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Modern non-tropical mixed carbonate-siliciclastic sediments and environments of the southwestern Gulf of California, Mexico

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Modern mixed carbonate-siliciclastic warm-temperate environments were studied in the southern Gulf of California (GOC), Mexico. The combined heterozoan and photozoan character is defined by the absence of true coral reef structures, calcareous green algae and non-skeletal grains, and the dominance of rhodoliths (unattached coralline red algae), mollusks and small coral patch reefs. The major carbonate producing environments are pocket bays, a shallow carbonate bioherm, high-energy rocky and sandy shorelines and mid-shelf settings. Sediments characterizing the pocket bays display heavily bioturbated bioclastic wackestone and grainstone textures. The rhodolith dominated bioherm is composed of coarse sediments exhibiting grainstone and rudstone textures with fine material being winnowed away by tidal currents. Rocky and sandy shorelines are characterized by erosion and mixing of up to boulder size granitic and volcanoclastic material with coralline red algal and molluscan carbonates. The mid-shelf settings are defined by a silt and fine sand sized non-carbonate matrix mixed with abundant molluscan fragments and foraminifera. Peak carbonate production takes place between 10 and 15 m water depth; below 40 m production significantly decreases, combined with a steep increase in the amount of siliciclastics. This is in contrast to many temperate and cool-water mixed-carbonate siliciclastic systems, where most carbonate production occurs in mid- to outer shelf settings. A full spectrum of sediments from pure carbonates (90-100% carbonate), allochem carbonates (50-90% carbonate) and allochemic mud or sand (<50% carbonate) was encountered in the study area. The absence of early diagenetic binding and cementation of the non-tropical carbonates facilitates mixing of carbonates and siliciclastics. The latter are mainly derived from adjacent Tertiary volcanoclastics and Mesozoic granites. Mixing takes place (1) as punctuated mixing during periodic short-term storm or hurricane events, when coarse granitic and volcanoclastic derived material eroded from rocky shorelines is transported into the shallow carbonate factories, and (2) as facies mixing on the outer carbonate shelf below 40 m water depth where carbonates interfinger with olive-gray sandy and silty siliciclastics.

Palabras clave: Specialist, Heterozoan, Photozoan, Mixed carbonate-siliciclastics, Warm temperate

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