



Measuring and utilizing the hydrogen isotopic composition of deep-sea corals

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Despite the widespread use of hydrogen isotopic analysis of bioarchives in paleoenvironmental reconstructions, no previously-published work has yet attempted to measure or utilize the hydrogen isotopic composition (δD) of deep-sea corals. Geographically ubiquitous and with lifespans on the scale of hundreds of years, δD measurements of deep-sea corals have the potential to elucidate physical paleoceanographic parameters at well-resolved spatial and temporal resolutions.

We present a method for the determination of annually-resolved δD from deep-sea corals measured from gorgonin, a complex proteinaceous material making up the horny skeleton of gorgonian corals. We address the issue of exchangeable hydrogen in gorgonin by controlling the isotopic composition of exchangeable hydrogen using a heated batch dual-equilibration technique. Coupled with $\delta^{15}N$ measurements, we attempt to identify the relationships between trophic feeding levels, physical oceanographic parameters, and the δD of gorgonin from corals collected from chemically distinct ocean basins.

Preliminary results from 43 samples indicate reproducible measurements on coral species *Primnoa pacifica*, *Primnoa resedaeformis*, and *Keratoisis grayii* with bulk δD values ranging from -40‰ to -110‰ and bulk $\delta^{15}N$ values ranging from $+13\text{‰}$ to $+17\text{‰}$. Final results will include a full suite of non-exchangeable δD values and $\delta^{15}N$ of corals from the Labrador Sea and from the Gulf of Alaska.