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# Coral skeletons provide new insights into the role of groundwater nitrogen on tropical reef productivity

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Coral reef islands are well recognized as hotspots of biological activity, yet we still have a limited understanding of the nutrient supply mechanisms regulating this productivity. This stems from an absence of long-term nutrient discharge records to coral reef systems. Here we combine $\delta^{15}$N and barium measurements in modern and fossil coral skeletal material as a new proxy for reconstructing historical patterns of nitrogen discharge to coral reefs. Analysis of coral skeletal material from the Cook Islands reveals that rainfall-driven groundwater discharge has been supporting coral reef productivity for over 50 thousand years. We propose that persistent biological productivity around tropical islands, the so called “island mass effect”, is dependent on regular groundwater nitrogen inputs in highly oligotrophic regions of the ocean. The implications of our findings on future coral reef health are discussed.