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**UNIVERSITY OF KABIANGA**

**SCHOOL OF EDUCATION ARTS AND SOCIAL SCIENCES**

**DEPARTMENT OF PSYCHOLOGY AND FOUNDATION**

**COURSE TITLE: INTRODUCTION TO EARTH’S PHYSICAL ENVIRONMENT**

**COURSE CODE: GEO 120**

**TASK: GROUP WORK ASSIGNMENT (GROUP 4 A)**

**INSTRUCTOR: MR. ISAAC BIWOTT**

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**Definition of Sea Floor Spreading**

Sea floor spreading is a geological process that explains the creation of new oceanic crust and movement of tectonic plates at the divergent plate boundaries, typically along mid-ocean ridges.

**Processes of Sea floor spreading**

1. **Divergence of mid-ridges**

Sea floor spreading occurs at divergent boundaries specifically at mid-ocean ridges.

Magma rises from the mantle the reduction in pressure at the ridge due to the plates moving apart allows magma to rise up from the mantle through the rift created between the plates.

Magma cools and solidifies when the magma reaches the surface at the ocean floor, it comes into contact with cold sea water causing it to cool quickly and solidify from new ocean crust.

1. **Movement of tectonic plates**

The newly created oceanic crust acts as a conveyor belt that pushes the older oceanic crust further from the ridge cause tectonic plates to spread out.

**Causes of Sea Floor Spreading**

1. Mantle convection

Heat from the earth’s core causes the hot molten magma in the mantle to rise towards the surface of mid-ocean ridges.

1. Divergence of Tectonic plates

This separation creates a gap or rift in the oceanic crust which allows magma from the mantle to rise up and fill the gap forming new oceanic crust.

1. Upwelling of magma

Upwelling of magma is caused by reduction in pressure at mid-oceanic ridges which allows the molten rock to rise more easily towards the surface.

1. Slak pull at subduction zones

As the oceanic crust sinks into the mantle at these zones it pulls the rest of the plate along it further driving the spreading of the mid-ocean ridge.

1. Cravity and ridge push

As new oceanic crust forms at mid-ocean ridges the hot buoyant crust creates a ridge like structure.

**Sea Floor Spreading Theory**

The sea floor spreading theory was first developed by Harry Hess, an American geophysicist who lived from 1906 – 1969. His discoveries in seafloor spreading were based on the theory of continental drift, which proposes that the continents were once joined and have slowly drifted over time to their current positions due to slowly moving tectonic processes. Critics of the continental drift theory doubted that continents moved independently, and Hess theorized that the movement of the continents was a result of tectonic processes taking place near underwater maintain ranges.

**Evidence Supporting Seafloor Spreading**

1. Magnetic striping

Earth’s magnetic field has reversed polarity as new crust forms at the mid-ocean ridges, minerals in the basaltic magma align with the current magnetic field.

1. Age of oceanic crust

This age distribution supports the idea that new crust is continuously being added at the ridges and spreading outward.

1. Hydrothermal rents

This are found along mid-ocean ridges where sea water interacts with the hot newly formed crust.

1. Sea floor topography

Features such as rift valleys at the mid-ocean ridges and the symmetrical pattern of seafloor features either side of the ridge support the seafloor spreading model.

**Significance of Seafloor Spreading**

**Positive Effects**

1. Supports plate tectonic theory

It explains the movement of tectonic plates and how continents drift helping scientists understand earth’s dynamic structure.

1. Creation of new oceanic crust

The process of sea floor spreading create new oceanic crust at mid ocean ridges.

1. Regulation of earth’s heat

Seafloor spreading facilitates the release f earth’s internal heat through mid-ocean ridges hydrothermal vents.

1. Formation of Marine Ecosystem

Hydrothermal vents, which form along mid-ocean ridges create diverse marine ecosystem.

1. Distribution of Natural Resources.

Sea floor spreading plays a role in the distribution of valuable minerals ad structures.

**Negative Effects**

1. Triggering earthquakes

Seafloor spreading contributes to the movement of tectonic plates which can lead to earthquakes.

1. Volcanic Activity

The formation of new oceanic crust through seafloor spreading is often accompanied by volcanic activity of mid-ocean ridges.

1. Tsunamis.

The movement of tectonic plates caused by seafloor spreading can lead to tsunamis.

1. Environment Disruption

Creation of new crust at mid – ocean ridges can sometimes lead to changes in ocean circulation and release of gases from volcanic activity which can alter marine environment.

1. Impact of oceanic resources

While sea floor spreading can distribute valuable minerals such as those found around hydrothermal. It can also make mineral extraction difficult.

1. Damage to Infrastructure

Sea floor spreading can lead to the creation or fracture zones and transform faults that result in significant shifts in the ocean floor.

1. Alteration of ocean currents

The creation of mid – ocean ridges and the associated changes in water temperature and salinity can alter ocean currents. These changes can have long – term effects on global climate patterns and weather systems, potentially leading to more extreme weather events.

**Examples of sea floor Spreading**

* Mid – Atlantic ridge
* East – Pacific ridge
* Indian – Ocean ridge system
* South – West Indian ridge