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TI: **Three-dimensional Geology of the Hayward Fault and its Correlation with Fault Behavior, Northern California**

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AB: Relationships between fault behavior and geology along the Hayward Fault were investigated using a three-dimensional geologic model of the Hayward fault and vicinity. The three-dimensional model, derived from geologic, geophysical, and seismicity data, allowed the construction of a `geologic map' of east- and west-side surfaces, maps that show the distribution of geologic units on either side of the fault that truncate against the fault surface. These two resulting geologic maps were compared with seismicity and creep along the Hayward Fault using three-dimensional visualization software. The seismic behavior of the Hayward Fault correlates with rock unit contacts along the fault, rather than in rock types across the fault. This suggests that fault activity is, in part, controlled by the physical properties of the rocks that abut the fault and not by properties of the fault zone itself. For example, far fewer earthquakes occur along the northern part of the fault where an intensely sheared Franciscan m,lange on the west side abuts the fault face, compared to the region to the south where more coherent rocks of other Franciscan terranes or the Coast Range Ophiolite are present. More locally, clusters of earthquakes correlate spatially with some of the contacts between Franciscan terranes as well as mafic rocks of the Coast Range Ophiolite. Steady creep rates along the fault correlate with the lateral extent of the San Leandro gabbro, and changes in creep rate correlate with changes in geology. Although preliminary, the results of comparing fault behavior with the inferred three-dimensional geology adjacent to the Hayward Fault suggest that any attempt to understand the detailed distribution of earthquakes or creep

along the fault should include consideration of the rock types that abut the fault surface. Such consideration would benefit greatly from incorporating into the three-dimensional geologic model the physical properties of the rock types along the fault.

DE: 7230 Seismicity and seismotectonics
DE: 8123 Dynamics, seismotectonics
DE: 7200 SEISMOLOGY
DE: 1219 Local gravity anomalies and crustal structure
DE: 1517 Magnetic anomaly modeling
SC: Seismology [S]
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