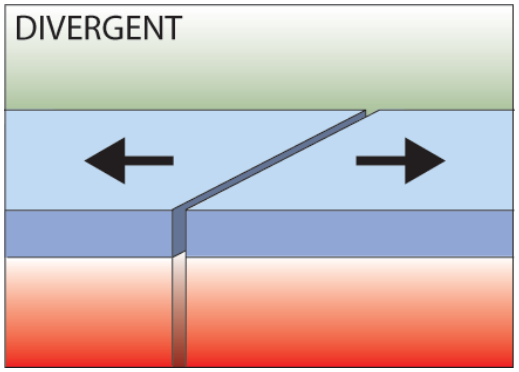
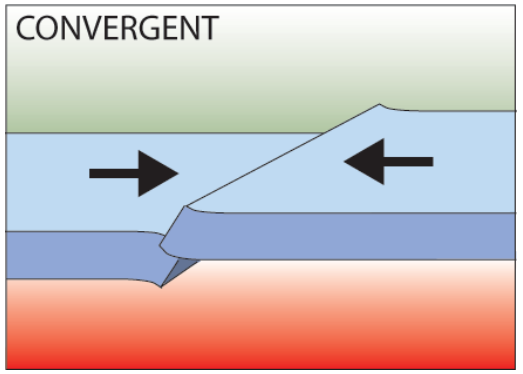
Three types of plate boundary

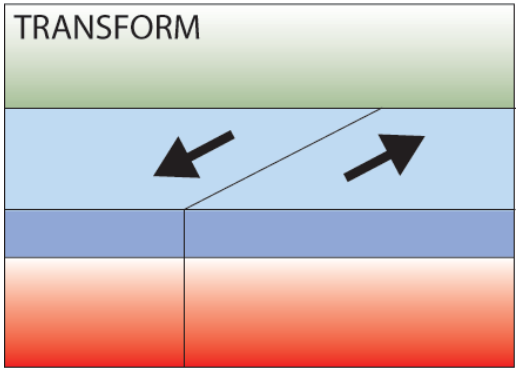
- **Divergent**



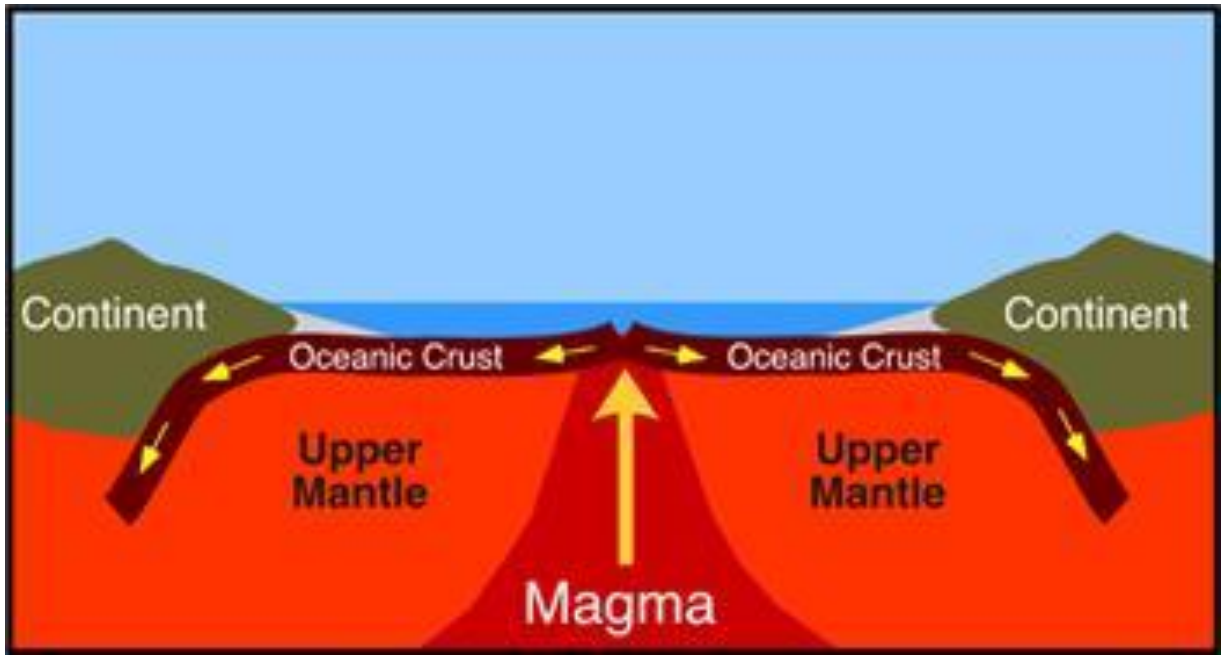
- **Convergent**



- **Transform**



Divergent Boundaries

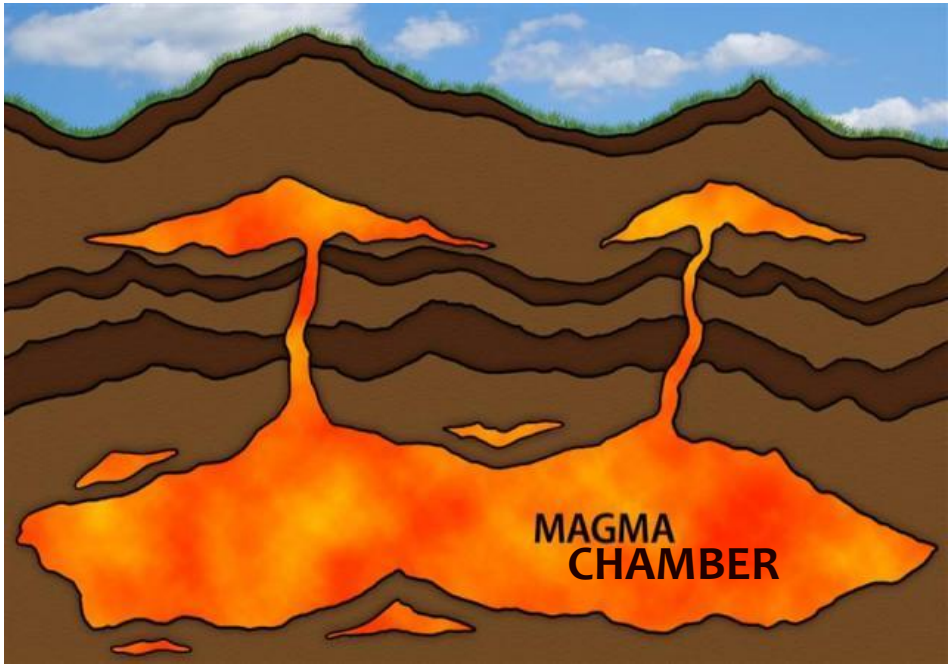


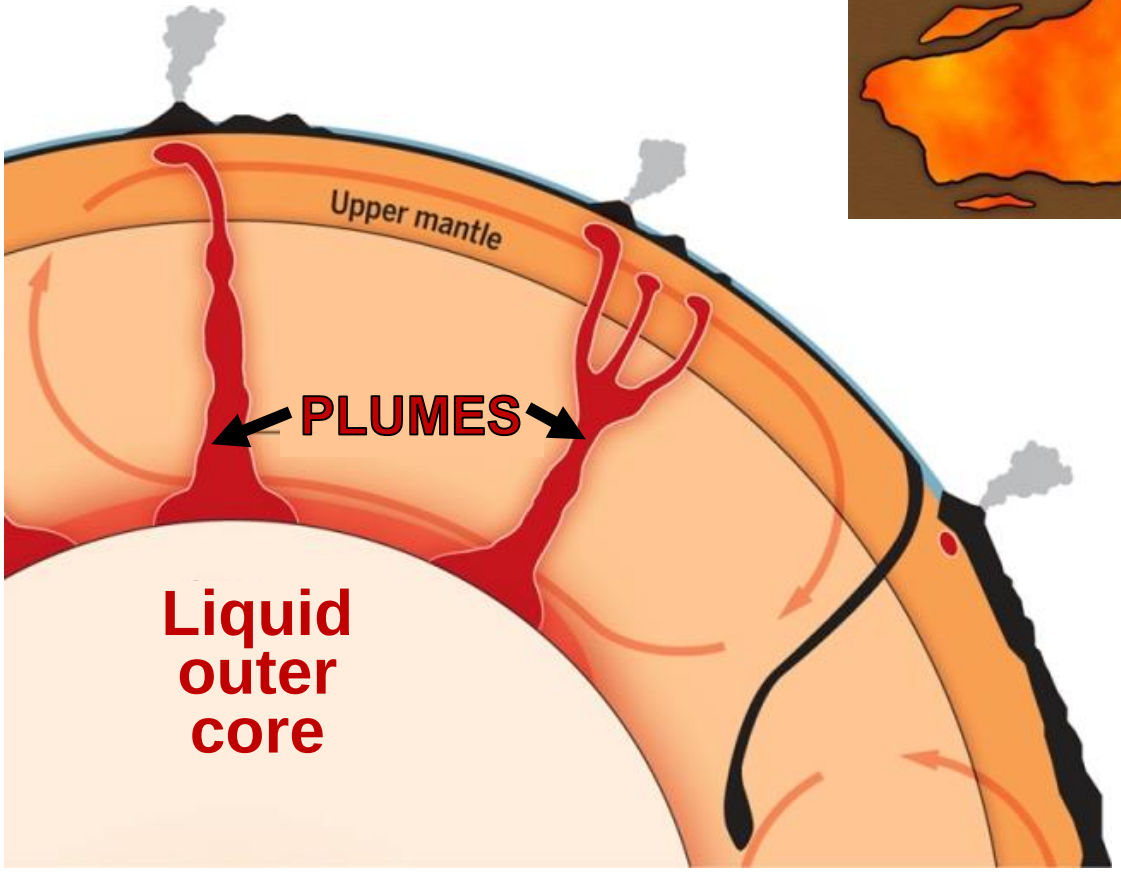
- **Spreading ridges:**
  - **as plates move apart, new material is erupted to fill the gap**
  - **young crust is formed**

What is magma and where does it come from?

Magma

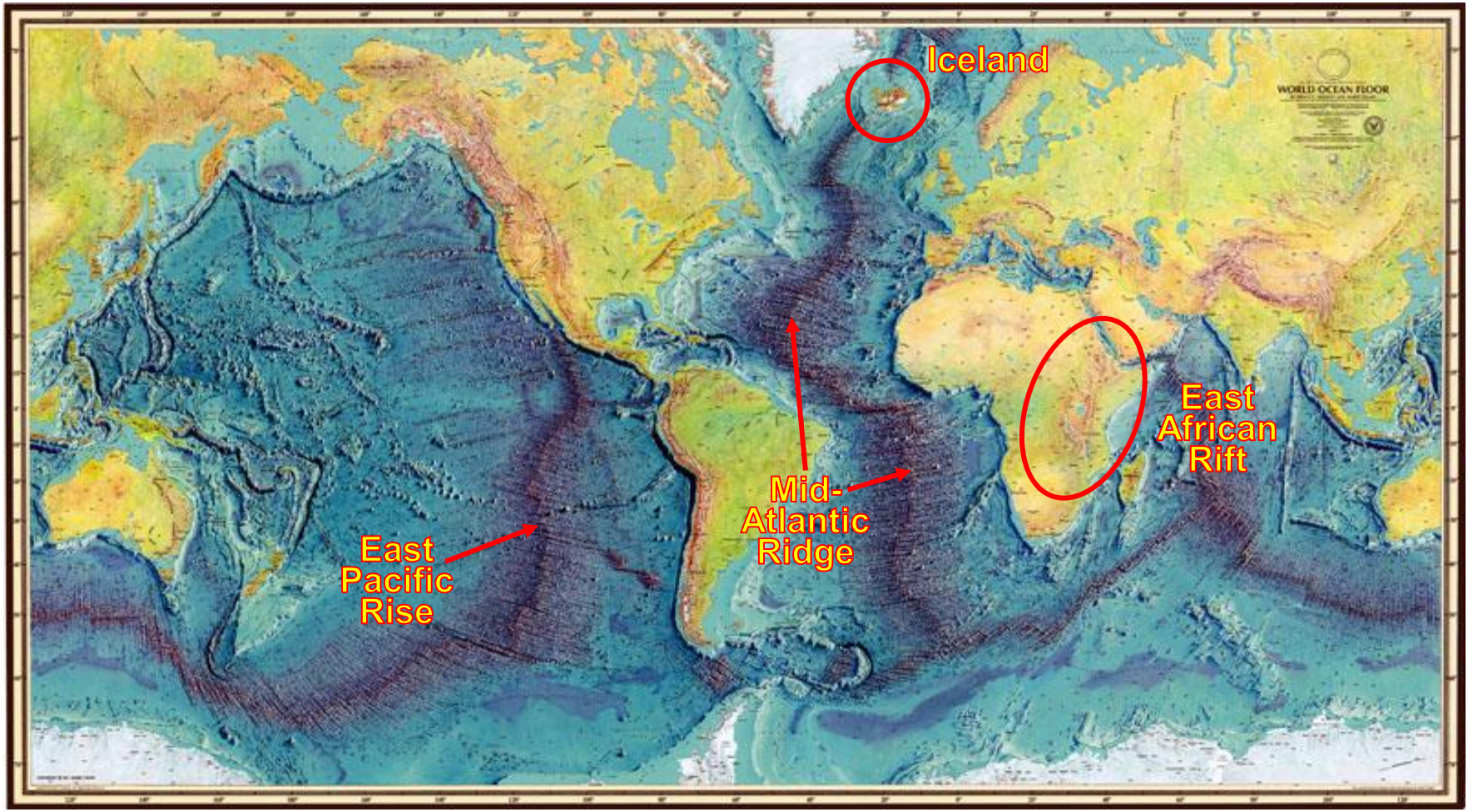
- **Partially <u>molten rock</u> found in high temperature, low pressure environments beneath the Earth's surface.**





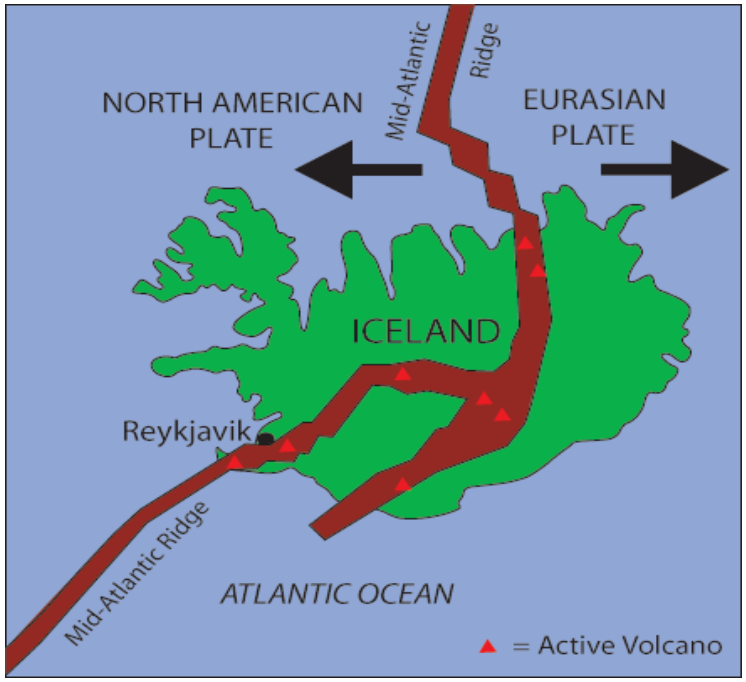
- **Develops and collects in magma chambers usually within several miles of the Earth's surface.**
- **May also rise in mantle plumes directly from the outer core/mantle boundary.**

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:

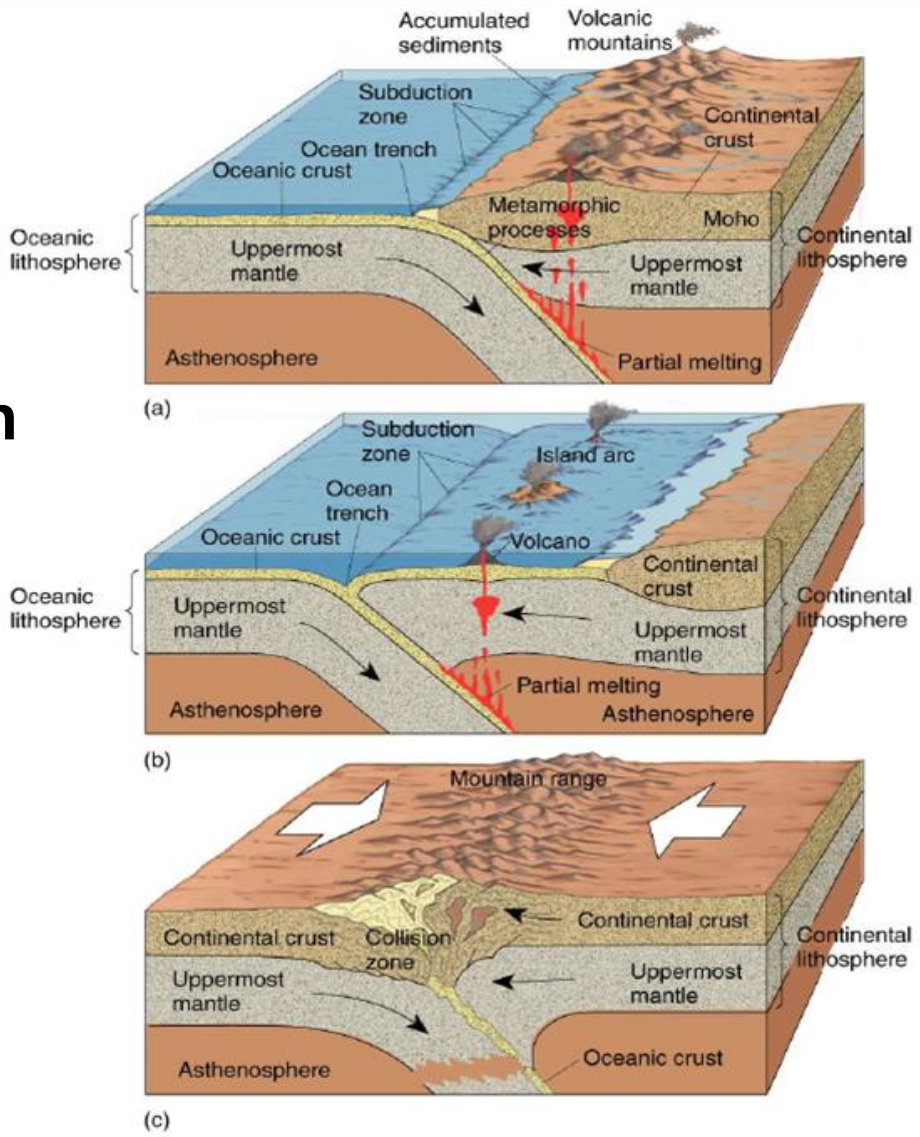
a) **Continent-oceanic crust collision**

b) **Ocean-ocean collision**

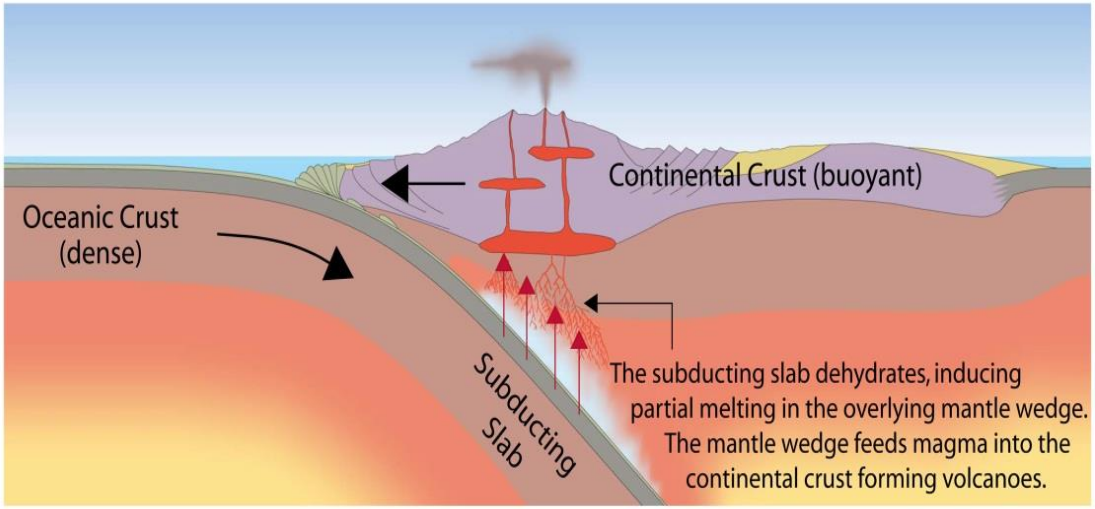
c) **Continent-continent collision**

Convergent boundaries are also called <u>destructive plate boundaries</u>.

Why?

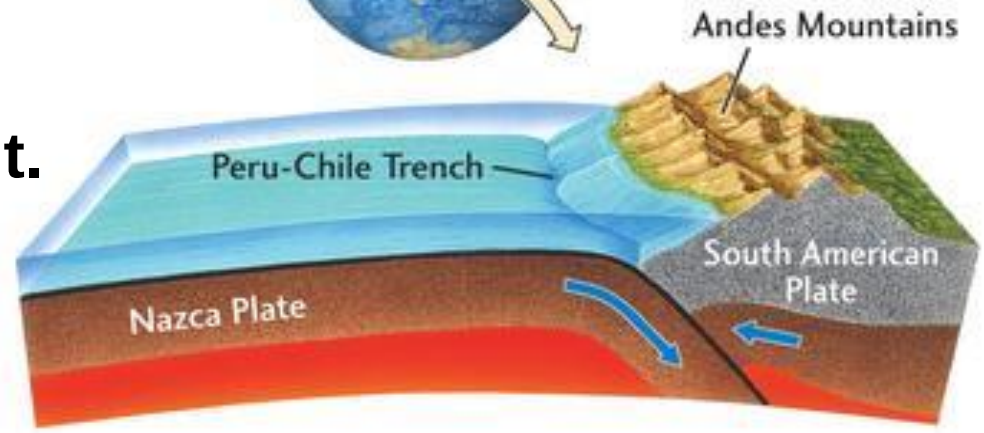


Continent-Oceanic Crust Collision



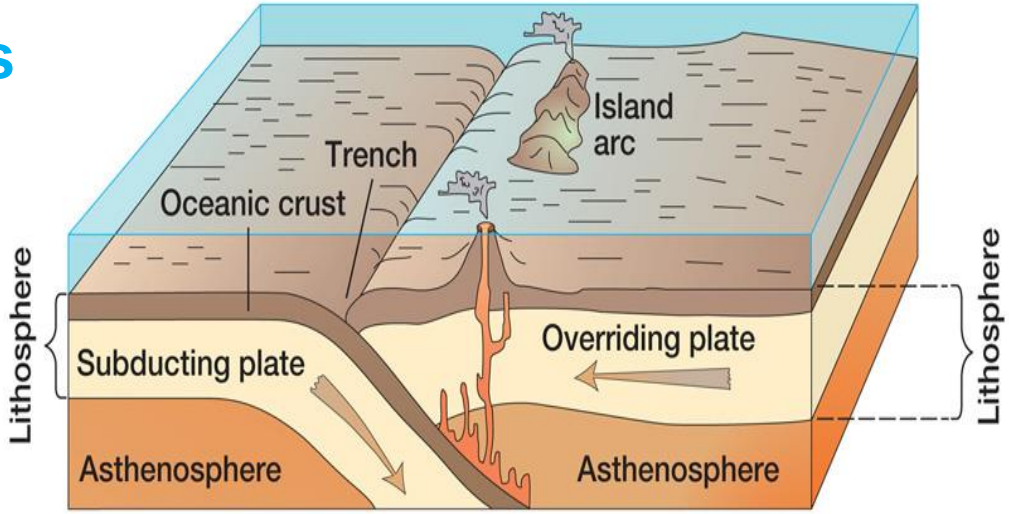
"Subduction"- the *denser* plate moves *under* the *less dense* one

- **Oceanic lithosphere subducts underneath the continental.**
- **As it subsides, oceanic lithosphere slab heats and induces mantle melt.**
- **This results in volcanic mountains formation (example: The Andes).**



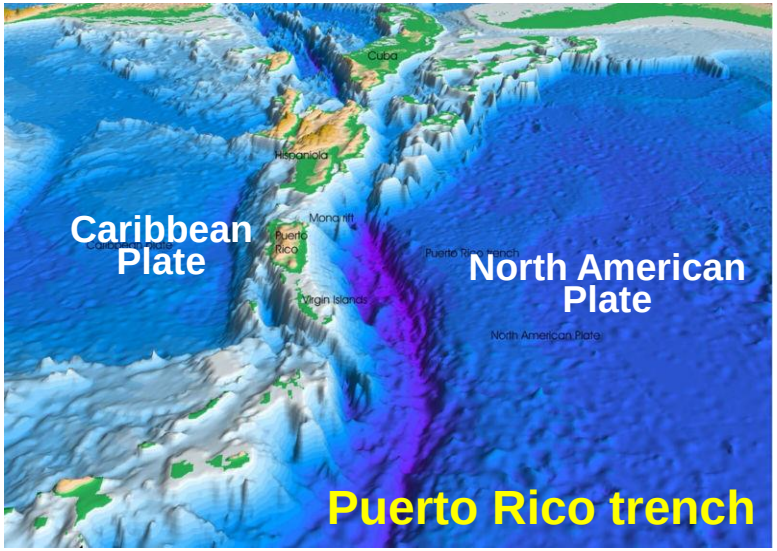
Ocean-Ocean Plate Collision

- **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.**

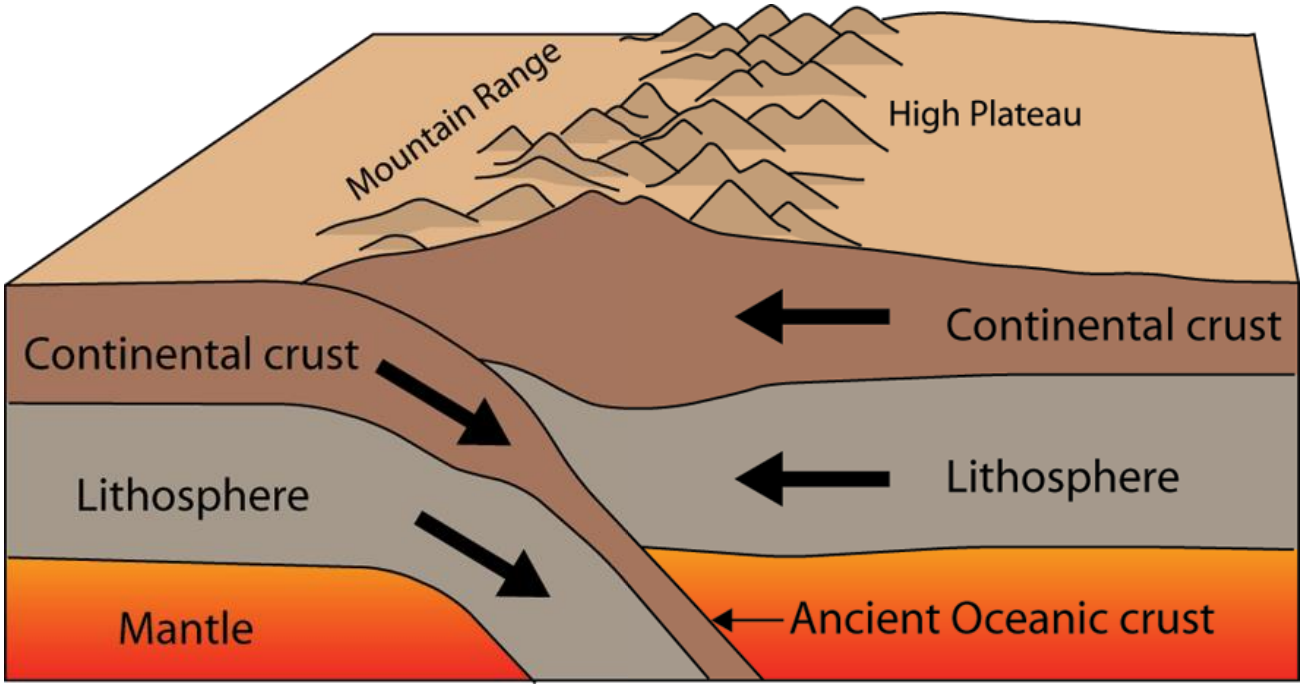
- **Volcanic island arc is usually formed fairly close to, but not right next to, the trench.**
  (ex: Mariana Islands, Aleutian Islands, Solomon Islands, Lesser Antilles)



Continent-Continent Collision

- **Plates <u>push against</u> each other**

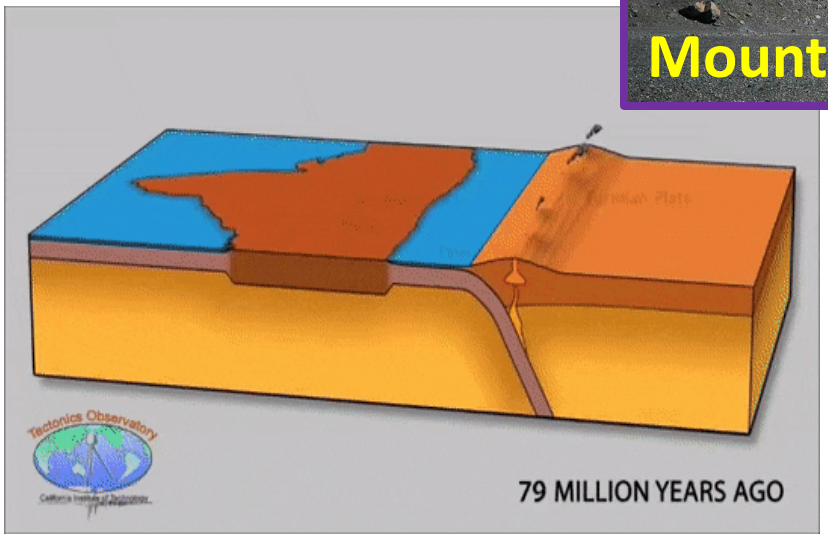
the crust buckles and cracks, pushing up (and down into the mantle)



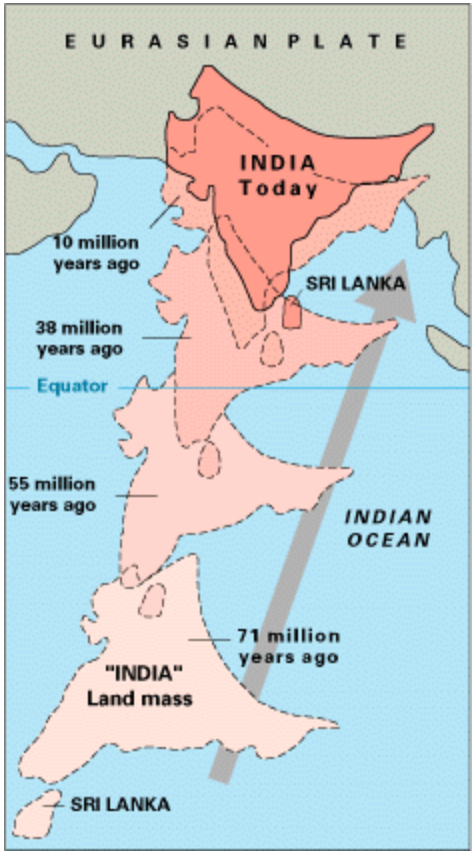
- **Forms mountains (European Alps, Himalayas) and high plateaus**

Himalayan Range is home to more than

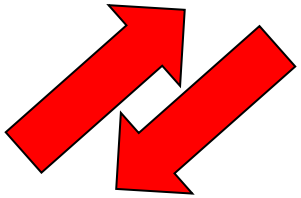
one hundred mountains exceeding 7,200 m (23,600 feet) in elevation, and all the planet's peaks exceeding 8,000 m, including the highest, Mount Everest.



Currently standing at 8,848.86 m (29,031.7 ft) Mount Everest still *grows* ~4 mm/year!

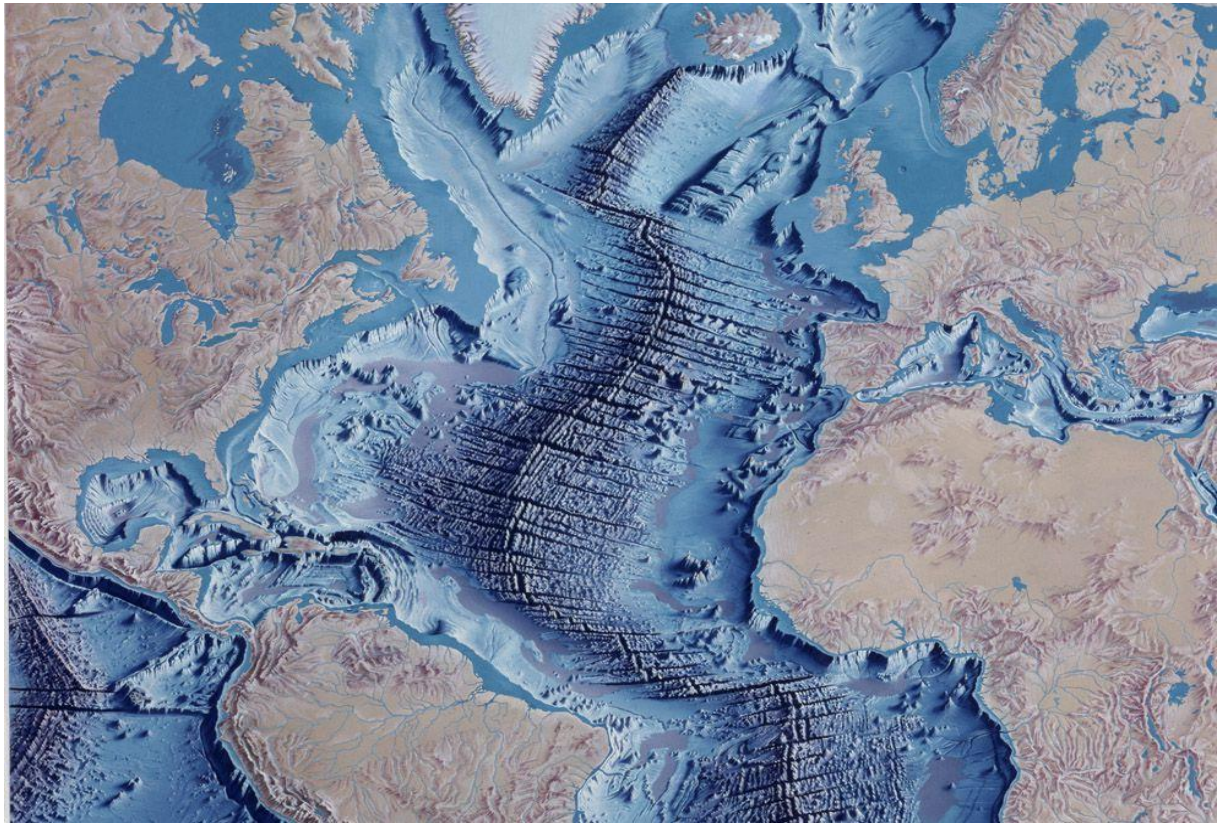


Transform (Boundaries) Faults



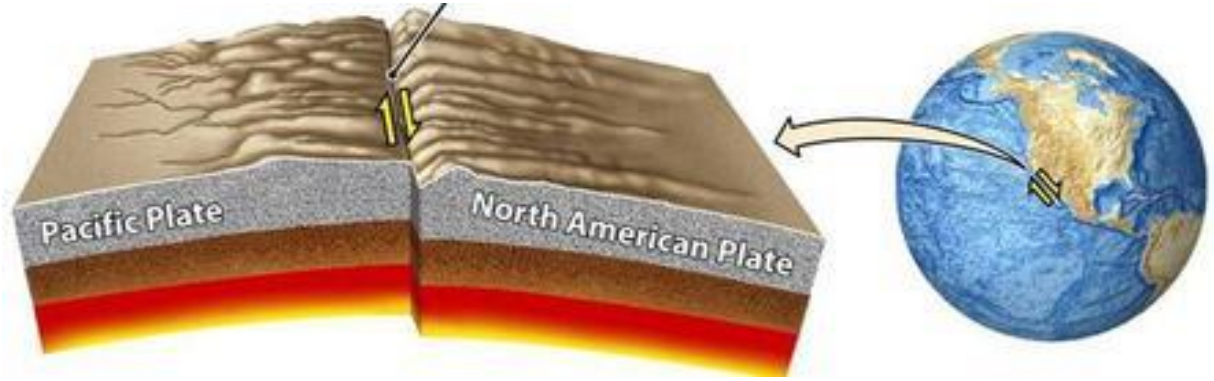
Plates slide past each other

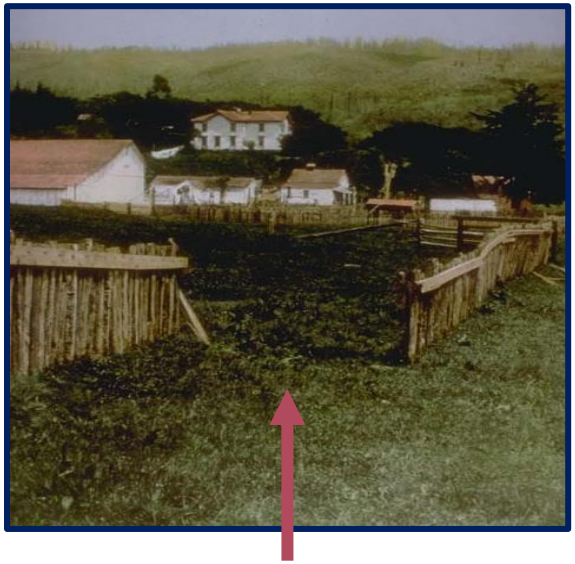
- Commonly found along mid-ocean ridges (between ridge segments that are moving at different rates).
- Less common on land.



- Termed *conservative boundaries*, since *rock is neither created nor destroyed but only shifted.*

San Andreas Transform Fault





Fence offset resulting from ground shift

What are the consequences of the tectonic plates' movement?

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