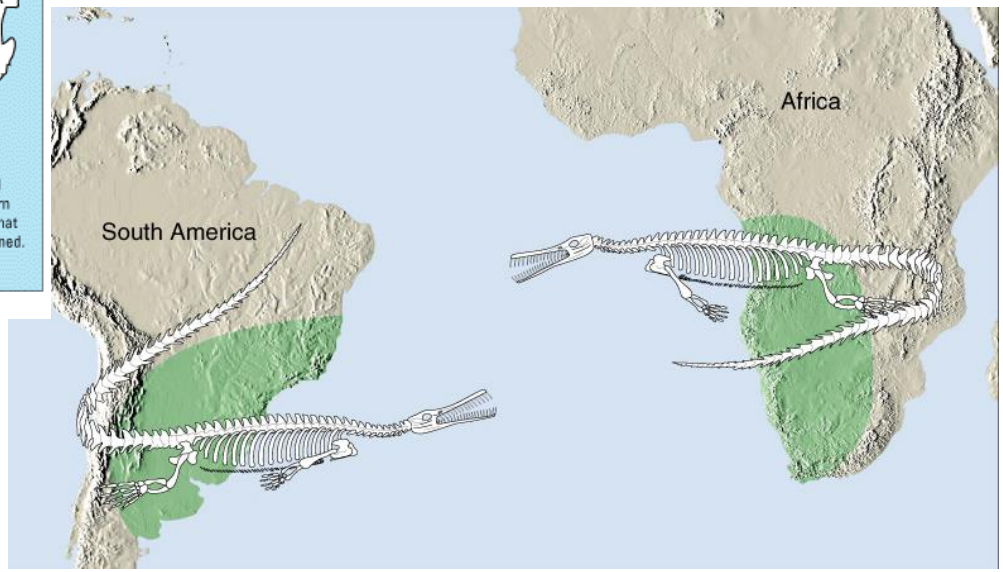
- Investigations of glaciers also indicated that the land masses on Earth were once a supercontinent.

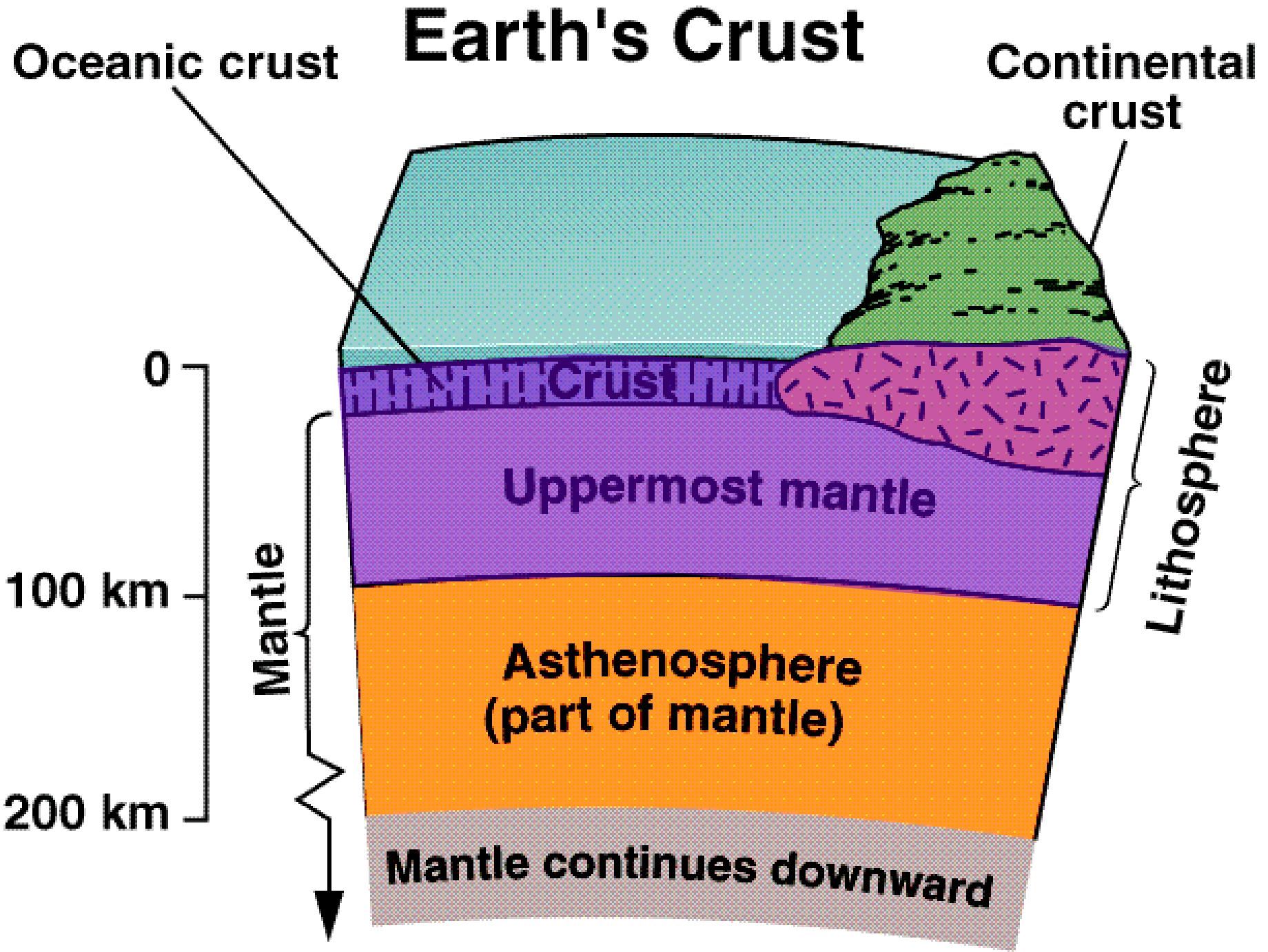


- Wegener found matching reptilian <u>fossils</u> on either side of the Atlantic Ocean.

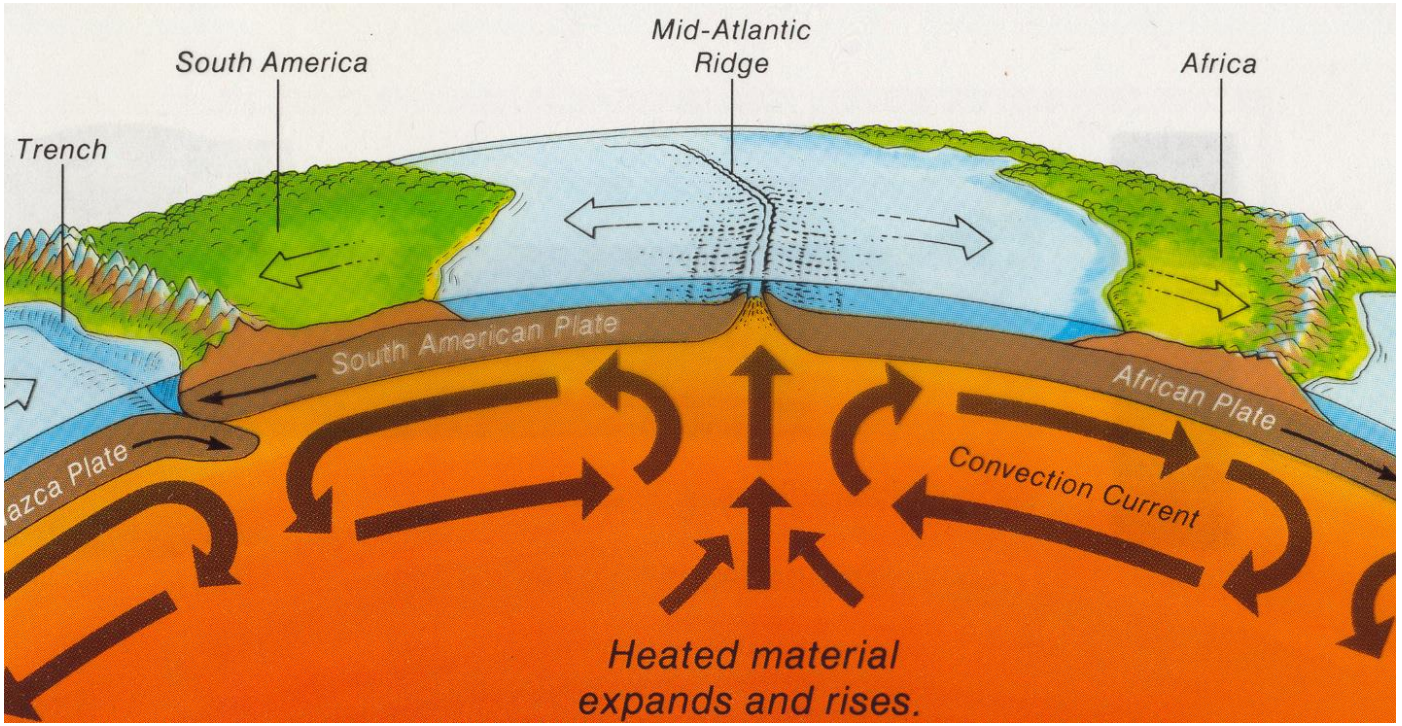




- Alfred Wegener's theory explain his theory on proving that the plates have moved over millions and millions of years.
- However, he could not explain **HOW** they moved. Therefore his theory was not widely accepted.

# Convection Currents

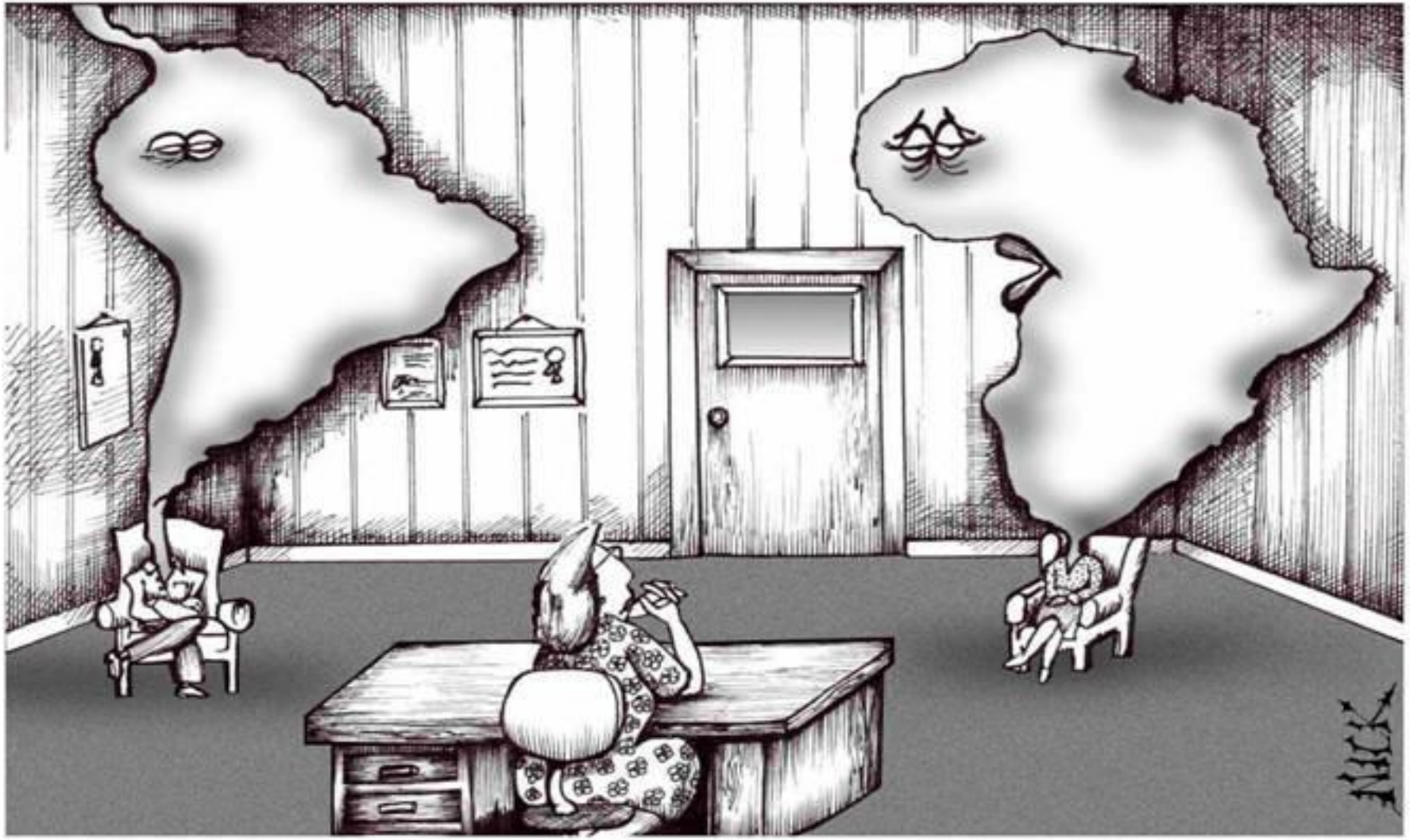



Harry Hess's theory of "seafloor spreading"
Convection Currents are responsible for plate movement.

SO TO REVIEW

# Plate Tectonics

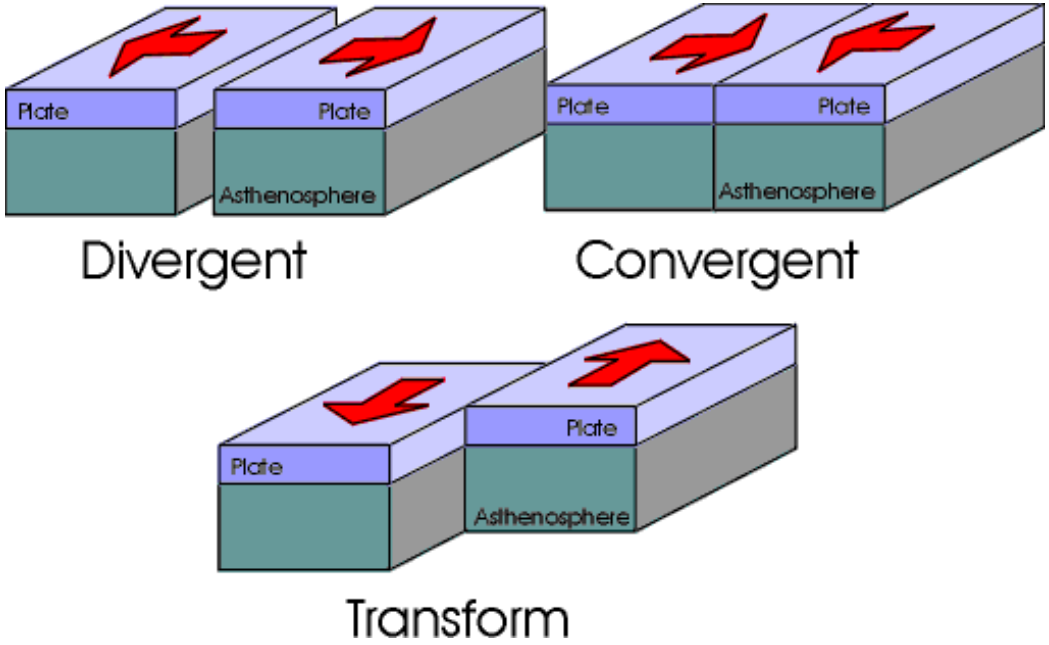
- Continental Drift - theory that all the continents were joined together called “Pangaea”
- Evidence exists;
  - Fossils, rocks, glaciers, coastlines
- Harry Hess – seafloor spreading theory that explains convection currents move the plates and the acceptance of theory of plate tectonics



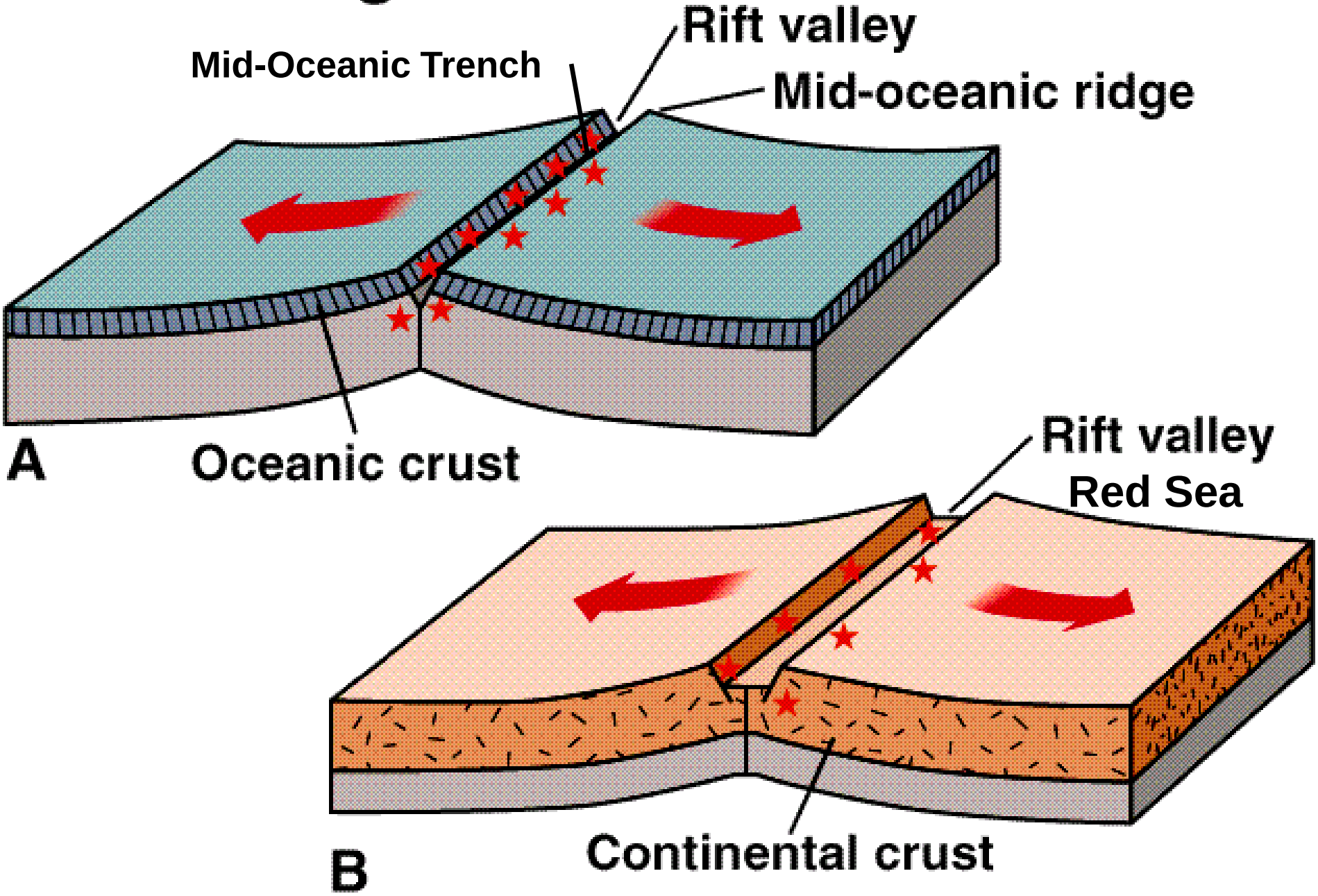
*"Well looking back I suppose it's been going on for quite some time, but I only noticed we were drifting apart during the last 50 million years..."*

# Types of Plate Boundaries

- Divergent
- Convergent
- Transform

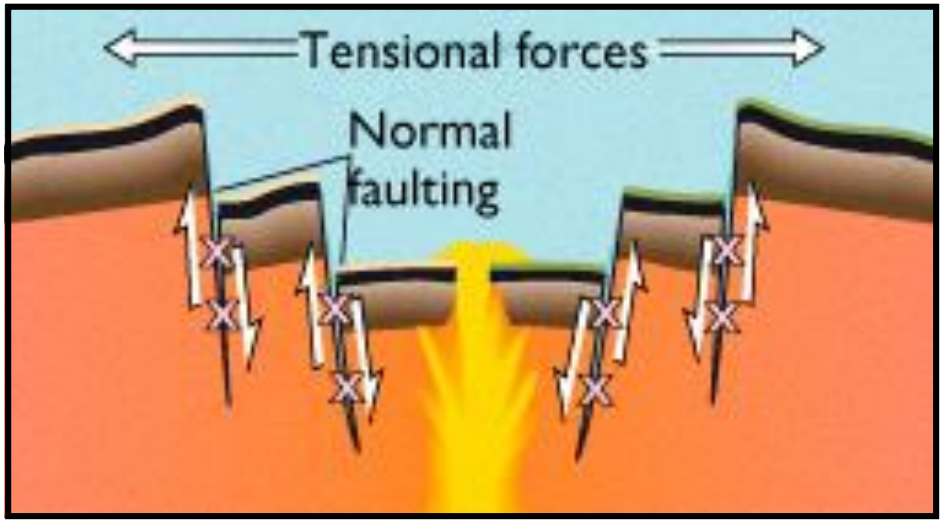


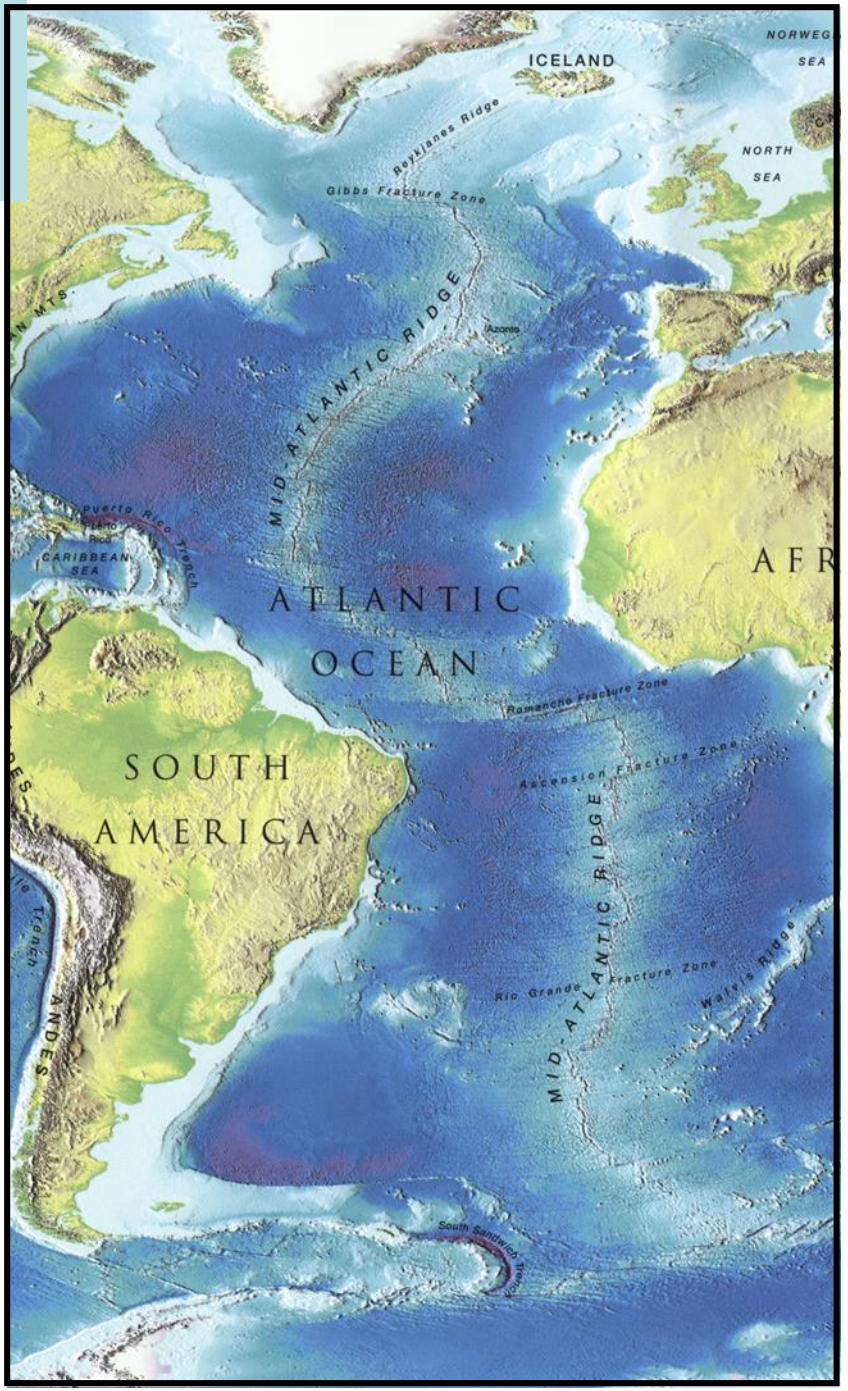
# Divergent Plate Boundaries



# Oceanic Divergent Boundary

## Example: Mid-Atlantic Ridge

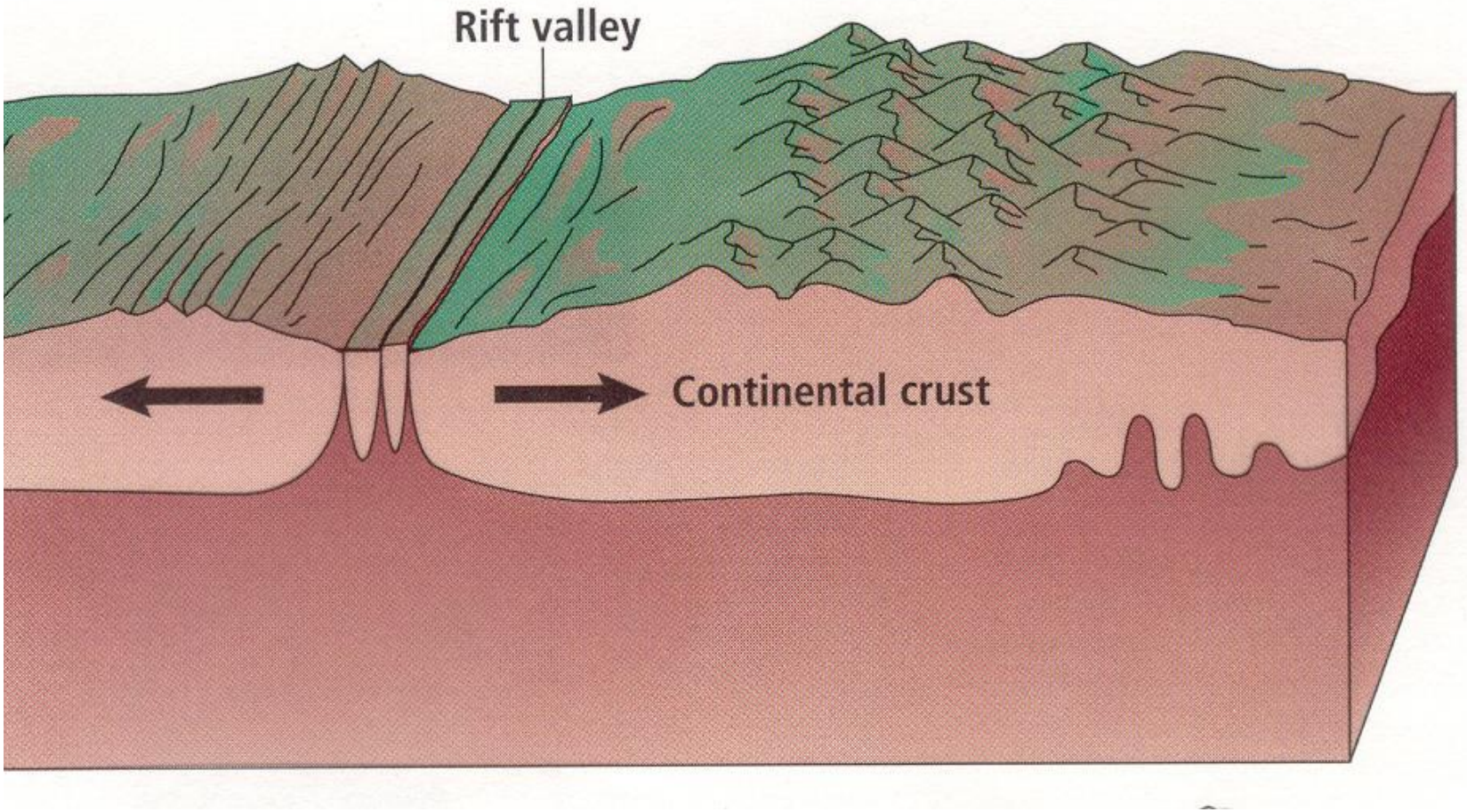



Creates trenches and ridges as well as new seafloors

# Continental Divergent Boundary

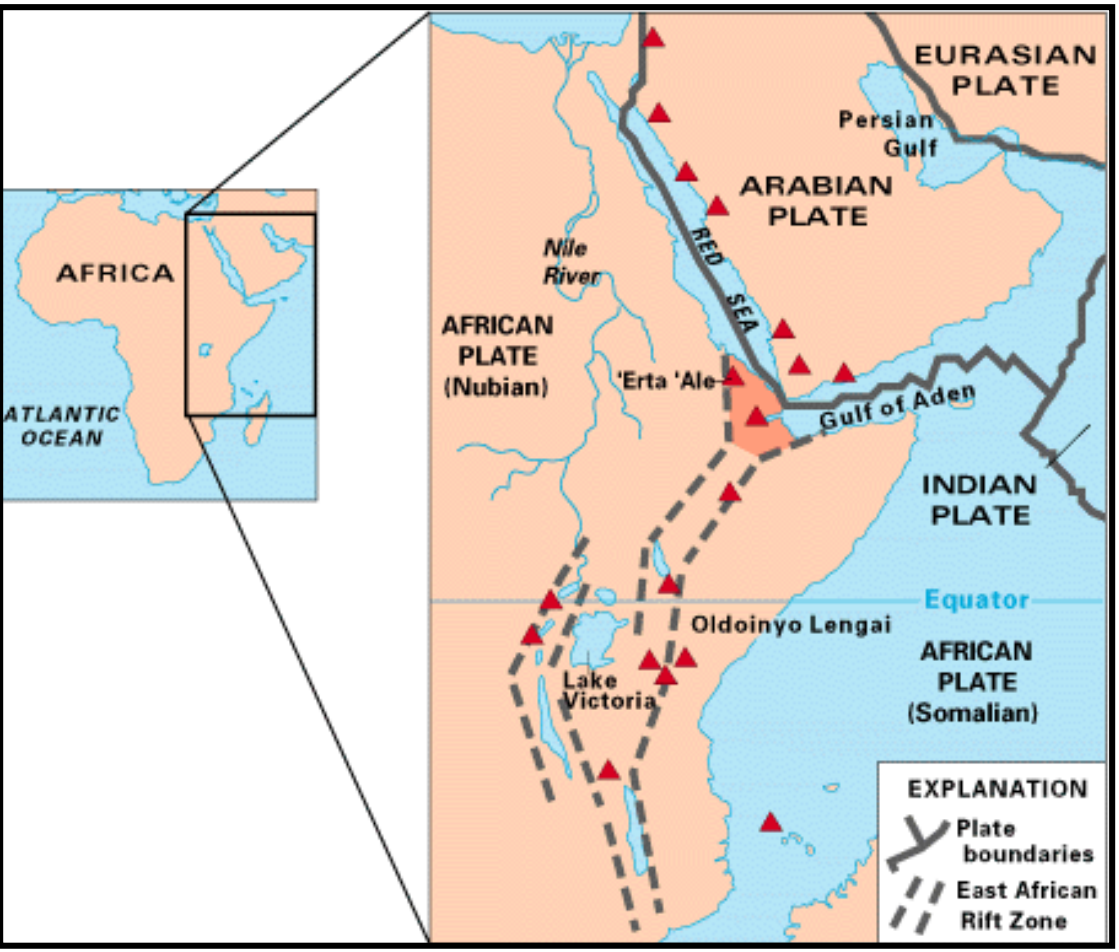
Example: Mid-Atlantic Ridge

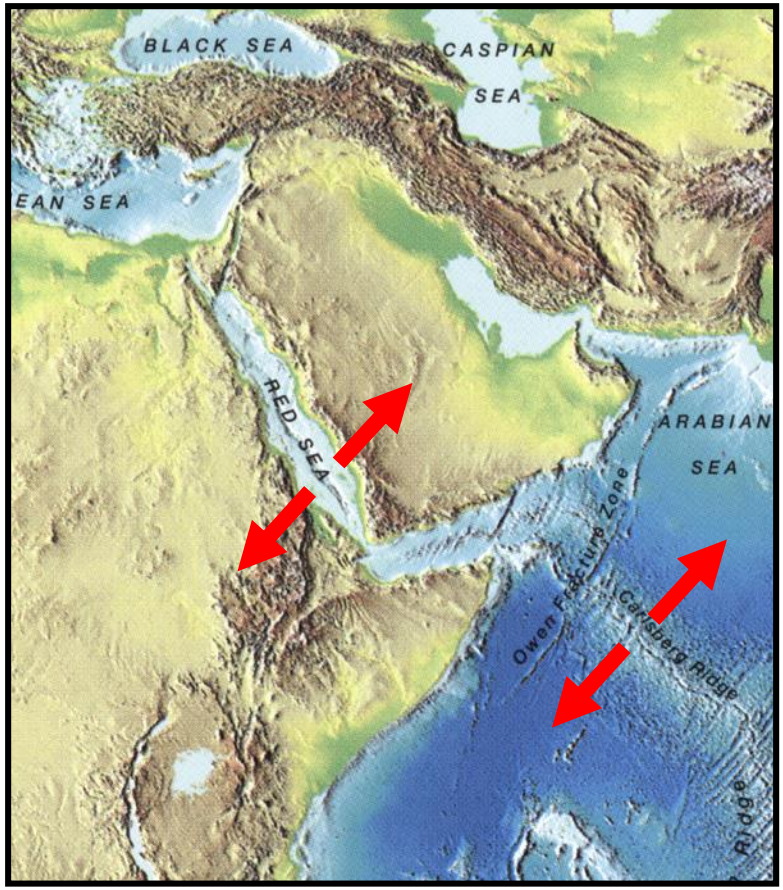



Divergent boundary of two continental plates.

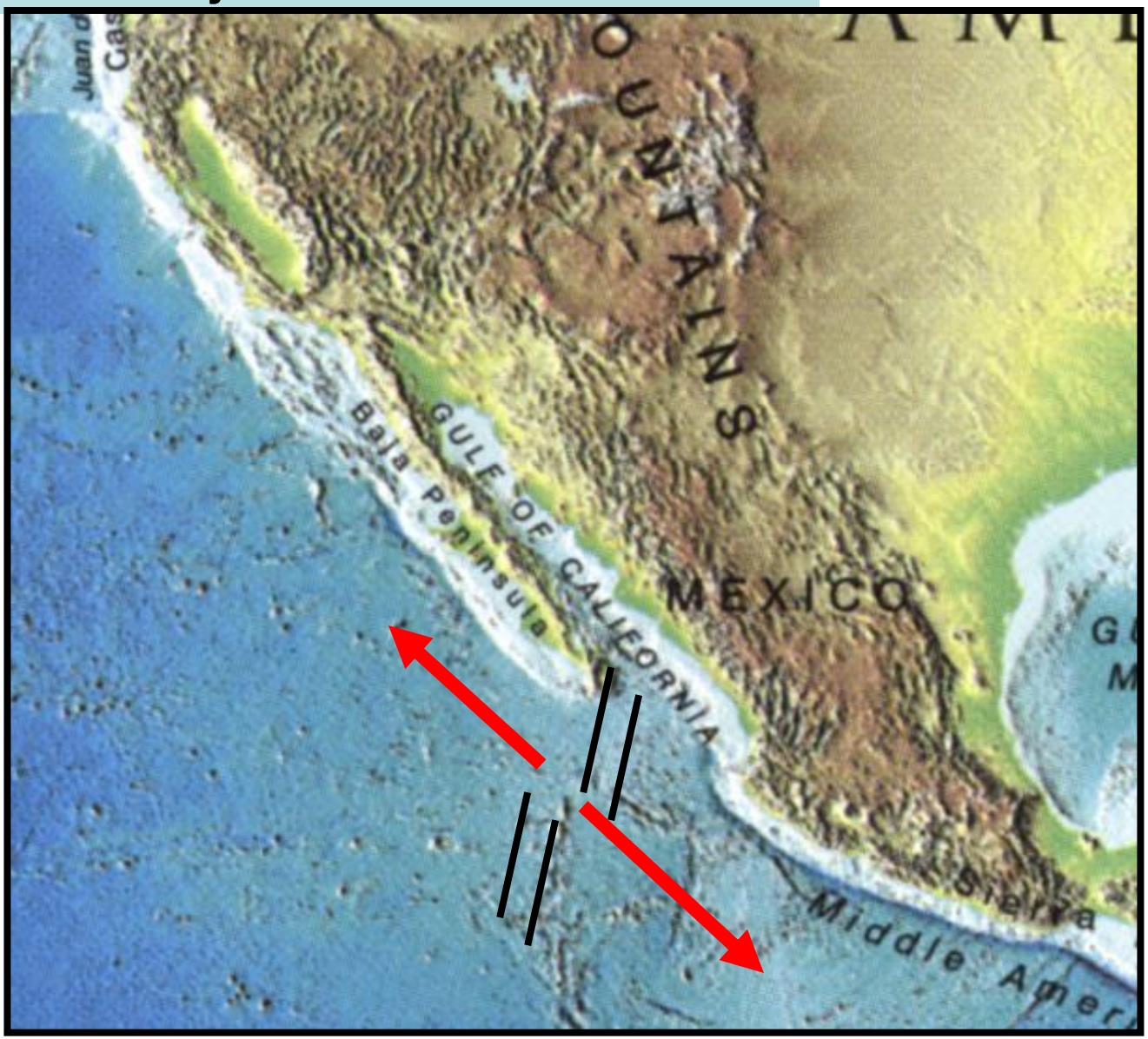
Creates a rift valley and sometimes new bodies of water.

# Continental Divergent Boundary
# **Example** 1: Red Sea / E. African Rift



# Continental Divergent Boundary
**Example** 2: Baja California

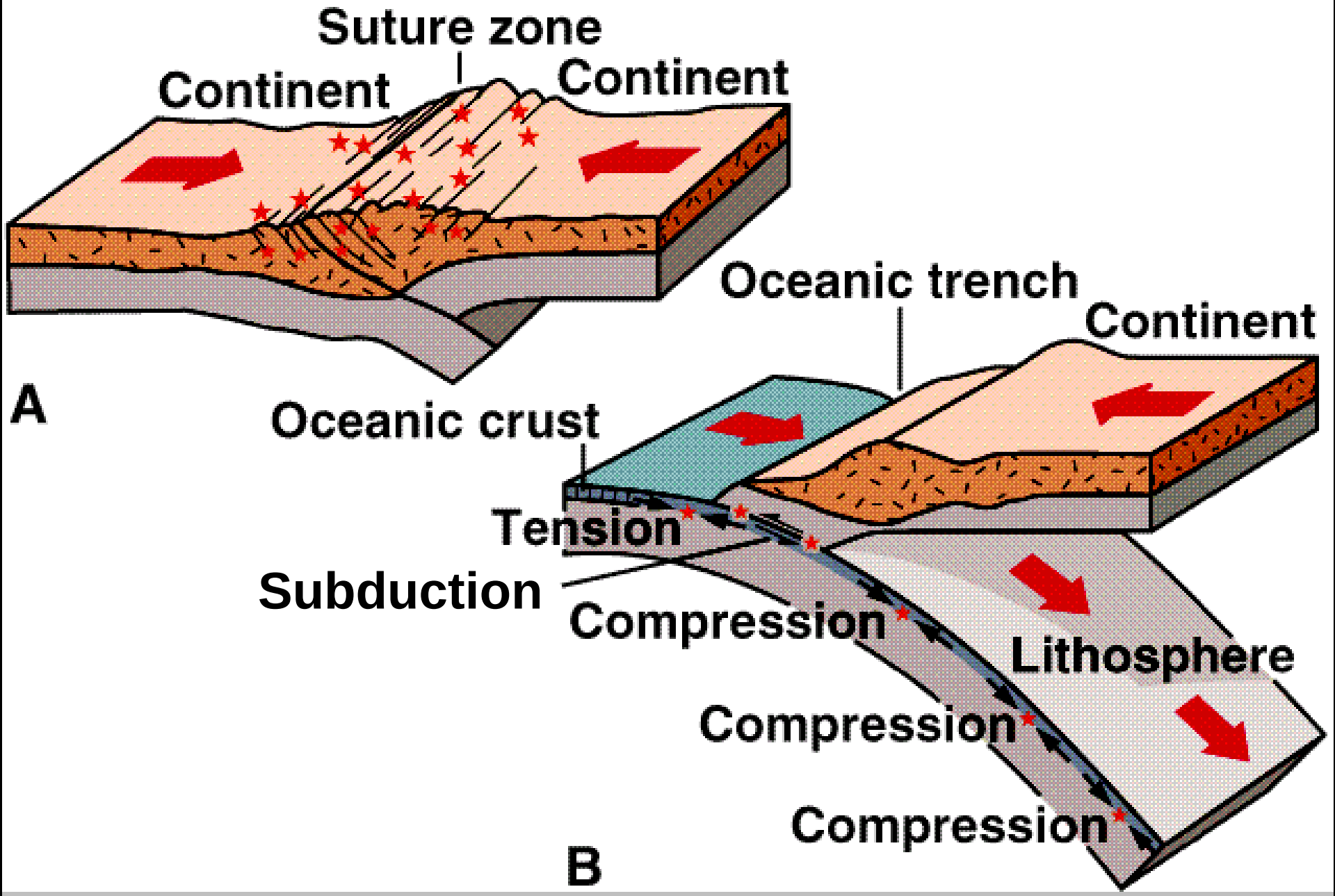


SO TO REVIEW

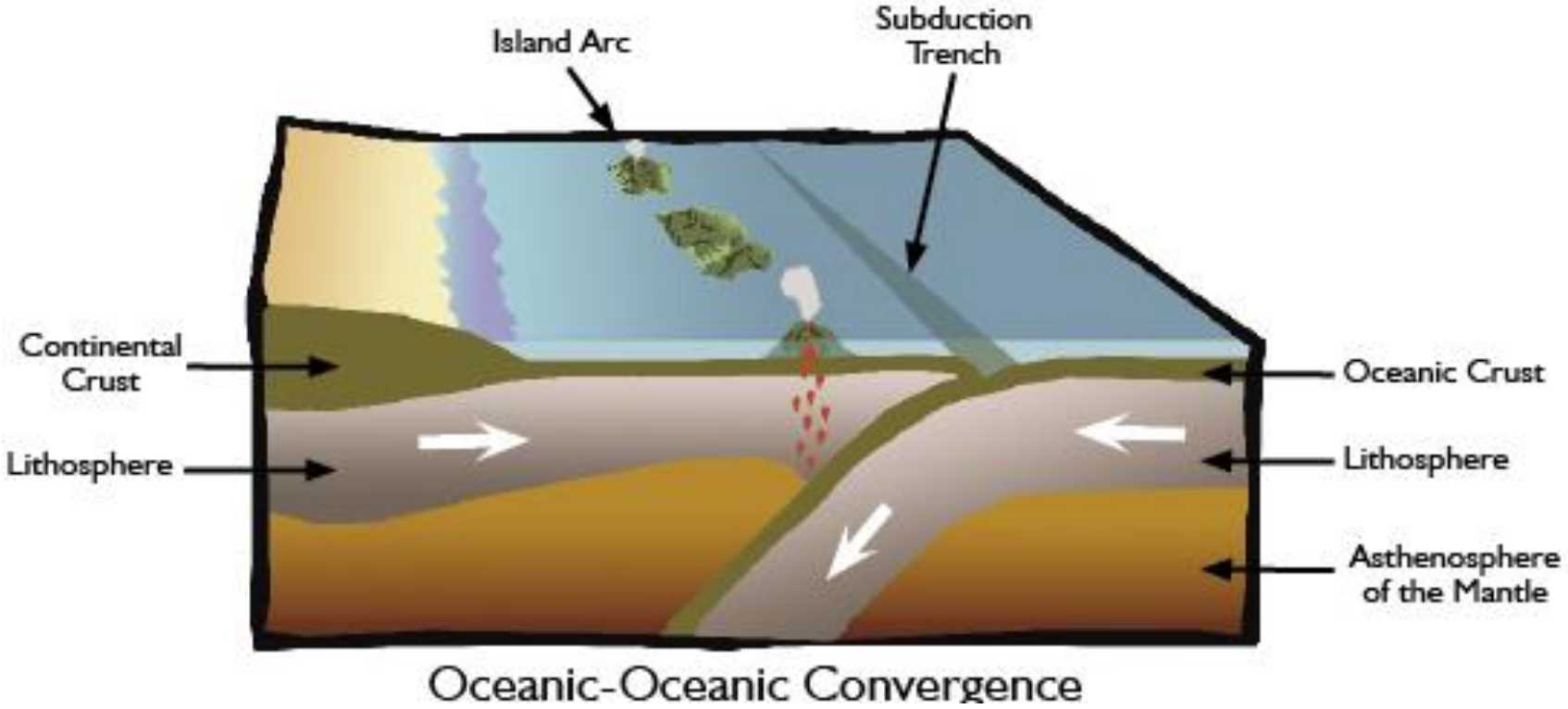
# Divergence Types

- Oceanic-Oceanic
  - Rift Valley, mid-oceanic trenches and ridges new sea floor, Mid-Atlantic Ridge
  - Newest rocks in the Mid-Ocean Trenches.
- Continental-Continental
  - Rift Valley, New shallower land, Red Sea, new body of water.

# Convergent Boundaries

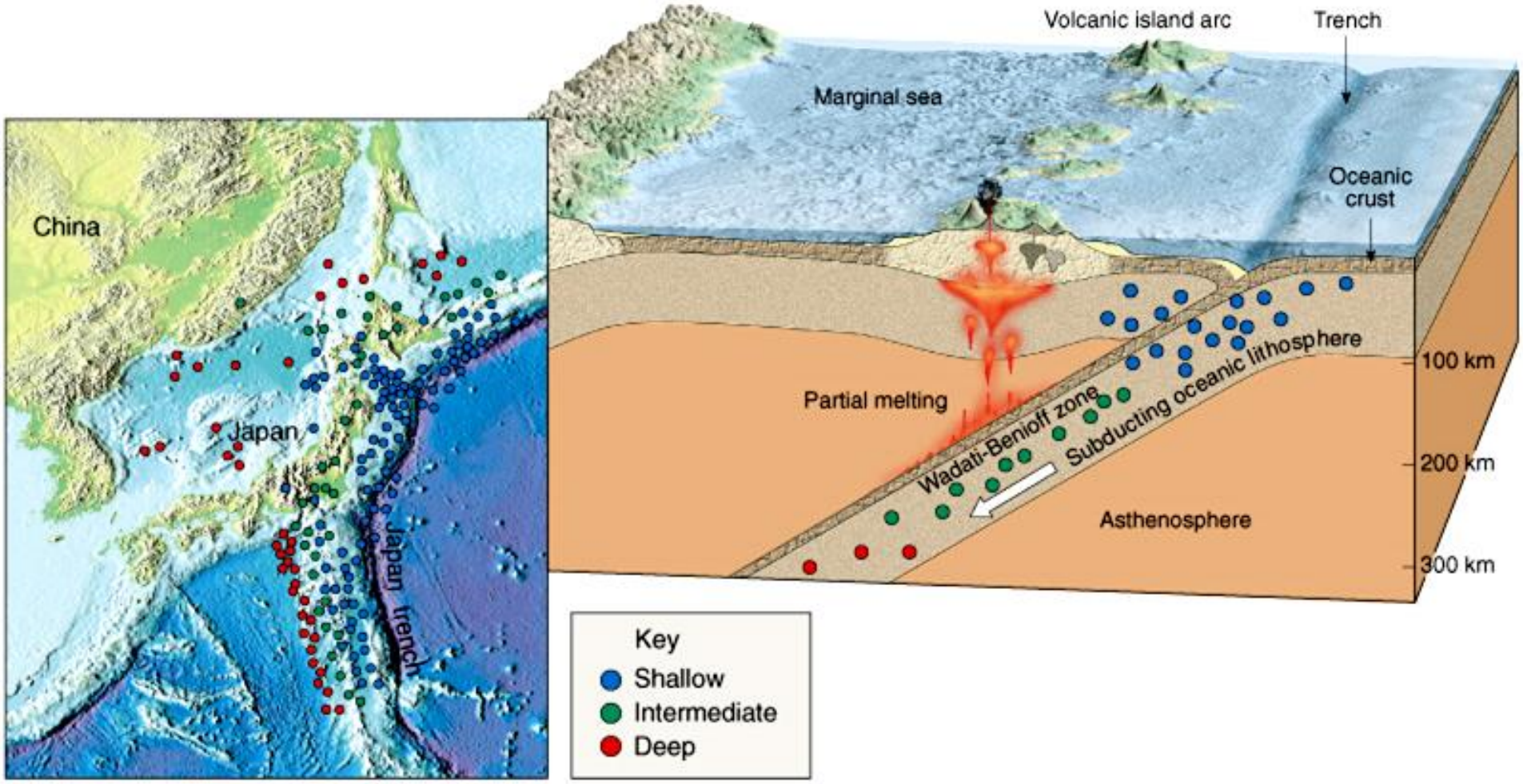


# Oceanic Convergence Boundary




-the denser plate forced below the less dense plate and volcanic islands can form. The area where the crust is forced below is called Subduction Zone.

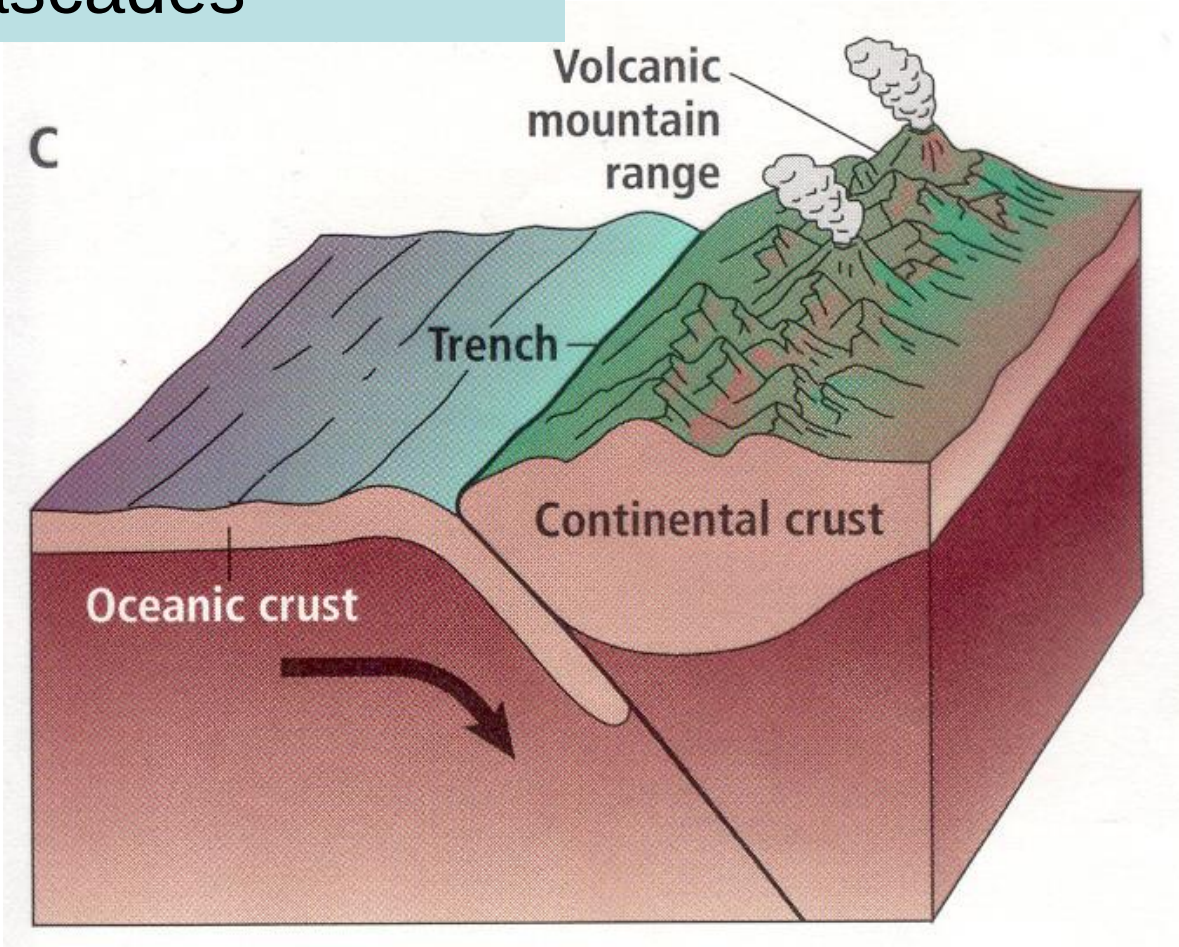
# **Example** of Oceanic Convergence Boundary JAPAN



# Oceanic - Continent Convergence

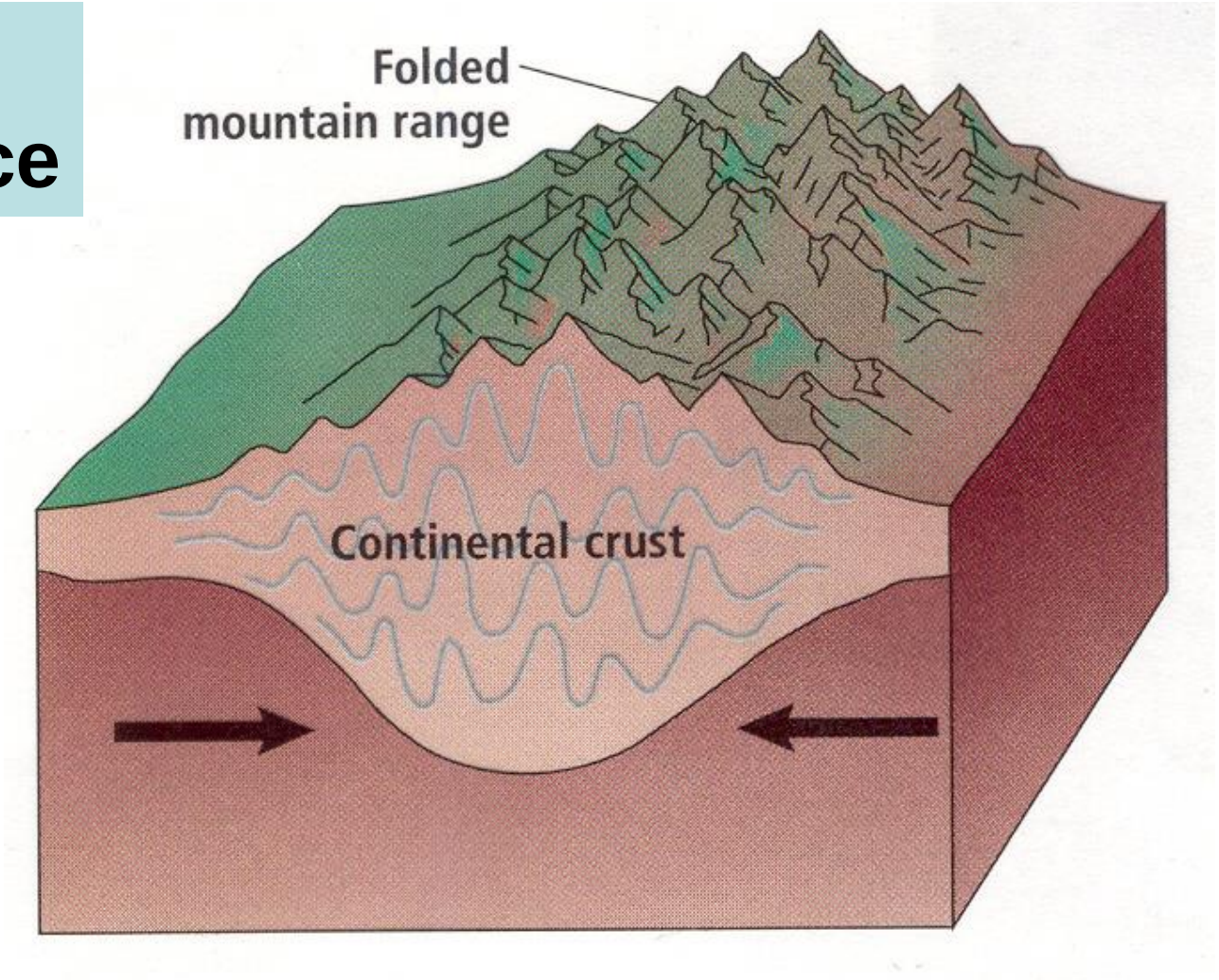
Example: Andes, Cascades

Convergent boundary of an oceanic plate and a continental plate may cause <u>volcanic mountains.</u>



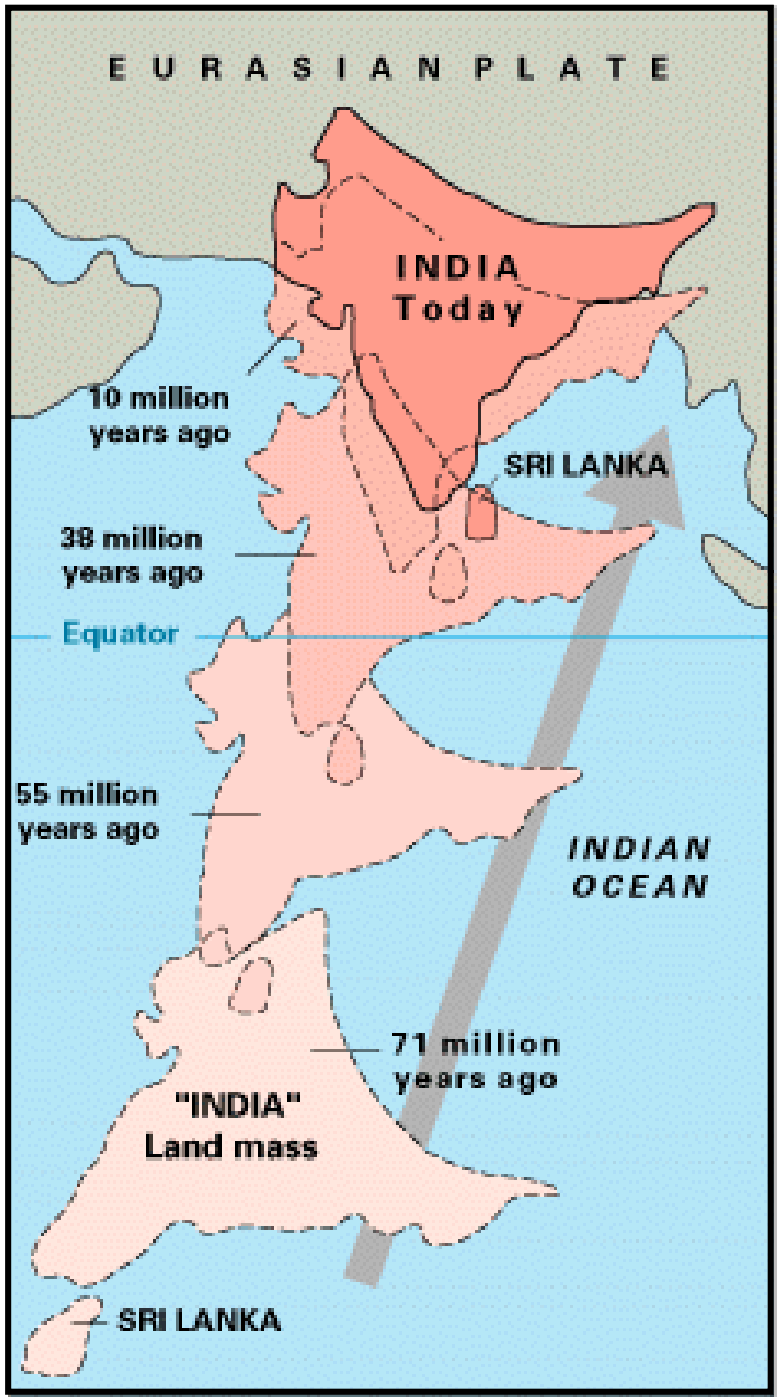

The ocean subducts, and forms a <u>deep oceanic Trench</u>.

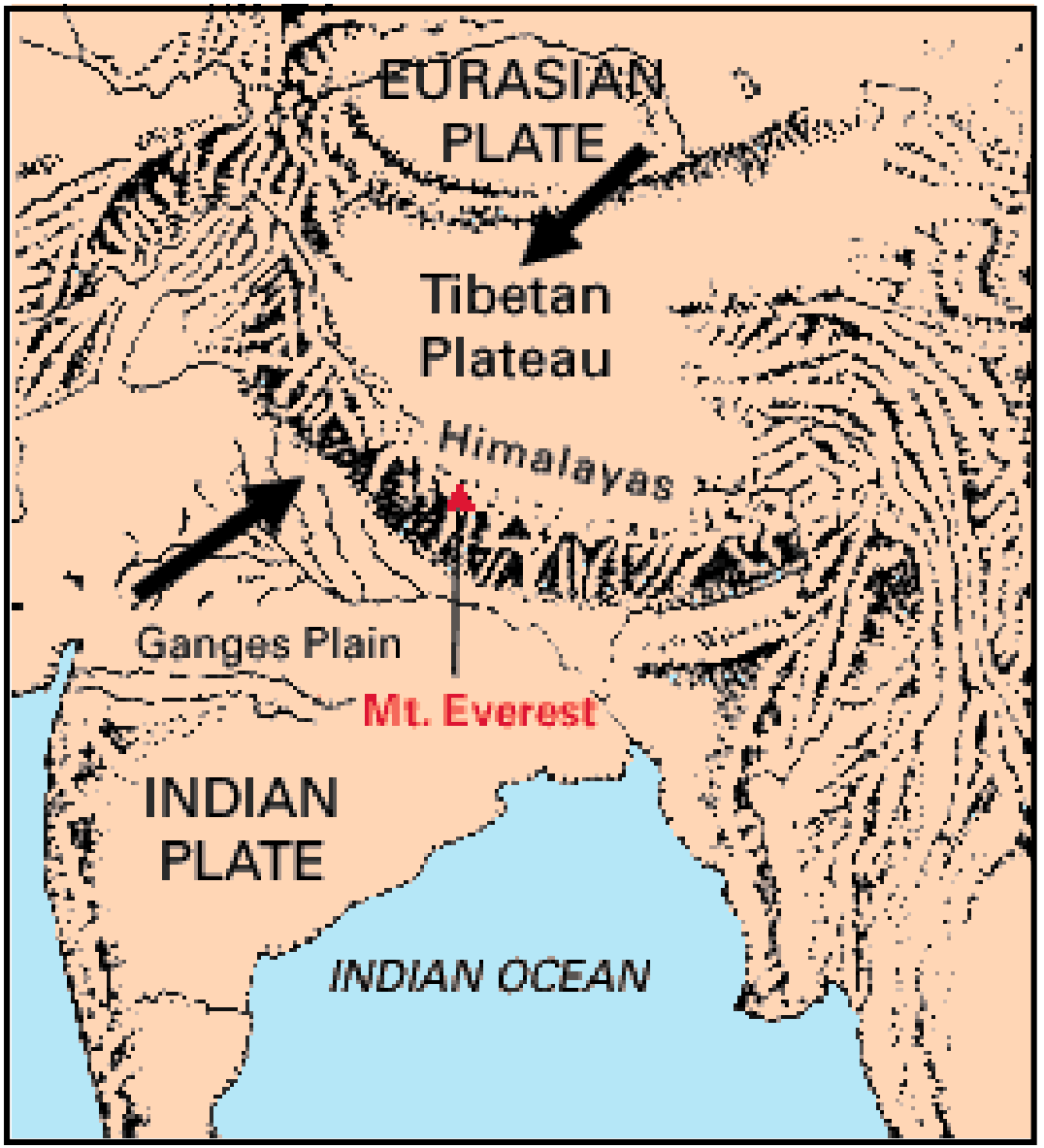
# Continental Convergence




Convergent boundary of two continental plates create <u>mountains</u>.

**Example:** Appalachians, Himalayas, Alps



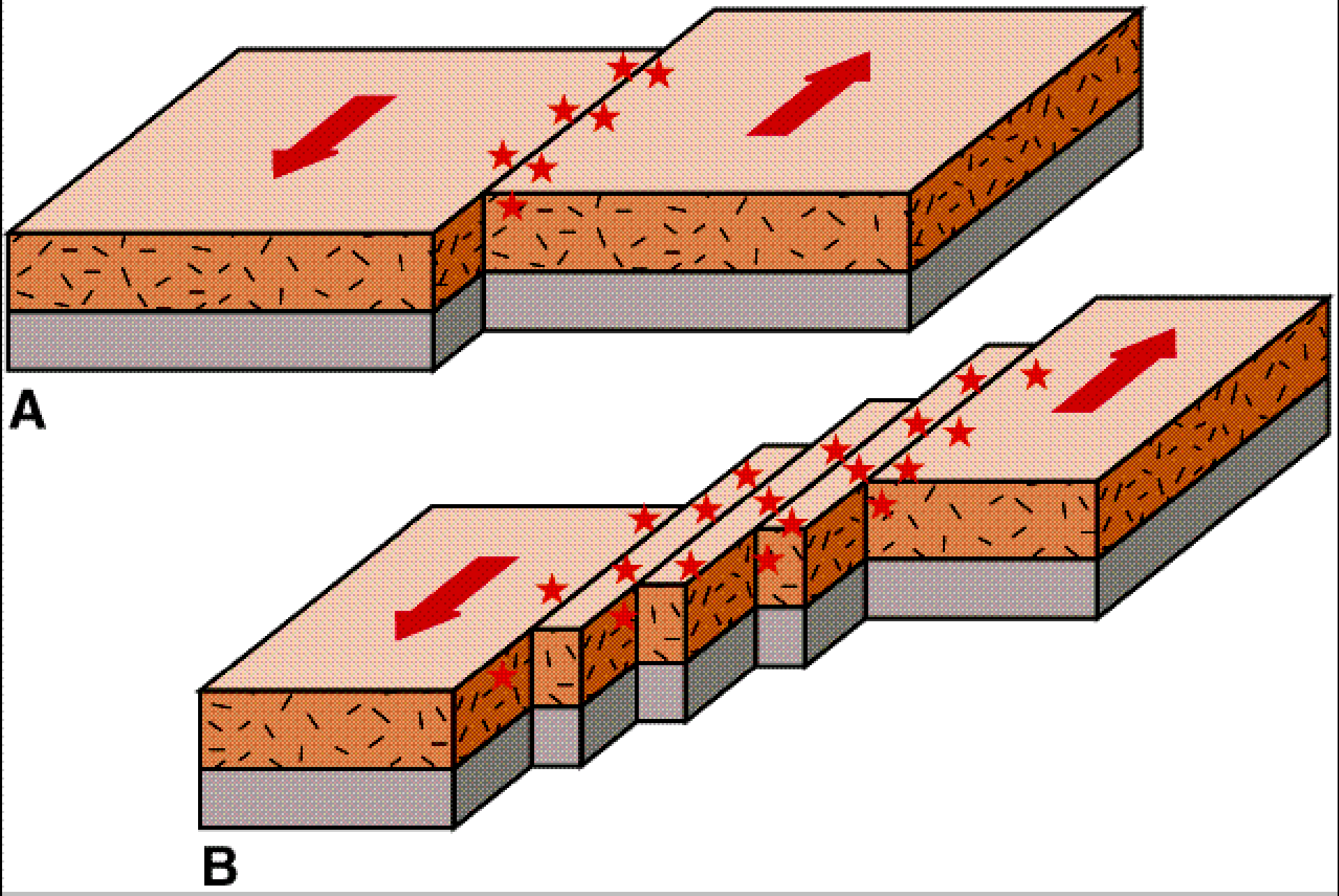



SO TO REVIEW

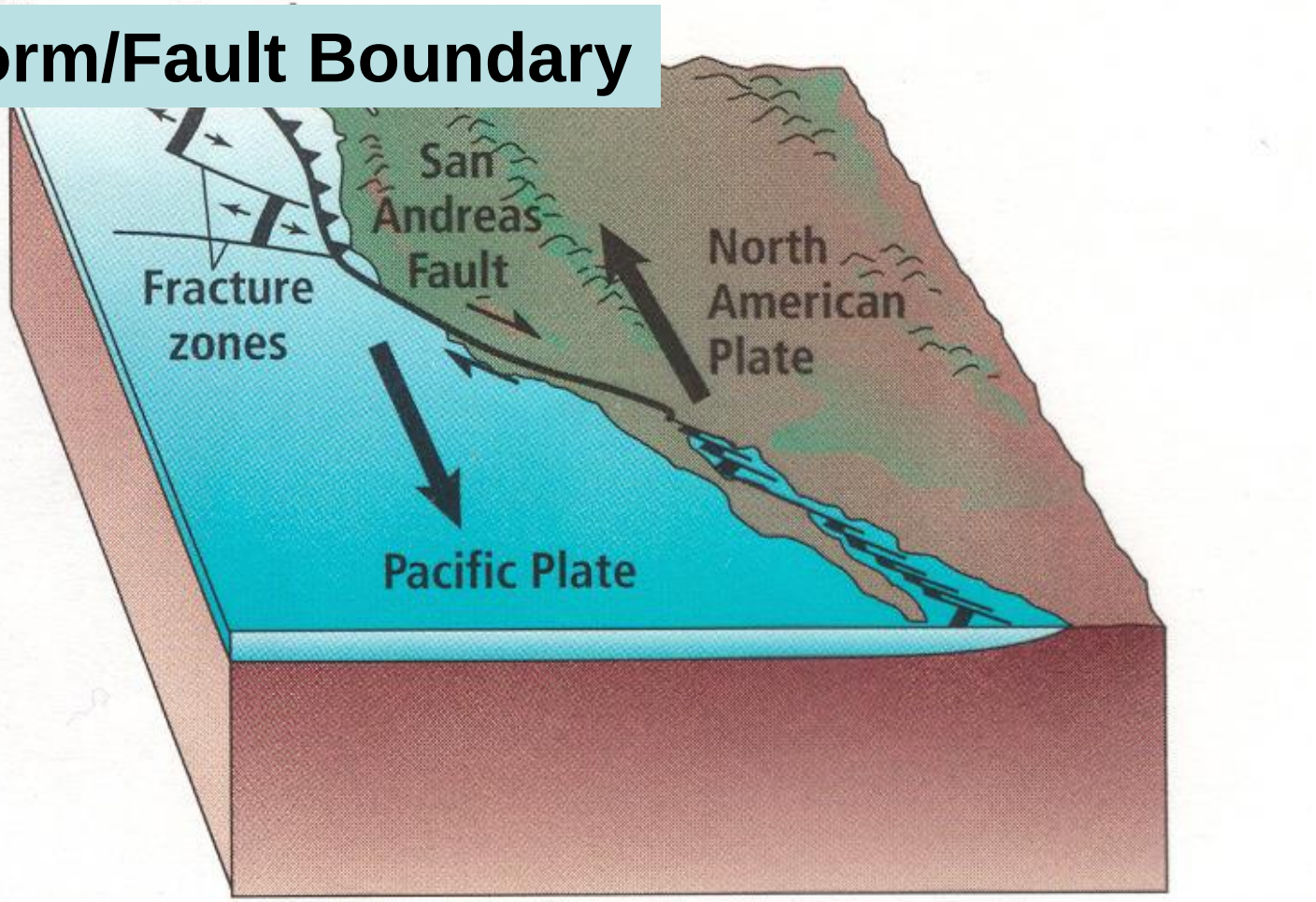
# Convergence Types

- Oceanic
  - Submersion, volcanic islands
- Oceanic-Continental
  - Submersion, volcanic mountains, deep ocean trenches
- Continental
  - No Submersion, none-volcanic mountains

# Transform Boundaries



# Transform/Fault Boundary




Transform-fault boundary where the North American and Pacific plates are sliding against each other.

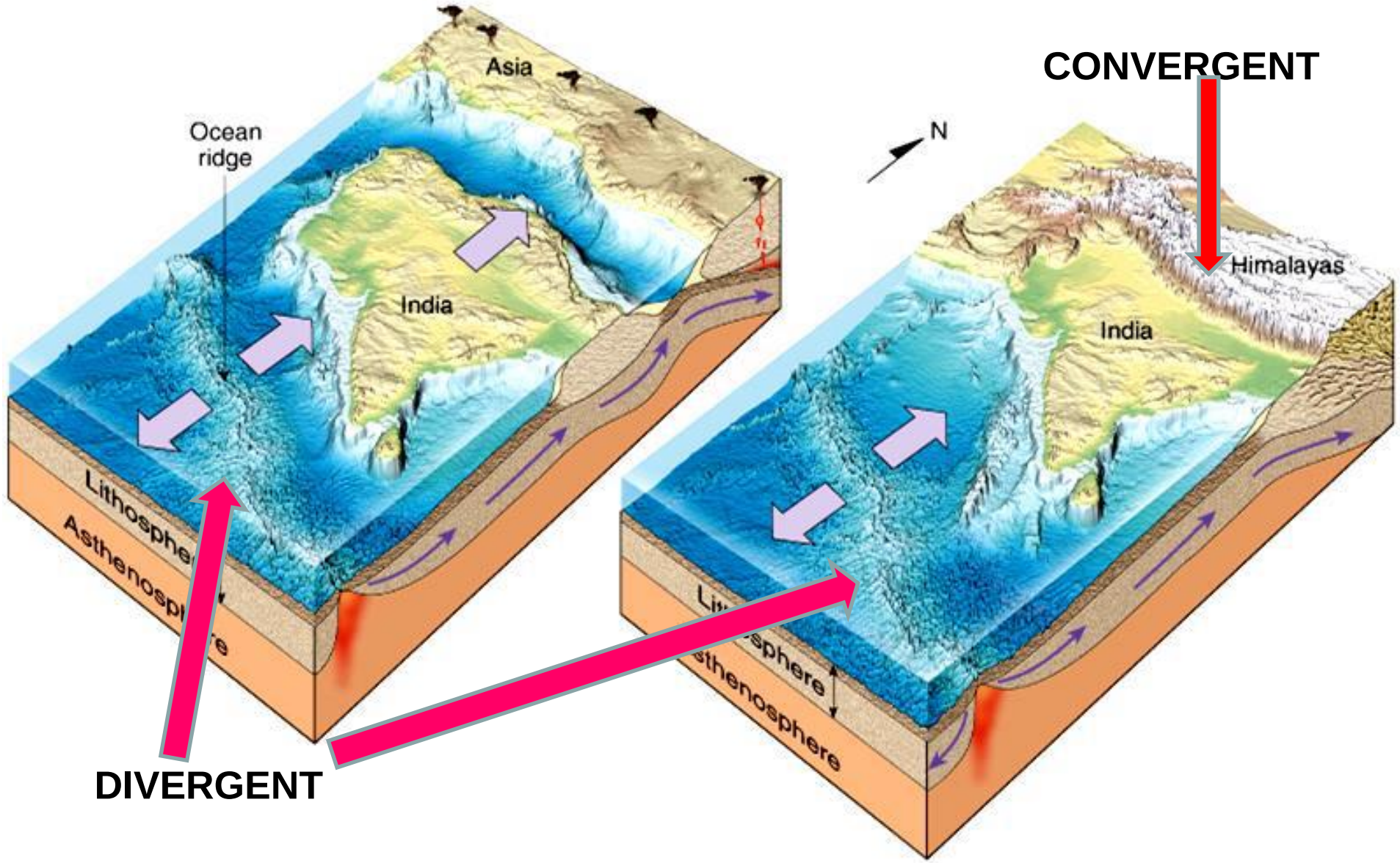
**Example**: San Andreas Fault

SO TO REVIEW

# Transform/Sliding Boundaries

- Fault lines – earthquakes
- Biggest Transformation Fault line in California – San Andreas Fault

**THE FORMATION OF ONE TYPE OF BOUNDARY OFTEN RESULTS IN THE FORMATION OF ANOTHER.**



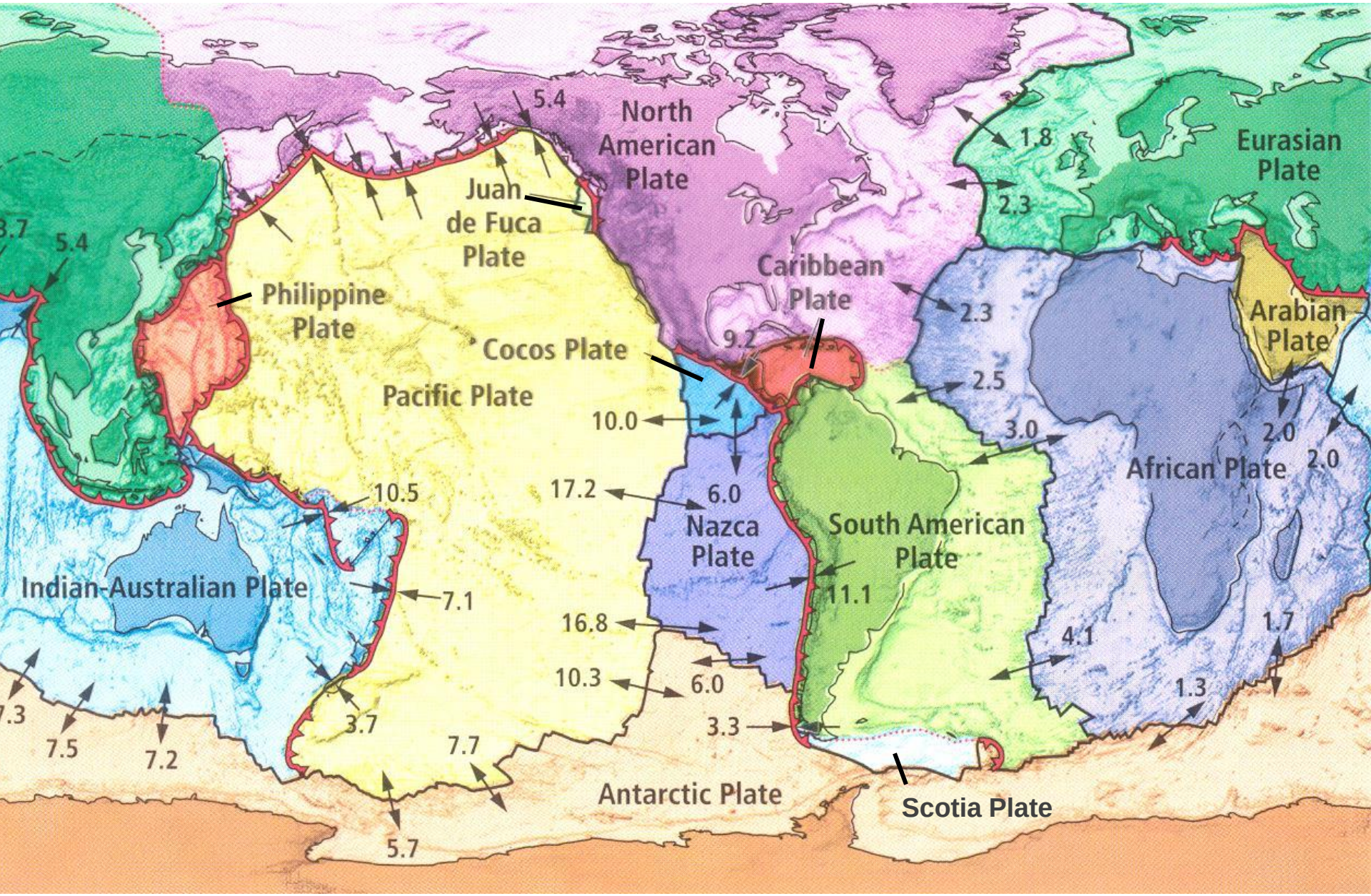



Plate movements are on the order of a few centimeters/year - about the same rate as your fingernails grow!