

PALEOSEISMIC EVALUATION OF THE EAST FRANKLIN MOUNTAINS FAULT EL PASO, TEXAS

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ABSTRACT

In a two-phased approach, mapping of Quaternary morphostratigraphic units and trenching at selected locations was used to evaluate neotectonic activity along the East Franklin Mountains fault in El Paso County, Texas. In the initial tasks, geology and geomorphic surfaces were mapped in a non-urbanized area north of El Paso, where the East Franklin Mountain Franklin Mountains fault obviously offset Quaternary units by as much as 125 m. Using units correlative to those established for the Desert Project in southern New Mexico, the mapping indicated faulting of Jornada II age units (150 to 25 ka) and older. No younger units displayed conclusive evidence of offset. It remains unclear if Isaack's Ranch age units (15 to 8 ka) exist in the area; however, younger Organ units (< 8 ka) are clearly unfaulted.

Based on the morphostratigraphic mapping, potential trenching locations were selected to examine colluvial wedge stratigraphy and confirm offset of the older units. Trenches were finally placed based on access constraints at a location where Jornada II offset was apparent and adjacent areas in which the fault was projected were covered by unfaulted younger units.

Trenching conducted on a 10.7 m high section of the fault scarp revealed a complex sequence of tectonic activity, including evidence for multiple post-Jornada II displacements (4 to 6 events). Typical offset-per-event is estimated at 1.8 to 3.5 m. Evidence for latest Quaternary or early Holocene activity is preserved in the trench. These colluvial wedge units may be relicts of activity during or between Isaack's Ranch and oldest Organ (even though these units may not be preserved elsewhere as surface morphostratigraphic units). Soil carbonate development suggests that the latest surface faulting earthquake occurred between 9 and 22 ka. Strong carbonate development in the older units and colluvial wedges suggests > 100 ky between the older offsetting events. This coupled with an apparent increase in latest Quaternary/Holocene activity is being used to suggest episodic activity.