



Earthquake prediction; Principles

(Part I)

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The basic problem of geophysics in more precise prognosing earthquakes and volcanoes' eruptions has for decades been the erroneous idea of the very self matter and properties of the basic force of our Universe – the gravity force. This incorrect concept and errors in description of the Earth's interior resulting from it cause that the astronomers see the motion of the planets as the motion in freefall.

The universality of free fall (UFF) asserts that a point test body, shielded from all known interactions except gravity, has an acceleration that depends only on its location [1].

Point test body is an intellectual auxiliary object in physical theories and does not exist in the real universe. The whole momentum (impulse) of a real existing heterogeneous celestial body needs to be calculated by integration of momentum of all its material points $d\mathbf{m} = dV \cdot \rho$; dV - volume element, ρ - density . Therefore the whole momentum \mathbf{p} of a celestial body is vector sum of all momenta of all its parts of different densities:

$$\mathbf{p} = dm_1 \cdot \mathbf{v} + dm_2 \cdot \mathbf{v} + \dots + dm_n \cdot \mathbf{v} = dV_1 \cdot \rho_1 \cdot \mathbf{v} + dV_2 \cdot \rho_2 \cdot \mathbf{v} + \dots + dV_n \cdot \rho_n \cdot \mathbf{v};$$

\mathbf{p} – momentum, \mathbf{v} – velocity' vector

Hence the direct conclusion that each change of velocity or motion's direction of a heterogeneous space object creates stresses in its interior between zones of different density, caused by inertia. It means that transformation of coordinate system to such where orbital centrifugal force does not exist is mathematically prohibited. Through this transformation the whole information concerning the internal structure of the celestial body and stress in its interior is lost.

Therefore both the Free Fall and the Universality of Free Fall are myths that need to be rejected by physics as they block further development of geophysics and astronomy. After rejecting these myths we have to simply state that in the real existing universe the centripetal force always acts together with the centrifugal force. According to the action-reaction basis, none of these forces acts separately. Every real existing object of our universe becomes a centrifuge when rotating. No transformation of coordinate system can change this fact. It means that the signals registered at the University of Washington with the *Eot Wash torsion balance apparatus* have nothing to do with the Equivalence Principle or other problems of cosmology. These signals show only differences of orbital centrifugal force for test bodies of different density. Analysing these signals in terms of cosmological problems is a waste of time for physics.

The arguments presented above, together with the articles [2] and [3], show that the drive mechanism of plate tectonics and most of tectonic phenomena on the surface of the Earth is the west drift of Earth crust deformations. The proof of that are changes of water level in seas and oceans:

- 36000 cubic kilometers of water flows through Gibraltar from the Atlantic Ocean to the Mediterranean Sea; the water flows further, raising the level around Venice and in the Black Sea.

- system of ditches in east Africa gets filled with water from the Indian Ocean

- when Anders Celsius was the director of the Astronomic Observatory in Uppsala, he marked the level

of water in the Baltic Sea on a neighboring rock. Nowadays, 260 years later, the level of water in

Baltic is few meters lower than in times of Celsius.

- similarly as in Scandinavia, the water level on Greenland and Iceland decreased by few meters during

the last 200 years.

- in the region of Philippines, New Guinea and Australia the ocean water decreased by more

than 10 meters during the last 200 years.

The "post-glacial hypothesis", that is used for explaining the decrease of the water level in Scandinavia, can't explain the decrease of the water level in the equator zone. The increase of the water level in places such as:

- eastern Africa
- Caribbean Sea
- Maryland in USA
- around Venice
- in the Black Sea.

and decrease of the water level in other places is a clear proof for that the reason of those changes of the water level can only be the west drift of the Earth crust's deformations that are shown on the "geoid models" [GRIMM, GRAVTOP(GFZ), EGM96, (NASA, OSU, NIMA)]. Water in oceans and seas flows from those places on Earth which rise to those which drop, on the principle of equalizing the hydrostatic level.

In the report concerning the Gibraltar the "faster water evaporation in the Mediterranean Sea than in the Atlantic Ocean" was given as the explanation of the water flow between these reservoirs. However, no physical bases were given to explain this phenomenon.

A simpler model explaining more phenomena is methodologically always more probable than complicated local hypotheses created in exactly the same manner as the epicycles' theories.

[1] *New tests of the universality of free fall*; Dept. of Physics, Univ. of Washington, Seattle, WA

Y. Su, B.R. Heckel, E.G. Edelberger, J. H. Gundlach, M. Harris, G. L. Smith, H. E. Swanson

[2] *Earth-Moon System; The Origin, Development and the Future. Mathematical-Physical Basics to the Computer Simulation of the System*, T. Tumalski, The 8th World Multiconference on Systemics, Cybernetics and Informatics, July 18 - 21, 2004 Orlando, Florida, USA

[3] <http://www.cosis.net/abstracts/EGU05/05663/EGU05-A-05663-1.pdf>