

Influence of water flow on skeletal oxygen and carbon isotopic composition in the branching coral *Pocillopora damicornis*

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Fragments of branching *Pocillopora damicornis* coral colonies were grown in experimental flumes under two water flow regimes (flow, 20 cm s⁻¹; still, less than 3 cm s⁻¹). Colony size and buoyant weight increased most rapidly in the fast-flow regime. Branch tips from the upper and outer parts of the colonies showed the lowest and most consistent skeletal oxygen isotope ratios. Flow regime had little influence on the lowest oxygen isotope ratios, which were at least 3.5 per mil lighter than the calculated oxygen isotopic equilibrium. These kinetic isotope effects are comparable to those observed in *Porites* corals. Relatively more branch tips showed extreme ¹⁸O depletions under low-flow conditions, and among small coral colonies. Isotopic variability was greater among branch tips from the lower and inner parts of the colonies and at high flow. Skeletal oxygen and carbon isotope ratios generally showed positive correlations. Despite the particularly large offsets from isotopic equilibrium, the isotopically lightest branches showed the greatest isotopic consistency and therefore would make the best isotopic thermometers. Isotopic variability within the colony may provide an indication of flow regime.