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On the earthquake effects in the regime of Pc1

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Surveying records of the electromagnetic field variations from the Borok observatory during earthquakes, the following effects were revealed: 1 - impulse electromagnetic signals in the frequency range of 0–5 Hz being close to or concurring with the earthquake moment; 2 - response to earthquake processes in the geomagnetic pulsation regime with a distinct time closure to the moment of impulse signal arising. Geomagnetic pulsation response to impulse processes of the earthquakes shows itself as an effect of stimulation or breakdown of Pc1 oscillations (so-called “pearls”). When stimulating, the effect of impulse emission impact is the generation of a pearl series with a distinct closure of the oscillation commencement with the time of impulse. If a Pc1 series already exists impulse action on the environment can lead to a sharp breakdown of oscillations or result in their fast decay. The Pc1 stimulation and breakdown effect can be considered as response in the regime of geomagnetic pulsations to processes initiated by action of impulse signal from the earthquake onto the magnetosphere. The pearl series breakdown following the impulse is probably connected with the earthquake-induced change of the wave transfer through the ionosphere. It can be supposed that this change is caused by particle precipitation into the ionosphere as a result of the resonant interaction of the Earth’s impulsive emission with the radiation belt particles. The supplemental ionisation changes the coefficient of wave reflection from the ionosphere and as a result leads to the effect of the oscillation abrupt breakdown or sudden decay. To explain the reverse effect, Pc1 stimulation after the impulse, it can be supposed the following. When conditions in the generation region are favourable for the oscillation excitation the electromagnetic signals coming from the earthquake can play a role of the seed impulse for Pc1 generation. Then a resonant frequency is being cut off from a continuous spectrum and a pearl series is developing, the beginning of which is very close to the electromagnetic signal emergence. This work was done under the financial support of the Russian Foundation for Basic

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