Seafloor Spreading Theory, Evidence, Example, Diagram

Seafloor Spreading

Seafloor Spreading Theory was put forth by American geophysicist Harry H. Hess in 1960. Magma rising in the rift as the old crust pulls itself in opposing directions causes the seafloor to spread. The seawater cools the lava, creating a fresh crust. Over millions of years, the magma's upward flow and subsequent cooling produced high ridges on the ocean floor.

However, when the oceanic crust slides beneath continents and falls back into the mantle at subduction zones, the bottom is reforged there and destroyed elsewhere. The East Pacific Rise is the region of the Ring of Fire where the seabed is spreading most quickly. It is situated where the Pacific Plate, the Cocos Plate, the Nazca Plate, the North American Plate, and the Antarctic Plate separate. The Cocos Plate is west of Central America... Read more at:

Sea Floor Spreading Theory

At mid-ocean ridges, where new oceanic crust is created by volcanic activity and gradually moves away from the ridge, the seafloor spreading process takes place. Harry Hess proposed the idea that the continents move when the seafloor shifts as it spreads out from a central axis.

Sea Floor Spreading Theory states that the intense heat produced by radioactive substances in the mantle, which is located between 100 and 2900 kilometres beneath the surface of the planet, searches for a route out and induces convection currents to form. On the ocean floor, oceanic ridges and trenches form where the rising and descending limbs of these currents meet. New material is introduced to the ocean floor as older material is pushed away from the crest.

As molten material erupts from the mantle, spreads out, and pushes older materials to the sides of the rift, a new ocean floor forms along fractures in the ocean crust. The additional ocean floor is being added as a result of sea-floor spreading.

Seafloor Spreading Theory Evidence

1. Evidence from **Magma**

Molten material frequently erupted from fissures along the mid-ocean ridge before rapidly cooling, according to evidence found in the form of rock pillows.

2. Evidence from **Drilling Samples**

Ocean floor core samples show that the youngest rocks are found in the centre of the ridge, whereas older rocks are found further from the ridge.

3. Evidence from **Magnetic Stripes**

The rocks that make up the ocean floor are arranged in a pattern of magnetising stripes that keep track of changes in the Earth's magnetic field.

4. **Subduction**

When a section of the ocean floor descends into a deep ocean trench, it then descends back into the mantle.

5. **Deep Ocean Trench**

This takes place in subduction zones in the Deep Ocean Trench. Underwater canyons with great depth develop as the marine crust bends downward.

Seafloor Spreading Effects

Seafloor spreading affects the carbon cycle and sea level. The ridge expands as the seafloor spreads more quickly. Before it cools and shrinks, the hot, young lithosphere is forming, moving farther away from the ridge, and doing so more quickly. Sea level therefore rises. Faster rates result in increased volcanic activity, which releases greenhouse gases into the atmosphere and affects the carbon cycle.

Seafloor Spreading Theory Outcomes

It put an end to the battle between the older rocks found farther out from the centre of mid-oceanic ridges and the younger crust found there. Furthermore, it also explained why the sediments in the cores of the oceanic ridges are so thin. The expansion of the seabed supported Alfred Wegener’s idea of continental drift and advanced plate tectonics theory.

Seafloor Spreading Reasons Behind Decline

1. **Growing Mountains on the Continent**

   One of the potential explanations for the slowdown may be the continents’ growing mountain ranges (as it causes resistance to seafloor spreading). When the supercontinent Pangea began to break apart around 200 million years ago, there were no significant plate collisions or associated mountain ranges. Back then, the continents were largely flat.

   As mantle convection moves heat from the earth’s interior to the surface, changes in that process could possibly be at play. The mantle of a planetary body is a layer that is encircled by the crust on top and the core underneath. Mantle convection is the method by which heat is transferred from the blazing core to the brittle lithosphere. The slow cooling of the mantle is caused by below- and above-surface heating and cooling over long periods of time.

2. **Mature Stage of the Supercontinent Breakup**

   New ocean basins evolved as Pangea gradually disintegrated, and eventually, the widely dispersed continents began colliding with one another. For instance, this occurred between Africa and Eurasia, the Arabian Peninsula and Eurasia, and India. This is a normal result of the supercontinent’s breakdown and dispersion having reached a “mature” stage.

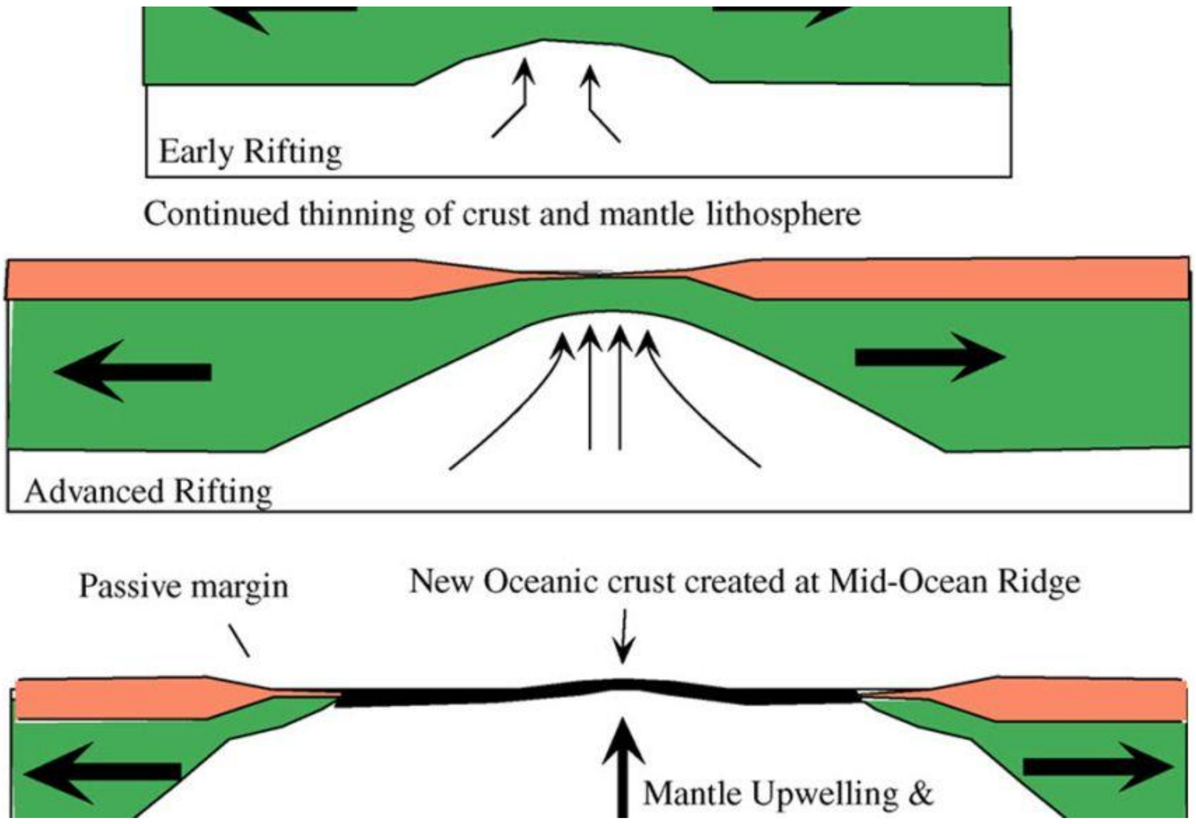
Seafloor Spreading Theory Limitations

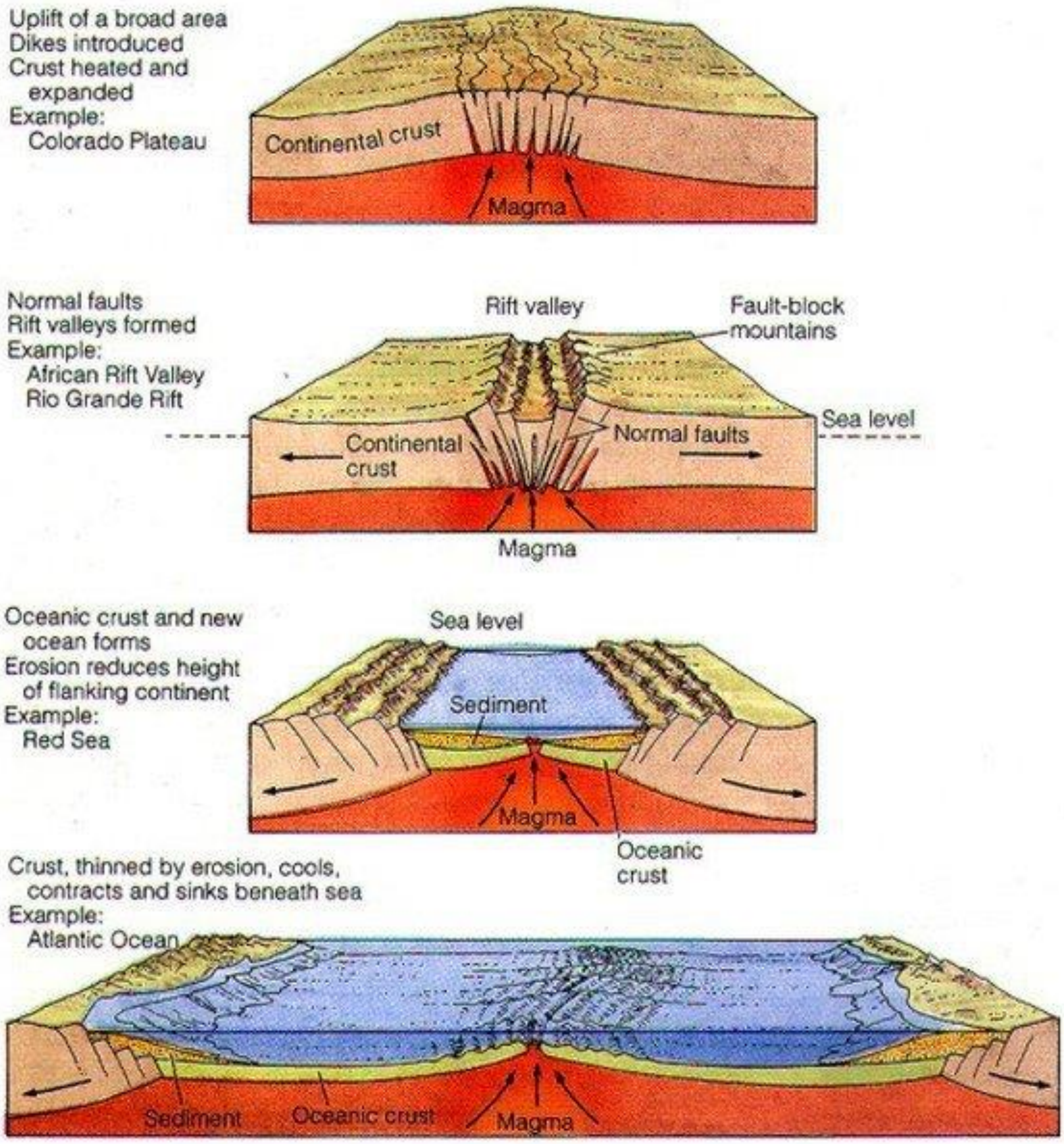
The properties of ocean floors or how continents move are not discussed by Harry H. Hess. Unlike the prevalent contemporary theory, which describes the lithospheric plates, this idea made no mention of them.

CONCLUSION:

The first thorough theory to address the origin and migration of the bottom was seafloor spreading. Morgan, along with McKenzie and Parker and a number of other experts, carried out a more thorough investigation of the movement of various parts of the earth’s crust in 1960. Plate tectonics is the theory that will adequately explain it.

Seafloor Spreading Diagram





Here is the elaborated diagram of Seafloor Spreading