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Bamboo coral gorgonin: Surface water geochemical records from an intermediate-depth coral

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Deep-sea bamboo corals (family Isididae) found on seamounts on the California margin (37°22'N – 31°54'N) have the potential to record annual to subannual changes in water mass chemistry over decades to centuries. These corals are composed of calcite internodes precipitated from the surrounding intermediate water (as evidenced by D¹⁴C values), and organic nodes formed from the organic matter of the coral's food source. Both organic and inorganic portions of the skeleton are precipitated annually, with growth rates of ~100 microns/year. Geochemical analyses of the organic nodes of living corals collected in 2004 and 2007 (800-2200m water depth) exhibit post-bomb radiocarbon values of >80‰ D¹⁴C on the outer edge of the organic nodes, suggesting that the organic matter is surface-derived; pre-bomb spike values range from -81.3‰ to -116.9‰ in the interior of the coral organic node. Carbon isotopic values of recently precipitated organic nodes range from -16.5‰ to -18.8‰. Nitrogen isotopic values range from 13.8‰ – 18.9‰, likely reflecting a zooplankton-derived food source for the corals. Carbon isotopic variability in a 300+ yr old specimen exceeds 3‰, indicating changes in productivity on the California margin during this time period. Organic geochemical analyses of several long-lived corals will provide long term, high-resolution records of surface water productivity, nutrient dynamics and biogeochemical cycling on the California margin.