



Thermoelastic waves and ratcheting – basic mechanism of global tectonics

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The deformation measurement of rock mass in the depth and mathematical modelling solved the old question of Wegener's theory "What is the main engine for the lithosphere movement?".

The solar energy, which reaches the Earth, is two orders higher than the energy of all earthquakes and volcanoes. Only a small part of the solar energy is accumulated in the rocks and the thermal wave created by the solar irradiation penetrates the subsurface layers. The thermal expansions of rocks give rise to excitation of the thermoelastic waves, which are observable in depths as well as in the whole lithosphere plate. The thermoelastic waves with diurnal and annual periods are well observable. The limit cases were modeled by the Simulation-Based Reliability Assessment (SBRA) method (probabilistic Monte Carlo approach). The upper limit corresponds with slow slip events, tremors, creep or earthquakes, the lower limit corresponds with opening of cracks and faults, which can be filled by ratchets. Such mechanism leads to the non-reversible expansions of rocks and spreading of the ocean floor.