



ON SEISMIC SENSITIVITY OF BIOSYSTEMS AND COSMIC CYCLE PERTURBATION

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Abstract. *The paper discusses the connections of the occurrences in biosphere with the cosmic seismic activity and cosmic cycles, namely, with the interposition of the sun and the planets. Some relation patterns between the changes of the radon concentration in thermal-mineral waters, the physiological events occurring in and biosystem and cosmic biorhythms have been revealed.*

Key words: *piezoelectric, radon, blood plasma, membrane permeability, nerve impulse, mediator-serotonin, immune system, allergology, immunogram, the neuroendocrine system, hormonal balance, neuro-reflective, cosmic rhythms.*

The processes in the biosphere are closely linked with the cosmic events. Therefore, the cosmic influence determines our existence. Long seismic observations and analysis of the heliophysical data shows that seismicity of the Earth and its separate regions is connected with different phases of solar activity cycle, various space factors, and certain regularities can be observed [1].

With the aim to study geochemical, hydrogeodynamical, biological and some other precursors of the earthquake a periodic study of the influence of solar activity and solar-lunar cycles on a chemical composition of underground waters and gases was carried out in cosmophysical observatory of Akaki Tsereteli State University. It is necessary in order to avoid a false alarm based on abnormal changes in the concentrations of chemical gases and underground waters during the seismically active periods.

The processes in the biosphere are closely linked with cosmogenic factors. Therefore, the study of these processes and their practical application will not be complete without considering the regularities of the cosmos. In particular, while designing the physical models of an earthquake formation we rely on the fact that the changes of the solar activity, planetary configuration, interactions between interplanetary magnetic field and the earth's magnetic field affect the speed of the Earth's rotation, which in its turn affects the movement of tectonic plates, water levels in the oceans, tides, climate, weather and so on. Earthquakes are mainly due to the movement of tectonic plates. During the formation of strong earthquakes in the geological structures huge mechanical tension is produced which leads to the formation of electric fields as a result of the piezoelectric effect. Consequently, in the ionosphere the movements of charged particles as well as the parameters characteristic to the electromagnetic field are subject to change [2]. During this period the changes of geomagnetic field can be explained by the generation of thermoelectric currents in the Earth's crust. These currents arise in every heterogeneous body where the temperatures vary considerably. Prior to a sharp movement of the mountain rocks during huge mechanical tension in graphite, basalt and dolomite structural heterogeneity and uneven heat distribution takes place resulting in generation of thermoelectric currents, which should be considered as a source of magnetic fields. All of these changes can be regarded as the cause of abnormal changes of electromagnetic field, which accompany the formation period of a strong earthquake. The resonant impact of these changes on electromagnetic field of the biological objects can cause functional disorders of the vital mechanisms. During the period of the increase of seismic activity allocation of mineral and fresh water resources, changes in the concentration of balneologically active substances are possible that will affect the patients in the sanatoria [3].

Human and animal organisms are able to perceive even the smallest intensity of the environmental changes. Changes of geophysical parameters during the period of the formation of strong earthquakes and repeated shockings influence people's spiritual and physical health. While developing the physical model of this influence during the period of increased seismic activity several abnormalities in functioning of cardio-vascular and nervous systems were found. The work of a cardiac muscle and blood coagulation is closely related to plasma electrolyte content, in particular the concentration of calcium ions. During the abrupt changes in low-frequency electromagnetic radiation the concentration of calcium ions is reduced in the blood as well as in intercellular fluid, which leads

to a sudden increase in permeability of membranes in intercellular fluid, excitation of the nerve cells, initiation of nerve impulses [4]. During the formation period of strong earthquakes the mechanical tension of rocks dramatically increases. Many fissures are formed that are covered by a thin layer of water. A large number of quartz can be found in the mountains which reveals its piezoelectric properties due to mechanical tension. Therefore, under certain conditions, these rocks can electrically discharge, resulting in generation of positively charged solid particles that are thrown out through the cracks. When these particles (aerosols) enter the body through air increased secretion of neural mediator _ serotonin takes place. As a result, people complain of heart pain, their heads start to ache, animals become restless and leave the place where the concentration of aerosols is high.

During seismic activity functional disorders of certain biological systems affect the immune systems to some extent. These events were being examined in collaboration with Tsqaltubo Scientific-Research Institute of Clinical Immunology and Allergology [5].

On April 29, 1991 a strong earthquake occurred in Racha Samachablo. During pre-earthquake and post-earthquake periods the increase in the number of first-time patients (especially those living in the areas near the epicenter) in Kutaisi Psycho-Neurological Dispensary could be observed. In polyclinics the number of patients who felt pain in the chest increased. According to the research material of Tsqaltubo Scientific-Research Institute of Clinical Immunology and Allergology in the same period the changes in the immunograms of sanatorium patients were observed. During the period of seismic activity together with the Institute observations in terms of the hormonal imbalance and disorders of the neuroendocrine system of the body were carried out. The impact of changes in radon, carbon dioxide, sulfate ion concentration in mineral waters on the sanatorium patients was studied.

Long-term observations confirmed the influence of variations of the radon concentration of various baths of Tsqaltubo on neuro-reflective effect, the activation of repair system of deoxyribonucleic acid (DNA), stimulating action of the alpha-radiation and repair mechanisms of lymphocyte genetic apparatus as well as on the effects of radon daughter particles [5, 6].

In order to be able to substantiate functional changes in biological systems with aim of detecting earthquake precursors, it became necessary to clarify the reasons causing cosmophysical rhythms and carry out the corresponding calculations. One of these reasons is the configuration of the planets of the solar

system. The impact of the geometric arrangement of the planets on the geophysical processes may be due to two physical mechanisms: 1) The gravitational influence of the planets on the sun, 2) the influence of planets on ultrasonic stream of the solar wind particles and the transformation of magnetic fields in the interplanetary plasma along the stream.

It is envisaged that high-energy protons after reaching the earth through interplanetary plasma affect geophysical processes to some extent, the general circulation of the atmosphere. At the same time, because of the influence of the magnetospheres of the planets interplanetary magnetic field undergoes several changes. After passing the planets the solar wind additionally generates disorganised magnetic fields. If the planets are arranged in the direction of one radius vector from the center of the sun then these fields can be merged [2]. Through simple mathematical calculations it has been established that in the solar system the interposition of the planets can periodically reoccur. A similar picture is obtained when discussing the movement of the planets and their natural satellites. The planetary system is system with resonant vibrating characteristics. Natural cycles calculated in this way are reflected in a number of geophysical processes - in meteorology two-year, three-year and four-year cycles have long been observed.

The impact of the configuration of the planets and sun on biosystems can be explained as follows: the changes in the interposition of the planets affect the solar activity, which leads to geomagnetic field perturbation. Living organisms are very sensitive to natural events such as geomagnetic storms and lithospheric-atmospheric-ionospheric processes related to the latter [4,6].

References:

- [1] A. A. Chizhevskii-Earth echo of solar storms. Moscow. "Mysl" Publisher. 1976.
- [2] A. Miroshnichenko - Solar activity and Earth. Moscow. "Nauka" Publisher. 1981.
- [3] A. P. Dubrov - The Geomagnetic Field and Life. Leningrad. "Gidrometeoizdat" Publisher. 1974
- [4] Y. G. Mizun, V. I. Hasnulin. Our health and magnetic storms. Moscow. "Znanje" Publisher. 1991
- [5] R. I. Sepiashvili. Development prospects of immunorehabilitation. (Collection of Materials of Dagomys World Conference on Rehabilitation of Immune Systems). Tsqaltubo. 1992
- [6] T. G. Adeishvili and others. Natural basis of medicine. Kutaisi. 2014.