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Postseismic Viscoelastic Stress Change; is It Important?

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Majority of recent earthquake stress interaction studies and deformation models used to explain elastic behaviour for the crust and upper mantle shows that coseismic stress loading plays an important role for triggering subsequent events. However the time span between source and subsequent event can vary from hours to decades and coseismic static stress changes alone cannot explain these time delays.
It is now widely accepted that postseismic deformation might be the result of (1) transient aseismic fault slip, (2) poroelastic relaxation due to fluid flow in the upper crust, and (3) viscoelastic relaxation in the lower crust and/or upper mantle. Here we focus on this third model and apply it a number of well studied earthquakes occurred along the East Anatolian Fault (EAF) in eastern Turkey since 1822. Previously Nalbant et al (2002) investigated Coulomb stress evolution along the EAF and triggering relations of these earthquakes but ignored the postseismic stress changes. We adopted a number of possible lithosphere models and repeated the study of Nalbant et al. (2002) including postseismic viscoelastic relaxation of the lower crust and upper mantle. Our results indicate that stress changes in the postseismic era are comparable to these of coseismic and should be taken in consideration when studying long-term earthquake stress interaction and assessing present day seismic hazard.