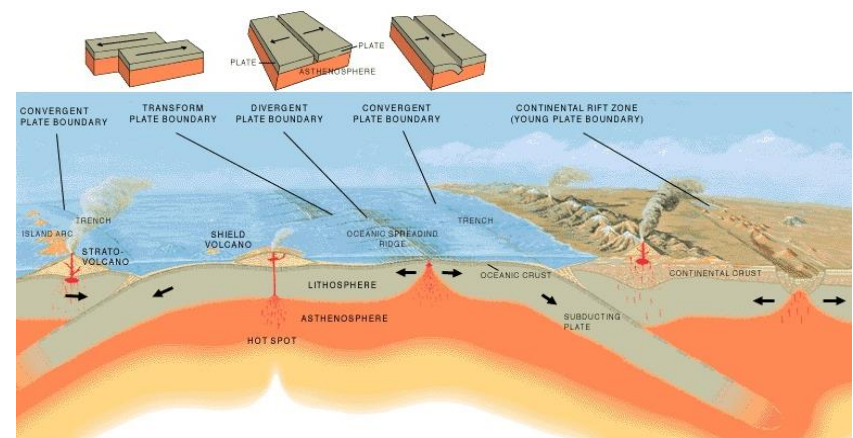
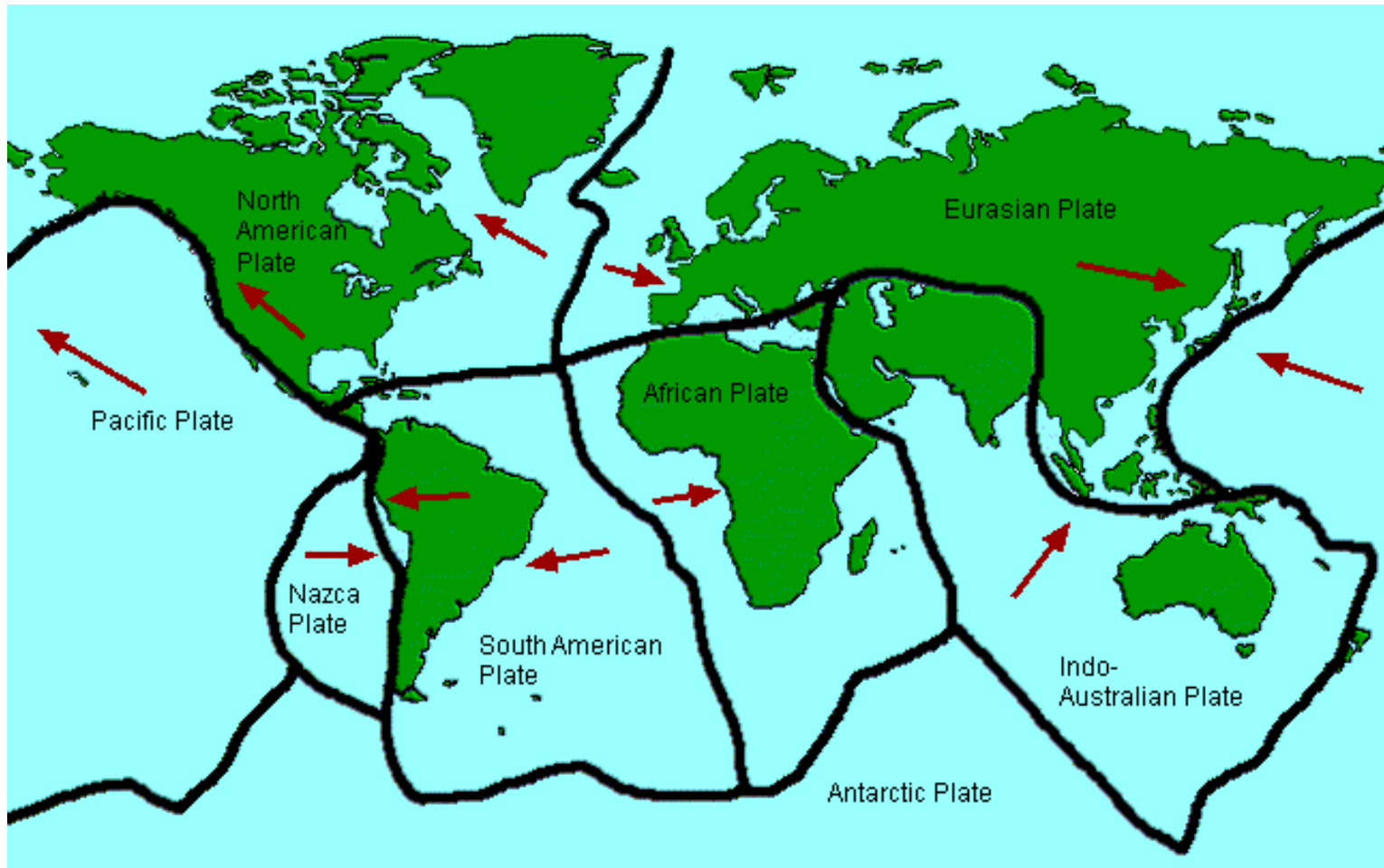


# Lithosphere *Part 2*



# Plate Tectonics

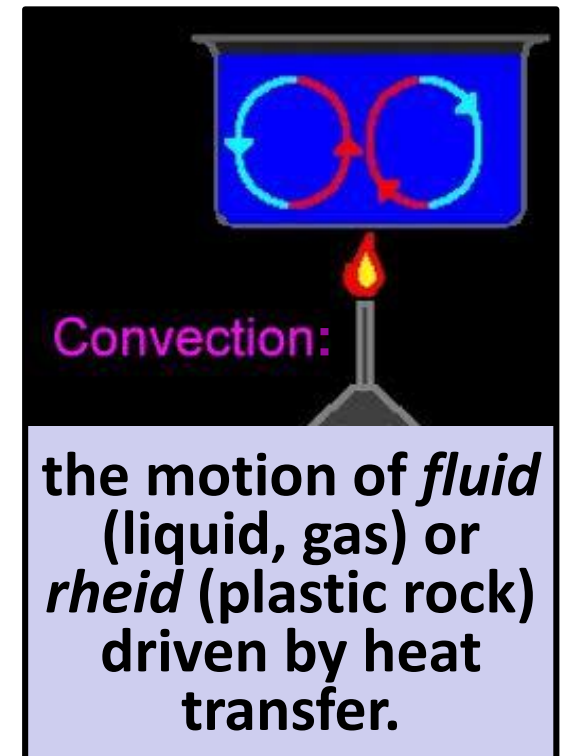
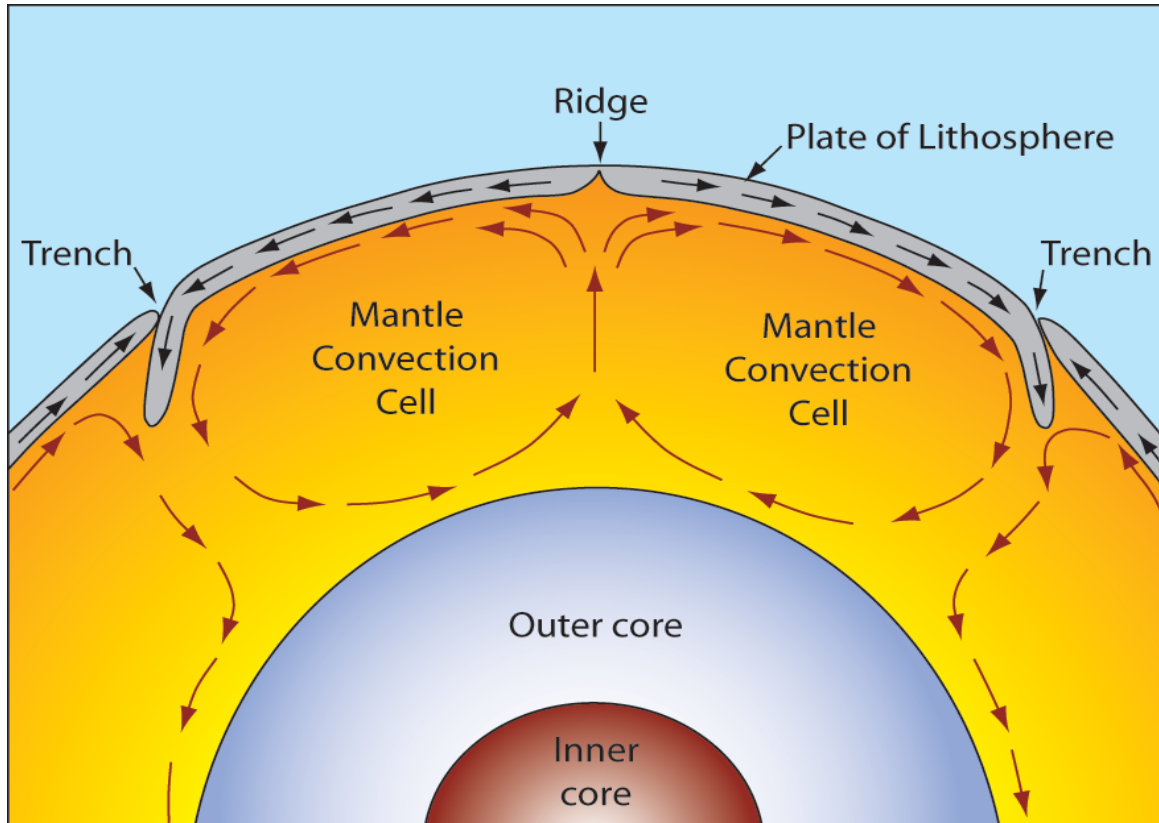
# Major Tectonic Plates



All tectonic plates **move** in different directions 1-2 inches per year.

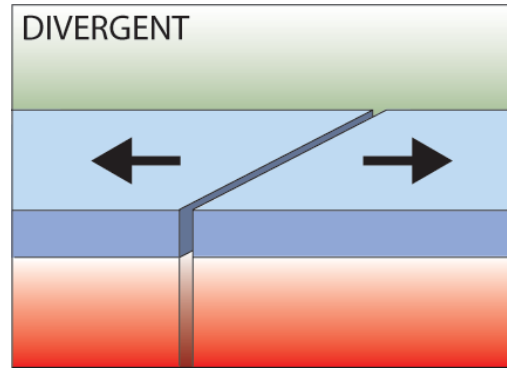
# How do Plates Move?

- The driving forces of plate motion still are active subjects of on-going research within geophysics.
- Leading theory: plates of lithosphere are moved around by **convection in the underlying hot mantle**.

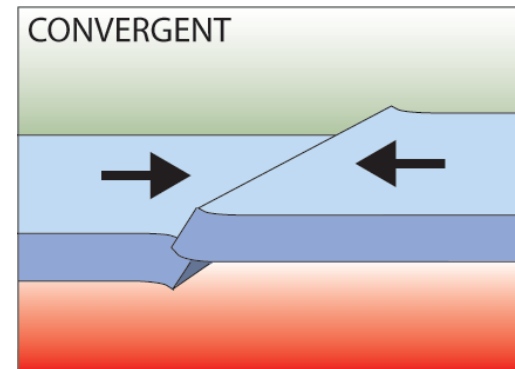


# Three types of plate boundary

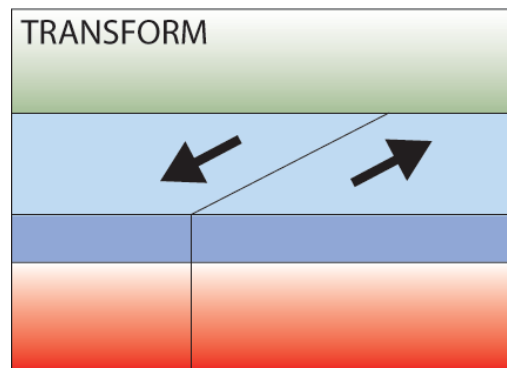
- **Divergent**



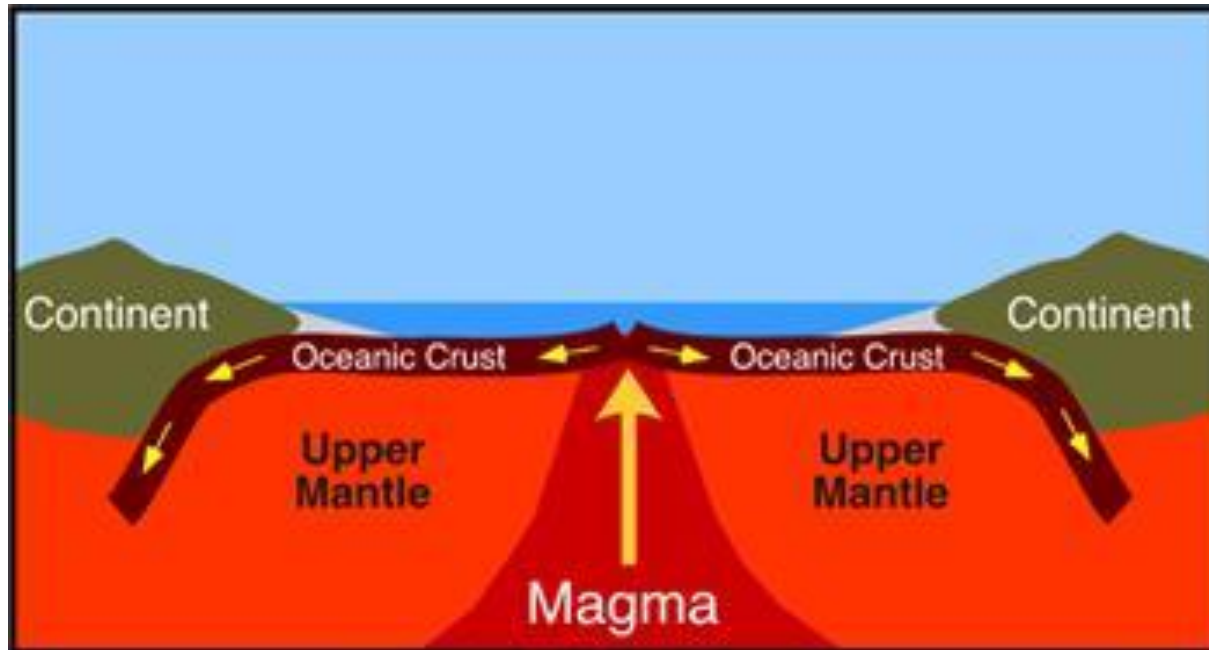
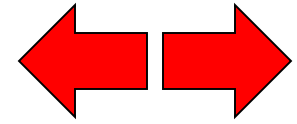
- **Convergent**



- **Transform**



# Divergent Boundaries



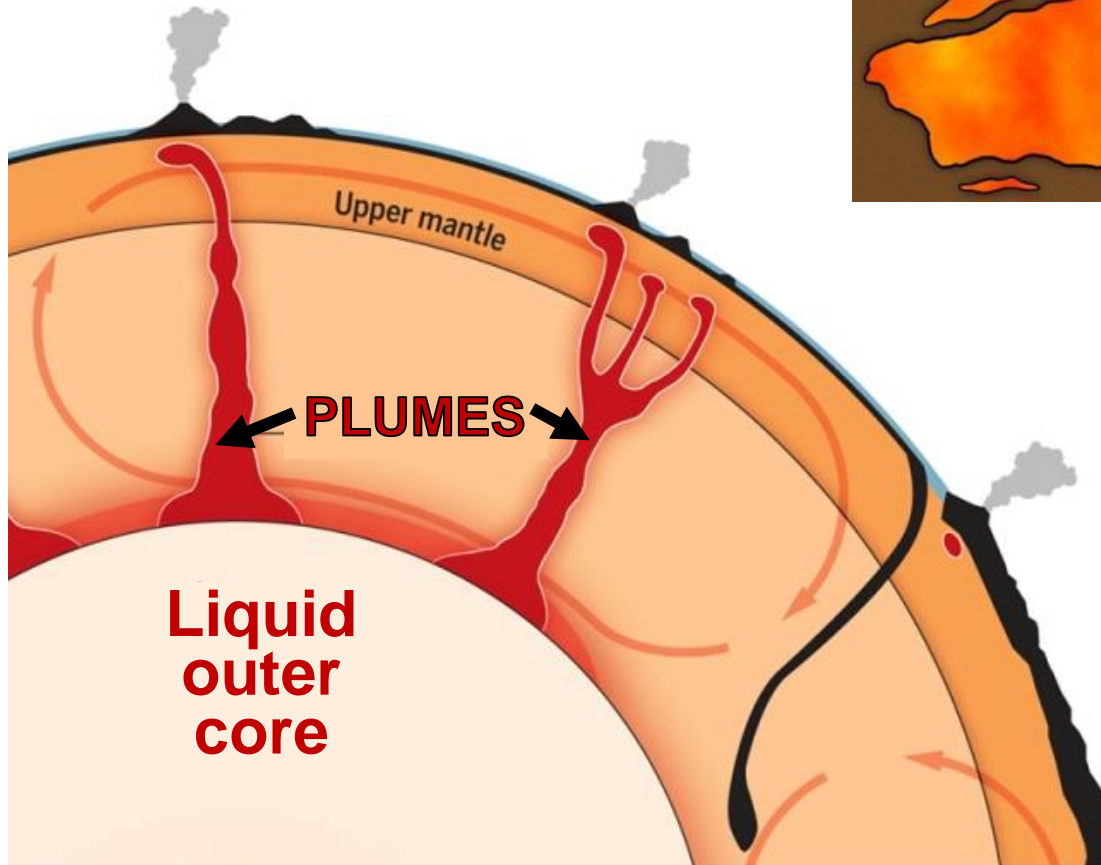
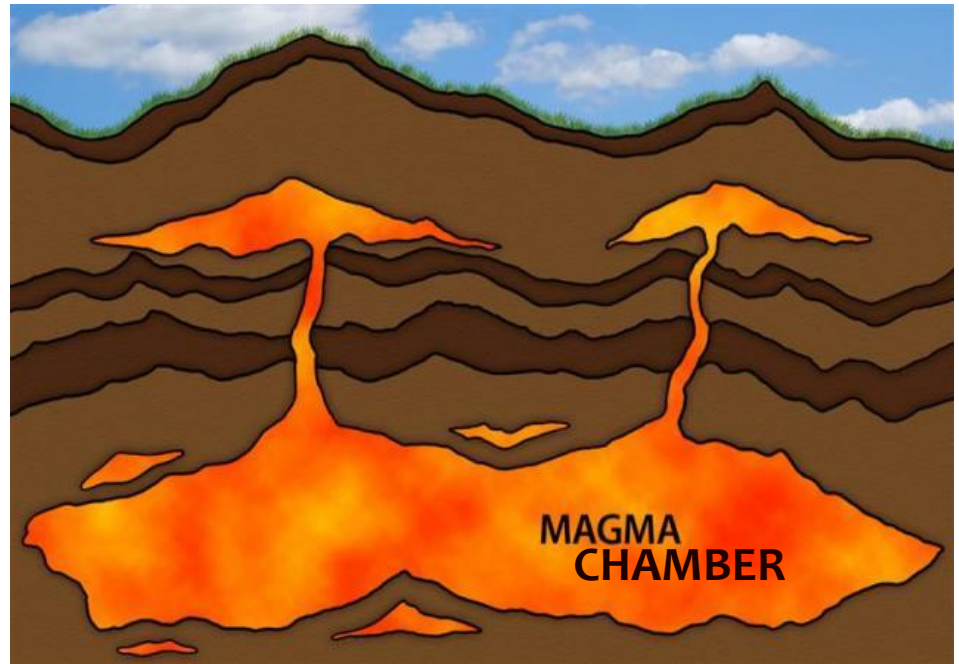
- **Spreading ridges:**
  - as plates **move apart**, new material is **erupted** to fill the gap
  - young crust is formed

**What is magma and where does it come from?**



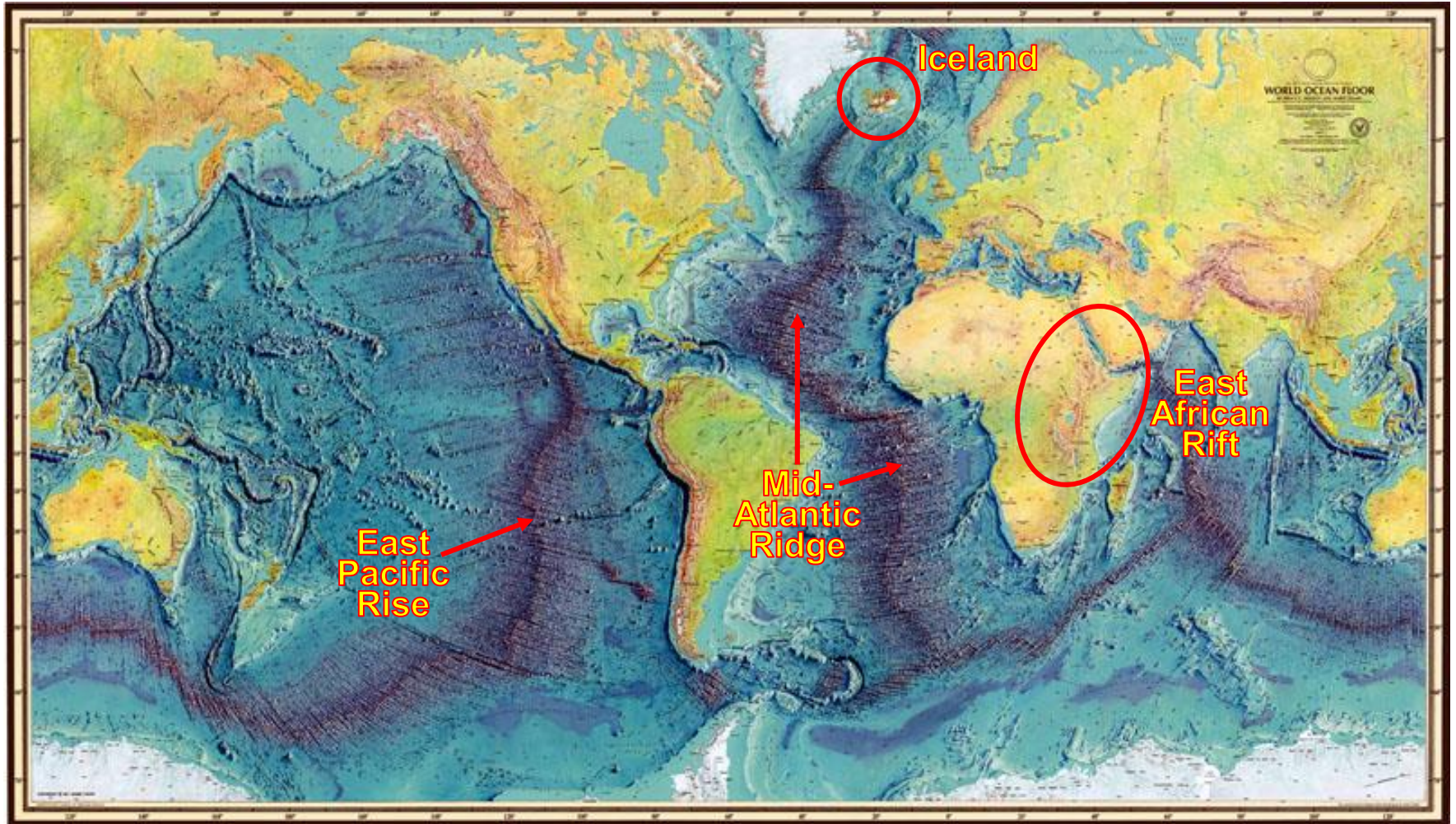
# Magma

- Partially molten rock found in high temperature, low pressure environments beneath the Earth's surface.



- Develops and collects in **magma chambers** usually within several miles of the Earth's surface.
- May also rise in **mantle plumes** directly from the outer core/mantle boundary.

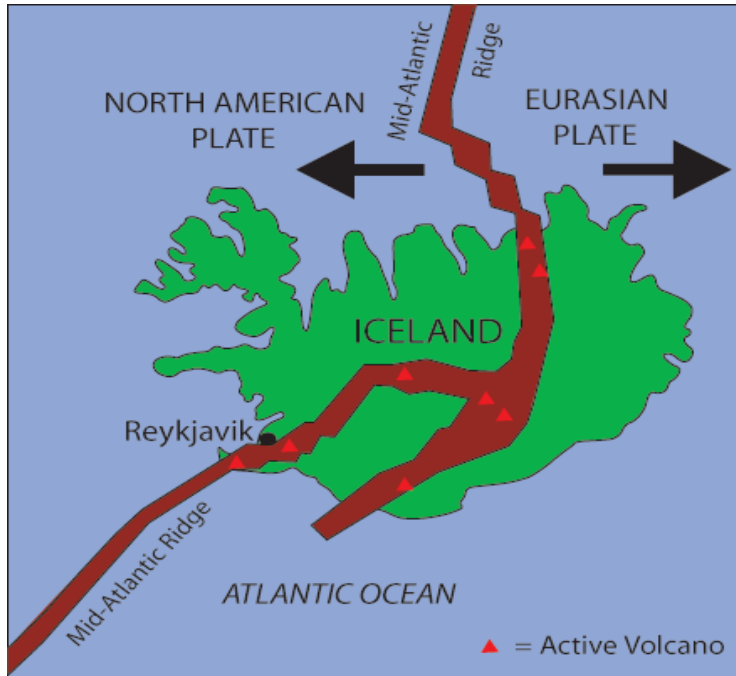
# World's Ocean Ridges and Continental Rifts



The ocean floor is not flat. It has well-pronounced mountain ridges running along the spreading plate boundaries.



# Iceland: an example of continental drift



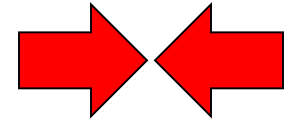
Iceland has a ***divergent plate boundary*** running through its middle.

In fact, the island exists because of this feature!



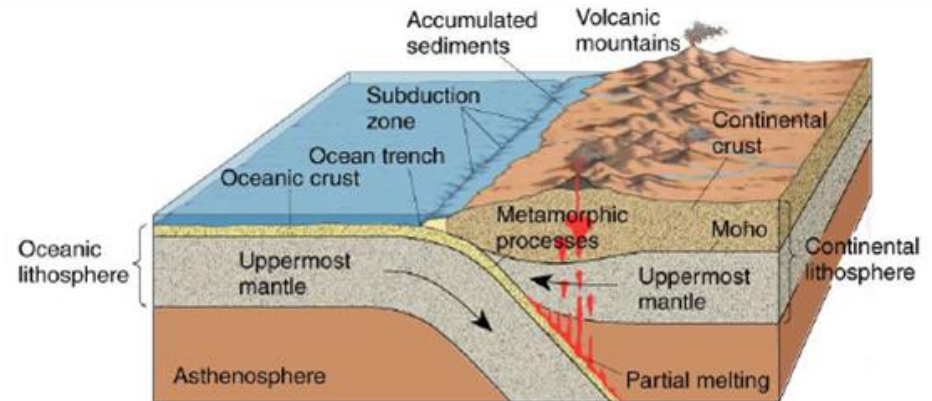


# Convergent Boundaries

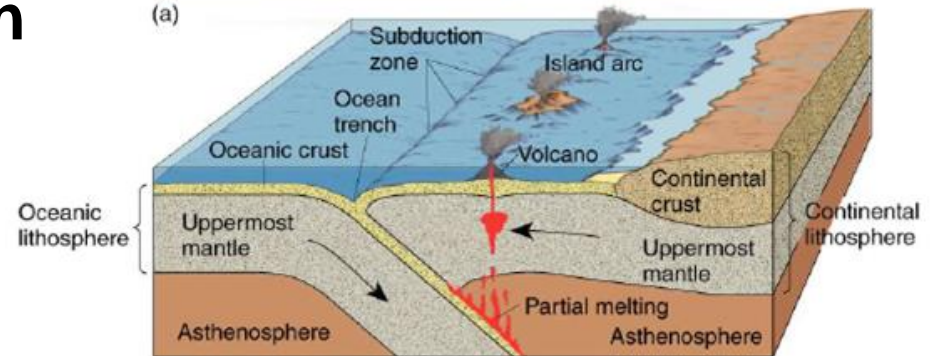


Three types:

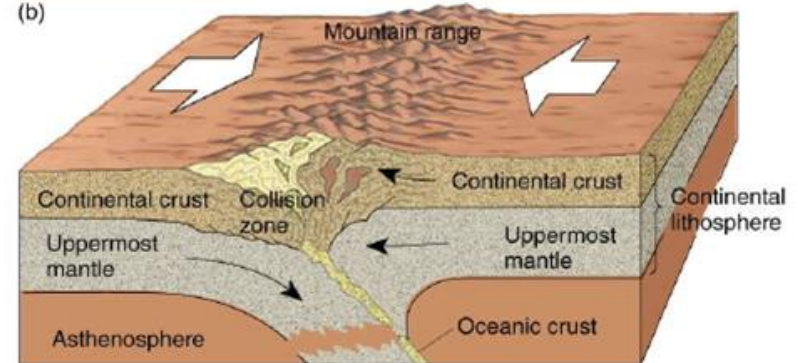
- a) **Continent-oceanic** crust collision
- b) **Ocean-ocean** collision
- c) **Continent-continent** collision



(a)



(b)



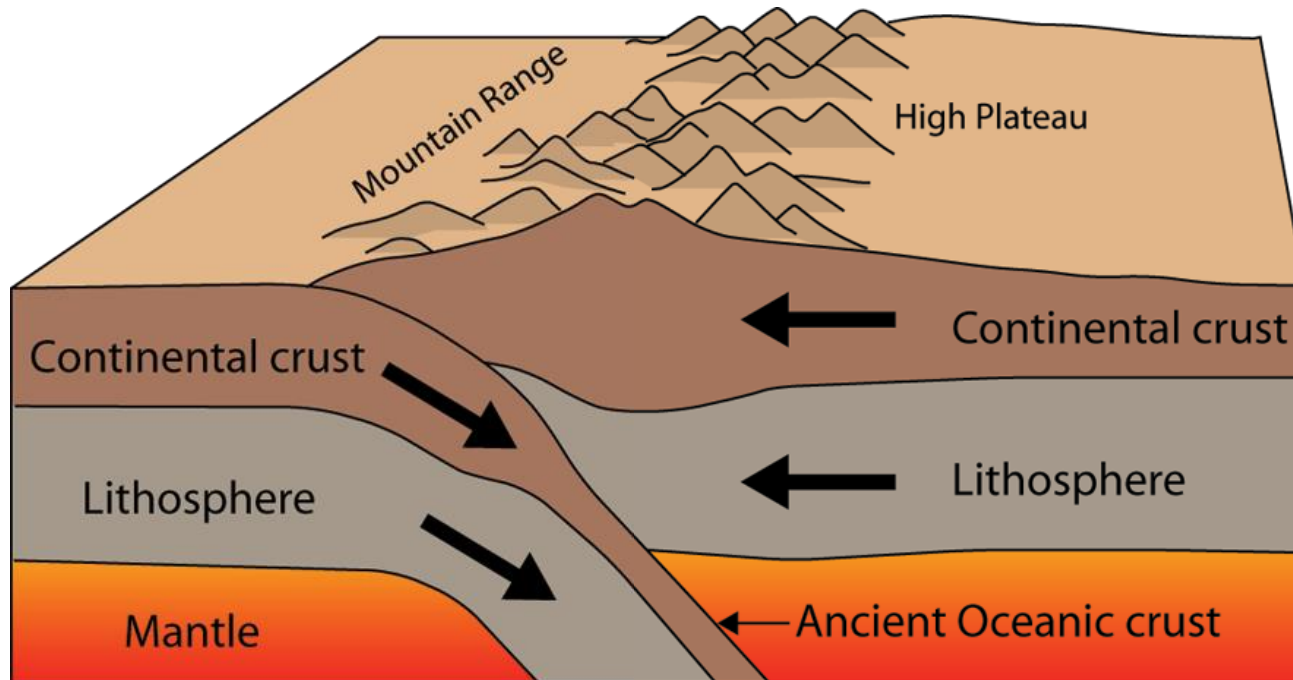
(c)

Convergent boundaries are also called destructive plate boundaries.

Why?

# Continent-Continent Collision

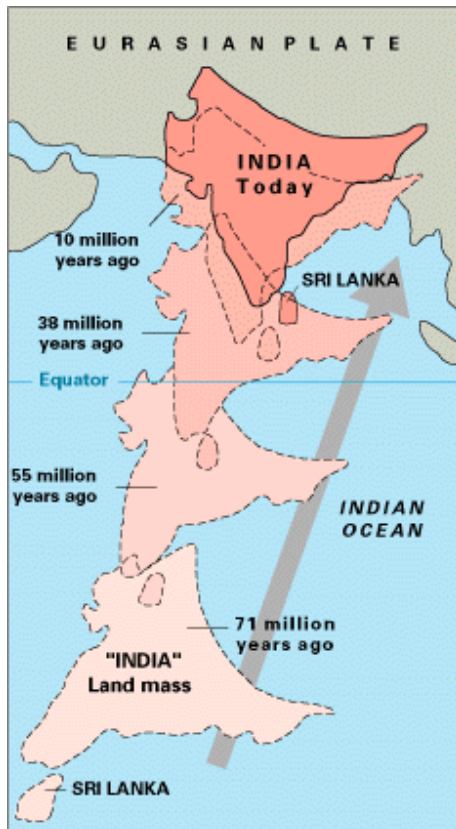
- Plates push against each other



- **Forms mountains** (European Alps, Himalayas)

# Himalayas

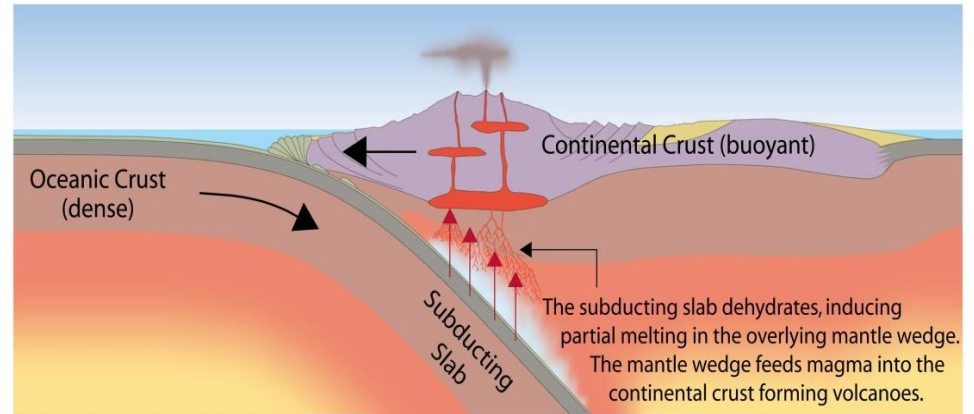
Himalayan range is home to more than one hundred mountains exceeding 7,200 m (23,600 feet) in elevation, and all of the planet's peaks exceeding 8,000 m, including the highest, Mount Everest.





# Continent-Oceanic Crust Collision

## “Subduction”

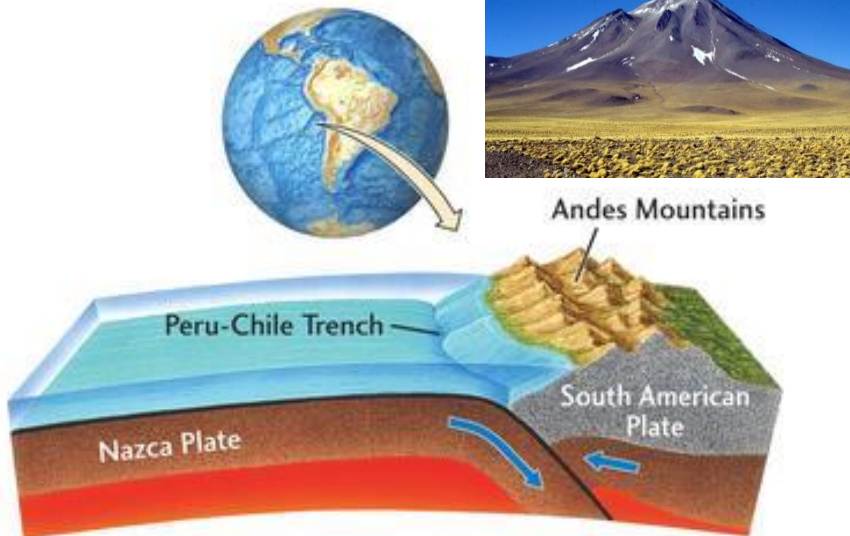


- **Oceanic** lithosphere subducts underneath the **continental** lithosphere.

- As it subsides, oceanic lithosphere heats and dehydrates.

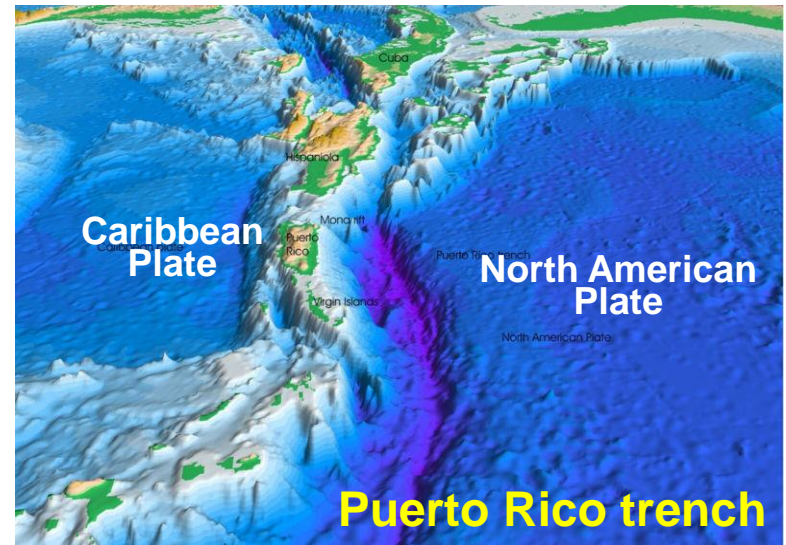
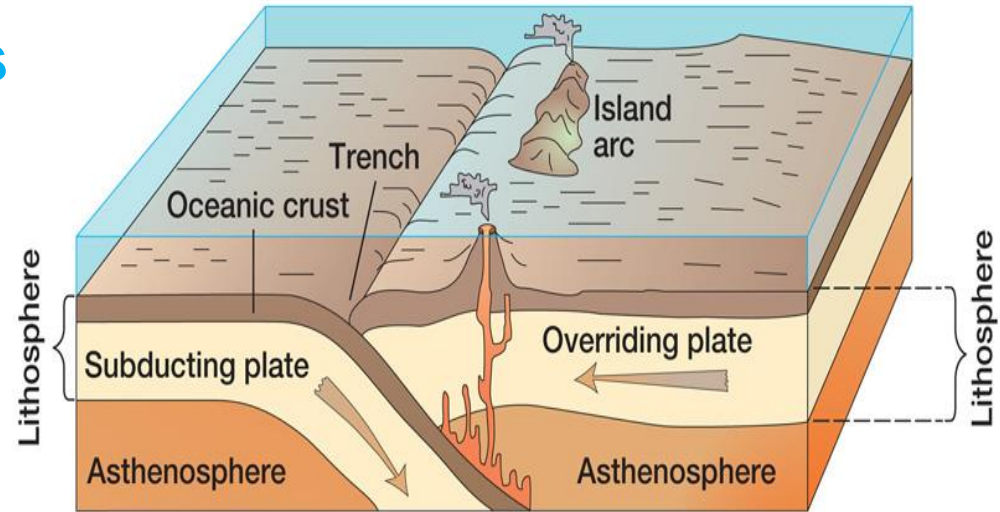
- The melt from mantle rises forming **volcanism**.

- Example: the Andes.



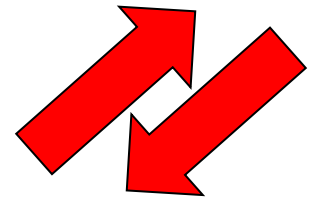
# Ocean-Ocean Plate Collision

- When **two oceanic plates collide**, the **younger one runs over the older one** which causes it to sink into the mantle forming a **subduction zone**.
- The subducting plate is bent downward to form a **very deep depression** in the ocean floor called a **trench**.
- **Volcanic island arc** is usually formed fairly close to, but not right next to, the trench.  
(ex: Mariana Islands, Aleutian Islands, Solomon Islands, Lesser Antilles)

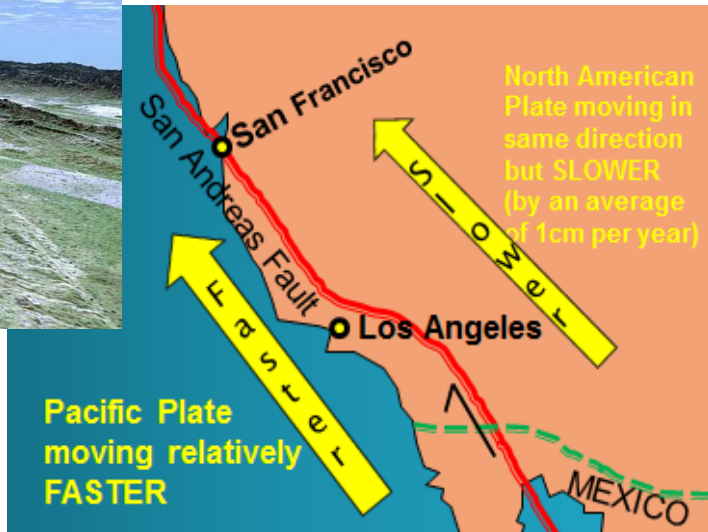
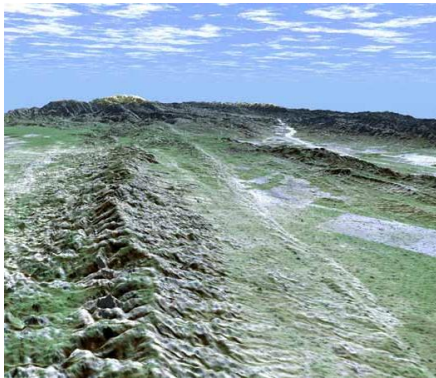
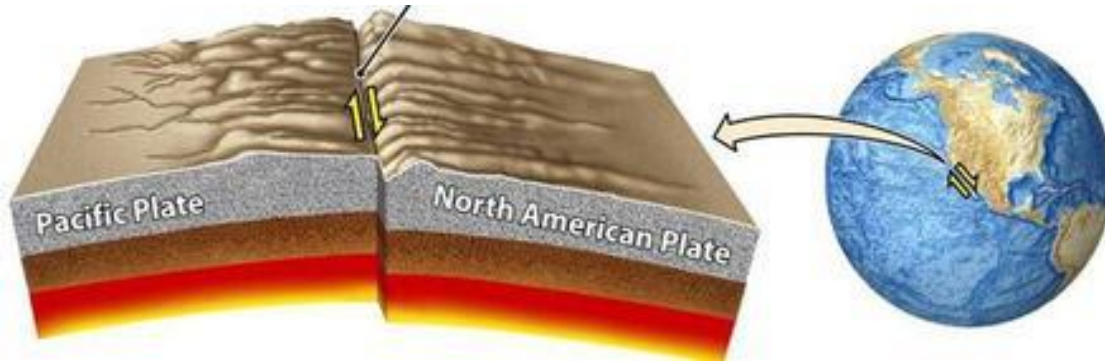




# Transform Boundaries



- Plates slide past each other



## San Andreas Transform Fault



# What are the consequences of the tectonic plates movement?

- **Landscape formation**
- **Volcano formation**
- **Orogeny (mountain formation)**
- **Earthquakes**
- **Tsunami formation**



# The Pacific Ring of Fire

