

The structure of the Earth is inferred through seismic studies, which analyze the behavior of seismic waves generated by earthquakes or artificial means (such as explosions) as they travel through the Earth's interior. Different types of seismic waves (P-waves and S-waves) and their behaviors provide insights into the Earth's layering and composition. The Earth's structure is composed of several layers, each with distinct properties, compositions, and characteristics. These layers can be broadly categorized into the following major divisions:

1. Crust:

- The Earth's outermost layer, divided into two types:
 - **Continental Crust:** Thicker (around 20-70 kilometers) and less dense compared to oceanic crust. Comprised mainly of granite rocks.
 - **Oceanic Crust:** Thinner (around 5-10 kilometers) and denser than continental crust. Comprised mainly of basalt rocks.

2. Mantle:

- The mantle lies beneath the crust and extends to a depth of about 2,900 kilometers.
- Divided into upper mantle (including the asthenosphere, a semi-fluid layer where convection currents occur) and lower mantle.
- Composed mainly of silicate minerals, with higher temperature and pressure as depth increases.

3. Outer Core:

- The outer core is a liquid layer located beneath the mantle, extending from about 2,900 kilometers to 5,150 kilometers in depth.
- Made primarily of molten iron and nickel.
- Generates the Earth's magnetic field through the movement of liquid metals.

4. Inner Core:

- The innermost layer of the Earth, extending from a depth of approximately 5,150 kilometers to the center at about 6,371 kilometers.
- Composed of solid iron and nickel due to high pressure, despite extremely high temperatures.

This layered structure plays a crucial role in various geophysical phenomena, including the generation of earthquakes, volcanic eruptions, and the movement of tectonic plates, as well as the formation of the Earth's magnetic field. Understanding the Earth's structure is fundamental to comprehending geological processes and the dynamics of our planet.