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Sedimentary facies of the eastern Pacific's northernmost reef-like setting (Cabo Pulmo, Mexico)

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Cabo Pulmo, Mexico, is often cited as the eastern Pacific's northernmost coral reef. We investigated sedimentary dynamics to verify whether the system functions sedimentologically as a reef, which would mean that it retained internal sediment in a framework and exported peri-reefal sediment creating clearly identifiable facies dominated by reefal fauna. We mapped distribution of sediments using grab samples, the acoustic ground-discrimination systems QTC View and Echoplus at 50 kHz signal frequency and an IKONOS satellite image. Morphologically, the bay of Cabo Pulmo can be divided into intrusive dikes and rocky hardgrounds in less than 10 m in depth and a sandy interior with rocky outcrops sloping to over 40 m. Reefal fauna without lasting framework-building but with production of typically reef-associated carbonate sediments, as well as a patch-reef facies were found on the dikes and hardgrounds. Sediments in the bay were a mixture of carbonates and siliciclastics and were influenced by a seasonal river near the bay's center that imported siliciclastic material. To the north and south sediments had a higher carbonate content, although overall the bay was characterized by ~50% siliciclastics. The shallower subtidal sands were dominated by mollusk fragments, whereas in depths > 30 m planktonic foraminiferal sand was found. Acoustically and optically remote-sensed maps were used to differentiate between the rocky and sandy areas and to identify the presumed off-shelf transport pathway of reef-derived carbonates. Overall, the sedimentary system is characterized by carbonate production, but the coarser reef derived carbonates (coral and reef-dwelling mollusks) are transported off-shelf along a steep depth gradient and little typical peri-reef sediment remains. This transport is likely aided by storms. Since no sediment retaining frameworks are formed, the dikes cannot retain internal sediment, and the reefal fauna was not dominant in sediments throughout the bay, we conclude that Cabo Pulmo sedimentologically functions only in a limited way like a coral reef.

Palabras clave: Biomasa, Cabo Pulmo, acoustic ground discrimination, satellite imagery, sedimentary facies, coral reef

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