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Title

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Permalink

<https://escholarship.org/uc/item/81722318>

Journal

GEOCHIMICA ET COSMOCHIMICA ACTA, 74(12)

ISSN

0016-7037

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Publication Date

2010

Peer reviewed

Developing radiocarbon within California mollusk shells as a proxy of upwelling intensity

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Our understanding of the complex interactions between the California Current strength, upwelling intensity and El Niño Southern Oscillation (ENSO) is currently limited by the short duration of instrumental records and a lack of suitable seasonal-resolution marine archives. Marine mollusk shells provide a seasonal-resolution archive with significant potential.

Living mussels (*Mytilus californianus*) were collected from Newport Beach, California. Sequential samples were micromilled from the outer calcite layer of shell cross-sections and analyzed for stable isotopes, trace elements and radiocarbon. By comparing the geochemical profiles produced from the shells with instrumental records and ocean geochemical measurements, including seawater dissolved inorganic carbon (DIC) radiocarbon, made at a nearby site over several years it is possible to identify empirical relationships between shell geochemistry, upwelling and oceanic variables.

We also present results from *Mytilus californianus* shells collected from Mexico to Oregon following the strong El Niño event of 1997-1998. This event caused a collapse of upwelling and provides an ideal test of the fidelity of these empirical relationships along the west coast of North America at a time of dramatic change within the California Current system.