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Hypothesis of a Thin Methane Gas-sphere between Earth's Crust and Mantle

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This paper presents the hypothesis that a thin methane gas-sphere exists between the solid crust rock and the mantle material of the Earth. This gas layer separates and protects the cold crust rocks from the hot mantle and core materials. The methane gas is produced by the mantle and core materials and is stored by the spherical trap of the compressive lower crust rock. The huge material mass of high temperature and high pressure forming the mantle and core of the Earth can have the ability to generate large amount of methane gas every day. The methane gas generated in the mantle and core has to migrate and flow upward and accumulate beneath and in the lower crust according to the second law of thermo-dynamics, where the lower crustal rock in high compression forms the primary spherical trap.

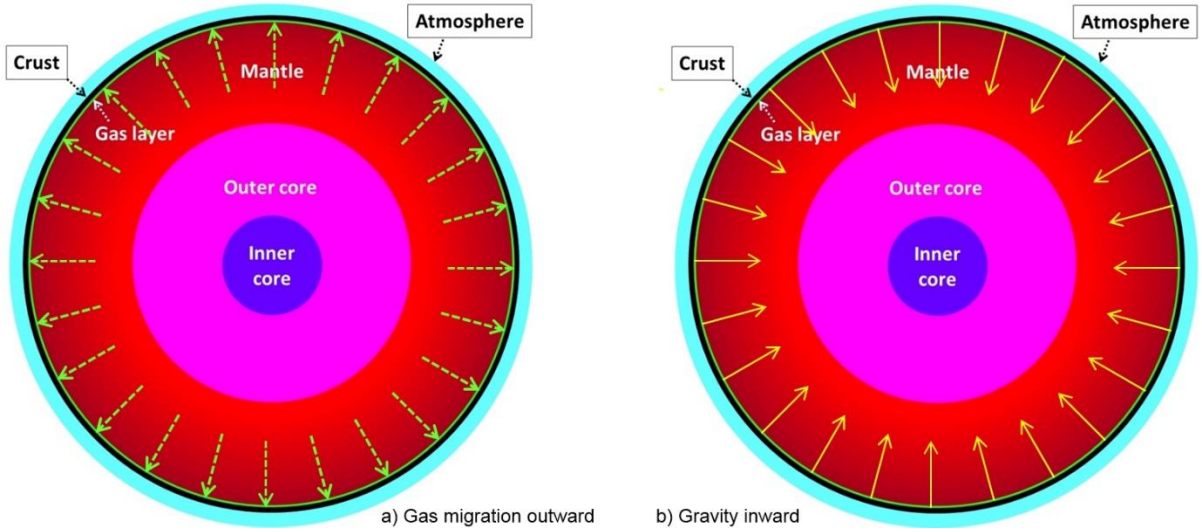

Figure 1: Existence and formation of a thin methane gas-sphere between crust and mantle

The spherical dense gas layer is an ideal foundation to flexibly support, uplift and float the spherical crustal rocks. So, the crustal rocks can be stable and integrity over vast areas, can form huge spherical plates and basins and can have relative hoop movement and drifts. It is also an ideal insulation layer to prevent the crust rock from melting by the hot mantle materials and also to prevent the heat of the mantle/cores from leaking into the crust rocks and the atmosphere. As a result, the mantle/cores can keep their hot temperatures and the crust can keep their solid rocks for millions to billions years. It is estimated that the thin gas layer can have the thickness variable from several hundred meters beneath oceanic crust to a few kilometers beneath mountainous plateau continental crust. Its density is from 1000 kg/m^3 to 2000 kg/m^3. Accordingly, the dense methane gas mass forming the thin spherical layer can be 10 to 240 times of the air mass (5.148×10^{18} kg) forming the atmosphere. Its leaking along deep faults or plate boundaries causes earthquakes and volcanoes and supplies to shallow gas and oil reservoirs beneath secondary traps in adjacent basins of the upper crustal rock mass.

References:

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