Size distribution and statistical analysis of the sediments indicate contrasting physical environments on either side of the Ras, even though geomorphologically they are similar. Sediments in the southern sector are generally better sorted (moderate to good), nearly symmetrically to slightly coarsely skewed, and unimodal, whereas the sediments in the northern sector are badly sorted, coarsely skewed, and bimodal in the shallower lagoonal area.

The distribution patterns reflect the physical oceanographic parameters within the reef, the areal coverage by vegetation, and the sediment source. Pure populations having the best sorting values are on the beach and within the southern lagoon. Sediments finer than 4ϕ are scarce within the reef.

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Small Computer Well-Data System

It would be desirable for offices in remote locations to be able to sort and select certain items of well data, but they usually lack on-site computer power. One system, an IBM System 32, is a small commercial computer used on a trial basis in this situation. Two files were input: (1) a general scout type containing drilling and production statistics and (2) data resulting from lithologic study containing test results and sand thickness. Programs executed against these files to generate reports based on the geologist's selection criteria are written in RPG 11 language, common to the System 32.

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Bed Forms and Processes on Estuarine Tidal-Current Ridge, Willapa Bay, Washington

Distinctive ebb and flood oriented bed-form fields are present on the opposite flanks of a tidal ridge within Willapa Bay, Washington. The ridge is approximately 3 km long, arcuate in shape, asymmetric in profile, and rises a maximum of 13 m above the channel floor. Repeated high-resolution profiling, diving observations, measurement of bed-form geometry, velocity profiles, and oriented cores define the formational processes and the depositional features of this migrating ridge.

Large-scale bed forms migrate along and up both ebb and flood flanks of the ridge during each respective tidal flow. Sinuous- to straight-crested sand waves occur on the steeper flood-dominated side; dunes and sand waves occur on the ebb flank. As the bed forms migrate up the ebb flank of the tidal ridge, they become lower and exhibit the following sequence in response to decreasing flow velocity: lunate dunes→catenary sand waves→sinuous- to straight-crested sand waves. The largest bed forms, 3 m high, occur between depths of 9 to 12 m within the lunate dune field.

Bed forms along the ridge crest change orientation with each tidal cycle. Bed forms on the ridge flanks reverse completely during spring tides, but during neap tides only the crests reverse. Oriented cores show unidirectional medium-scale cross-strata with reactivation surfaces on the flood and the ebb flanks of the ridge. Cores taken in troughs of some ebb-oriented dunes, however, show a veneer of ebb cross-strata overlying flood-oriented structures. Cores on the ridge crest have bimodal small-scale cross-strata.

The dominant ebb current transports sediment over the ridge crest where it is incorporated into flood bed forms on the reversing tide. Erosion on the ebb flank and deposition on the flood flank has moved the ridge 15 to 30 m/year for the last 20 years.

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Applied Biostratigraphy in Gulf Coast Tertiary

Concepts resulting from studies of microfaunal successions and paleoecology (biofacies) together with vertical and lateral sediment-distribution patterns (lithofacies) can be applied to exploration and development problems. Examples include correlation problems, predicting reservoir distribution, determining base of objective section, predicting geopressures, calibrating seismic events, and exploitation of salt-dome fields.

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Trace-Element Geochemistry and Diagenesis in Capitan Reef (Permian), West Texas

The lattice substitution of doubly charged cations into calcite during aqueous precipitation depends on solution composition and the appropriate partition coefficients. Thus, the trace-element geochemistry of a limestone encodes the chemical composition of the solution in which mineralogic stabilization occurred. Because different environments are characterized by specific solution chemistries, we can use the trace-element composition of a limestone to infer the diagenetic environment in which it stabilized.

A suite of calcite samples was collected in the reef core (massive) and upper fore-reef facies of the Permian reef complex (Guadalupian), from the cliffs above the entrance to McKittrick Canyon. These rocks averaged 375 ppm Sr^{2+}, 13,900 ppm Mg^{2+}, 9.4 ppm Zn^{2+}, and 40.1 ppm Mn^{2+} (AA analyses). Petrographic examination of these wackestones and packstones provided no conclusive evidence of the environment in which mineralogic stabilization occurred. However, the trace-element values, when compared to probable starting (sedimentary) compositions, indicate equilibration in an open chemical system with insignificant introduction of cations from an external source. Autodepletion of strontium and magnesium ($k^{Sr}_{cal} = 0.14$; $k^{Mg}_{cal} = 0.02$) accompanied autoenrichment of zinc and manganese ($k^{Zn}_{cal} = 5$; $k^{Mn}_{cal} = 15$). The degree of autoenrichment and autodepletion of these chemical species is characteristic of an open chemical system, that is, one in which fresh waters flush rapidly through the diagenetic site. This combination of fresh water and open system is diagnostic of a freshwater phreatic zone. We infer, then, that this part of the reef stabilized in a