Evaluating Segmentation Behavior Along the Alamogordo Fault Using Remote Sensing and Field-based Datasets

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Earthquake magnitude scales with the length of the ruptured fault plane (Wells and Coppersmith, 1994). Regional earthquake hazard assessments therefore require an understanding of how individual fault segments may link together to produce large earthquakes. Though fault segmentation’s impact on rupture has been explored along strike-slip faults, such as the San Andreas system in California (Schwartz and Coppersmith, 1984, Nishigami, 2000), similar studies along normal faults are limited (DuRoss et al., 2016). The Alamogordo fault is a segmented normal fault in the Tularosa Basin of south-central New Mexico with established seismogenic potential (Koning and Pazzaglia, 2002). A rupture along this fault would threaten critical infrastructure, such as the city of Alamogordo (population >30,000), White Sands Missile Range, and Holloman Air Force Base. Here we assess fault segmentation along the Alamogordo fault using a combination of remote sensing and field-based mapping techniques. Restricted access within the White Sands Missile Range has limited previous mapping efforts, but with the release of new statewide lidar datasets, we are able to conduct more detailed remote sensing-based neotectonic mapping. Our efforts have expanded the mapped extent of the fault by >15 km. Future work will include mapping of offset geomorphic surfaces at the northern and southern ends of the fault to verify remote mapping interpretations and integration of mapped fault geometries into the lithospheric dynamics code ASPECT to create a geodynamic model of the fault zone.

References:


Keywords:

Alamogordo fault, segmentation, geodynamic modeling, Tularosa Basin, mapping


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