Creepex–analysis of processes in focal zones of large earthquakes by means of GIS–ENDDB

© 2021 A.V. Mikheeva[1,2], I.I. Kalinnikov[3]

[1]*ICMMG SB RAS*, *Novosibirsk*, *Russia*; [2]*IPGG SB RAS*, *Novosibirsk*, *Russia*; [3]*IPE RAS*, *Moscow*, *Russia*

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Abstract The creepex (creep & explosion) parameter provides information on the relation between low- and high-frequency radiation components in the earthquake source and has become a physically meaningful tool for analyzing various aspects of seismogenesis, in particular, the diagnostics of the preparation processes and the its aftershocks activity of a strong event. This paper investigates the spatial-temporal dynamics of creepex in the focal zones of a number of the major earthquakes from the plate convergence regions, including continental Kashmir earthquake (08.10.2005, M_S=7.6) and continental-oceanic Tohoku (11.03.2011, Mw=8.7). One of the goals of this work is to demonstrate the capabilities of the method in studying physically grounded patterns of focal zones development at the first hours after the main shock. Because of this study, the following regularities of the source relaxation process were revealed: the partiality of the aftershock process, positive values of the creepex at its first hours (explained by the influence of the dilatancy process), and abrupt changes in the creepex during deep transitions (explained by the thermodynamic effect and by the increase in pressure with depth).

Keywords Catalogs and databases of earthquake, seismic and geodynamic process, tectonic environments.

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Information about author

Mikheeva Anna Vladlenovna, PhD, Researcher of the Institute of Computational Mathematics and Mathematical Geophysics of Siberian Branch of the Russian Academy of Sciences (ICMMG SB RAS), Novosibirsk, Russia; Senior Researcher of the Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences (IPGG SB RAS), Novosibirsk, Russia. E-mail: anna@omzg.sscc.ru

Kalinnikov Igor Ivanovich, PhD, Leading Researcher of the Schmidt Institute of Physics of the Earth of the Russian Academy of Sciences (IPE RAS), Moscow, Russia. E-mail: i-kalinn@yandex.ru