

The 1999 Hector Mine earthquake and 1992 Landers earthquake sequences: Earthquake nucleation and structural heterogeneities

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The October 16, 1999, Mw 7.1 Hector Mine earthquake occurred in southeastern Mojave Desert, California. We have used about 160,000 arrival times from 3538 events that are the 1999 Hector Mine and 1992 Landers earthquake aftershocks and there with events to investigate detailed 3-D P and S wave velocity and Poisson ratio structures in that region. We found that: (1) Most of the Hector Mine aftershocks occurred in areas with low Poisson ratio that may represent the brittle and competent patches of the fault zone. (2) High Poisson ratio anomalies are visible at the hypocenters of the Hector Mine and Landers mainshocks. These anomalies may be a fluid-filled, fractured rock matrix that contributed to the rupture nucleation.