THE ISOTOPIC RECORD OF MIOCENE-RECENT ENVIRONMENTAL CHANGES IN SHALLOW MARINE HABITATS ON EITHER SIDE OF THE PANAMANIAN ISTHMUS.

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The Pliocene uplift of the Panamanian isthmus isolated previously contiguous Caribbean and eastern Pacific marine faunas, and initiated the development of different selective regimes on opposing sides of the barrier. Contrasting environmental conditions provided the context for different rates and kinds of evolutionary change on either side of the isthmus. The goal of our study is to characterize the rates and types of these paleoenvironmental changes; we employ stable isotopic profiles of venerid bivalve shells from the Miocene-Recent deposits of Panama and Costa Rica.

We analyzed geographic and depth variation in Recent shells as a means of calibrating the fossil analyses. Results from Recent venerids highlight the differences between the Caribbean and eastern Pacific shallow marine environments. Pacific shells typically exhibit strong annual fluctuations in $\delta^{18}O$, associated with seasonal upwelling and its associated cool waters. In shallow, near-shore habitats, freshwater runoff during the rainy season also contributes significantly to annual $\delta^{18}O$ cycles. Caribbean shells exhibit negligible annual cyclicity.

We analyzed fossil shells from the Miocene Gatun Formation, and the Pliocene Cayo Agua, Escudo de Veraguas, and Rio Banano Formations from the Caribbean coast, and the Plio-Pleistocene Charco Azul Group from the Pacific coast. Results from fossil shells indicate that annual cycles are well-preserved, and not obscured by diagenesis or other alteration. A strong annual signal in $\delta^{18}O$ (amplitude >1.5‰) is found back at least to the Early Pleistocene along the Pacific coast. Some post-uplift Caribbean samples exhibit stronger seasonality than that observed in similar habitats today.

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