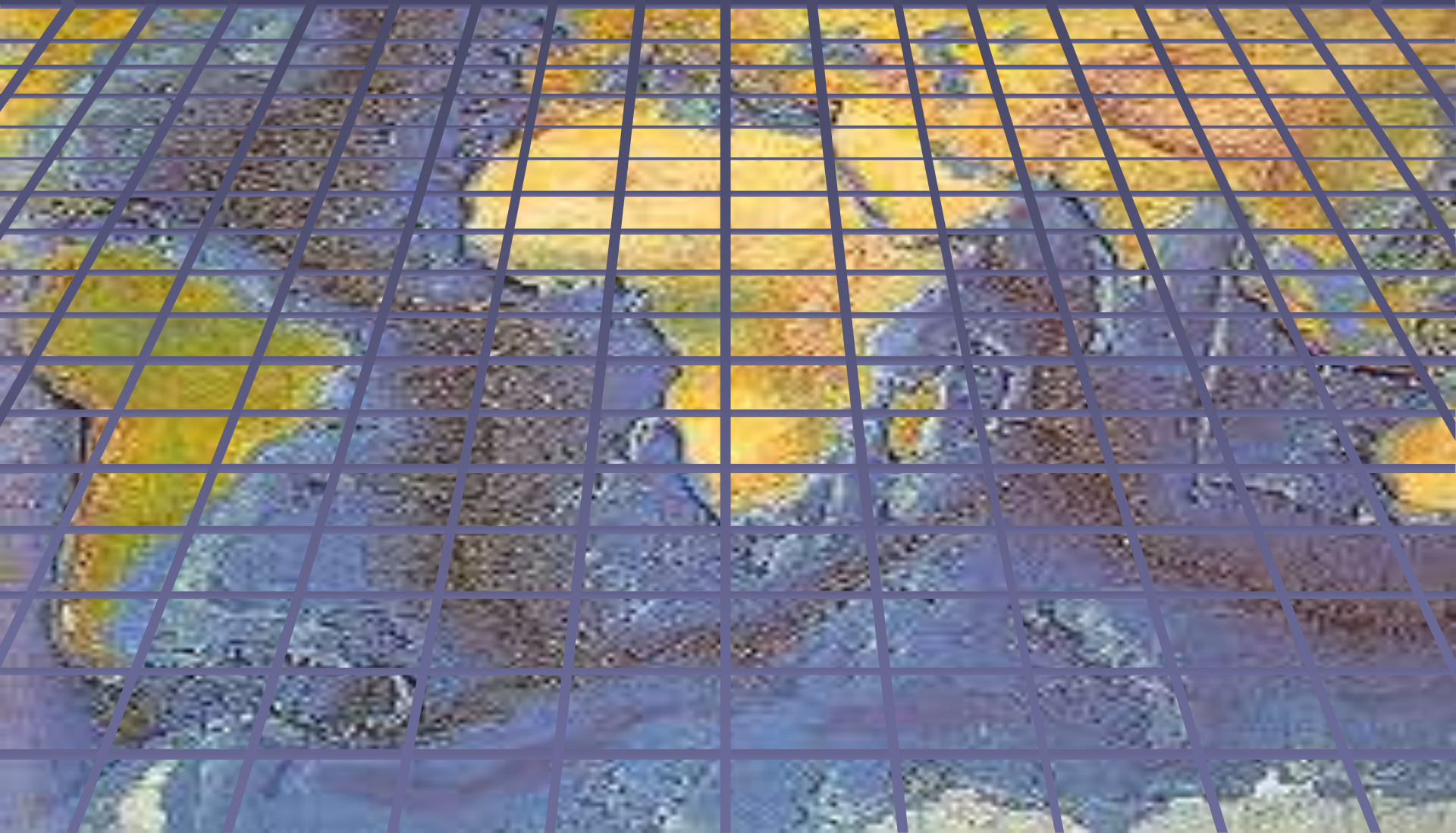
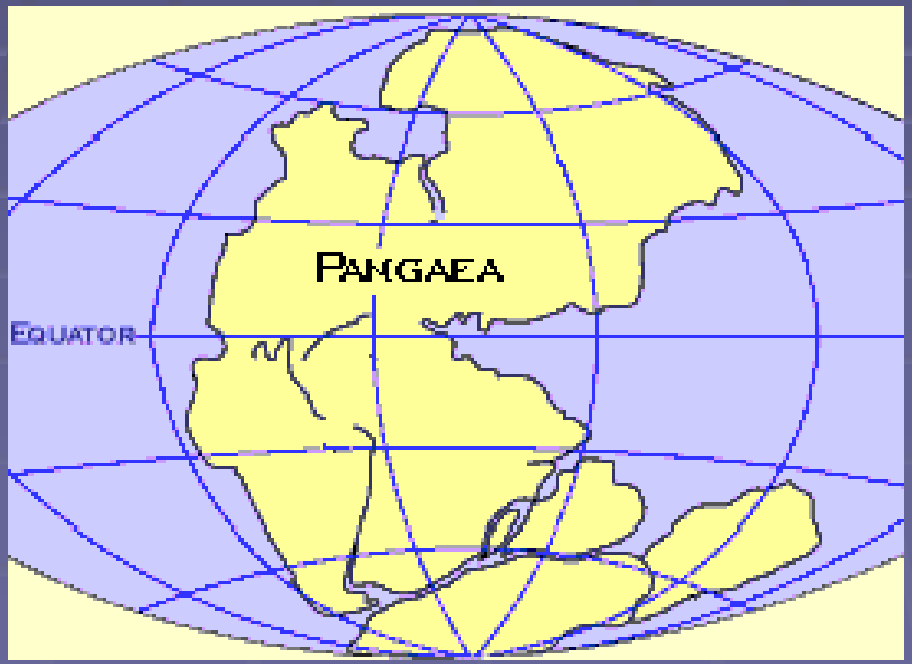
Plate Tectonics

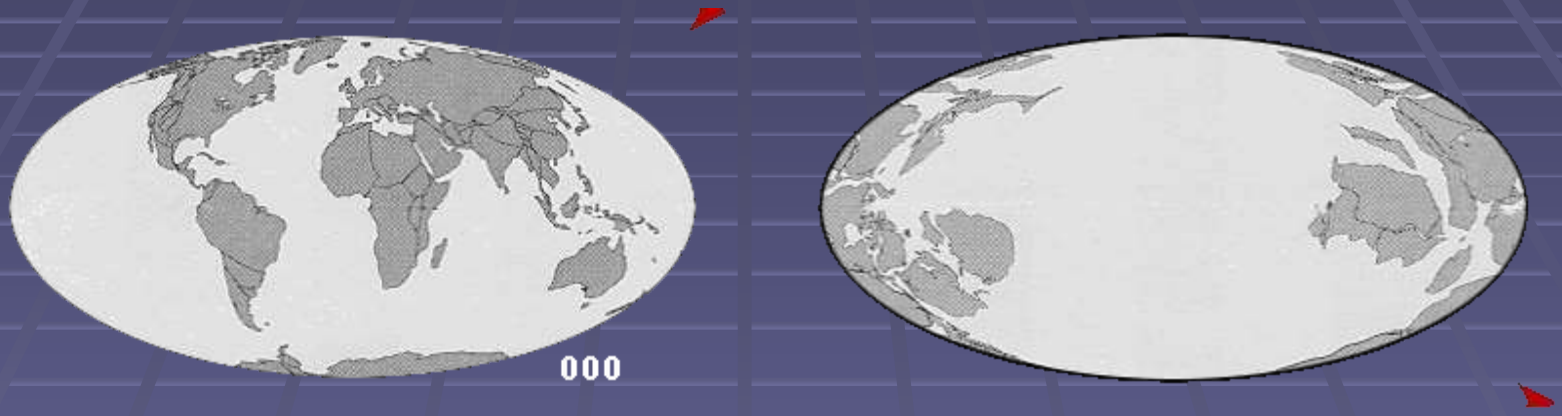


In 1912 **Alfred Wegener** proposed **Continental Drift**

- the continents have moved over time
- the continents were part of one giant landmass named **Pangaea**.



Pangaea



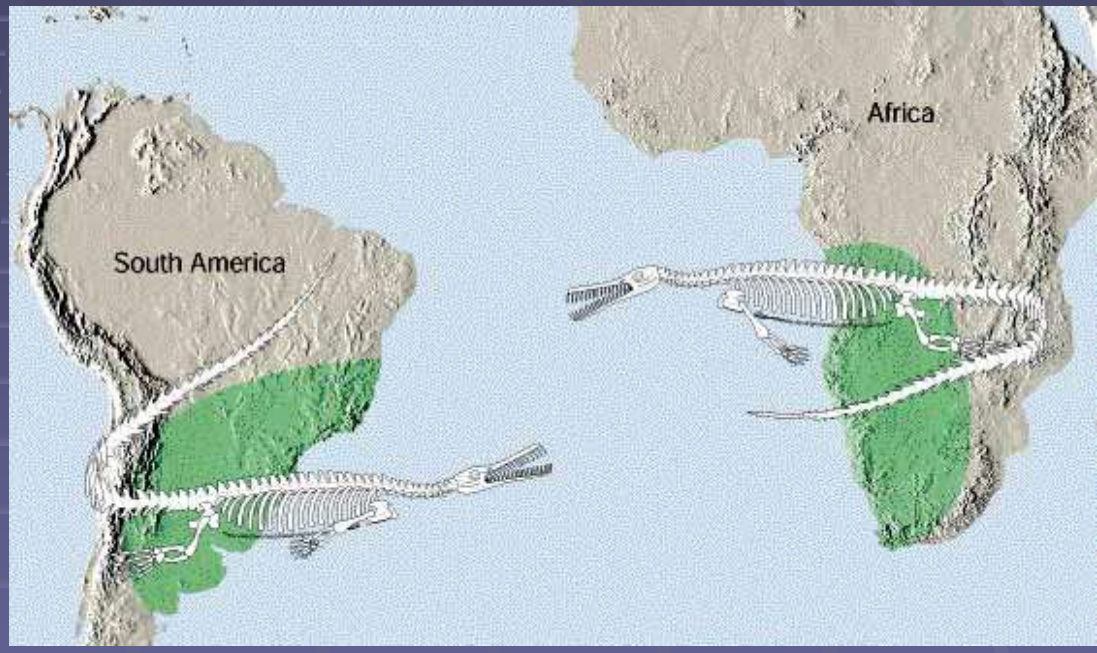
- Landmass movements over millions of years

Evidence for Continental Drift

- the shape of the continent's coastlines fit like a puzzle

Evidence for Continental Drift

- **fossil** evidence
- 270 million year old dinosaur fossils found in W Africa and S America
- no evidence of a land bridge
- dinosaurs couldn't swim across the Atlantic Ocean



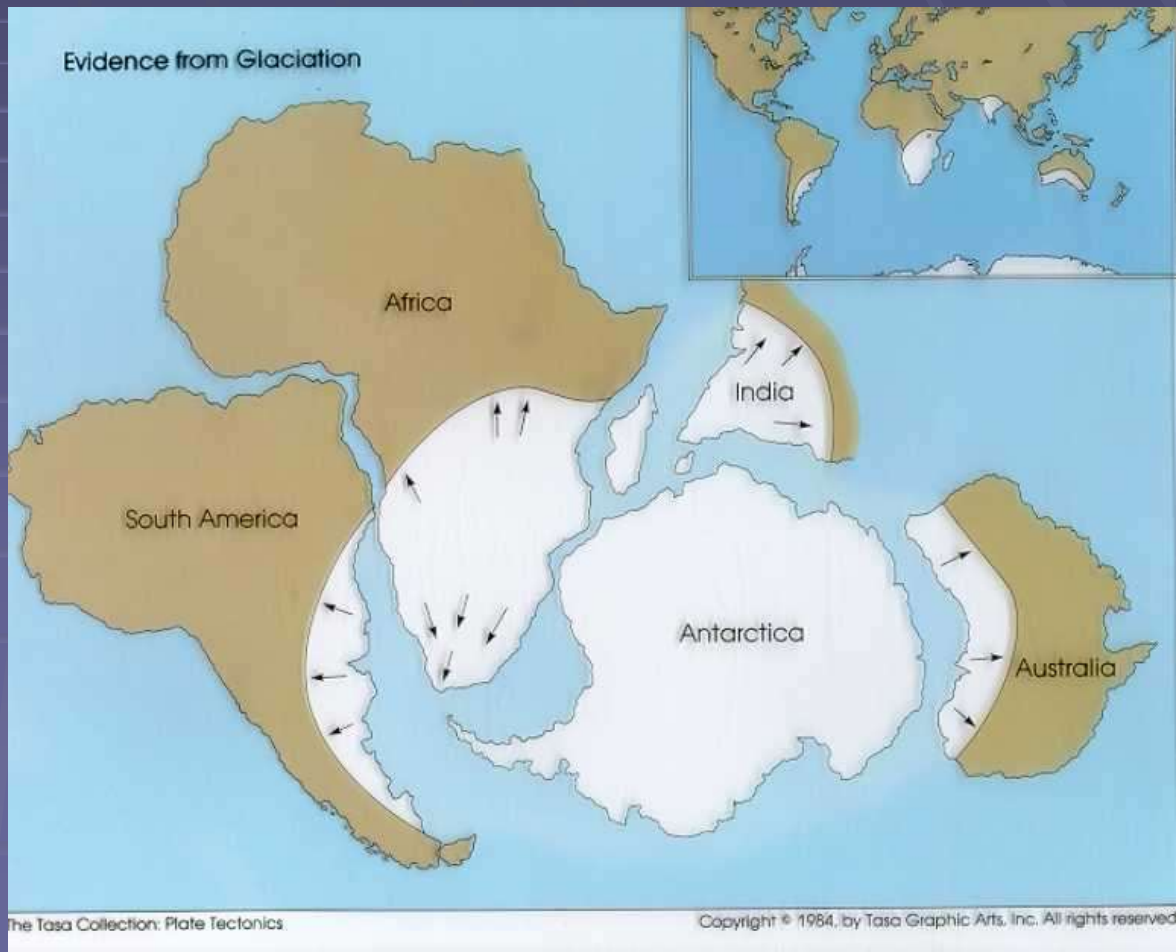
Wegener knew the **2** continents were once joined

Evidence for Continental Drift

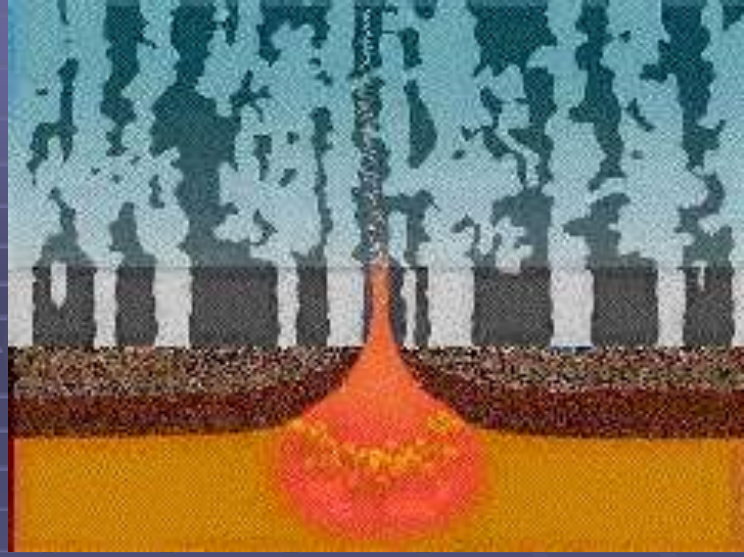
- The **age** and **type** of rocks found in different parts of the world look like they were once connected
- Rocks have same internal structure

Evidence for Continental Drift

- fossil evidence: coal and oil in parts of the world that were once in tropical regions are now in colder regions
- Glacial deposits in tropical regions



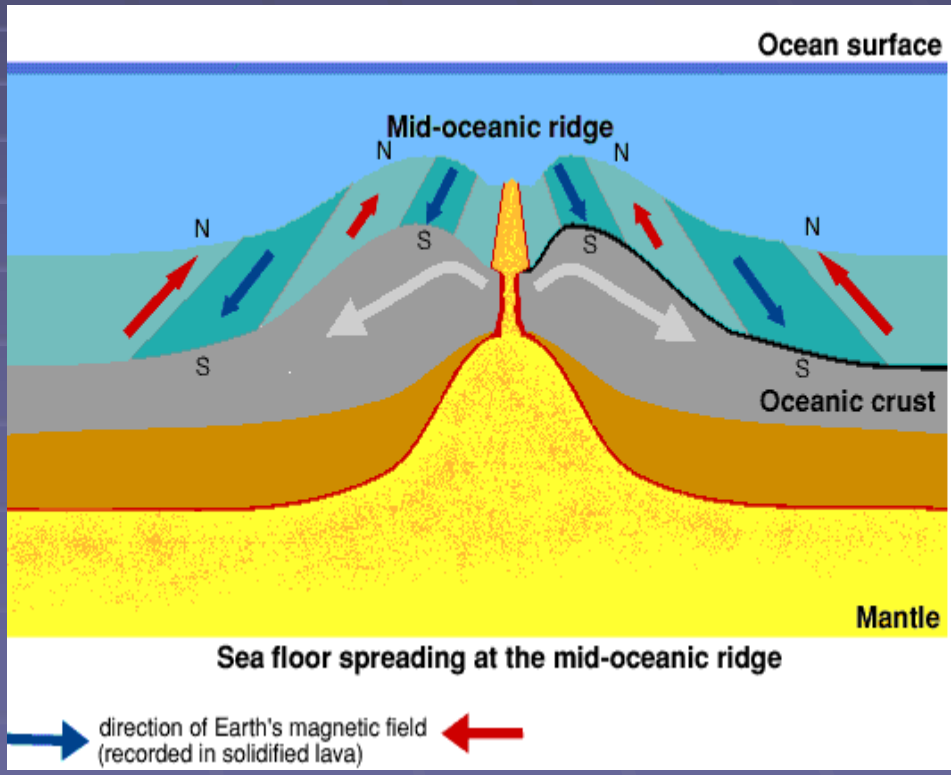
Evidence for Continental Drift



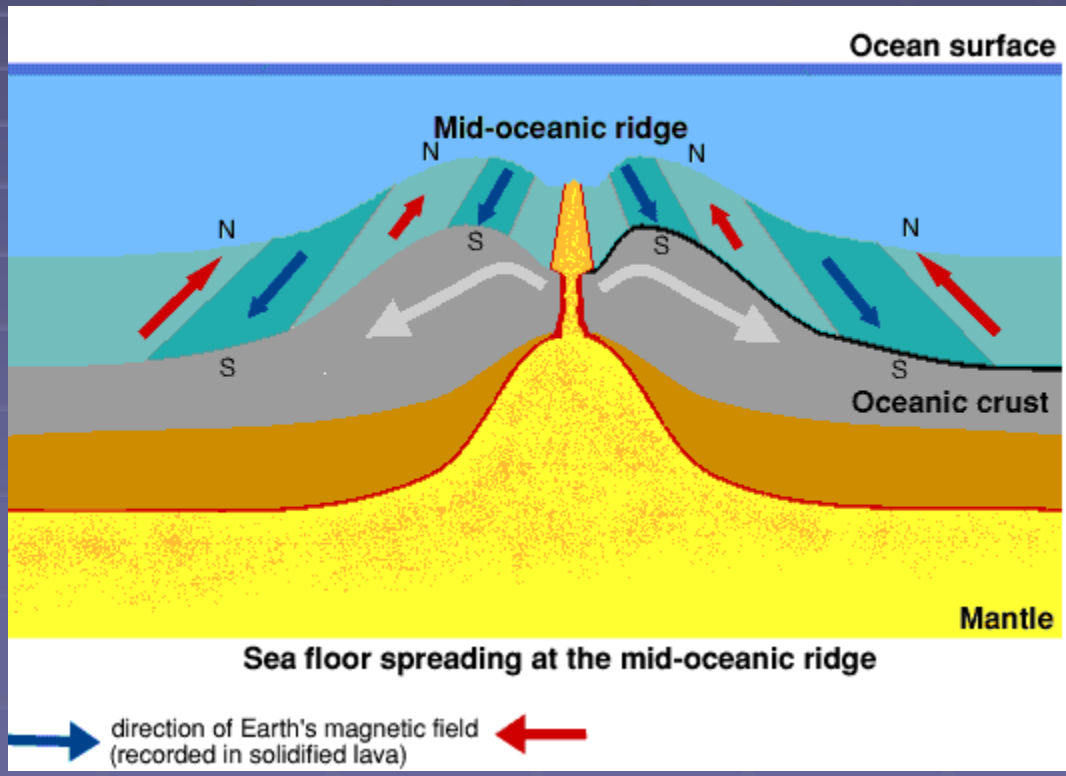
Paleomagnetism

When rocks form they have iron minerals that align toward the North.

- After finding the ages of rocks geologists noticed magnetic minerals were aligned in opposite directions
- found that Earth's **polarity** switches from North Pole to South Pole every once in a while.



- rocks of the same age on land and in the ocean had magnetic reversals
- rocks that were the same distance from the **Mid-Atlantic Ridge** on opposite sides had the same age and magnetism
- proved that plates were moving



- The Theory of **Plate Tectonics** was born
- It explains that the plates are moving and proposes a reason why

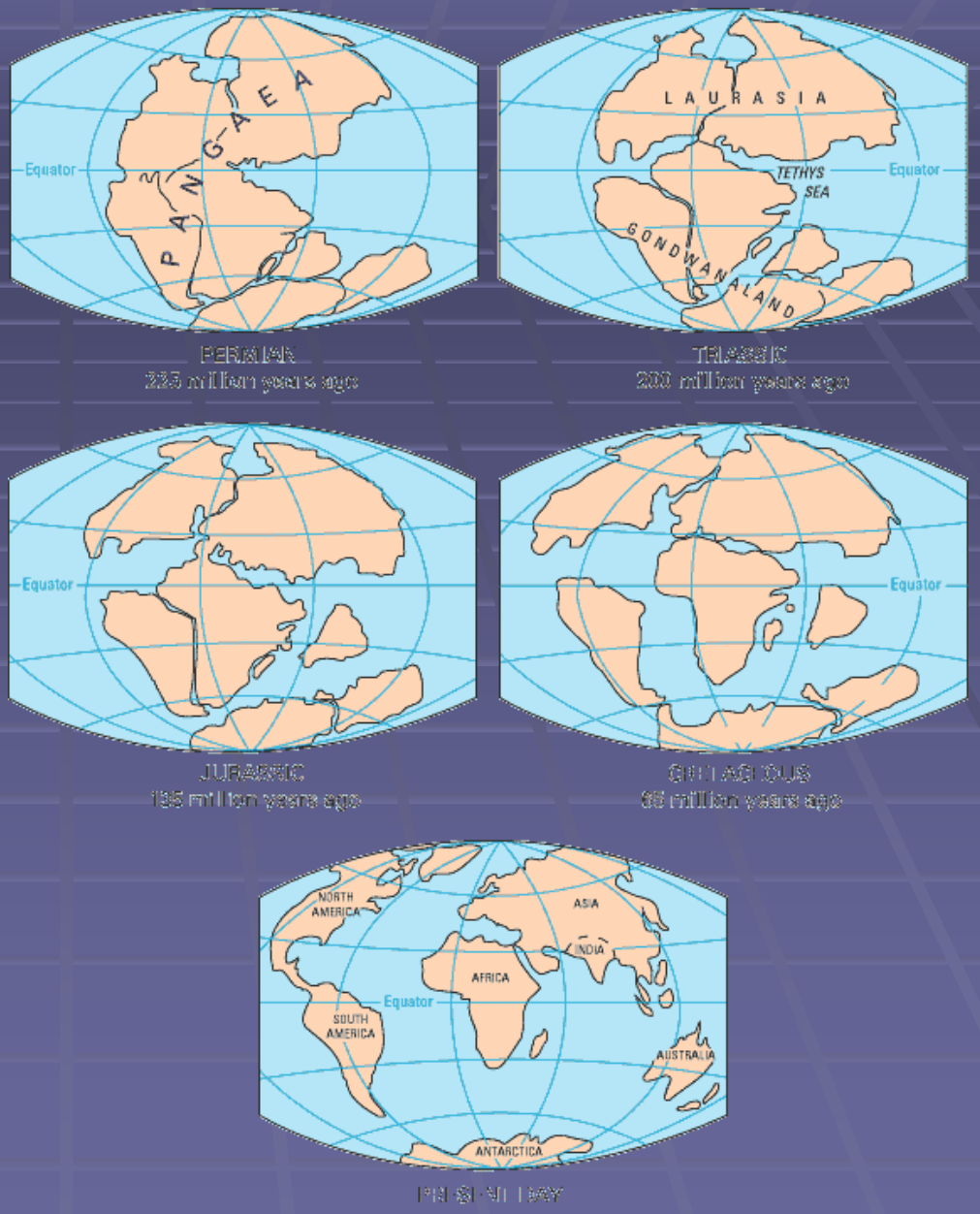
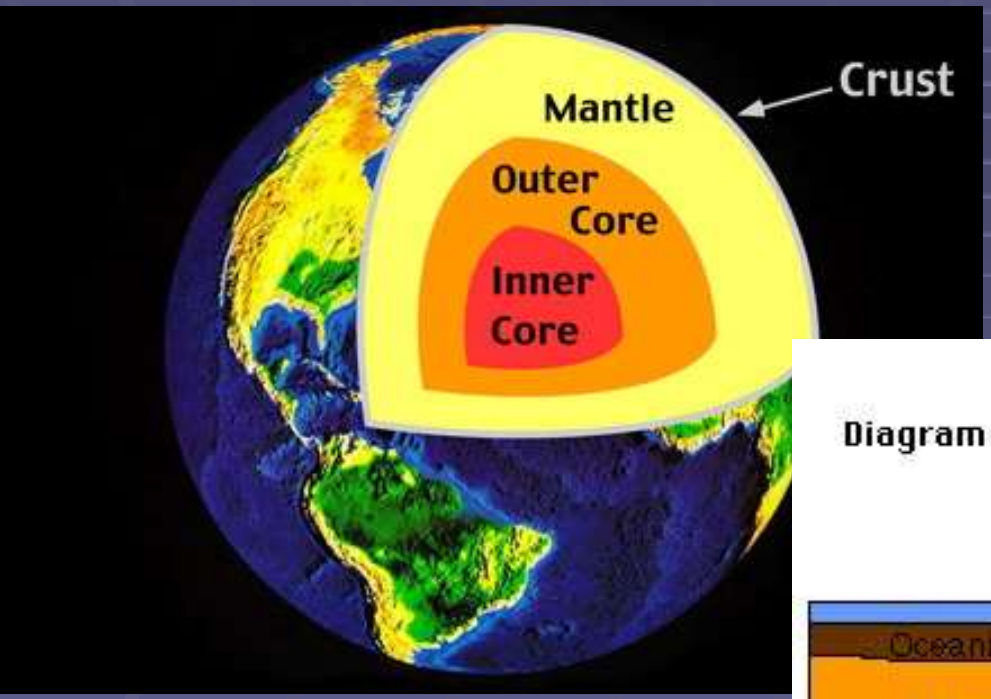
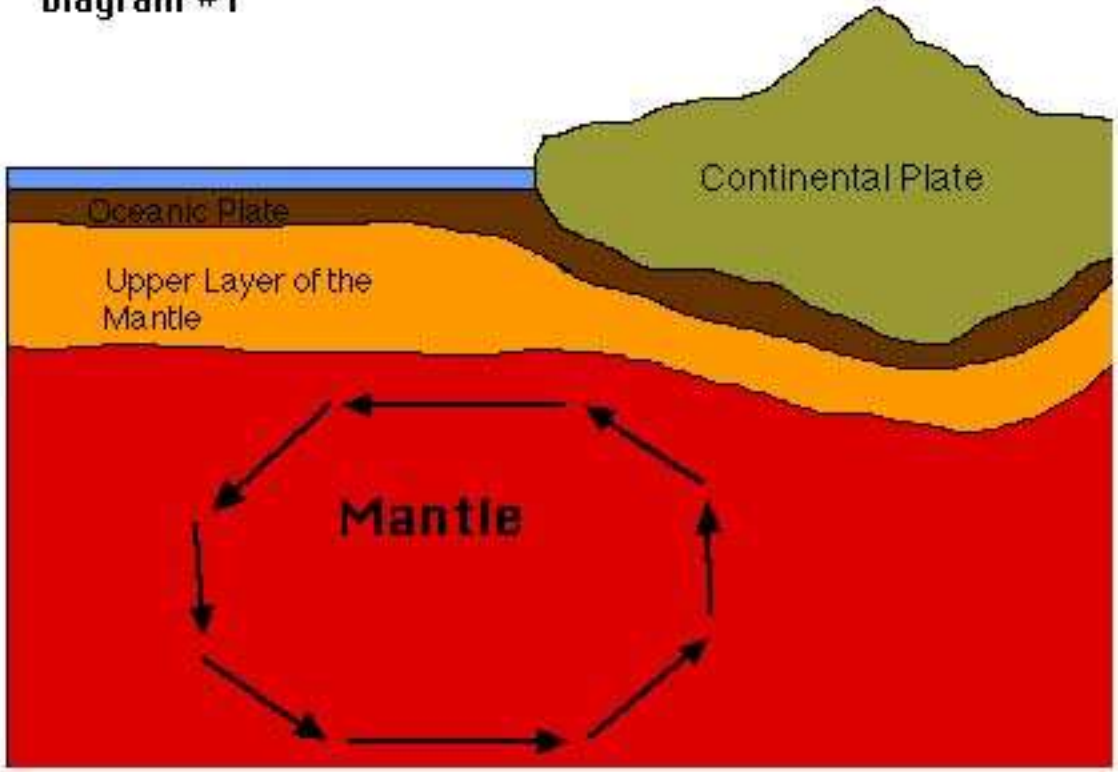


Plate Boundaries

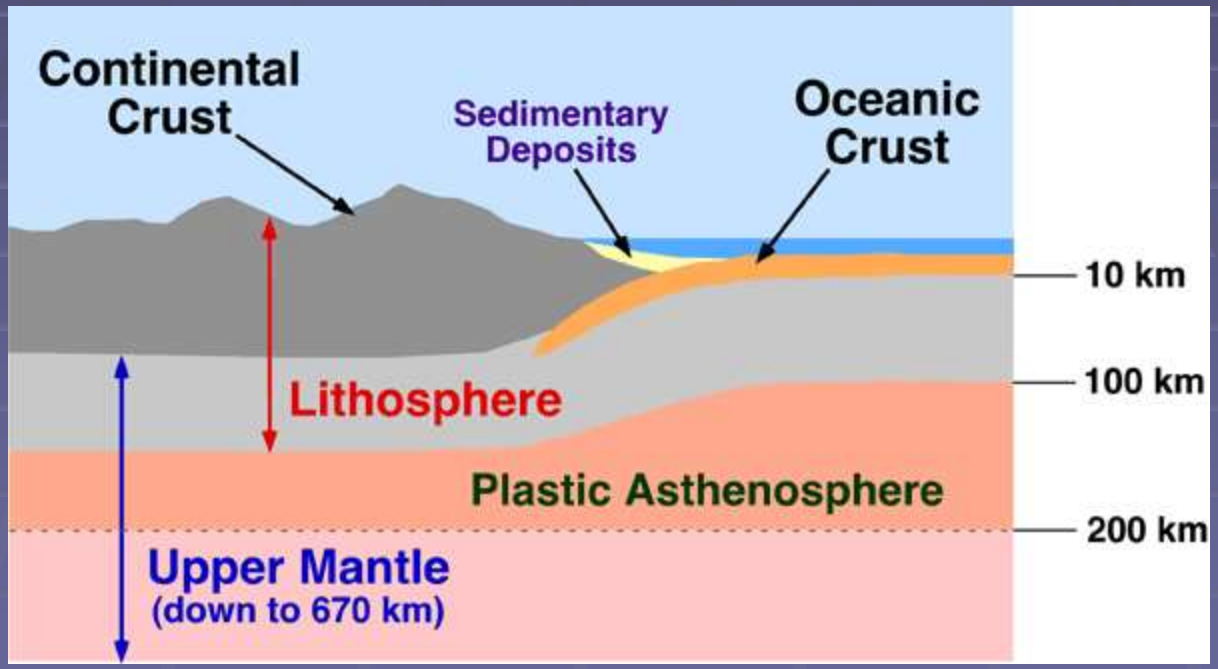


Layers of the Earth

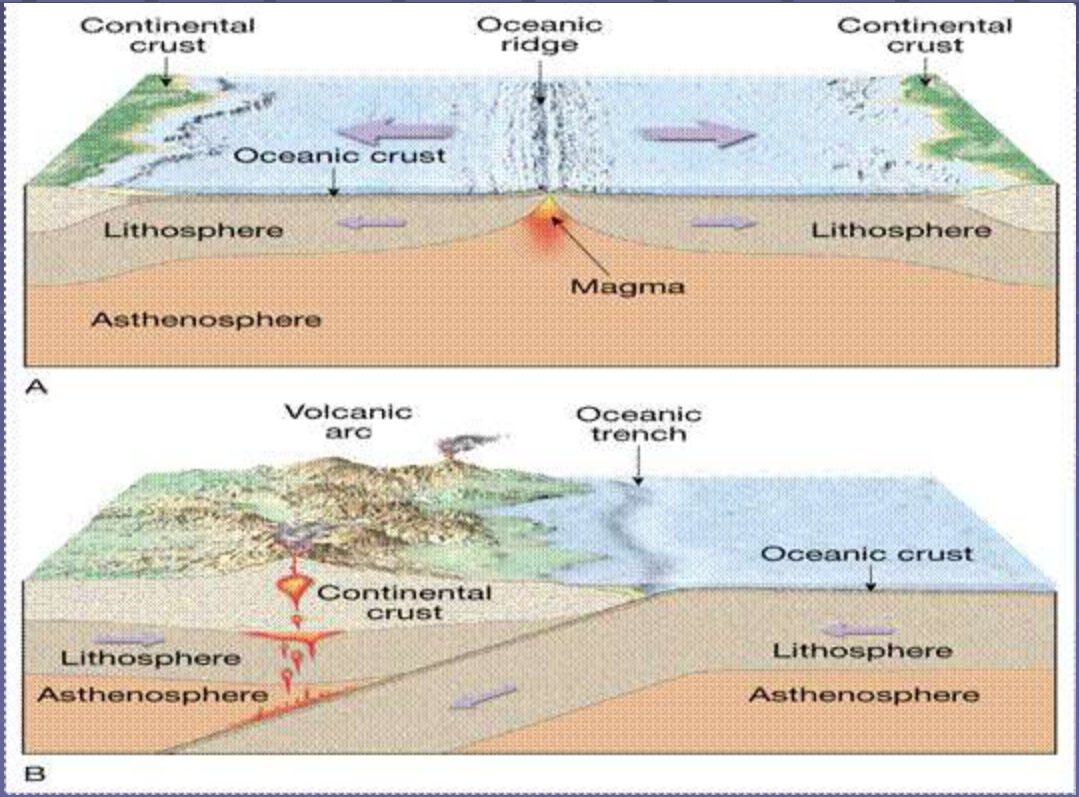
The Earth's plates are made up of a layer that includes the upper mantle and the crust. This layer is called the ***lithosphere***.



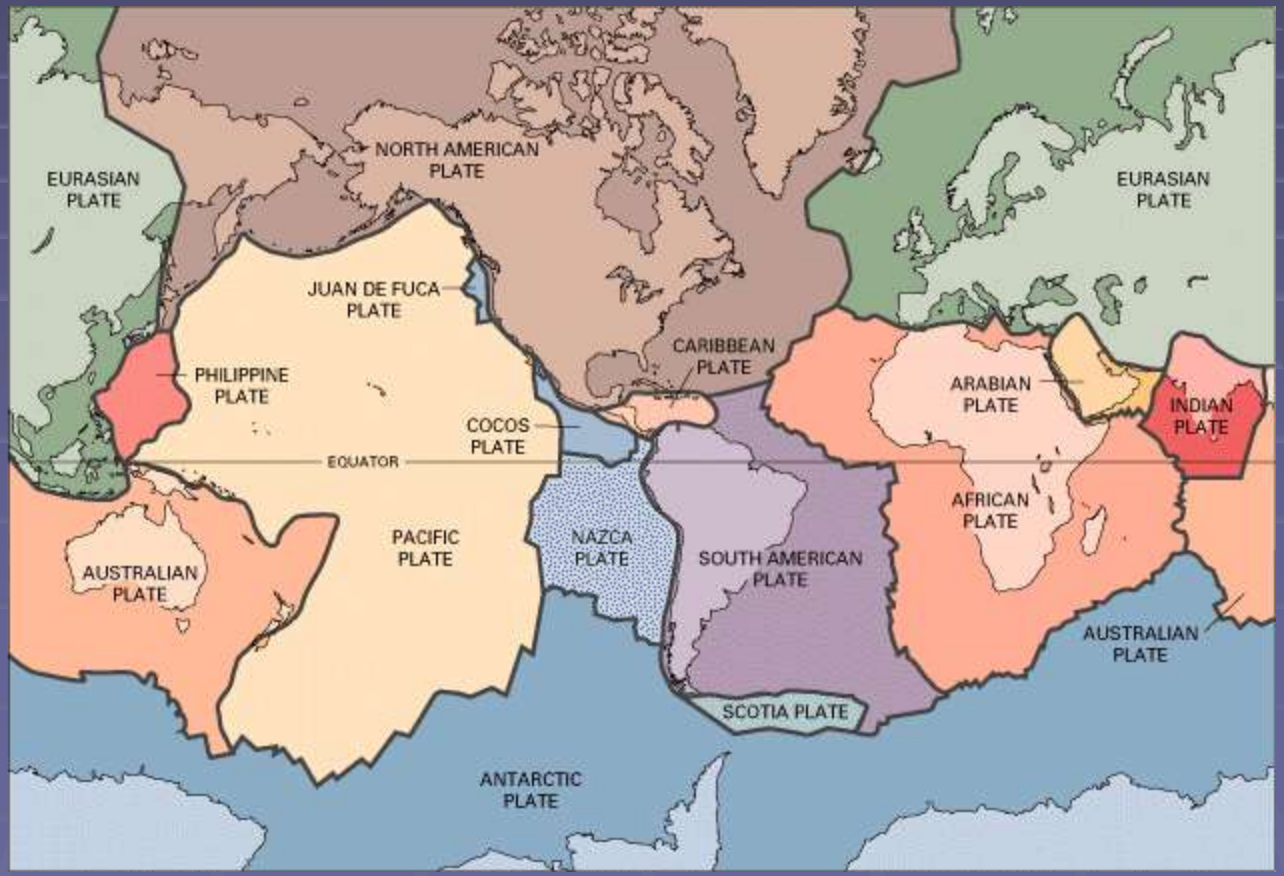
The Plates are made up of two types of crust **Oceanic** and **Continental**. These crusts and the rigid or hard mantle make up the **Lithosphere.**



The **asthenosphere** is the putty-like part of the mantle that the lithosphere floats on.



The lithosphere is broken into about **30** different plates around the world. There are 7-12 major plates.



•The **Pacific** plate and the **North American** plate are just miles from you. Their boundary is in southern California and is called the San Andreas Fault

•It is the reason we have earthquakes In southern CA

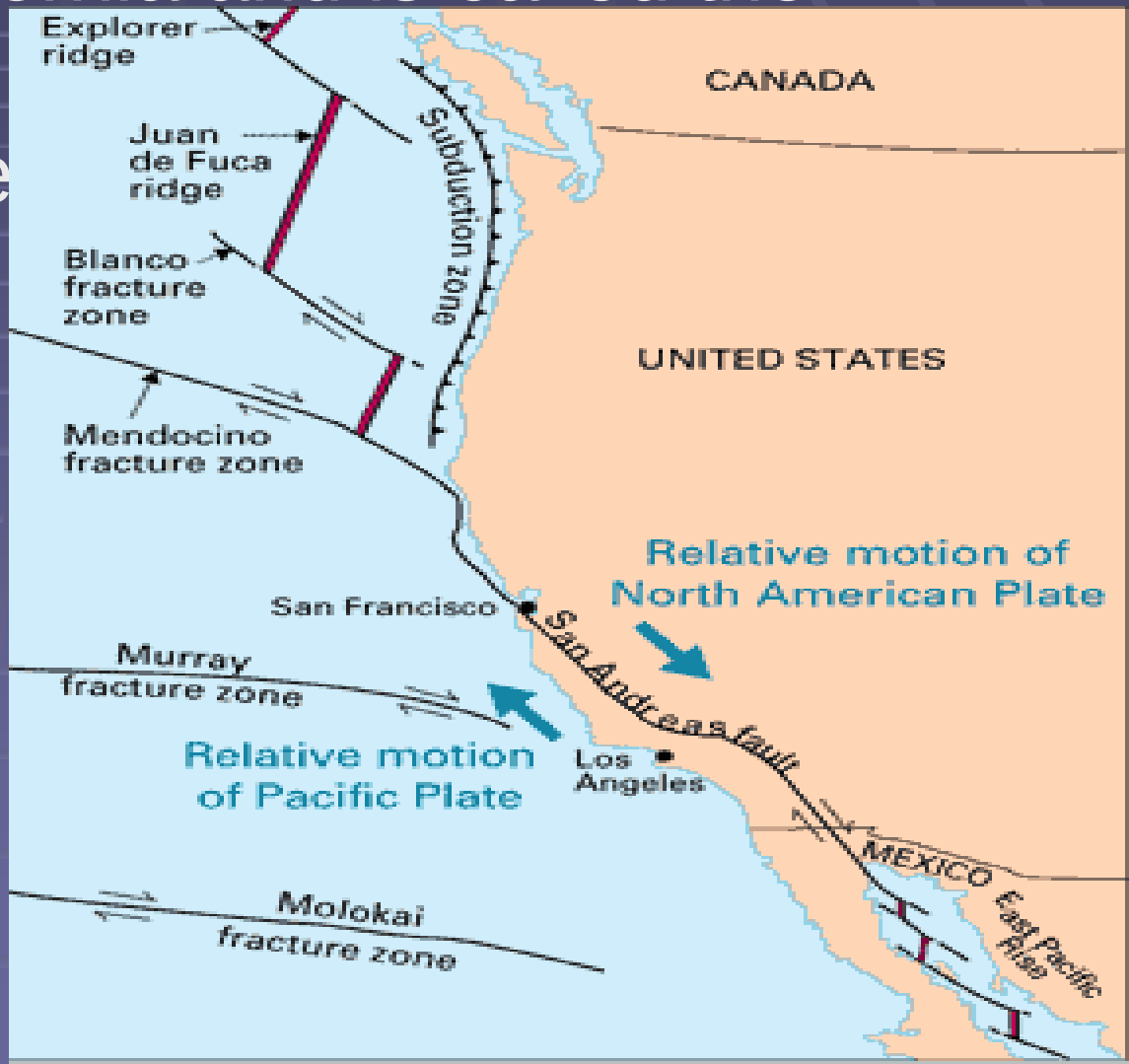


Plate Boundary Types

- **3 different kinds**

- **1. Transform** plate **boundaries**: two lithospheric plates are grinding passed one another, like the San Andreas fault.

•Transform Plate Boundary: **Pacific** plate and **North American** plate boundary is in S. CA and called the San Andreas Fault

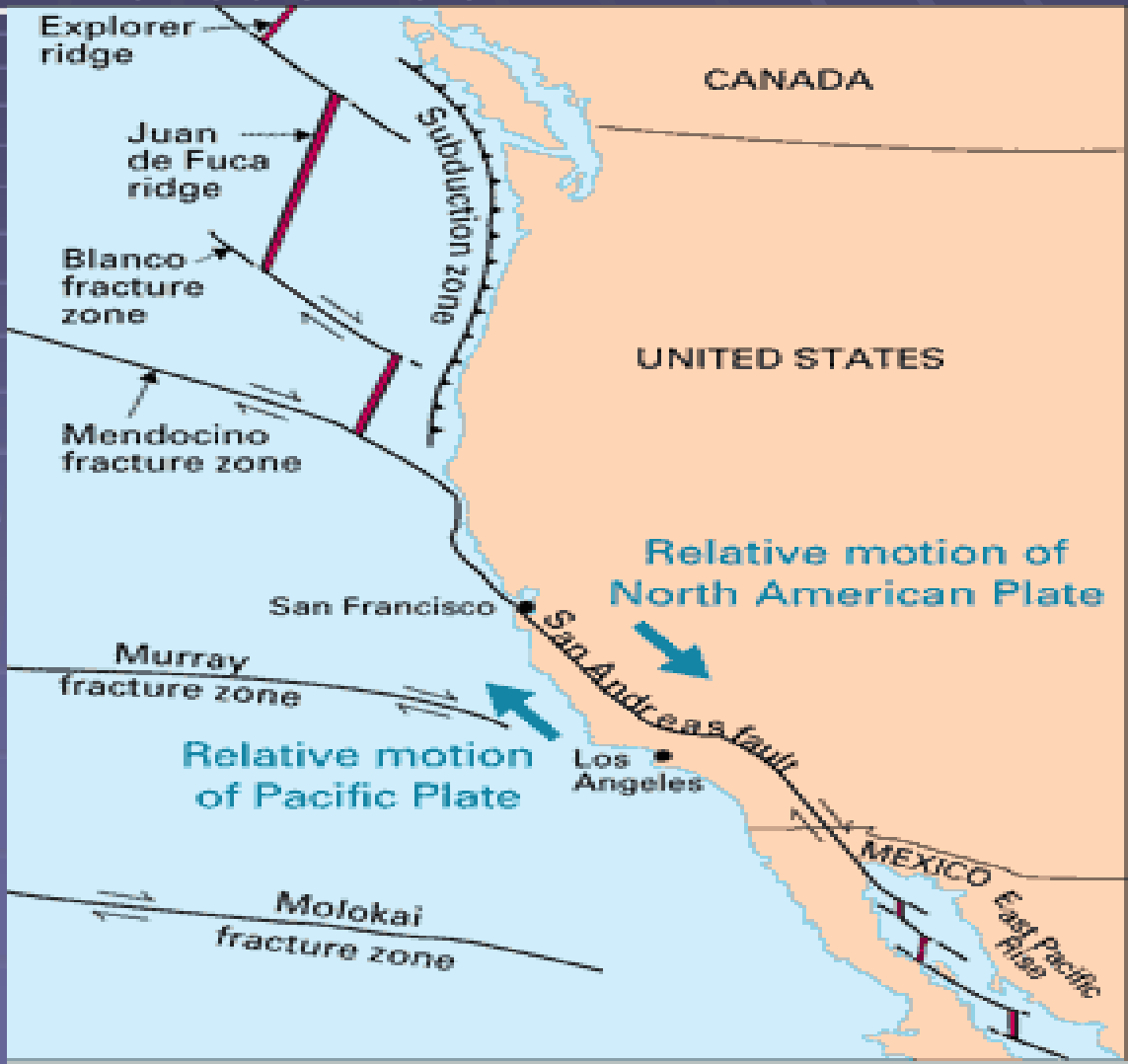


Plate Boundaries

2. **Divergent** plate boundary: plates moving away from each other. As they move apart **molten rock** from the asthenosphere rises up, fills the space, and creates new rock.

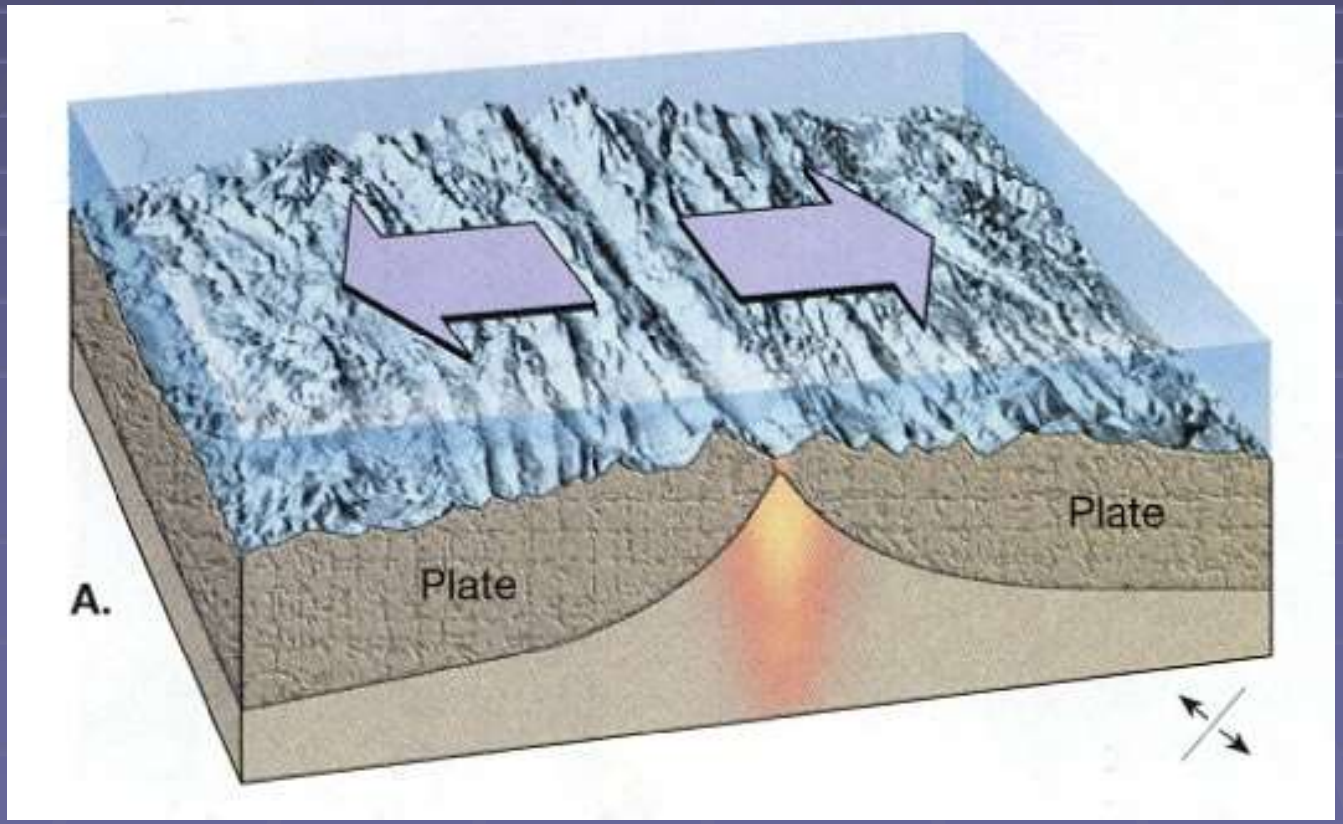
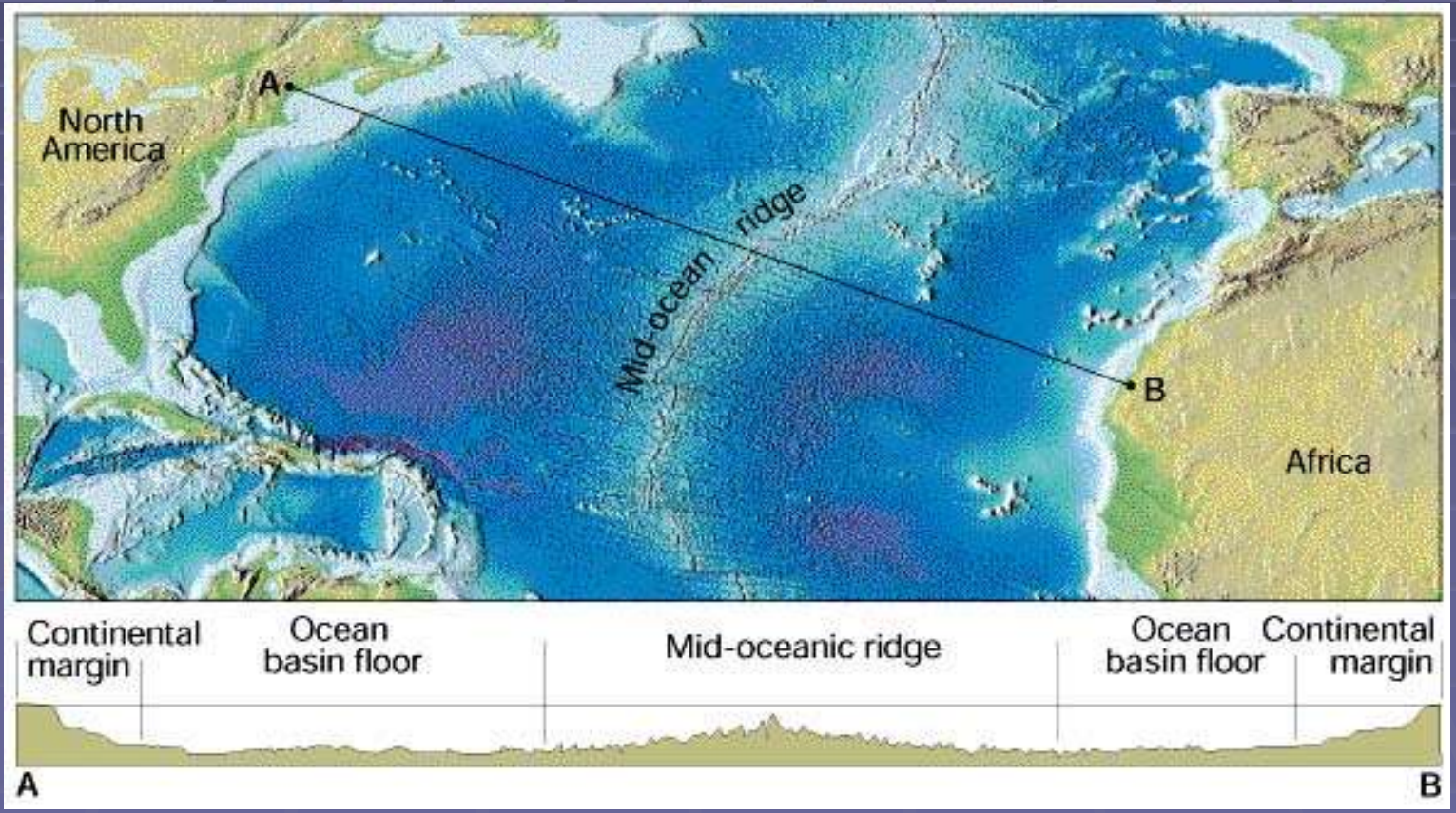


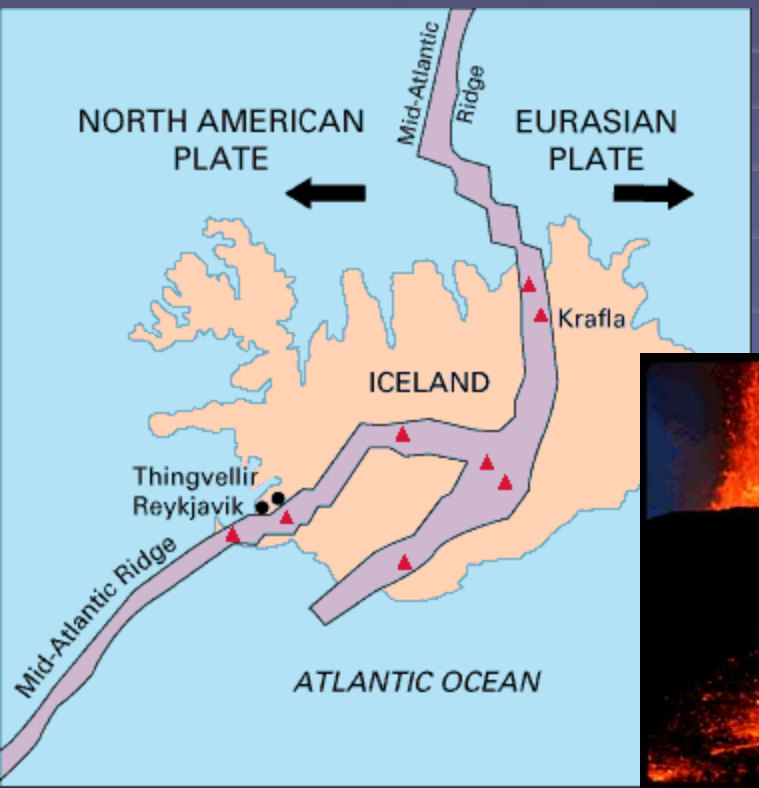
Plate Boundaries

Divergent plate boundaries: found mostly as mid-ocean ridges. The middle of the Atlantic Ocean is the world's longest rift valley.



Divergent Boundary

- Seafloor spreading and rifting – Ex: Iceland and Africa (new land created)



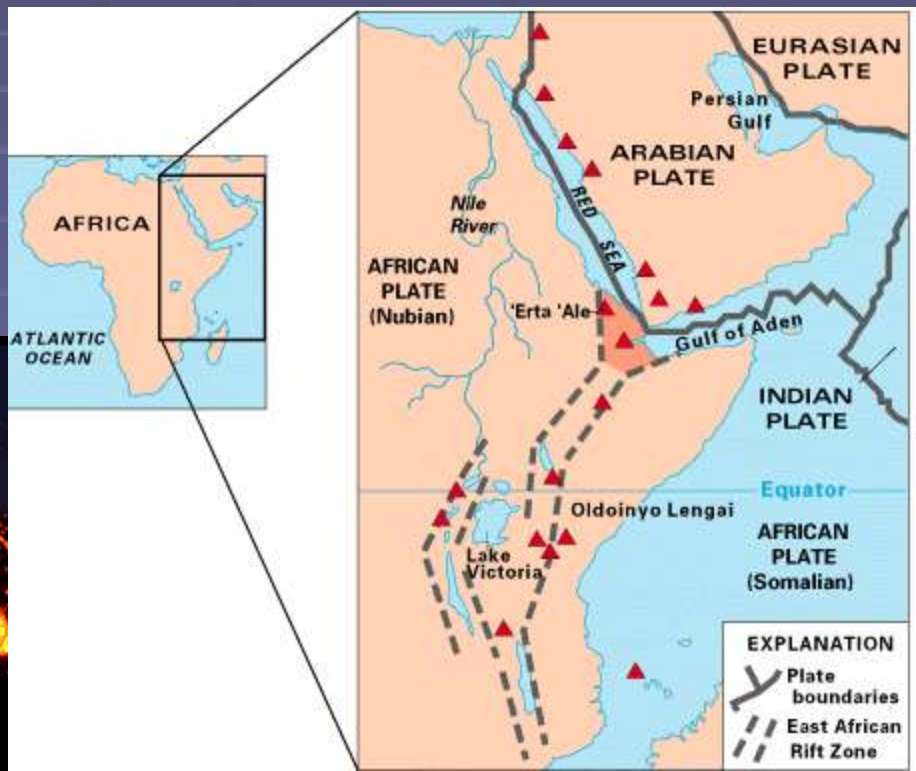


Plate Boundaries

3. C**onvergent** plate boundary: plates are moving toward each other. There are 3 types of convergent plate boundaries.

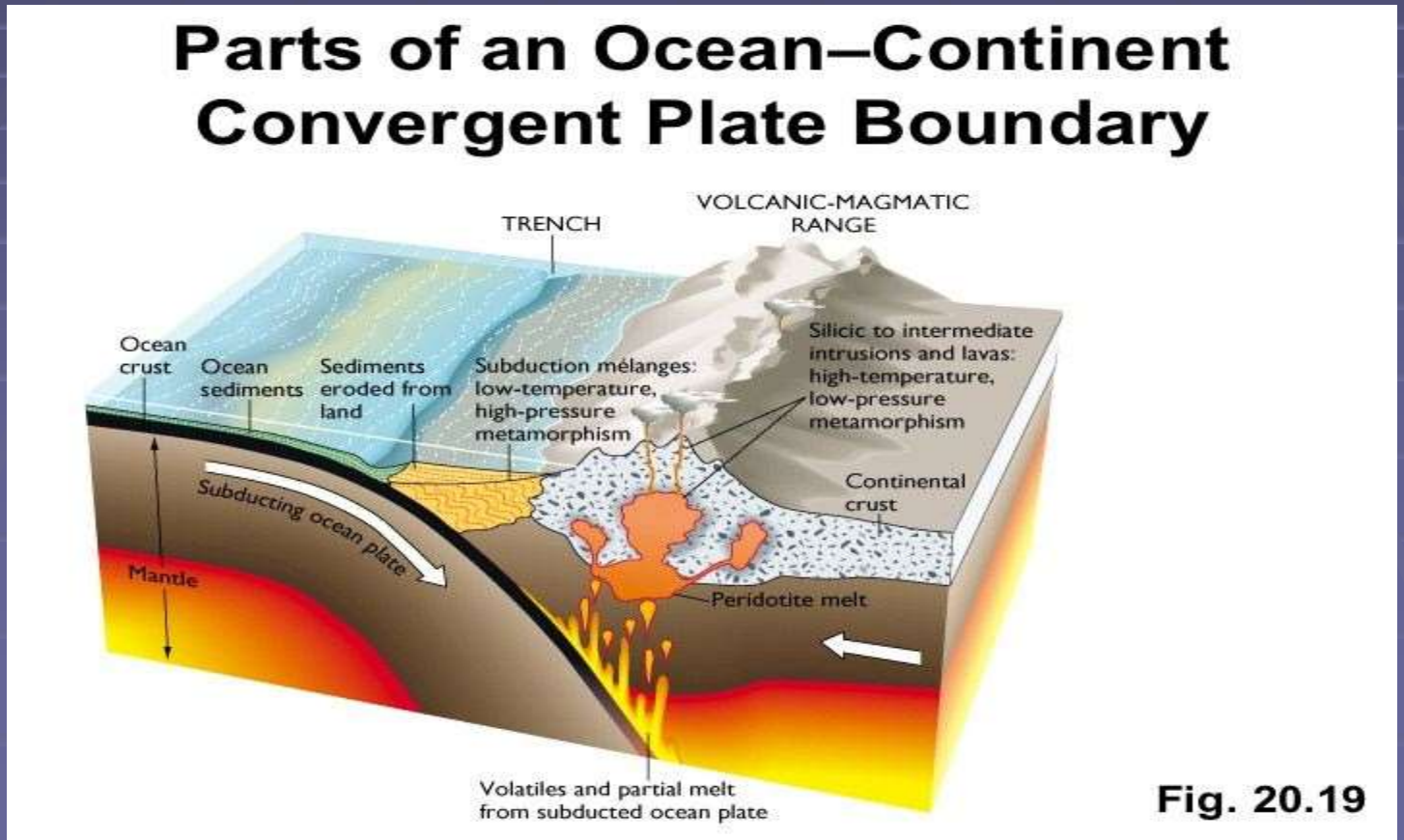
Convergent Plate Boundaries

Ocean - Continent

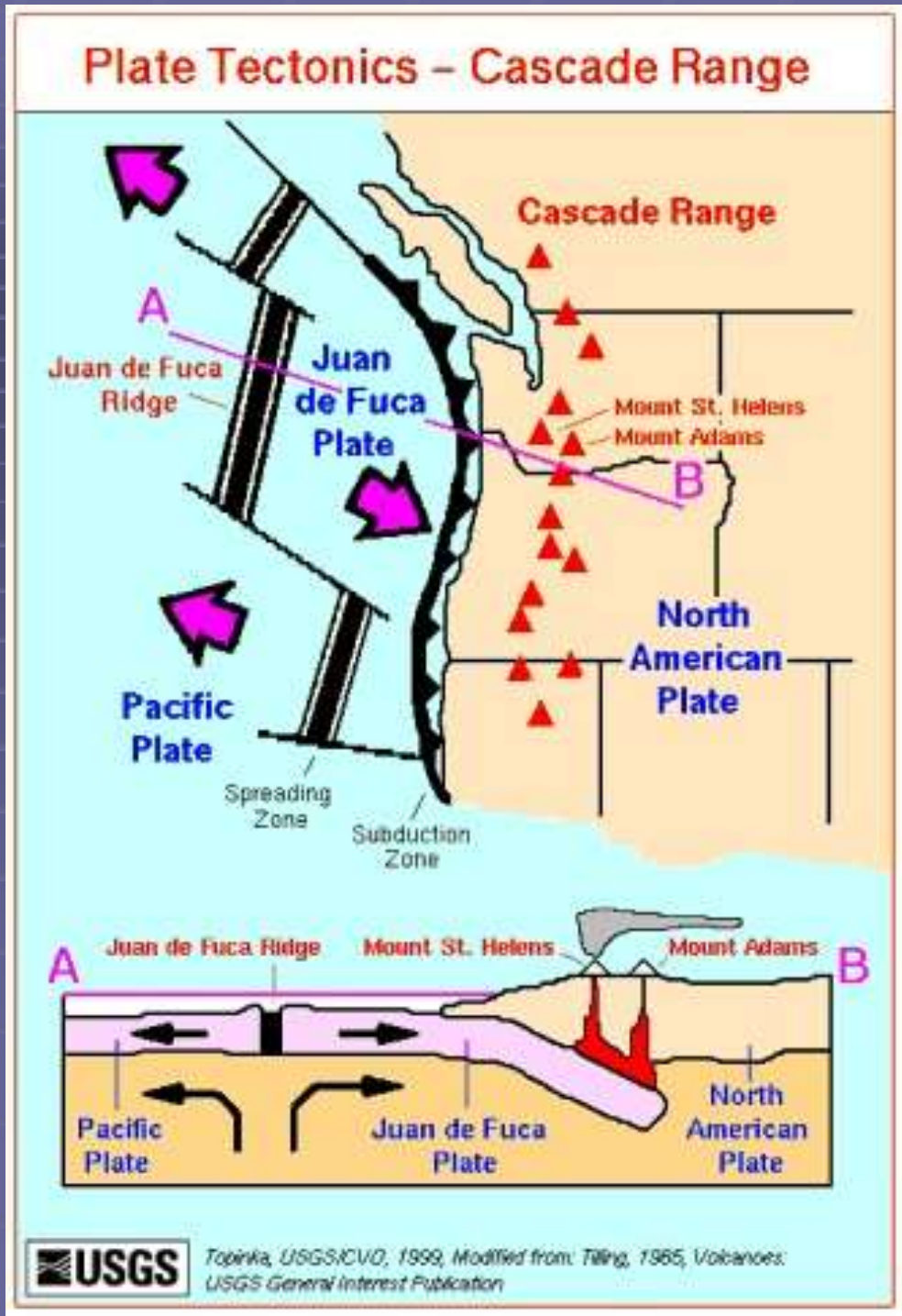
Continent - Continent

Ocean - Ocean

1 Convergent: <u>oceanic/continental crust</u>
Oceanic is denser than continental so when they collide, denser oceanic plates move under the continental plate creating a **<u>subduction zone</u>**.

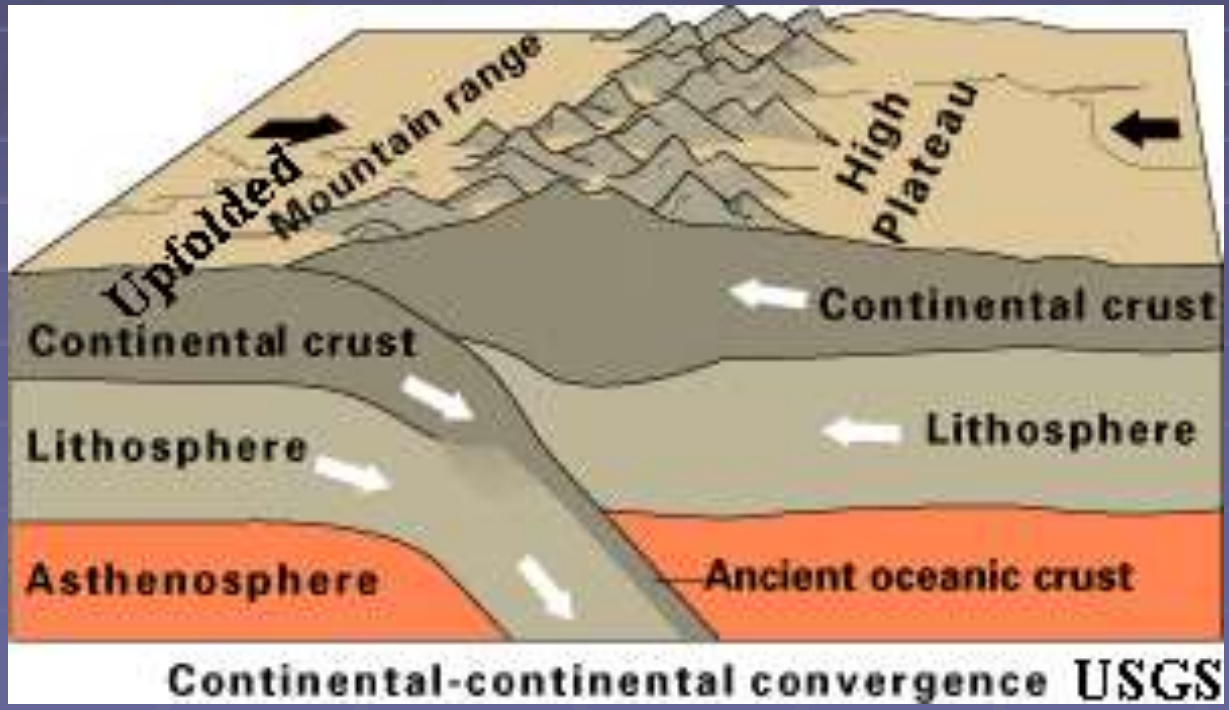


- **Subduction zones:**
- Create deep ocean trenches and volcanoes
- Subduction zones are all over Earth
- Juan de Fuca plate is subducting under the NA plate in NW USA making numerous volcanoes



2 convergent: Continent/continent crust

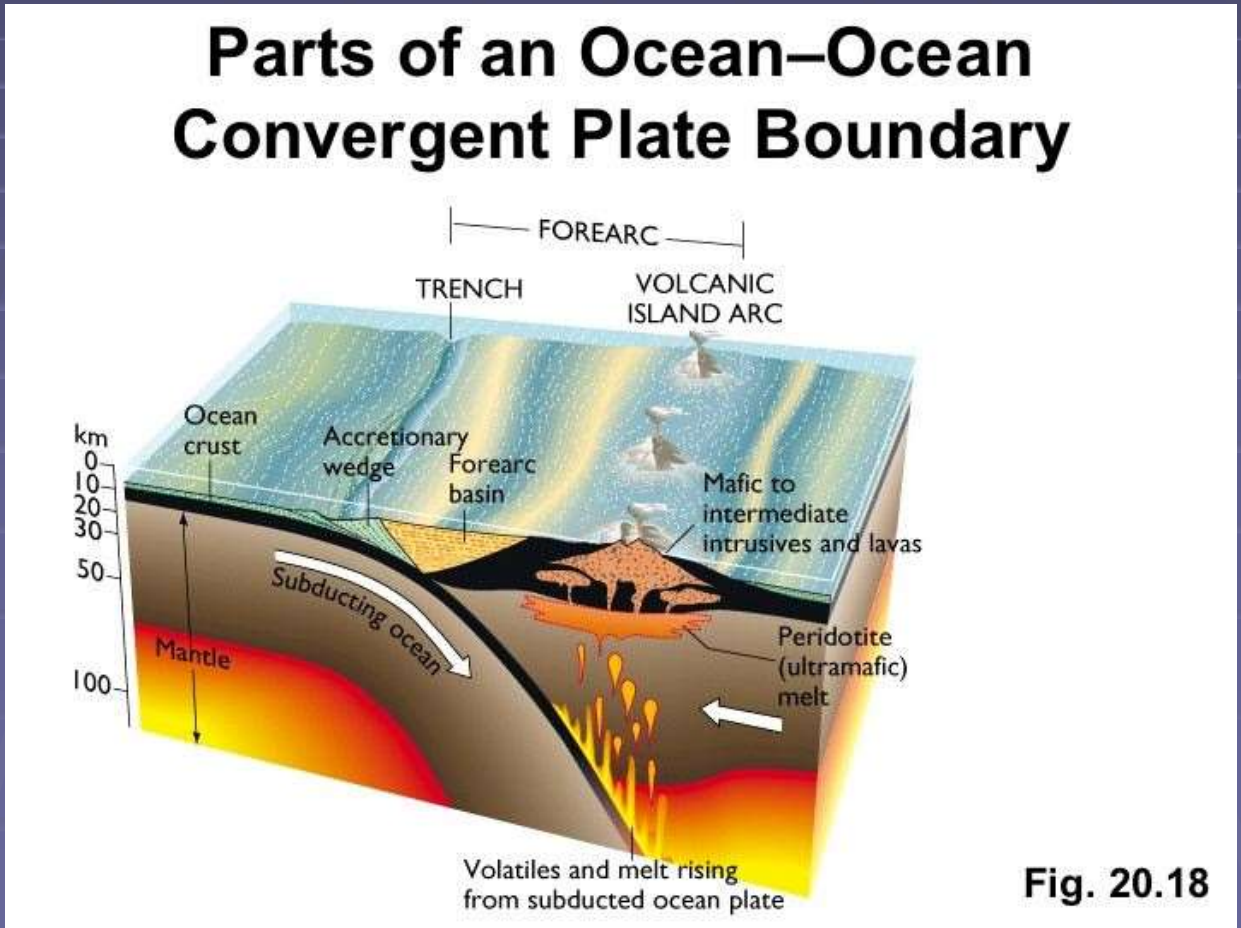
- two continentals crusts collide creating mountains and volcanoes



Since the densities of the rock are the same the continents crumple and rise to produce large mountain ranges like the **Himalayas** where Mt. Everest resides.

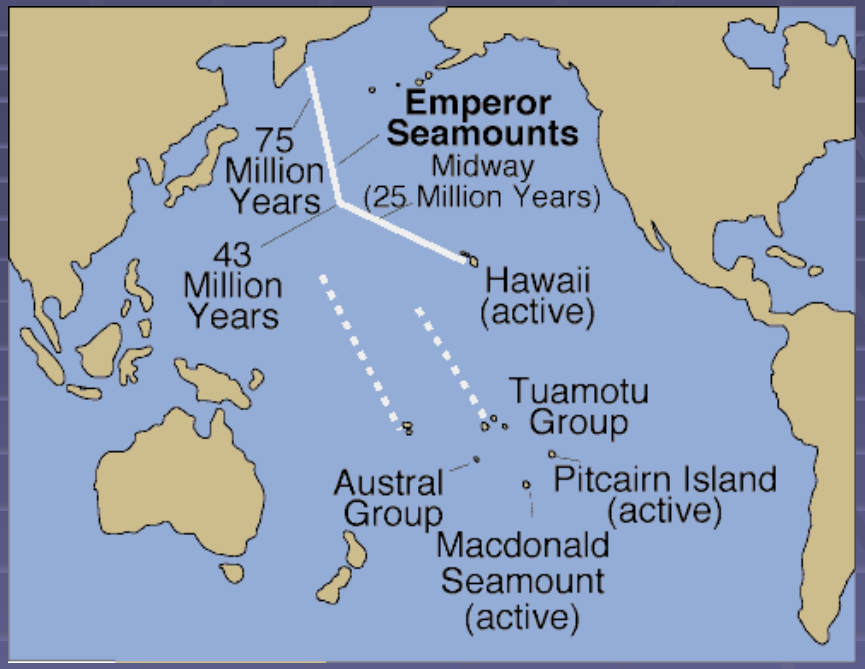
3 Convergent: Oceanic and Oceanic crusts

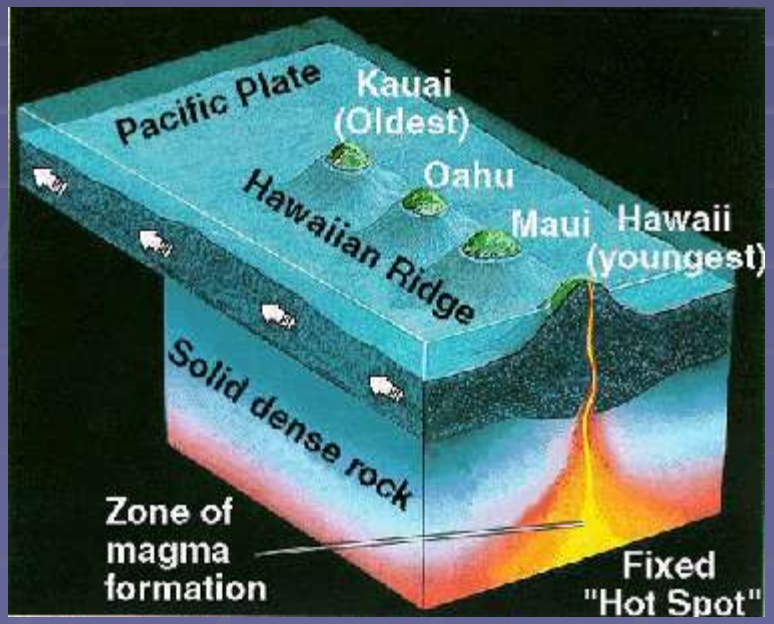
•one plate moves under another causing part of that plate to melt in the mantle. It is released in the form of volcanoes creating volcanic islands.



Hotspots

- Hawaii – the Pacific plate is moving across a fixed zone of hot magma





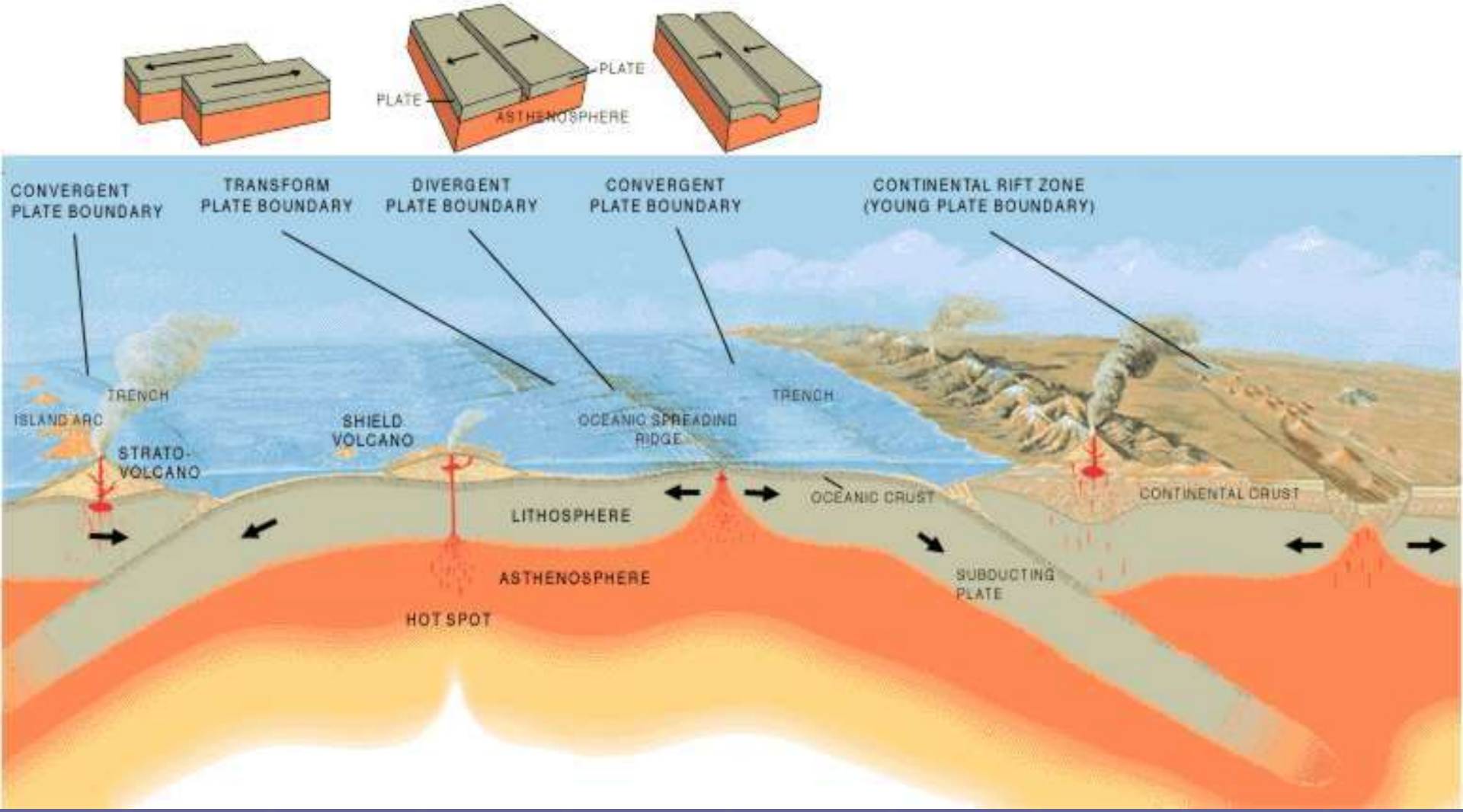
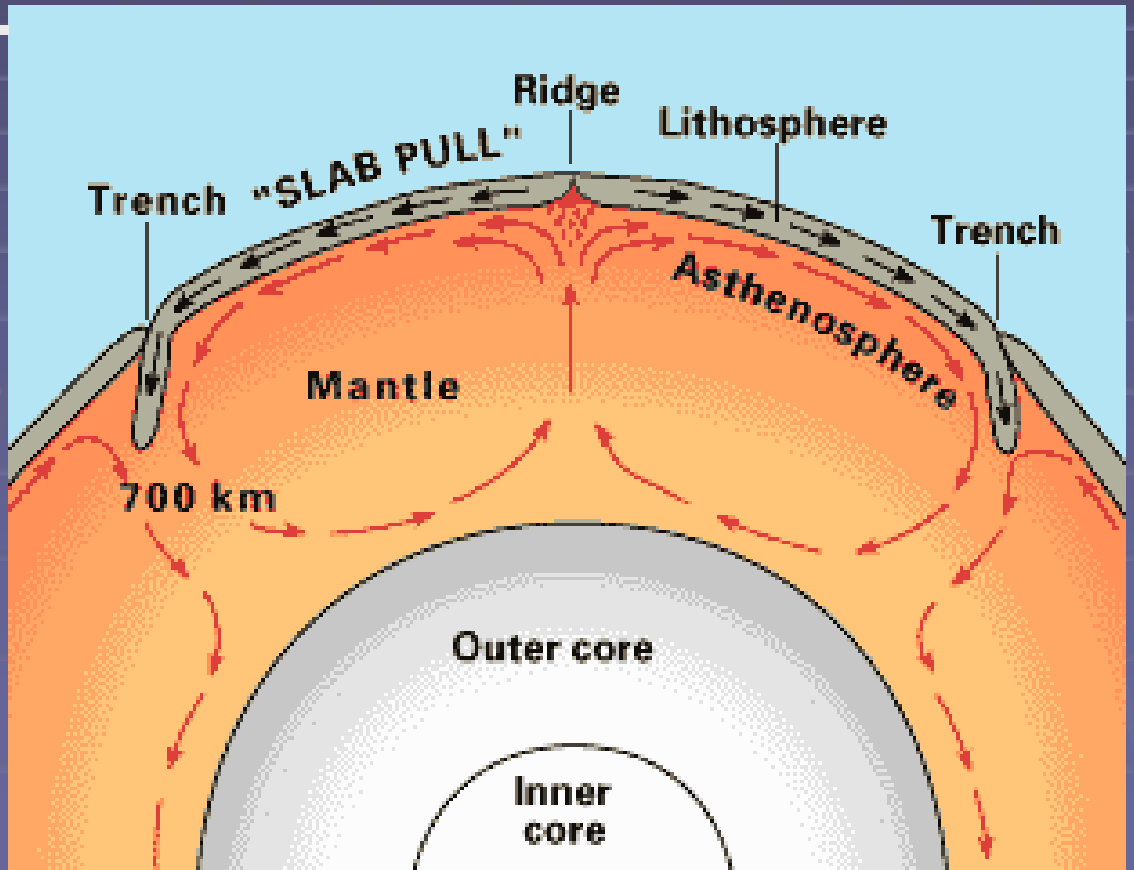


PLATE
PLATE
ASTHENOSPHERE
CONVERGENT PLATE BOUNDARY
TRANSFORM PLATE BOUNDARY
DIVERGENT PLATE BOUNDARY
CONVERGENT PLATE BOUNDARY
CONTINENTAL RIFT ZONE (YOUNG PLATE BOUNDARY)
TRENCH
ISLAND ARC
STRATO-VOLCANO
SHIELD VOLCANO
OCEANIC SPREADING RIDGE
TRENCH
LITHOSPHERE
OCEANIC CRUST
CONTINENTAL CRUST
ASTHENOSPHERE
SUBDUCTING PLATE
HOT SPOT

What causes these plates to move?

convection causes the plates to move

•as the mantle heats up hot fluid rises toward the crust. As the fluid cools it sinks back down into the mantle. This creates a circular motion called convection.



Questions

- WRITE OUT ALL QUESTIONS AND ANSWERS ON A SEPARATE PIECE OF PAPER:
  - Pg 253 #1-4
  - Pg 255 #1, 4
  - Pg 264 #1-4