Block model for the focus of earthquakes

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In the work we consider coseismal stage of earthquakes, when we have transition of the potential elastic energy into the kinetic energy and generating of seismic oscillations in a focus. As baseline we use the frictional theory of earthquakes [1], believing, that seismic radiation emits in source composed from two elastic connected blocks. On far bank from blocks in a fault, shearing arises, i.e sliding (slip) of the fault banks with the relative velocity u. In result this motion the blocks oscillations arises, which are calculated by using theory.

Statement and solution of a problem is posed in [1]. Concrete calculations is realized for basalt block in the form of cube with side 560 m and for a granite block 574,6 m. At occurrence of a slip with u = 5 km/s blocks start to oscillate, and the distance between blocks R decreases from 1 sm in the initial moment of time t = 0 up to zero. Next the blocks are compressed, at this time R< 0 and its oscillate with subsonic frequency. In a final position blocks adjoin to each other (R=0) though in the beginning they have been moved apart on 1 centimeter. In general case, the final position of blocks depends on initial conditions and characteristics of friction. In particular, the theory allows appear the residual phenomena such as arise of cracks or canyons, or on the contrary formation of hills, sharp ledges (thresholds) and other features of a landscape on a surface of the Earth after shallow-focus earthquakes.

In work we also calculated seismograms of accelerations and speeds of block movements. Variations of dissipative function, kinetic T, potential U and full E=T+U energy of earthquake, was calculated. Maximal value Emax = 357,82 giga - joules allows to calculate a power class of earthquakes K = log Emax = 11,55 and so Richter's magnitude M = 4,5

Literature

1. S.A. Arsenyev // Topical problems of the humanities and natural sciences. 2018. № 11 (117). P. 135 -145.