



Series of earthquakes 1811-2004 confirm the west drift of "Tectonical Death Zone"

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The basic problem of geophysics in more precise prognosing earthquakes and volcanos' eruptions has for decades been the erroneous idea that the astronomers see the motion of the earth as the motion in freefall. **The fact that the gravity force and orbital centrifugal force are in balance in the center of gravity of the Earth-Moon system doesn't mean that these forces don't exist.** During any shift (a) of the inner core from the center of the earth, two mass eccentricities (1) and (2) develop gravity force acting between them.

$$\Delta m_{G2} = 4/3 \cdot \pi g a^3 \cdot \rho_2 \quad (1)$$

$$\Delta m_{G3} = 4/3 \cdot \pi g a^3 \cdot (\rho_3 - \rho_2) \quad (2)$$

ρ_2, ρ_3 - the linearised density of the outer and inner core

In the contemporary geophysics the following argumentation has been repeated for years:

- Due to gravitational force acting between the masses (1) and (2) the inner core would have to make vanishing oscillations of period about 5h long. These vanishing oscillations would bring the inner core back to the center of the Earth and might have been without any problems registered on the surface of the Earth. And because until now even the most sensitive gravimeters haven't registered those 5h-long oscillations, the geophysicists conclude that the Earth's inner core lies in the geometrical center of Earth and is motionless in relation to the mantle.

This conclusion is one of the greatest mistakes in the history of geophysics. The geophysicists have forgotten to take into this consideration a very important fact that the Earth does revolve. Rotation of the Earth determines that in the inner-outer core mass

system exists a centrifugal force \mathbf{F}_ω that acts on the inner core in direction opposite to the gravitational force. The position of the inner core inside the mantle is determined by the 'internal' gravity force \mathbf{F}_G and the centrifugal force \mathbf{F}_ω ratio.

For the centre of gravity of any planet in its motion around the sun the equilibrium of the gravity force of the sun \mathbf{F}_G and the centrifugal force of the orbit \mathbf{F}_ω

$$\mathbf{F}_G = \mathbf{F}_\omega \quad (3)$$

is applicable.

The vector of the total gravity force of the sun acts on the centre of gravity of our planet. We have to calculate the centrifugal force of the orbit which acts on a mass point ' dm ' of our planet as

$$d\mathbf{F}_\omega = dm \cdot (\omega_O)^2 \cdot R_O \quad (4)$$

ω_O - angle speed of the orbit, R_O - orbit radius of the planet

But we have to calculate the mass of the mass point ' dm ' as

$$dm = dV \cdot \rho \quad (5)$$

dV - volume element of the planet, ρ - density in point dV

From this it results that the entire centrifugal force of the orbit must be represented as the following sum of vectors

$$F_\omega = \int_{V_1} \rho_1 \cdot \omega_O^2 \cdot R_O \cdot dV + \int_{V_2} \rho_2 \cdot \omega_O^2 \cdot R_O \cdot dV + \int_{V_3} \rho_3 \cdot \omega_O^2 \cdot R_O \cdot dV \quad (1)$$

The centrifugal force of the orbit is distributed on the individual parts of the celestial bodies proportionally to their density. From this it results unmistakably that no planet on the orbit around the Sun is in hydrostatic balance, what means that **the spherical symmetry of celestial bodies does not exist**. Due to the fact that the inner core of the earth has a higher density than its environment, it is shifted from the centre of our planet towards outside the orbit of the earth. The common action of the centrifugal force of the orbit and the rotation of the earth cause the eccentric inner core of the earth to move into the direction opposite to the rotation. This movement of the inner core causes differences in pressure in the outer core which lead to tides in it. These

tides also induce the magnetic field of the earth. This unequal pressure distribution causes deformations of Earth's crust and mantle. We can see those deformations on all of the images of geoid models (GRIM, EGM96 and others).

Together with the movement of the solid inner core inside the mantle also the zones of increased and decreased pressure inside Earth move and together with them the deformations of Earth's crust drift west. That west drift of the Earth's crust deformations is a driving mechanism of plate tectonics, which means it is the cause of the continental drift and all the phenomenons connected with it, among others - earthquakes.

In the equatorial cross-section of the surface of the Earth (GRIMM; GRAVTOP, EGM96,) we can see that the most active tectonic zones overlap with the regions of the greatest deformations of the Earth's crust. Therefore the heaviest earthquakes affect southern Asia and southern America. One of the important arguments confirming rightness of the here presented mechanism of plate tectonics is the increasing number of earthquakes in the interior of the Indian Plate. **Quotation:** *The number of damaging events occurring in and on the margins of India has increased significantly in the past 100 years, and doubled in the past 40 years (Bilham and Gaur, 1999).* Reasons of that rapid increase of earthquakes in the Indian Plate are directly due to the west drift of the greatest deformation of the Earth's crust. The biggest dent of the crust presently exactly crosses over the Indian Plate and the west drift of that dent provides energy for breaking the Indian Plate. The Earth's crust deformations drift west with speed of ca. 0.6 deg/year, therefore it is easy to calculate that a century ago the Indian Plate was crossed with more peaceful tectonic area that nowadays lies 60 deg further west, in the middle Africa. The Republic Day earthquake of India (Mw 7.6, January 26th, 2001, 19 727 casualties) was caused by a break in the Indian Plate in the greatest dent of the Earth's crust. Very similar, both in seismic results and magnitude, earthquake in Gujarat, June 16th, 1819, (Mw=7.7, ca. 1900 casualties) had similar cause as the Republic Day earthquake. As we can see (GRIMM2 and EGM96) in 1819, that is about 200 years ago, the Indian Plate was crossed over with a dent that now drifts 120 deg further west, through the Caribbean Sea. And that dent of the Earth's crust was the cause of the earthquake on June 16th, 1819. In the geophysical field reports right after the seaquake near Sumatra (December 26th, 2004, more than 226 000 casualties of tsunami) it was given that this seaquake has raised the sea-ground of about 10 metres, what was the direct cause of tsunami. This fact confirms once more the here presented mechanism of the west drift of the Earth crust deformations. Across the southern Asia right behind the greatest dent drifts west the greatest bulge of the Earth's crust. This Sumatra-seaquake took place in the most steep slope of the crust, where the tensions are the biggest.

Looking at the geoid models (GRIM, EGM96 and others) we can imagine how the

surface of Earth looked two hundred years ago. All the deformations were shifted ca. 120° East. The today's Carribbean dent was the reason of June 16th, 1819 Gujarat earthquake. In the same time at New Madrid longitude (90°W) was located the greatest bulge on the surface of the Earth, that today lies at ca. 150°E (New Guinea bulge). It means that the similarities between the Kachchh earthquakes and 1811-1812 New Madrid earthquakes are only due to the fact that all these were intraplate earthquakes. Kachchh earthquakes were caused by dent and breaking the Indian Plate downwards what caused the rise of ground waters' level after the earthquake (Times of India 3 Feb 2001 and Dr. V. K. Gaur). However, reason of the New Madrid earthquakes were bulge and breaking the American Plate upwards, what left the visible nowadays uplift of big area around the epicentre region. When looking at the given above picture of Earth's surface we realize that the reason of the earthquakes in southern Asia is the west drift of the Earth crust deformations visible on that map, it becomes clear that neither the Republic Day earthquake of India nor the Sumatra-seaquake were not the last ones in this region. The **Tectonic Death Zone** moves slowly but irrepressibly towards the Arabian Peninsula and Africa.

As it occurs from the above considerations the model of the west drift of Earth crust deformations as a drive mechanism of plate tectonics makes a logical picture of many geophysical phenomenonons. Logical picture of the plate tectonics drive mechanism may be the basis for improving both global and local prognosing of tectonical phenomenonons as earthquakes and volcanoes' eruptions. The only thing that geophysics and the inhabitants of the threatened areas of our globe need is good will of geophysicists themselves and their readiness to revise the wrong ideas that block the advancement of science.

1 Warsaw 19.01.2005