

TESTING THE LIMITS OF UNIFORMITY AND SIMPLICITY IN LIVING POLYNESIAN AND FOSSIL (CAPITAN LIMESTONE: PERMIAN, USA) REEF COMMUNITIES

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Environmental stress in reef rim communities involves long-term degradation primarily due to abnormal physical-chemical factors (eg. turbulence, salinity, temperature). Recovery occurs over ecological time (decades-centuries). The chief biological responses of these communities to stress are reduced species diversity and guild overlap, i.e. bafflers or binders become of such great volumetric importance that they replace constructors as the chief frame-builders. We first describe the biological responses of contemporaneous live Polynesian shallow sub-tidal reef face and inter-tidal atoll rim (spurs/grooves; algal ridge; reef flat) communities to environmental stress and then using uniformitarian/actualistic principles we compare these responses to reef face and reef rim communities in the Upper Capitan Limestone (Middle Permian) at Whites City, New Mexico. In both the living and fossil reefs, the upward sequence of contemporaneous communities record similar biological responses to increasing stress in progressively shallower water. This interpretation is simpler than invoking a temporal succession of responses due to transgression and/or regression.

Recognition of a steep reef face in the Capitan, comparable to modern Polynesian atolls, is based on the presence of tabular inozoan sponges (*Gigantospongia discoforma*). Seawater circulated through canals in suspended *G. discoforma* sheets protruding from the reef face, analogous to suspended sheets of calcareous algae and corals that protrude from the steep faces of modern atolls and barrier reefs.