# Radiocarbon Dating of Intertidal and Subtidal Fossils to Constrain Vertical Motion of Last Glacial Maximum and Younger Paleoshorelines, California Continental Borderland

## Details

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| **Meeting** | 2006 Fall Meeting |
| **Section** | Tectonophysics |
| **Session** | From Displacements and Dates to Rates: How Do We Measure Fault-Slip Histories at Timescales of 1 kyr to 1 Myr? I Posters |
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## Abstract

We use several species of intertidal and subtidal invertebrate fossils, high-resolution multibeam bathymetry, side-scan sonar, and submersible observation to identify and constrain the age of submerged paleoshorelines within the northern Continental Borderland, offshore southern California, as markers of vertical tectonic strain. AMS $^{14}C$ radiocarbon dating of 42 surficial shell samples collected by submersible between 2000 and

2004 from paleoshorelines that rim the northern Channel Islands and the entirely submarine Pilgrim Banks on the Santa Cruz-Catalina Ridge yielded ages that ranged between ~ 40,000 radiocarbon (RC) years and modern day. Of these, ages of between ~ 27,000 years (RC) and 11,500 before present (BP) years, indicative shoreline colonization during and following the Last Glacial Maximum (LGM), were obtained from the mussel *mytilus californicus*, a characteristic intertidal invertebrate commonly found along the west coast of North America, and the subtidal species *humilaria kennerleyi* and *tresus nuttallii*. Removal of the non-tectonic component of vertical change using an ice-volume equivalent eustatic sea level compilation, we find between 20 m and 40 m of uplift of the eastern portion of the northern Channel Islands block since the LGM lowstand, resulting in an uplift rate of 1.44 ± 0.46 mm/yr over the last 23 ka. This rate closely matches published rates for the Channel Islands thrust, which underlies the northern Channel Islands platform. Results from post-LGM shoreline features on Pilgrim Banks are somewhat more ambiguous. Dating of shell material collected above a depth of 140 m yielded ages between 44,000 years (RC) and modern day, but a with a non-linear age-depth relationship of LGM and younger ages suggesting either a change from uplift to submergence of the bank just prior to the Younger-Dryas, or deposition of shell material at the base of pinnacles on which organism growth tracked sea level. Nonetheless, these dated samples seem to highlight a slight northward tilt of Pilgrim Banks, which is likely related to transpressional interaction of the Borderland and Western Transverse Ranges blocks where the Santa Cruz-Catalina Ridge and northern Channel Islands intersect.

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