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Platform-Wide Dolomitization in Northern Belize: Modern Analog of Widespread, Early Platform Dolomitization

Holocene dolomite is ubiquitous in northern Belize, apparently more so than in any other area of the world. Average amount in peritidal and shallow-marine deposits is 70% (range 35- 100%) and 12% (range 1-65%), respectively, and it is present throughout such sediment sections. Dolomites are poorly ordered and calcic (39.5-47 mole% MgCO₃). Peritidal dolomites occur in both cement and replacive modes; average crystal size is 1.5 microns. Marine dolomites occur dominantly as cement; average crystal size is 7 microns. Despite pronounced differences in pore- water salinities of dolomitic peritidal and marine sediments, mean dolomite $\delta^{18}O$ values are identical -- 2.1 ‰ PDB with low standard deviation. These data are enigmatic in that they may suggest a limited salinity range of dolomite formation, or post-formative alteration in normal- salinity pore fluids. Depleted $\delta^{13}C$ values of peritidal dolomites (-0.6 to -5.2 ‰ PDB) suggest precipitation facilitated only by sulfate reduction, whereas the range of values of marine dolomites (-5 to +12 ‰ PDB) suggest precipitation facilitated by both sulfate reduction and methanogenesis. Reasons for these differences remain unclear.

Dolomite is found on most of the peritidal flats along the length (35 km) of Ambergris Caye, where it is present in Holocene sediments as much as 1 m thick. It is also present within individually extensive areas (20-50 km²) of organic-rich, shallow-marine mud bank and associated sediments (3-8.5 m thick) both on the outer and inner shelves. Accordingly, the "Belize dolomite factory" is a viable modern analog of widespread early dolomitization in some ancient platforms.