The seismicity latitudinal structure, tidal forces, and the Earth rotation.

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The concept about seismicity distribution dependence on the Earth's latitudinal disposition was formed in the last decade. It was stated that seismic activity of the planet is almost absent in the poles and in polar caps of the Earth, clearly expressed maximums in latitudes near 30-45° for both Hemispheres, and the stable minimum near equator reveal. These bimodal distributions are characteristic for a number of seismic events and for released energy as well. Analysis of lunar seismicity demonstrated similar form for the latitudinal distribution of moonquakes. The bimodal form of latitudinal distributions is typical not only for seismicity but also for distribution of hot spots at the Earth and for sunspots initiation regions.

The noticeable effects upon earthquake occurrence besides tectonic forces is excited by the tidal forces and by the changes of the Earth figure induced by planet rotation velocity variation. We carried out the assessment of kinetic energy variation caused by deformation of its rotating solid shell. It was demonstrated that the polar radius and average radius of the Earth (under the condition of the equality of the sphere volume and of the geoid volume) are connected by linear relationship where Earth ellipticity plays a dominant role. An equation of ellipsoid of rotation in polar coordinates and equation of free surface of elastic compressible rotating sphere are described by general expression which contains zonal spherical function of latitude of the second-order. This expression has a following unique feature: at the latitude $35°15'52''$ the length of radius-vector of geoid coincides with average radius of the Earth, doesn't depend on ellipticity and accordingly on angular velocity of the Earth rotation. At this latitude which received the name "critical latitude", the displacement of radius-vector of geoid is not occurring. Outside of this latitude a variation of angular velocity of the Earth rotation leads to a variation of displacement. Such displacements leads to the deformation of surface and accordingly to occurrence of an additional strains in terrestrial crust in case of change of angular velocity of the Earth rotation. Then the maximum changes of crust strain will occur just in this region and therefore dominant part of kinetic energy variation must be released in this region. The results of theoretical model received by authors for the latitudinal dependence of the Earth figure deformations agree properly with the observed latitudinal structure of seismicity. It was found that relative variation of the Earth rotation kinetic energy is proportional to relative variation of angular velocity of planet rotation. Because the value of relative variation of angular velocity is equal to 10-8, we calculated magnitude of variation of the Earth rotation kinetic energy which may be as great as 1018 J annually. This energy coincides in order of value with earthquake energy released annually. Therefore the Earth rotation energy and its variations can be considered as real source of earthquake energy, and analysis of seismicity structure calls for further investigation of complex system detected interaction outer and inner forces at the planet.