

Coral tracers of post bomb radiocarbon transfer in the equatorial Atlantic

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The robust calcium carbonate skeletons of deep-sea corals are often well preserved and offer continuous, high-resolution archives for reconstructing past environmental change, especially for intermediate water masses. Bamboo corals are characterized by bamboo-like skeletons, with high-Mg calcite internodes and nodes made of proteinacious organic matter. These layers record deep ambient seawater chemistry as well as surface water properties, respectively, giving a potential way to reconstruct coupled surface and deep record from a single coral test.

Here we show radiocarbon of both organic node and calcite internodes of a live-collected bamboo coral from 1400 m in the equatorial Atlantic – currently situated in north Atlantic Deep Water. The radiocarbon content of the organic node records a distinctively high bomb radiocarbon signal, enabling us to generate a reliable chronology for the coral specimen. By contrast, the calcite records a delayed bomb spike at a much lower amplitude. Additional element/Ca measurement of skeletal calcite reveals changes in ocean chemistry over the last ~50 years and changes in growth rate. This work will pave the way for us to trace the movement of anthropogenic carbon and trace metals throughout the world's oceans using bamboo coral substrates.