the field at 5,000 ft (1,525 m) or more at the eastern part of the field and flow upward and westward through the field.

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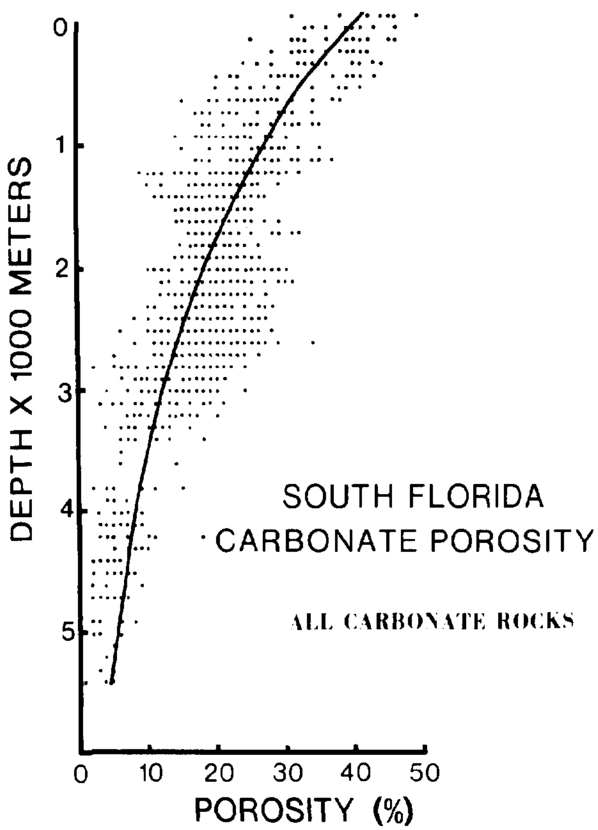
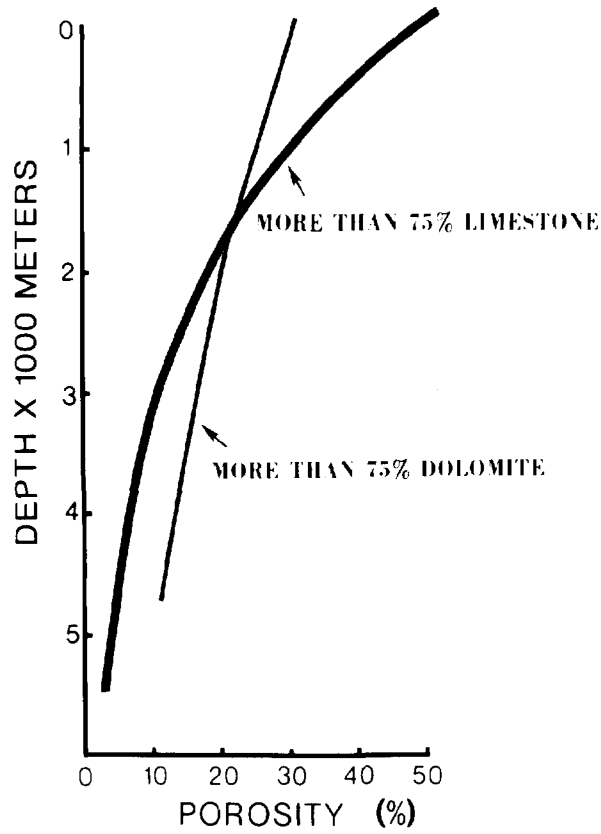
Carbonate Porosity Versus Depth: "Compaction" Curve for South Florida

Porosity data from 15 boreholes (0 to 5,500 m) in the South Florida basin show a trend of steadily decreasing porosity with depth (Fig. 1A). This trend is interpreted to result from "compaction" of carbonates in response to overburden pressure. Compaction is used here in a broad sense to include mechanical and chemical compaction, the latter encompassing carbonate dissolution and reprecipitation as burial cement (solution-transfer of Bathurst). Factors which contribute to the scatter about the trend include variations in depositional environment, diagenetic history, pore-fluid composition, pressure, age, geothermal gradient, and experimental error.




A




B

The compaction curve for south Florida (Fig. 1A) represents a composite of curves for different carbonate lithologies, including platform-interior limestone and dolomite. Curves for limestone and dolomite (Fig. 1B) illustrate that dolomite, although less porous than limestone at shallow depths, retains more porosity than limestone during burial, and is more porous than limestone below 2,000 m. Below 4,500 m, porosity greater than 5% occurs primarily in dolomites, an observation commonly made for the deeper parts of Paleozoic sedimentary basins.

If porosity reduction were due to cement derived from dissolution at the surface or from outside the basin, the curve (Fig. 1A) would simply be a record of increasing cementation with depth. This would require the removal of between 1,000 and 1,500 m of carbonate rock from somewhere within the section or from carbonates outside the basin. It seems more likely that the cement is locally derived. If mass transfer of carbonate is limited to a local scale, then the curve is a true compaction curve.

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Anomalous Seismic Character—Bering Sea

Seismic data collected within basins along the outer Bering Sea shelf often exhibit a distinct change in seismic character between 1.0 and 2.0 sec two-way time. This change appears on seismic sections as a reflector or as an increase or decrease in amplitude. The feature is of regional extent.

This seismic character change is a manifestation of what has been called in other basins a bottom simulating reflector (BSR). BSRs are reflectors that are (1) subparallel with sea-floor topography, (2) discordant with stratigraphy where the sea floor dictates, and (3) do not demonstrate the characteristics of a multiple.

Two causes of BSRs are generally accepted. One involves an ice-like mixture of water and gas, termed "gas hydrate," in which gas molecules are trapped within a framework of water molecules. The other cause involves the diagenetic alteration of biogenic opal-A to opal-CT in diatomaceous sediments.

BSRs were penetrated at three locations in the Bering Sea in water depths greater than 6,000 ft (1,829 m) on Leg 19 of the