



Thermodynamic interpretation of physical processes of earthquake preparation

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Common assumptions about physical processes of earthquake preparation can be reduced to eliciting several stages of reaction of rock massive to external forces of tectonic or induced nature:

1. stage of development of fracture formation
2. stage of fracture magnification and formation of rupture plate(s)
3. stage of destruction

It is known that before an earthquake there occurs a decrease in the emitted energy – a stage of seismic gap which is related to the abnormal behavior of V_p/V_s parameter, abnormal behavior of electro-conductivity etc. The above-said characteristics of physical processes in a focal area provided a basis for two most famous and accepted within the scientific community models of seismic sources avalanche-unstable fracture formation (Sobolev G.A., 1980) and dilatancy model (Stuart W.S., 1974).

Analysis of energy structure of the processes in seismic sources using the technique developed by KNIIGiMS in 2004-2005 enables one to provide thermodynamic interpretation of the physical processes of earthquake preparation and justify the possibility of short-term earthquake prediction. In particular, on basis of thermodynamic interpretation in 2005 we predicted the catastrophic aftershock (28.13.2005 $M=8,0$, Sumatra) 3 months in advance with the error of estimate – 10 days, and contradicted the prediction given by RAS before the end of 2005 of an earthquake near P-Kamchatski city.