IASPEI Symposium / IASPEI03. Earthquake Generation Process / S09. Open se
ssion: Earthquake generation process – physics, modeling and monitoring for forecast

Round-the-world seismic echo effect in aftershock sequences of strong earthquakes: a statistical analysis

* Prof. Alexey Zavyalov [1)] , Dr. Oleg Zotov [2)] , Prof. Anatol Guglielmi [1)] , Mr. Ivan Lavrov [2)]
Schmidt Institute of Physics of the Earth RAS [1)] , Borok Geophysical Observatory of Schmidt Institute of Physics of the Earth RAS [2)]

The existence of the effect of the round-the-world seismic echo was shown in the work on a broad evidence base, including hundreds of the main shocks and thousands of aftershocks. The effect is that the surface waves excited in the earthquake source by the main shock makes a complete revolution around the Earth and excites strong aftershock in the epicentral area of the main shock. The physical nature of the effect is that a critical concentration of wave energy in epicenter is created by converging surface waves under achieving of epicentral area. Effect of the first seismic echo is manifested most clearly. Thus, in this report confirmed the hypothesis of the authors on the activation of rock failure under the cumulative impact of the round-the-world seismic echo onto the focal area unloading ("cooling off") after the main shock. Spatial patterns of effect manifestation and independence probability of its occurrence from the magnitude of the main shock were established. Theoretically predicted and experimentally observed phenomenon of the seismic echo can be used to improve the reliability of strong aftershocks forecast in determining the scenario of seismic process in the epicentral area of occurred a strong earthquake.
This work was supported by the Russian Foundation for Basic Research, the project # 15-05-00491.