

RECONSTRUCTING PALEO-UPWELLING IN THERMALLY ANOMALOUS COMMUNITIES FROM THE LAST INTERGLACIAL PERIOD IN SOUTHERN CALIFORNIA

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No-analogue communities (communities containing co-occurring species that are today geographically and thermally disjunct) pose significant challenges to traditional faunal based paleoenvironmental reconstructions which rely on extrapolating modern environmental distributions to the past. In southern California, several shallow marine no-analogue, so-called “thermally anomalous” communities have been hypothesized to represent the intensification of coastal upwelling during the last interglacial period. Here, I propose to directly test this hypothesis by conducting fieldwork on six thermally anomalous fossil communities located in Newport Beach and Cayucos, CA. I will micro-sample fossil growth lines for $\delta^{18}\text{O}$, $\delta^{13}\text{C}$, and Mg/Ca isotopic ratio analysis. This approach will allow me to constrain seasonal and inter-annual paleoenvironmental variation in paleo- temperature, salinity, and upwelling intensity. The proposed study will enhance our understanding of the faunal signatures of potential petroleum source rocks by (1) testing whether upwelling coincides with the mixing of cold and warm water taxa and (2) assessing the conditions under which faunal based paleoenvironmental reconstructions may be inaccurate by directly reconstructing the environments in which no-analogue fossil communities form.

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