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Triggering of Landers aftershocks from Hector Mine earthquake due to Overpressured Fluids

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The central portion of the Landers earthquake was notable for the ubiquity of aftershocks lasting for years after the 1992 (M 7.3) mainshock. The typical Omori Law decay rate was punctuated on a number of occasions by sudden seismicity increases. This was particularly evident immediately following the 1999 (M=7.1) Hector Mine earthquake, where seismicity increased significantly in the central Landers region. The seismictiy pattern of the subsequent shocks correlates with the calculated fluid pressure field that evolved by fluid-driven aftershocks from a high pressure source at depth. Further investigations of increased seismicity rates years after the mainshock in the Landers region shows that each rate increase is synchronous with earthquakes as small as magnitude 4 within about 100 km radius. Arguments for rate increases due to stressing rate changes in the rate-state argument can not be discounted, but considering that dynamically triggered sesimicity from distance earthquakes are almost always found in hydrothermal and/or volcanic regions, I argue that the rate increases at Landers are due to the same mechanism: Namely, that (overpressured) fluid-filled and islolated fracture networks are perturbed by dynamics stresses, destroying the sealed system and resulting in fluid-pressured driven seismicity. Numerical modeling results and observations are consistent with this scenario.