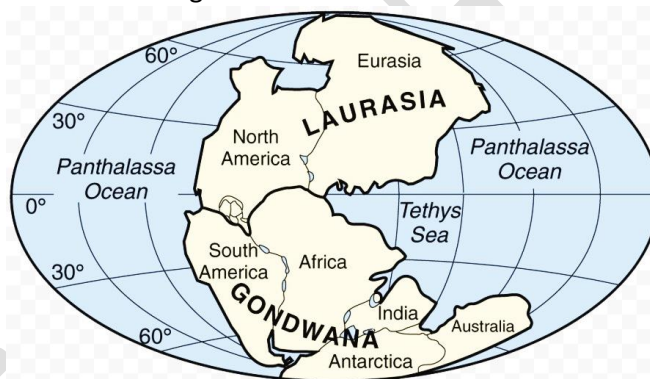


CONTINENTAL DRIFT

It was Abraham Ortelius, a Dutch map maker, who first considered the possibility of the two Americas, Europe and Africa, to be once joined together. Antonio Pellegrini drew a map showing the three continents together.

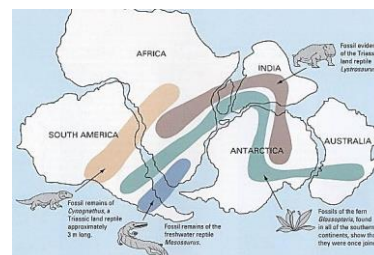
Continental drift theory:

- It was Alfred Wegener—a German meteorologist who put forth a comprehensive “the continental drift theory.”
- At the time most scientists believed that the earth was a solid, motionless body.
- According to Wegener, all the continents formed a single continental mass named PANGAEA and mega ocean named PANTHALASSA surrounded the same.
- He argued that, around 200 million years ago, the super continent, Pangaea, began to split into two large continental masses as Laurasia and Gondwanaland forming the northern and southern components respectively.
- Subsequently, Laurasia and Gondwanaland continued to break into various smaller continents that exist today.



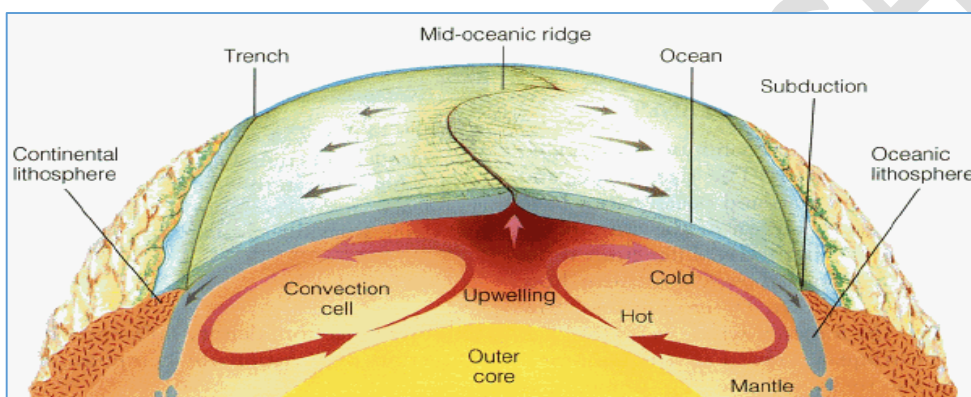
Evidences in support of Continental drift theory:

- The Matching of Continents (Jig-Saw-Fit): The coastlines of Africa and South America facing each other was mapped and have a remarkable and unmistakable match.
- Rocks of Same Age Across the Oceans: Through radiometric dating methods it was found that the belt of ancient rocks of 2,000 million years from Brazil coast matches with those from western Africa. This suggest that the Atlantic Ocean did not exist prior to that time.
- Tillite: It is the sedimentary rock formed out of deposits of glaciers. Overall resemblance of the Gondawana-type sediments of India, Africa and Australia clearly demonstrates that these landmasses were placed together.
- Placer Deposits of Gold: The distribution of placer deposits suggest that the gold deposits of the Ghana are derived from the Brazil plateau when the two continents lay side by side.
- Distribution of Fossils: The observations that Lemurs occur in India, Madagascar and Africa and the skeletons of Mesosaurus found in South Africa and Brazil suggest that these landmasses were once together.



Convectional Current Theory

- Arthur Holmes in 1930s discussed about it.
- He argued that the mobile rock beneath the surface is believed to be moving in a circular manner.
- The heated material rises to the surface, spreads and begins to cool, and then sinks back into deeper depths.
- This cycle is repeated over and over to generate what he called a convection cell or convective flow.
- Heat within the earth comes from two main sources: radioactive decay and residual heat.
- Due to these convection currents the tectonic plates move.



CONCEPT OF SEA FLOOR SPREADING

- Harry Hess (1961) to propose his hypothesis, known as the “sea floor spreading”.
- He argued that constant volcanic eruptions at the mid-oceanic ridges cause the splitting of the oceanic crust, pushing the oceanic crust on either side.
- He further maintained that the ocean floor that gets pushed, sinks down under continents at the oceanic trenches and gets consumed.
- The ocean floor, thus spread.

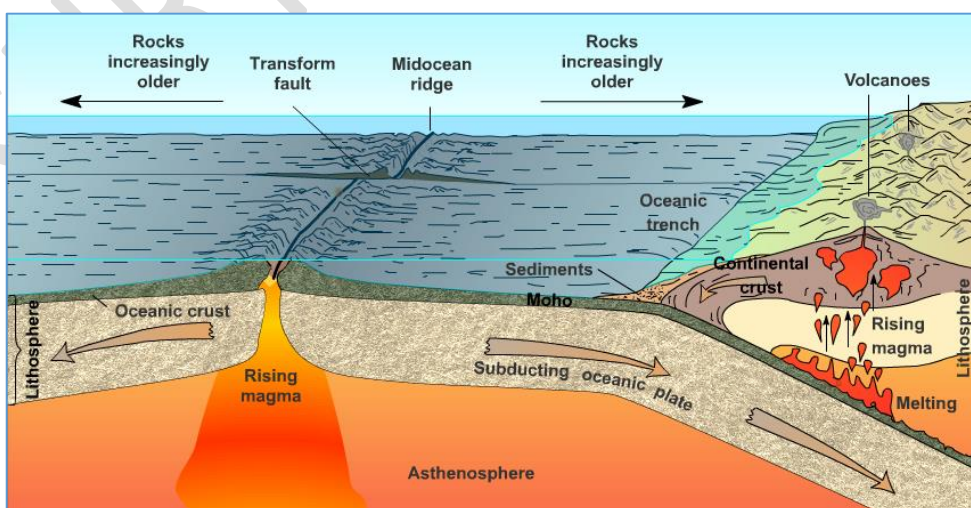
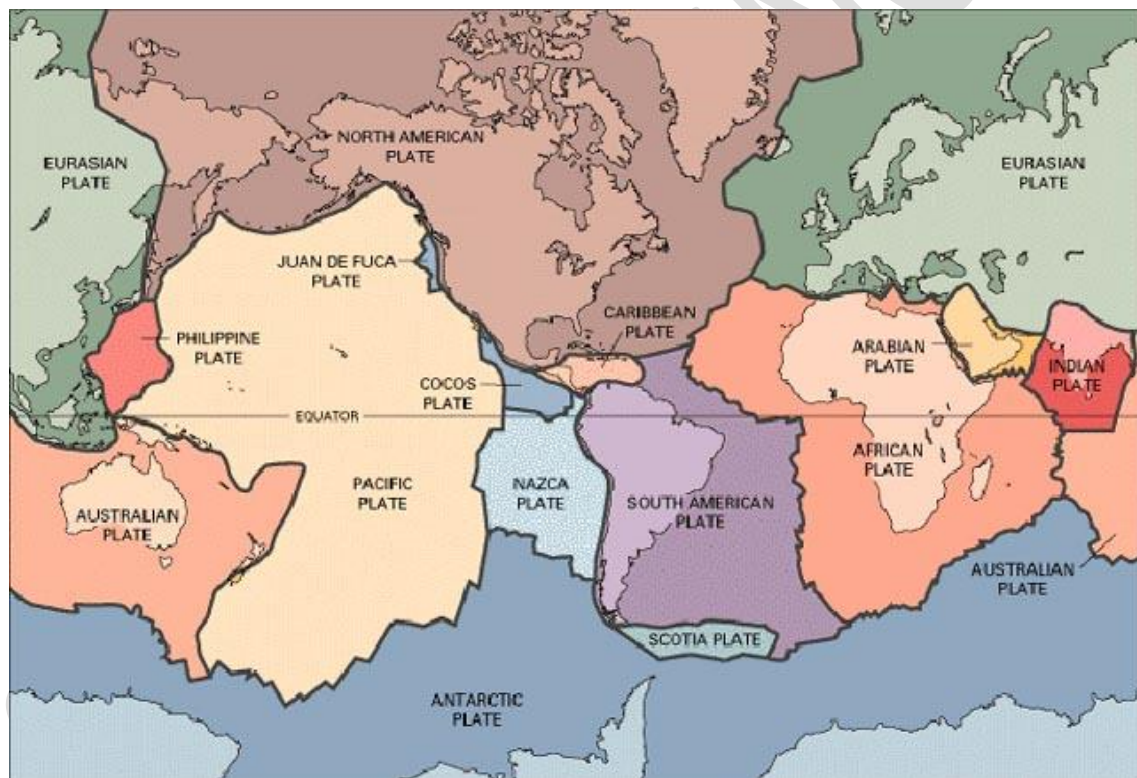


PLATE TECTONICS

- It was in 1967, McKenzie and Parker and also Morgan, termed a new concept - Plate Tectonics.
- A tectonic plate (also called lithospheric plate) is a massive, irregularly-shaped slab of solid rock, generally composed of both continental and oceanic lithospheres.
- The theory of plate tectonics proposes that the earth's lithosphere is divided into seven major and some minor plates.
- Plates move horizontally over the asthenosphere as rigid units.
- A plate may be referred to as the continental plate or oceanic plate depending on which of the two occupy a larger portion of the plate.
- Pacific plate is largely an oceanic plate whereas the Eurasian plate may be called a continental plate.



Modern developments

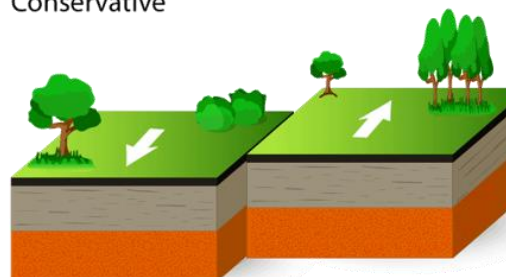
- All kinds of tectonic plates have been constantly moving over the globe.
- It is not the continent that moves as believed by Wegener but what moves is the plate.
- Later discoveries reveal that the continental masses, resting on the plates, have been wandering all through the geological period.
- Both the surface of the earth and the interior are not static and motionless but are dynamic.
- The slow movement of hot, softened mantle that lies below the rigid plates is the driving force behind the plate movement.

PLATE MOVEMENT

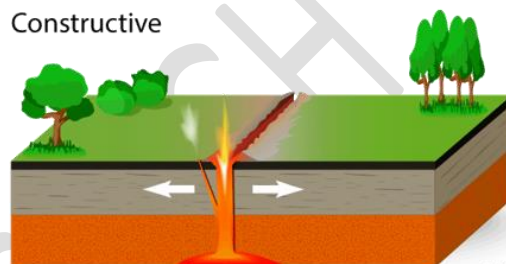
Three types of plate boundaries:

1. Transform Boundaries
 - a. Where the crust is neither produced nor destroyed as the plates slide horizontally past each other.
 - b. Their plain of separation is generally perpendicular to the mid-oceanic ridges.
2. Divergent Boundaries
 - a. Where new crust is generated as the plates pull away from each other.
 - b. The sites where the plates move away from each other are called spreading sites.
 - c. The best-known example of divergent boundaries is the Mid-Atlantic Ridge. At this, the American Plate(s) is/are separated from the Eurasian and African Plates.
3. Convergent Boundaries
 - a. Where the crust is destroyed as one plate dived under another.
 - b. The location where sinking of a plate occurs is called a subduction zone.
 - c. There are three ways in which convergence can occur. These are: (i) between an oceanic and continental plate; (ii) between two oceanic plates; and (iii) between two continental plates.

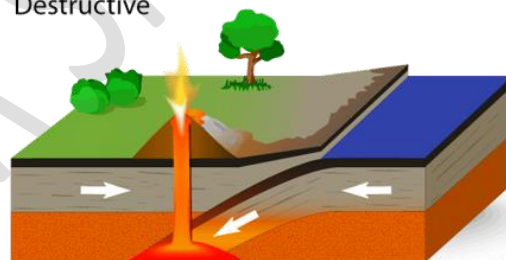
Conservative



Constructive



Destructive



MOVEMENT OF THE INDIAN PLATE

- Till about 225 million years ago India was a large island situated off the Australian coast, in the southern hemisphere.
- The Tethys Sea separated it from the Asian continent.
- During the movement of the Indian plate towards the Eurasian plate, a major event that occurred was the outpouring of lava and formation of the Deccan Traps.
- India collided with Asia about 40-50 million years ago causing rapid uplift of the Himalayas.
- Scientists believe that the process is still continuing and the height of the Himalayas is rising even to this date.

