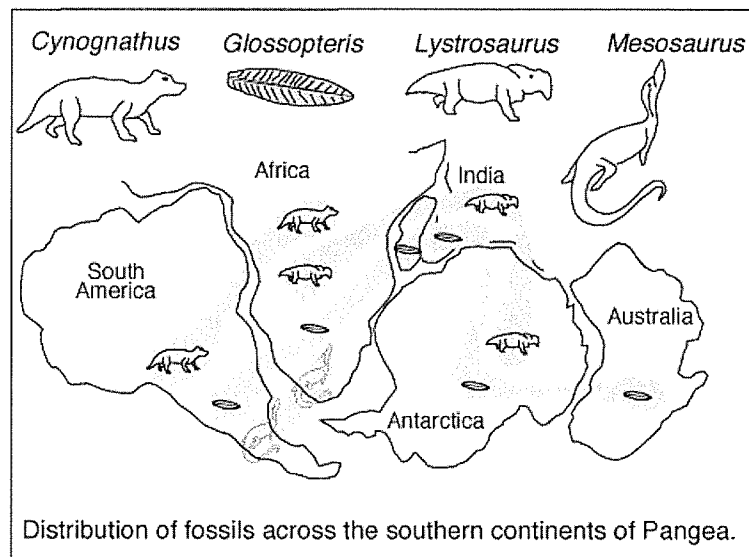


Topic 5B: The Dynamic Crust

The Theory of Continental Drift – states that the continents were once all part of one large landmass called **Pangaea**, and since then the continents have been moving or “drifting” around the surface of the Earth.

What evidence supports Continental Drift?

- 1) Continental “fit” or map fit – In 1910, Alfred Wegener first thought of this theory by noticing on a map how South America and Africa seemed to fit together like a jigsaw puzzle.
- 2) Matching fossils and rocks – Fossils of plants and animals that are only found on the West coast of Africa and the East coast of South America. When the continents are put together like a jigsaw puzzle, similar rock types and mountain ranges are located next to the other.



- 3) Sea-floor spreading – If you “rewind” the spreading of the mid-Atlantic ridge, it would seem that North America and South America were joined to Europe and Africa around 200 million years ago (abbreviated m.y.a.).

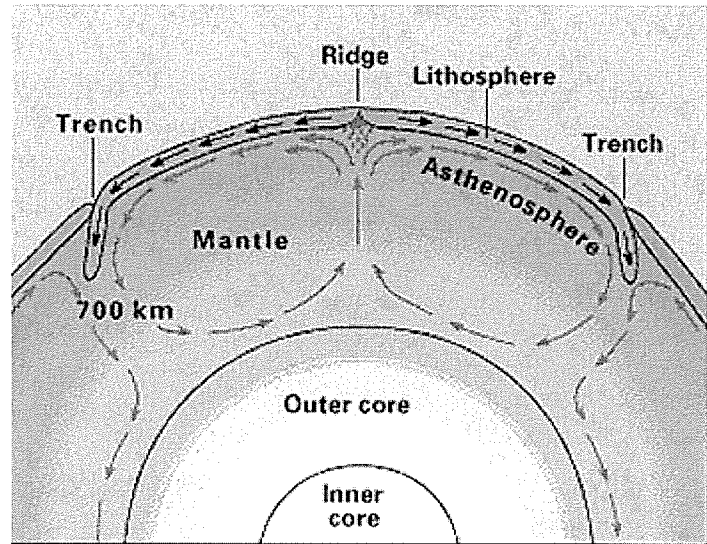
C. What is the Theory of Plate Tectonics?

The Theory of Plate Tectonics- This theory states that the Earth's crust is made of 12-20 large, rigid plates that move above a very thick layer of liquid molten. These plates are constantly moving, and where two plates meet is called a plate boundary. At plate boundaries, exciting things happen like mountains are built, volcanoes form and earthquakes occur.

⇒ Some tectonic plates consist of just oceanic crust and other tectonic plates have both oceanic and continental crust.

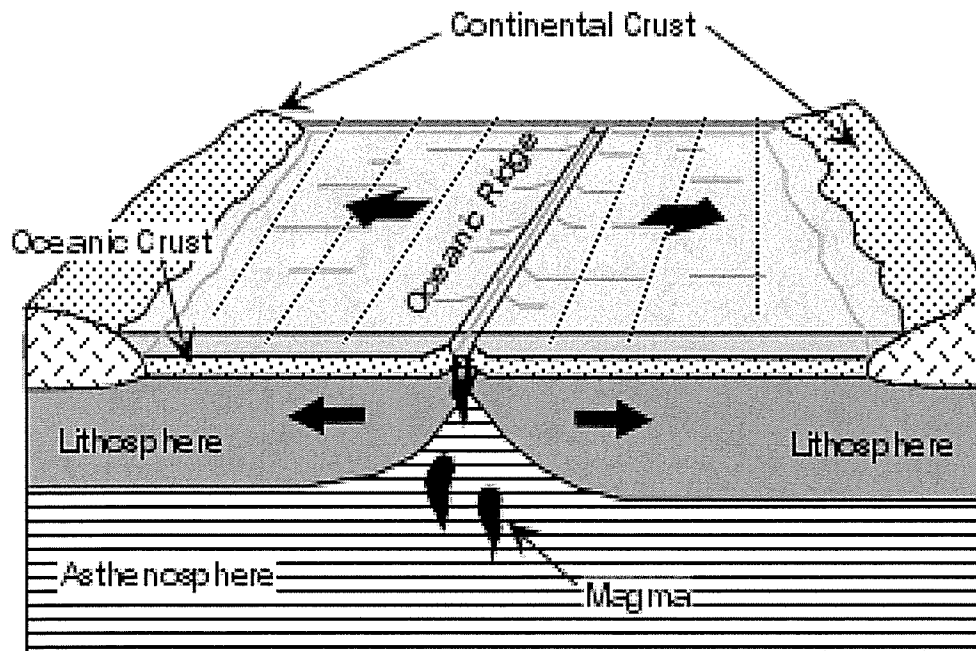
D. What causes the plates to move?

Convection currents within the Asthenosphere. Convection is the movement of a liquid or gas when there is a difference in density. The hotter the material, the less dense it will be, which causes it to rise. The plates "ride" on the Asthenosphere as it flows.



E. What are the three types of plate boundaries?

1. Divergent boundary - two plates moving apart; the best example of this is the mid-ocean ridges like the Mid-Atlantic ridge.

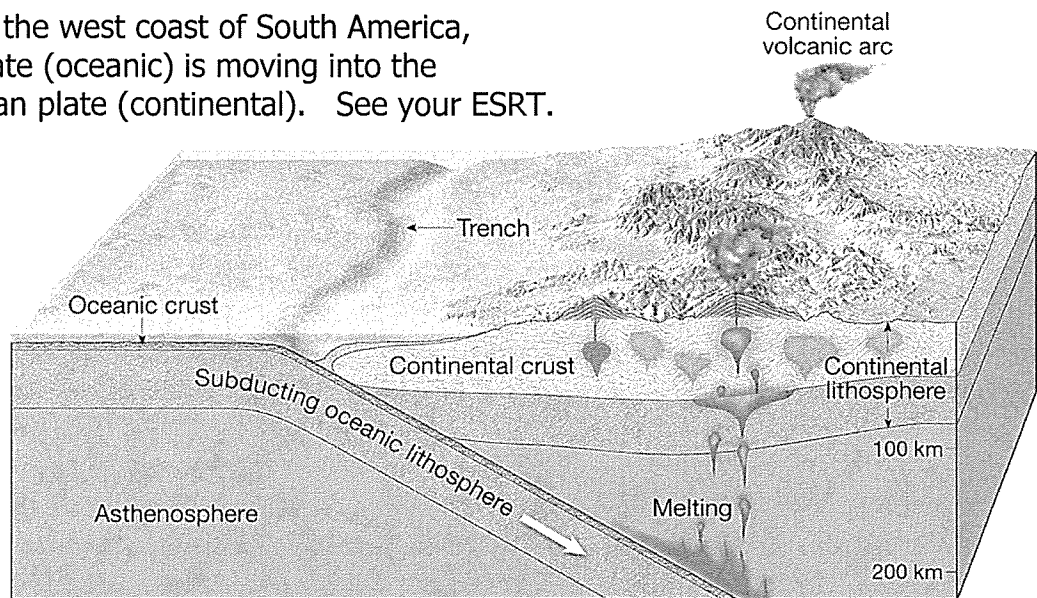


Diverging Plate Boundary
Oceanic Ridge - Spreading Center

2. Converging boundary – Where two plates are moving toward one another and collide. There are two types of converging boundaries depending on the type of plates involved.

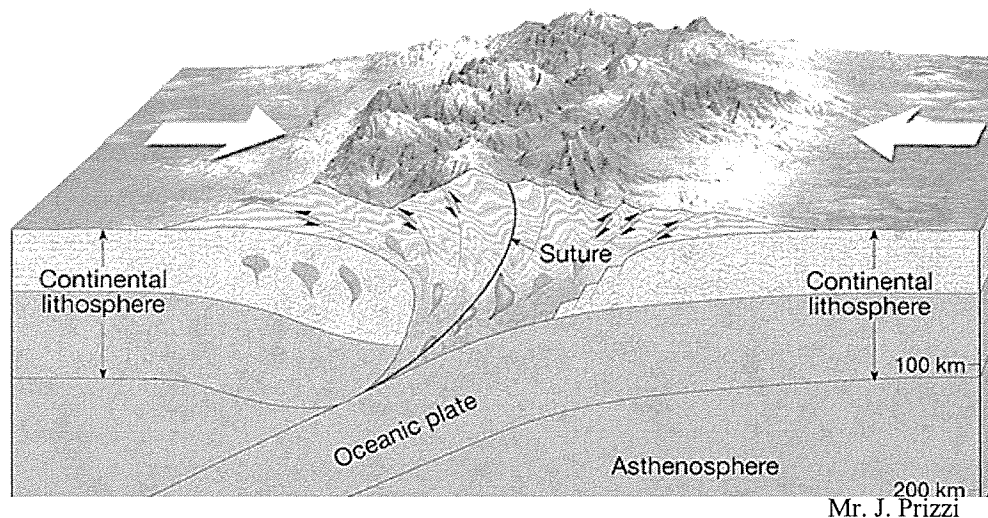
a) Oceanic plate moving into continental plate: This causes the oceanic crust to **subduct** below the continental crust and melt into the Asthenosphere. This area is called a **subduction zone** and a trench forms which is normally the deepest part of the ocean. It can also cause volcanoes to form on the continents from the magma coming up.

Example: At the west coast of South America, the Nazca Plate (oceanic) is moving into the South American plate (continental). See your ESRT.



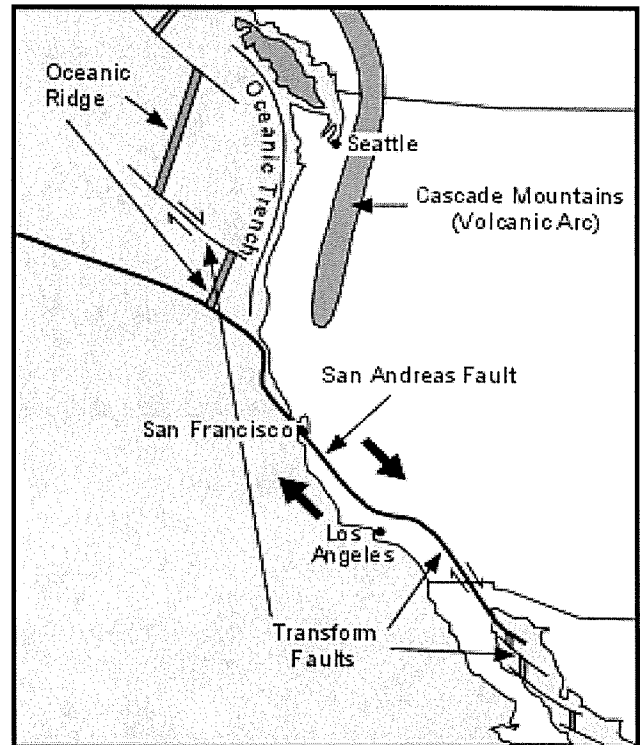
b) Continental plate moving into continental plate: This causes earthquakes and mountain building. Regional metamorphism results from the extreme pressure created.

Example: The Indian plate is colliding with the Eurasian plate creating the Himalayan Mtns.



3. Transform (a.k.a. sliding) boundary: This occurs when any two plates are sliding past one another in parallel directions. This causes major earthquakes.

Example: This type of boundary exists between the Pacific plate and the North American plate in California which is known as the San Andreas fault and is responsible for the large number of quakes that California receives.



Example: A large number of transform boundaries exist at diverging boundaries.

