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FLUID FLOW DISTORTION OF THE EARTH DURING THE PREPARATION OF TECTONIC EARTHQUAKE

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Abstract. The stream of fluids (usually, gaseous) from the Earth's interior observed in some regions on a surface. At the same time, distortions of intensity of this stream are fixed before tectonic earthquakes and they are considered as precursors of seismic events. The deformation of the Earth's interior during the preparation of earthquake is the defining reason of such distortions. They occur on three mechanisms: 1) change of a rock permeability, 2) variations of pore fluid pressure and 3) transition of gas in the free state if it has been connected in crystalline lattices or is dissolved in a liquid. The procedure of calculation of these phenomena is developed on the basis of the equations of mechanics of two-phase medium and calculation of changes of a stream is made in view of first two mechanisms. Process is described by the linear parabolic equation with variable coefficients. The problem of mass transfer in a half-space for this equation is led to an integral equation and its solution is received as the first approximation. Zones of amplification and weakening of stream have been found out in field observations. Calculations have led to the same effect. The described procedure also can be used at calculation of the heat transmission processes.

Keywords: parabolic equation, the Earth’s crust deformations, earthquake precursors.