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## Plate Tectonics by the Einstein's Theory of Relativity

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There are presently two controversial models for plate tectonics: 1) the **Plume Model** [1], in which deep mantle-derived thermal plumes propel the plates through convection currents; and 2) the **Plate Model** [2], where gravity is responsible to form and drive the plates, the called top-down tectonics. Foulger [3] evaluates the present status of this controversy. Destro [4] proposes a new model, based on the Einstein's **Theory of Relativity** [5], in which plate tectonics is a result of the changes in whole mass-energy balance of the Earth since its formation 4.5 Ga ago.

The change in the whole mass-energy balance of the Earth resulted in a redistribution in the geometry of the spacetime network because of the greater density and pressure towards its center. This space contraction induced changes in the moment of inertia and the angular momentum inside the Earth. The inertia approach in the model presented herein is according the **Theory of Relativity**, that is, as a field property of the spacetime, analogous to the electromagnetic field [5].

In the outer layers of Earth, the above-mentioned matter-energy redistribution provoke portions of the lithosphere to split in smaller blocks, which constitutes the tectonic plates. As a result, the continental and oceanic lithospheres travel as riders over the lower layers. This proposed model may justify the forces that are adequate to drive the plates, break the plates and cause continental drift, as well as to form mountain belts and subduction zones. It also approaches accordingly the earthquakes and specific magmatism associated to the distinct portions of the plates.

The newly presented model also explains the magmatism that occur in the large igneous provinces of the Earth. It includes the ones formed during the initial breakup of the continents, and the volcanic chains and clusters that occur in the oceanic basins. In this latter case, gravity plays an important role in the magmatism, in association with the cooling of the oceanic lithosphere, either the ones associated to divergent or convergent margins. The approach of gravity is also the one by the **Theory of Relativity** [5] that is, resulting from the distortion in the spacetime network caused by the Earth's mass.

### References:

[1] Morgan WJ (1972) AAPG Bull 56, 203-213

[3] Foulger G (2010) *Plates vs. Plumes: A Geological Controversy*: Wiley-Blackwell, 328 p

[4] Destro N (2016) *Plate tectonics by the Einstein's Theory of Relativity*: In press.

[5] Einstein A (1956) *The Meaning of Relativity*: Barnes and Noble Books, New York, 169p

