

Relation between the number of the aftershocks and the postseismic deformation of large earthquakes

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Large earthquakes are followed by many aftershocks and postseismic deformation. Decay rate of aftershocks can be approximated by the Omori's power law. A postseismic deformation caused by a velocity-strengthening afterslip follows a logarithmic decay. A postseismic deformation caused by a viscoelastic relaxation follows an exponential decay. On the other hand, time series estimated from the seismic moments of small repeating earthquakes in the northeastern Japan subduction zone shows that the temporal change in afterslip follows a temporal power law (Kawada et al., 2009).

We compared the temporal evolutions of aftershock and postseismic deformation observed by the GEONET for some large earthquakes in and near Japan since 2000. A logarithm model may match the number of aftershocks as well as a power-law model. Both a power law model and a logarithm model may match for postseismic deformations of different earthquakes. In many cases the same model can be applied for aftershocks and postseismic deformations.

Keywords: number of aftershocks, postseismic deformation, modified Omori formula