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Electric field and infrared radiation in the troposphere before earthquakes

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Some years ago, a model of the generation of local electric fields in the atmosphere a few days before earthquakes and up to a few hours after the seismic shock was proposed. The generation of the electric fields occurs because of an increased ionisation intensity of the atmosphere at the presense of aerosols. The generation of the electric field is the result of the fact that the larger aerosols which are mainly negatively charged have a larger velocity of gravitational precipitation than the smaller, mainly positively charged aerosols. The ionisation in such atmospheric regions is caused by radon, the concentration of which increases in earthquake preparation regions. The formation of mosaic-likely distributed regions of electric fields with intensities of $3 \cdot 10^2 - 10^5$ V/m, and on the other hand, large aereas with increased electrical conductivity should cause a series of physical effects which may be studied using earth-based, atmospheric and satellite observations.

The theoretical analysis of the possible infrared emission spectra showed, that the most important spectral bands, from which information is obtained on electric fields in the night-time ionosphere, possess wavelengths in the interval between 7.0 μm and 15.0 μm. A hypothesis is proposed according to which the infrared emissions are not only connected with the electron acceleration, but also with the heating of the light ions in the electric field. Consequently there occur particles the energies of which are situated in the tail of the energy distribution function. Therefore, their energies are sufficient for the excitation and emission of quanta of energy, which correspond to the vibrational spectral bands of the molecules N_2O, CH_4, CO, CO_2, O_3, and NO_2 of the atmosphere.