

A 2000 Year Lacustrine Paleoseismic Record on the Peninsular Segment of the Northern San Andreas Fault at Lake Merced, San Francisco.

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The Peninsula section of the San Andreas Fault is an obvious and significant hazard to San Francisco and peninsula cities, however the history past events on the SAF on the peninsula is poorly known. We opened a paleoseismic site at Lake Merced, within the city of San Francisco. The lake may be an asymmetrical pull-apart basin with the NSAF system. We conducted a coring and geophysical investigation to test the site for its potential for development of a long-term earthquake history. We collected four main long cores of 5-7 meters, and 4 overlapping cores. The lake has a record of turbidites that dominate the 3-4 m lacustrine gyttja section, overlying a sharp contact with shelly-sandy estuarine material below. The lake record above the contact includes 15 turbidites spanning ~ 2000 years. The turbidites for the most part have sharp bases, some with load features, and fining upward sequences that can be correlated around the lake. Their individual thicknesses show little relation to stream input. Breaching of the spit at the north end of the lake has occurred in historic times, but appears to have drained the lake without open access to the sea, suggesting the event beds are not externally sourced. Radiocarbon dating thus far shows the uppermost 2 events to include bomb carbon, and occurred in ~1955-57 and 1976-1996. These two beds may relate to a local earthquake near the lake in 1957, and the Loma Prieta earthquake of 1989. The third event is thick, and has a model age of ~ 1890 (1860-1930), likely the 1906 event, supported by anthropogenic Pb content. Events dated at ~ 1720, and ~ 1580 underlie the 1906 bed, similar in age to those reported for the penultimate events on the North Coast and Peninsular NSAF segments respectively. The remaining event bed ages appear mostly compatible with turbidites at Noyo Canyon, and the Vedanta Marsh, suggesting that likely 6 and possibly 11 North Coast segment ruptures extended to the Peninsula segment.