Reconstructing paleo-reef fish community

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Abstract

Understanding long-term changes in coral reef fish communities is challenging due to limited historical data. Here, I demonstrate a technique using fish otoliths in reef sediments to reconstruct these communities. I will first present a case study using otoliths from modern and mid-Holocene reefs in Caribbean Panama and the Dominican Republic. More than 5,400 otoliths were found in 169 bulk sediment samples, representing 56 taxa belonging to 35 families. Most otoliths were juveniles, which are challenging to identify, and predation appears to be a key process in otolith accumulation. Comparisons with living fish communities showed that otolith assemblages accurately reflect the living fish composition. Radiocarbon dating indicated minimal sediment mixing in actively accreting reefs. The modern fish community has significantly shifted from its past analogue, exhibiting changes in fish trophic structure. Finally, I introduce our parallel pilot effort to understand fish community dynamics over time in Green Island through coring on the reef sediments there.