SCLEROCHRONOLOGY OF HERMATYPIC SCLERACTINIAN CORALS FROM THE MESOAMERICAN BARRIER REEF SYSTEM IN BELIZE, CENTRAL AMERICA

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Sclerochronologic methods are used to shed light on the skeletal growth of reef-forming (hermatypic) corals. Within the extinct Paleozoic corals, limitations are given by uncertainties in the time-related skeletal formation of their internal (tabulae) and external (epitheca) banding types, which are accompanied by further constrains of their phylogenetic and paleoecologic relationships with scleractinian corals. Therefore, a main advantage of living scleractinian corals is the development of taxon-specific age models for their formation of skeletons. Based on this, our research focusses on actualistic approaches on modern-day hermatypic corals to evaluate their skeletal formation. Analysed skeletal growth patterns include (1) annual extension rates [cm/yr] by investigating X-ray images, (2) measurements of skeletal density [g/cm^3] using the analytical approach of gamma(g)-densitometry, and, based on those (3) reconstructed calcification rates [g/cm^2*yr]. For quantifying skeletal density, we perform a grid scanning of the sample with a well-defined, mostly monochromatic gamma ray beam emitted by radioactive decay of a source of ^{241}Am-isotopes and measured by a single photon counting detector. With this approach, we obtain a particularly high control on statistical and systematical uncertainties. A spatial resolution of 0.5x0.5 mm per grid point, offers high-resolution density measurements by selecting isolated grid rows perpendicular to the growth direction. This approach enables the intraannual examination of high- and low-density bandings (HDBs/LDBs). Drill cores of the massive scleractinian coral *Orbicella faveolata* (formerly known as *Montastraea faveolata*) are herein used, representing a widespread hermatypic coral from the Mesoamerican Barrier Reef System (MBRS) in Belize, Central America. Time series analysis of a colony spanning >186 years of skeletal growth, showed long-term periodicities with cycle lengths corresponding to the Atlantic Multidecadal Oscillation (AMO). Overall, our data suggests a complex interplay of coral growth and environmental settings, which underlines the necessity of greater datasets to evaluate coral growth within wider reef areas.