sediment point sources and dispersal centers. Turbidity variability along the inner shelf is jointly attributed to variations in coastal runoff, relative tidal sediment flux from individual inlets, and ambient wind-induced hydrographic conditions. The outer-shelf patterns suggest the shelfward incursion of open-ocean waters, the extent of which varies spatially and temporally. Regional turbidity patterns appear to reflect the degree of interchange between the gulfward movement of turbid inner-shelf waters and the shelfward incursion of clear open-ocean waters. The observed variability is compatible with a conceptual model of the regional dispersal system based on seafloor sediment distribution, which suggests both net offshore and net southward alongshore transport on a wind-dominated shelf.

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Three-Dimensional Aspects of Belize Patch Reefs

Rotary-drill rock cores and vibrocores of sediments were used to investigate the origin and sedimentary history of patch reefs and a "rhomboid" shoal in offshore Belize (Central America). All lagoonal patch reefs and shoals examined are localized on preexisting Pleistocene topography. The buried topographic highs are composed of Pleistocene coralline limestone, suggesting a constructional patch-reef origin rather than an erosional or karst origin. The principal Holocene sediment- and framework-builder is the branching coral *Acropora cervicornis*, but *A. palmata*, various massive corals, and the lettuce coral *Agaricia* sp. are also contributors. These accumulations, up to 27 m thick, amplify Pleistocene topography. The accumulations are totally uncemented, and metal probes can easily be inserted more than 5 m into the living reef slope. Steep dips, commonly greater than 45° and extending from the surface to a least 30 m in depth, provide a sedimentary paradox. Even though these reefs are uncemented and periodically subjected to hurricanes, reef debris has not been found in the surrounding lagoonal muds more than a few meters away from the reef "toe." The surrounding coral-free lagoonal sediments, consisting both of clays and carbonate materials, are more than 6 m thick.

Understanding the mechanics of patch-reef formation may provide clues important to oil exploration: (1) many of the rhomboid shoal reefs are of reservoir size even though they are less than 9,000 years old; (2) their position adjacent to a humid mountainous hinterland makes them susceptible to burial by terrigenous clays as the coastal plain progrades; (3) both the clays and carbonate muds are in a favorable stratigraphic position to serve as source beds.

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Dolomitization of Pliocene-Pleistocene Carbonate Sediments, Bonaire, Netherlands Antilles

Dolomitization of sediments may be controlled, in part, by their predolomitization diagenetic history. The Pliocene-Pleistocene dolomites on Bonaire underwent a period of minor freshwater diagenesis prior to dolomitization. During this initial stage of diagenesis, some low-magnesian calcite cement formed. Unaltered high-magnesian calcite skeletal fragments were replaced during dolomitization, aragonite was dissolved, and low-magnesian calcite was at first inert and later locally dissolved. The inclusion crystals and crystal molds of calcite cement in dolomite rhombs, the presence of calcite zones in dolomite rhombs, and the preservation of limestone fragments in dolomitized breccias demonstrate that low-magnesian calcite was not replaced during the initial dolomitization. Cloudy centers and clear rims formed when the dolomitizing fluid changed from near saturation with respect to calcite (cloudy centers owing to inclusions and molds) to undersaturation with respect to calcite (inclusion and mold-free rims).

The concentration of Na^+ in these dolomites is approximately 350 ppm, and the $\delta^{18}O$ values range from +1.97 to +4.1. These data indicate that the dolomitizing fluid was low in Na^+ (relative to seawater) but isotopically heavier than most groundwater and, therefore, probably an evaporation-concentrated fresh water.

The data suggest that dolomitization may be climatically controlled. In humid climates, a sediment in the freshwater-seawater mixing zone may undergo rapid calcification owing to the high PCO_2 in the groundwater. In arid climates, the water will have a lower PCO_2 as a result of limited soil development; therefore, calcification will be slower and chances for dolomitization will be increased.

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Description and Sedimentology of Submarine-Fan Gas Reservoir in Woodbine–Eagle Ford Interval (Upper Cretaceous), Sugar Creek Field, Tyler County, Texas

Abundant gas and some condensate are being produced from fractured sandstones of the Upper Cretaceous Woodbine–Eagle Ford interval at depths of 10,800 to 11,350 ft (3,240 to 3,405 m) in the Sugar Creek field area of Tyler County, Texas. The reservoir sandstone units are complex, single to multiple bodies 15 to 40 ft (4.5 to 12 m) thick and less than a few thousand feet wide within a mud-dominated clastic wedge. The wedge thickens from about 50 ft (15 m) near the Lower Cretaceous shelf edge to more than 1,500 ft (450 m) within 15 mi (24 km) downdip to the south. Subsurface correlation and mapping of the discontinuous, lenticular sandstone bodies indicate that they are best delineated as a series of coalescing, dip-oriented lobes. Deposition appears most likely to have been as prograding submarine-fan lobes, with sediment being channeled from updip delta and nearshore deposits across a narrow shelf and through shelf-edge breaks and then dumped downslope.

Within the major sandstone units, individual beds commonly are 1 to 3 ft (0.3 to 1 m) thick and display sharp contacts with interbedded, thin (1 to 2 in.; 2.5 to 5 cm) shale layers. As viewed in polished core slabs, the sandstones are mostly massive; however, radiography reveals abundant lamination and cross-stratification and some ripple-bedding and soft-sediment-deformation structures. A detailed analysis of sedimentary features and sandstone fabric suggests periodic rapid