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INTERIOR OF THE EARTH

EARTH'S INTERIOR

Based on all the evidence from Seismic data and their analysis, the earth's interior has been divided into three layers.

CRUST

This is the outermost layer of the earth. Its depth varies from 16 km – 40 km.

It is thicker at continents (30 - 40 km) and its thickness underneath the ocean basin varies from 5-10 kms.

At continental crust, the uppermost part is mainly sedimentary rocks followed by granite and gneisses rocks which overlie the basaltic rocks. The oceanic crust, however, is devoid of sedimentary or granitic cover and mainly consists of basaltic rocks.

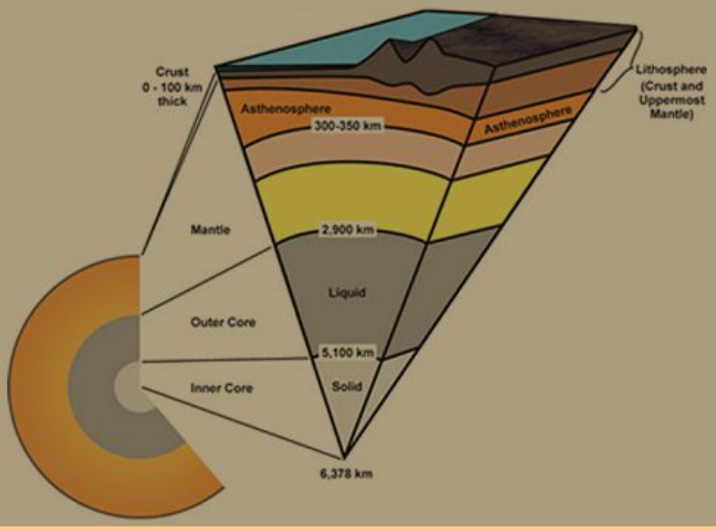
Thus, continental and oceanic crusts di?er in nature where continental crust is mainly granitic while oceanic crust is mainly basaltic in composition.

MANTLE

This is the intermediate layer below crust. It extends up to 2900 km depth.

It is composed of dense and rigid rocks having a predominance of minerals like magnesium and iron. These rocks are similar to peridotite.

CORE



It is the innermost layer of earth. It is divided into outer core and inner core.

Outer Core: It extends from 2900 km to 5100 km depth from sea level. This is primarily made of iron with a small proportion of nickel, which is in liquid condition. At this depth, the S-waves suddenly disappear. Also, the velocity of P-waves abruptly decreases. Despite such a high pressure, outer core is in liquid form because of the presence of silicon which decreases the melting point of iron.

Inner Core: It lies beyond 5100 km depth. The average density increases to 13. This is mainly composed of pure iron and nickel in solid state. The outer liquid core moving around solid inner core of iron acts as a giant self-exciting dynamo which is responsible for magnetic field of earth.

DISCONTINUITIES WITHIN THE EARTH'S INTERIOR

CONRAD DISCONTINUITY:

The Conrad discontinuity corresponds to the sub-horizontal boundary in continental crust at which the seismic wave velocity increases in a discontinuous way. This boundary is observed in various continental regions at a depth of 15 to 20 km, between outer and inner crust however it is not found in oceanic regions.

MOHOROVICIC DISCONTINUITY:

The Mohorovicic Discontinuity, or "Moho," is the boundary between the crust and the mantle.

REPETTI DISCONTINUITY:

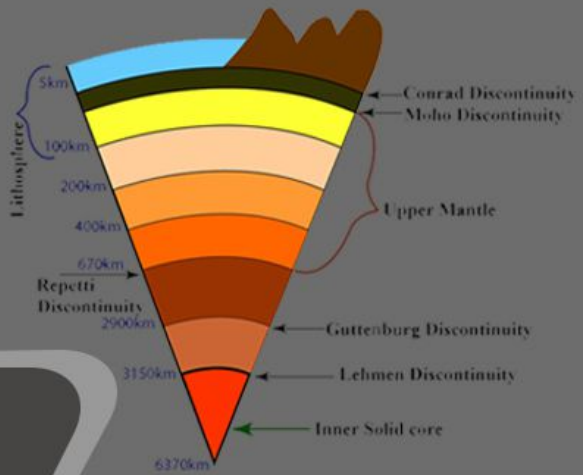
This discontinuity is found between upper and lower Mantle. This is marked by general decrease in velocity of seismic waves between upper and lower mantle.

GUTENBERG DISCONTINUITY:

The Gutenberg discontinuity occurs within Earth's interior at a depth of about 1,800 mi (2,900 km) below the surface, generally between mantle and core ,where there is an abrupt change in the seismic waves (generated by earthquakes or explosions) that travel through Earth.

LEHMANN DISCONTINUITY:

The Lehmann discontinuity is an abrupt increase of P-wave and S-wave velocities at the depth of 220±30 km, discovered by seismologist Inge Lehmann. It appears beneath continents, but not usually beneath oceans, and does not readily appear in globally averaged studies. It is generally found between outer and inner core.



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