

DATING OF EMERGENT MARINE TERRACES AND RATE OF UPLIFT FOR THE WESTERN SANTA BARBARA FOLD BELT, CALIFORNIA

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Uranium-series analysis of a solitary coral is used to date emergent marine terraces and calculate a rate of vertical uplift for the western Santa Barbara Fold Belt. A well-preserved single, fossil specimen of the solitary coral "Balanophyllia elegans" was collected from the first emergent marine terrace at Isla Vista, California. The sample was cleaned and prepared following the procedure by Stein et al. (1991). The Isla Vista sample weighed 0.2 g and analyzed for U and Th isotopes by the TIMS technique (Chen et al., 1986). Although the concentration of ^{232}Th in the fossil coral is higher than reef building corals, they have negligible effect on the ^{230}Th - ^{234}U date. The Isla Vista terrace coral yielded an age of 47 ± 0.5 ka. The calculated initial $^{234}\text{U}/^{238}\text{U}$ activity (U_i) for the terrace coral (1.149 ± 0.007) is within the same error as in modern seawater (1.144 ± 0.004).

Geomorphic and mapping of the Isla Vista and UC Santa Barbara marine terraces, as well as shallow subsurface mapping of the marine platforms, demonstrate that they form a continuous marine terrace. Based on the U-series age of 47 ± 0.5 ka, the Isla Vista and UC Santa Barbara marine terraces are assigned to oxygen isotope substage 3a. The associated paleo-shoreline is exposed west of the Isla Vista terrace at an elevation of 17.2 ± 1.6 m. This yields a local, vertical uplift rate of 1.22 ± 0.13 m/ka for the western Santa Barbara Fold Belt.

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