Analytical 2D modeling of a strike-slip fault in a viscoelastic space

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Expressions for the displacement and stress field generated by a screw dislocation embedded in a layered viscoelastic half-space have been obtained in analytical form. The equlibrium equation for the shear stress on fracture plane has been solved for a 2D fault model correspondingly to different boundary conditions, in order to obtain the slip distribution on fault plane and the displacement and stress field for the whole medium.
The evolution of these solutions is analysed in function of time for different viscoelastic configurations of the layered half-space. If the coseismic slip is 'frozen' for $t > 0$, the stress field is observed to change considerably in proximity of the boundary interface between surface layer and welded half-space. Also the stress on crack plane is found to change with the time.
Stress concentrates on the fault segment closer to the boundary interface. This may modify the expected aftershock rate, and aftershocks may cluster around the intersection between fault and interface. This process would be enhanced for a low viscosity of the viscous half-space. In fact, some indication for the predicted aftershock clustering is observed for the South Iceland Seismic Zone after the two August 2000 earthquakes.