

BELT-LIKE BEHAVIOR OF SURFACE-RUPTURING EARTHQUAKES IN THE WESTERN BASIN AND RANGE PROVINCE, USA

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Seismicity in the west-central Basin and Range Province is concentrated in two zones (the Central Nevada and Sierra Nevada-Great Basin seismic belts). Paleoseismic studies over the past decade within these two zones provide new insights on belt-like behavior (i.e., spatially associated events clustered in time relative to average recurrence intervals).

Over the past century, up to eight surface-rupturing earthquakes have occurred along the Central Nevada seismic belt (ten, including the 1872 Owens Valley and 1992 Landers ruptures), providing a striking example of belt-like behavior. However, the causative faults have diverse paleoseismic records, indicating belt-like behavior is either unusual or involves varying patterns and combinations of faults. The 1932 Cedar Mountain rupture zone shows evidence for six events over the past 20 kyr, the 1954 Fairview Peak rupture zone previously had not ruptured for at least 35 kyr, the 1954 Dixie Valley rupture zone experienced one prior Holocene event, and faults in the La Plata Canyon area (between the Fairview Peak and Dixie Valley ruptures) experienced a cluster of four latest Pleistocene/early Holocene events.

Most of the Carson Range fault system, a principal frontal fault within the Sierra Nevada-Great Basin seismic belt, has ruptured at least twice during the late Holocene. Radiocarbon ages indicate much of the system ruptured during events at about 500 and 2000 years ago. Age uncertainties allow constraining events within 100 to 200 years at best, and it is thus difficult if not impossible to discriminate between belt-like behavior and rupture during single events or sequences.