T45D-0152 - Determining the Relationship Between the Garlock Fault and the Eastern California Shear Zone Through Detailed Digital Mapping and Age Characterization of Faulted Landforms, Southeastern California.

Thursday, 15 December 2022

12:45 - 16:15

McCormick Place - Poster Hall, Hall A (South, Level 3)

Abstract

Southeastern California is known for complex fault networks that accommodate strain from PacificNorth American plate convergence. The 250-km-long, left-lateral Garlock fault is integral to this system, yet its overall kinematic role within the plate boundary and relationship with faults of the Eastern California shear zone/Walker Lane belt remain poorly understood. A key area that has not been adequately studied is a 15-km stretch of the eastern Garlock fault, at its intersections with the rightlateral Brown Mountain fault and left-lateral Owl Lake fault. This segment of the fault lies in within the China Lake Naval Air Weapons Station and U.S. Fort Irwin boundaries, which have restrictions on civilian access and portions of which contain unexploded ordinance, making them unsuitable and unsafe for field investigations. The purpose of this project is to use a combination of high-resolution LiDAR topographic data, remotely sensed imagery, and new and published geochronology data to map and establish the ages of faulted landforms along this portion of the eastern Garlock fault. The inaccessibility of this area makes it ideal for the application of remote-sensing techniques.

A range of surface analysis techniques are being used to differentiate and map Quaternary units in the study area. Geomorphic surface properties are being determined from physiographic roughness and surface reflectance data, established from analysis of LiDAR, radar backscatter, and visual-near and short-wave infrared multispectral and hyperspectral reflectance datasets. The ages of faulted landforms are being established using two approaches: (1) fault scarp and terrace riser degradation analysis and (2) a surface property-age model that links remotely sensed surface properties to new and published ages of alluvial surfaces in the region. A final goal of the study will be to determine the slip rate along this segment of the Garlock fault and other faults in the map area. To accomplish this, offset landforms, such as terrace risers and channels, will be analyzed in the context of the new age determinations. The results will be compared to published slip rate estimates for the region in order better understand the Garlock fault's role within the plate boundary and how plate strain is being accommodated in intraplate settings.

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