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TITLE: CHRONOLOGY OF MAJOR LATE-HOLOCENE EARTHQUAKES IN SOUTHCENTRAL ALASKA

ABSTRACT

Radiocarbon ages of buried organic soils from boreholes in upper Turnagain Arm, Alaska, indicate that rapid submergence of the area occurred at least six times prior to the 1964 Great Alaska earthquake during the last 4,240 years. These submergence events probably corresponded to vertical tectonic displacements during major earthquakes in southcentral Alaska. Following each event, the submerged soil was buried by intertidal fine sand and silt in the same manner that the pre-1964 soil and vegetation were buried by the Placer River silt after the Great Alaska earthquake. Intervals between radiocarbon ages range from about 425 to 1,320 years. However, because borehole sampling was not continuous, additional soil layers may be present that would indicate more frequent events.

Four of the radiocarbon ages correspond favorably to published ages from elevated marine terraces on Middleton Island that are also believed to represent major prehistoric earthquakes. When combined with radiocarbon ages of other elevated or submerged coastal sites in the rupture zone of the 1964 earthquake, the data suggest that at least ten major vertical tectonic displacements preceded the Great Alaska earthquake in southcentral Alaska during the last 4,500 radiocarbon years. Recurrence intervals ranged from about 150 to 600 years and averaged about 430 years.

The data from upper Turnagain Arm indicate that the area has undergone net submergence at an average rate of about 3 mm/yr during the last 4,240 years. Because sea level was probably still rising during the early part of this period, the rate of net subsidence may be slightly lower.

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