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Carbonates calibrated against oceanographic parameters along a latitudinal transect in the Gulf of California, Mexico

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Trophic resources are an important control governing carbonate production. Though this importance has long been recognized, no calibration exists to quantitatively compare biogenic assemblages within trophic resource fields. This study presents a field calibration of carbonate producers in a range of settings against high-resolution in stu measurements of nutrients, temperature and salinity. With its latitudinal extent from 30° to 23° N, the Gulf of California, Mexico, spans the warm-temperate realm and encompasses nutrient regimes from oligo-mesotrophic in the south to eutrophic in the north. Accordingly, from south to north carbonates are characterized by: (i) coral-dominated shallow carbonate factories (5–20 m water depth) with average sea-surface temperatures of 25°C (min. 18°C, max. 31°C), average salinities of 35.60% and average chlorophyll a levels, which are a proxy for nutrients, of 0.25% mg Chl *a* m^{-3} (max. 0.48,, min. 0.1). (ii) Red algal-dominated subtidal to inner-shelf carbonate formation (10–25 m) in the central Gulf of California exhibiting average temperatures of 23°C (min. 18°C, max. 30°C), average salinities of 35.25%, and average Chl a levels of 0.7 Chl a m^{-3} (max. 5.62, min. 0). (iii) Molluskan ryozoan-rich inner to outer shelf factories in the northern Gulf of California (20–50 m) with average sea surface temperatures of only 20°C (min. 13°C, max 29°C), average salinities of 35.01%, and average contents pf 2.2 mg Chl *a* m^{-3} (max. 8.38, min 0). By calibrating sedimentological data with *in situ* measured oceanographic information in different environments, the response of carbontate producers to environmental parameters was established and extrapolated to carbonates on a global scale. The results demonstrate the importance of recognizing and quatifying trophic resources as a dominant control determining the biogenic composition and facies character of both modern and fosil carbonates.

Palabras clave: Specialist, Nutrients, Heterozoan, Photozoan, rhodoliths, trophic resources