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# ABOUT THE MECHANISM OF IMPACT OF EARTHQUAKES ON HUMAN HEALTH

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*Abstract*

*It is known, that when preparing for an earthquake, at the time of the earthquake and in the period following the earthquake in the epicenter area generated infrar-alow frequency (0.001-10 Hz) weak electromagnetic fields that are registered in areas far from the epicenter. Generated by an earthquake infra-alow frequency fields superimposed on electromagnetic fields of Schumann resonance frequencies, causing changes in the biosphere, the low frequency electromagnetic situation . Values of the Schumann resonance frequency can also be changed by propagation generated by earthquake acoustic-gravity waves (AGW). The amplitude of ionospheric perturbations caused by earthquakes, peaks at a height of Alven resonator (layer F). AGW generated by earthquake and associated propagation of disturbances in the Schumann and Alven resonators alters background ultralow frequency electromagnetic situation of the biosphere and related with this changing biological effect.*

Natural geomagnetic fields create conditions for synchronous work of numerous rhythms existing in a human body and its normal functioning. Change of parameters of natural fields in the biosphere during their disturbances causes violent reorganization of an organism according to a new situation, that rather without serious consequences occurs for a healthy, mature human body.In organisms in which ability to adaptation is weakened or being in process of formation (sick, elderly, embryos, children) adaptation proceeds difficult or defectively. Therefore synchronous connection between exogenous "leading" natural rhythms and endogenous biorhythms is broken ,that causes desynchronization of endogenous rhythms, and, results in health deterioration. Reaction of biological objects to geomagnetic disturbances represent adaptive stress reaction [1]

In days of magnetic storms infra-low frequency weak natural electromagnetic fields are observed. During these days impact on live organisms is carried out by means of the information mechanism when the bioeffect of influence is measured not by energy of an electromagnetic signal and its frequency, i.e. the information which contains a signal. Information influence is especially effective at so-called resonant frequencies, i.e. at influence of such fields frequencies which coincide or owe close to frequencies of different parts of a human body and own frequencies of biological systems. Such resonant frequencies arise in Schumann resonators (the resonator Earth – ionosphere) and Alven resonators, occupying space between a wall ionosphere of the Schumann resonator and a maximum of electric ionospheric concentration ($h \leq 800$ km). Theoretical values of frequencies of Schuman resonator are: 8 Hz, 14 Hz, 20 Hz, 26 Hz and 32 Hz. The first three

frequencies from them are expressed most clearly. Source of excitement of this resonator is atmospheric discharge (lightning) during a thunderstorm.

Thunderstorm is quite frequent phenomenon on Earth therefore the Earth- ionosphere resonator always is in the excited state. Resonance frequencies of the Alven resonator less than 6 Hz and sources of his excitement are in the atmosphere and a magnetosphere.

Values of resonant frequencies of natural resonators depend on a condition of an ionosphere which, in turn, depends on activity of the Sun, geographic latitude of observation point, a season and an interval of day time.

Coincidence of values of frequencies of the main infra-low components of the electromagnetic fields generated by separate systems of a human body with values of resonant frequencies of natural of Schumann and Alven resonators and the short periodical magnetic disturbances became the basis to explain negative influence of magnetic storms on an organism with resonance or information influence of infra-low frequencies weak natural fields

Change of an infra-low frequency electromagnetic state in the biosphere can be provoked by a earthquakes which number also correlates with activity of the Sun, and often strong magnetic storms can occur against strong and weak earthquakes [2]. Those years when the number of spots grows on the Sun, a strengthening of seismic activity is observed on Earth. It is established that by preparation for an earthquake, at the time of an earthquake and during the period following an earthquake in the epicenter area weak electromagnetic fields of ultra-low-frequencies (0,001-10 Hz) are generated, which are registered in the areas remote from epicenter [3,4]. During earthquake preparation the ultra-lowfrequency electromagnetic waves generated in the epicenter are considered as earthquake harbingers, they are perceived by live organisms. Human mortality (generally from cardiac heart attacks and cerebral hemorrhages) in the areas remote from epicenter where there were no destructions, is related to the waves caused by an earthquake generated in the specified frequency range at the time of an earthquake and the subsequent period.

On the infra-low frequencies electromagnetic fields, generated by an earthquake resonant Schumann frequencies are imposed, causing change of an electromagnetic low- frequency situation in the biosphere that affects on human health. Values of Schuman resonant frequencies and, respectively, an electromagnetic situation of the biosphere can be changed also at quasiperiodic (T = 3 - 40 sec.) changes of an ionospheric wall's height of the resonator and distribution of the acustic-gravitational waves (AGW), generated by an earthquake. There are two mechanisms of generation of AGV [5]: 1) at the time of an earthquake AGV are generated in epicenter under the influence of a strong "piston" push on the atmosphere, which are registered for hundreds and thousands kilometers from epicenter; 2) superficial seismic waves ,which are generated in epicenter and extend in all the directions. On the way of propagation weak surface fluctuations of Earth also generate AGV in the atmosphere.

It is known [6] that amplitude of atmospheric acustic-gravitational waves grows depending on height, and in high layers of the atmosphere (at ionosphere heights) is shown in the form of quasiperiodic (T ~ 5-90 sec.) variations of parameters of an ionosphere, so-called mobile disturbances of an ionosphere. The disturbances amplitude of ionosphere caused by earthquakes, reaches the maximum values (10-15%, sometimes more) at the height of F layer of ionosphere, where Alven resonator is located. It is possible to expect that AGV generated by an earthquake and

the related distribution of disturbance of an ionosphere in Schumann and Alven resonators create prerequisites for intensive quasiperiodic (T ~ 5-90 sec.) changes of values of their resonant frequencies and corresponding to these frequencies electromagnetic waves, that surely causes change of a background ultra-low frequency electromagnetic condition of the biosphere and related biological effect with this change. Change of an electromagnetic situation of the biosphere can happen and at AGV transformation in electromagnetic waves.

At the present time at an assessment of negative influence of magnetic storms on human health change of frequency-energetically parameters of background of infralow frequency range electromagnetic fields in the biosphere, caused by close or far earthquakes isn't taken into account, though presumably , the role of earthquakes in the above-noted changes, especially in seismoactive areas, is considerable. Therefore geomagnetic storms, even weak, occurring on low latitudes during strong close earthquakes in seismically active areas, can have bigger biological effect, than on high latitudes, though strong magnetic storms there are observed.

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## О МЕХАНИЗМЕ ВОЗДЕЙСТВИЯ ЗЕМЛЕТРЯСЕНИЙ НА ЗДОРОВЬЕ ЧЕЛОВЕКА

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Резюме

Установлено, что при подготовке к землетрясению, в момент землетрясения и в период, следующий за землетрясением, в регионе эпицентра генерируются инфранизкочастотные слабые электромагнитные поля, которые регистрируются и в районах, удаленных от эпицентра. Генерируемые землетрясением инфранизкочастотные поля накладываются на электромагнитные поля резонансных частот Шумана, вызывая в биосфере изменения электромагнитной низкочастотной обстановки. Значения резонансных частот Шумана могут изменяться также распространением генерируемых землетрясением акустико-гравитационных волн (АГВ). Амплитуда возмущений ионосферы вызванных землетрясениями, достигает максимальных значений на высоте резонатора Алвена (слой F). Генерируемые землетрясением АГВ и связанное с ними распространение возмущений в резонаторах Шумана и Алвена вызывает изменение фонового инфранизкочастотного электромагнитного состояния биосферы и связанный с этим изменеием биоэффект.