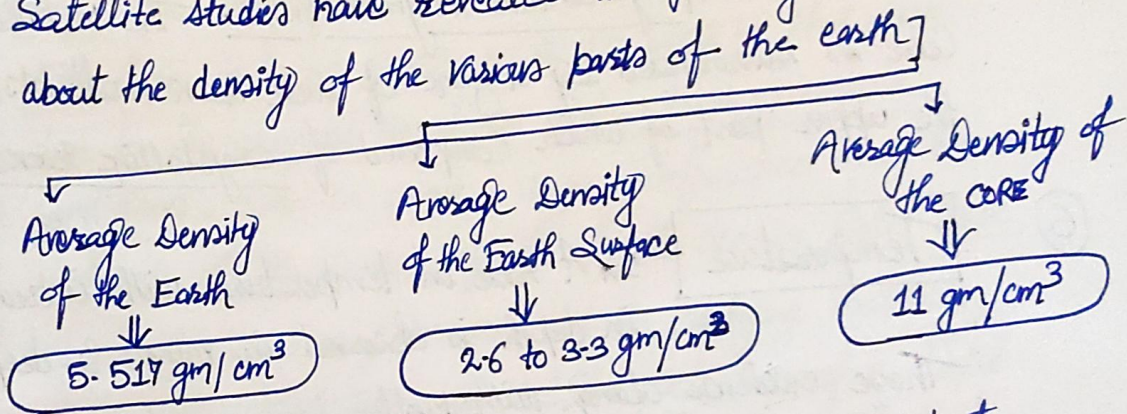


## (B) INDIRECT Sources

④ Density → The average density of the whole Earth is about  $5.5 \text{ gm/cm}^3$ . Due to increase in pressure and presence of heavier materials like Nickel & Iron towards the CORE, the density of Earth's layers is also gets on increasing towards the centre. The Satellite studies have revealed the following results about the density of the various parts of the earth



Thus, the density of the CORE of the Earth is Highest of all parts of the Earth.

⑤ Pressure → Just like the temperature, the pressure is also increasing from the surface towards the centre of the Earth. It is due to the Huge weight of the overlying materials like rocks & sediments. So, the pressure increases the density of rocks. Since the weight & pressure of rocks increases with increasing depth & hence the density of rocks also increases with increasing depth. That's why the density of the core is very much high.



But, there is a critical limit in each rocks, beyond which the density of that rocks cannot be increased impite of increasing pressure therein. It may be thus forwarded that, very high density of the CORE of the earth is not because of high pressure prevailing there. It is therefore due to must be composed of intrinsically heavy metallic materials of high density. This inference is also validated on the basis of geocentric magnetic field. The Metallic Core is surrounded by a zone of such rock materials, the upper part of which composed of crystalline rocks.

⑥ Temperature → A rise in temperature with increase in depth is observed in mines & deep wells.

These evidence along with Molten lava erupted from the Earth's interior supports that the temperature increases towards the Centre of the Earth. The different observations shows that the rate of increase of temperature is not UNIFORM from the surface towards the Earth's Centre.

It is faster at some places & slower at other places. In the beginning, this rate of increase of temperature is at an average rate of 1°C per every 32 ~~metre~~ <sup>metre</sup> increase in depth. While in the upper 100km, the increase in temperature is at the rate of 12°C per km and in the next 300 kms it is 20°C per km. But going further deep this rate reduces to more 10°C/km. This shows that <sup>while</sup> the Temperature is



increasing from the Earth's Surface towards the Centre but the rate of increasing temperature beneath the surface is decreasing towards the Centre". It is evident from this discussion that most parts of the Radioactive minerals are concentrated in the uppermost layer of the earth.

\* → The temperature at the Centre is estimated to lie somewhere between 2000°C & 5000°C, may be that much due to the chemical reactions under High-pressure conditions. Even in such a high temperature also, the materials at the Centre of the Earth are in Solid state because of the Heavy pressure of the overlying materials, ~~these molten materials~~ acquired the properties of a Solid & are probably in a Plastic State.

⇒ Generation & Transfer of Heat inside the Earth

It may be pointed out that the Heat in the interior of the Earth is generated through the disintegration of the Earth Radioactive minerals & Conversion of Gravity force into thermal energy.



From book (Jaininder Singh)



⑦ Gravitation & Magnetic field (crust especially) → The Gravitation force ( $g$ ) is not the same at different latitudes on the surface. It is greater near the poles & less at the equator. This is because of the distance from the centre at the equator being greater than that at the poles. The Gravity values also differ according to the mass of materials. The uneven distribution of mass of material within the earth, influences this value. The reading of the Gravity at different places is influenced by many other factors. These readings differ from the expected values. Such a difference is called Gravity Anomaly. Gravity anomalies give us information about the distribution of mass of the material in the crust of the earth. Magnetic surveys also provide information about the distribution of <sup>the magnetic</sup> materials in the crustal portion and thus, provide information about the distribution of materials in this part.

⑧ Meteors → Another source of information are the Meteors that at times reach the Earth. However, it may be noted that the material that becomes available for analysis from meteors, is not from the interior of the Earth. The material and the structure observed in the meteors are similar to that of the Earth. They are solid bodies developed out of materials same as, or similar to our planet. Hence, this becomes yet another source of information about the interior of the earth.