



## **Detailed investigations of fault slip and surface processes using newly developed IRSL dating**

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New developments in single grain Infra-Red Stimulated Luminescence (IRSL) of potassium feldspar using a post-IR IRSL approach is providing a radically improved degree of resolution in age estimates of sediment deposition for fluvial and alluvial sediments offset by fault movement. In the Mojave Desert, California, the timing and slip history of the left-lateral Central Garlock fault can be reconstructed by applying IRSL dating to offset alluvial fan sediments deposited on the margins of the paleo Lake Searles/China Lake system at Christmas Canyon West, combined with high resolution earthquake event history based on radiocarbon age control from the nearby site of El Paso Peaks. These new age estimates allow us to demonstrate a significantly enhanced slip rate for the last two thousand years in comparison to the Holocene and Geologic mean slip rates. This suggests that the Central Garlock fault is displaying pronounced earthquake clustering and slip rate variation. The age estimates provide a detailed record of sediment aggradation and incision over the last half of the Holocene. Despite disruption to small scale sedimentary structures by extensive bioturbation, the relatively high density of sampling for IRSL age estimation allows the reconstruction of sediment packages, erosional events, and some control of environmental response to changing climate over this period. The patterns of apparent age distribution between individual grains in each sample provide some insight into transport and depositional conditions at the time of sedimentation, and have the potential to provide histories for sediment transport rates and storage.