massive burrow-mottled silts, moderate species diversity, moderate abundance of individuals, mainly microscopic, with a wide size range among individuals.

4. Flooding > 90% of the time (*subtidal*)—massive pelletal silts and clays, highly burrow-mottled, high species diversity, high abundance and wide size range of individuals within species, many macroscopic invertebrates. Areas of high intertidal and supratidal sediments where ponding of waters occurs for extended periods are characterized by single or multiple algal and sediment laminae much thicker than in areas where waters drain rapidly.

Sedimentation in zone 1 forms thin beds, derived from sediment-laden waters driven over the area during storms. In Zone 2, sediments are deposited in thin laminae; sedimentation is controlled by the trapping of particles carried by tidal currents and binding them onto mats of blue-green algae. Sedimentation in zone 3 occurs mainly in the form of thin beds deposited during storms and subsequently reworked by organisms. In zone 4, deposition occurs by settling of (1) *in situ* sediments; (2) particles carried into the area by tidal currents; and (3) particles from sediment-laden storm waters.

Measurement of production of calcareous sediment within the Cape Sable area, measurements of the net transport of sediment into the area by tidal currents, and measurement of the volume of sediment deposited in the area since its opening to the sea in the 1920s allow the following calculations to be made. Since 1920, 4% (0.01 cm/yr) of the total deposit has been derived from *in situ* production, 34% (0.28 cm/yr) by net transport into the area on tides, and 62% (0.50 cm/yr) by storms.

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Effect of Three Different Depositional Environments on Dipmeter Results

Many dips that appear on a high-resolution dipmeter plot reflect environmental energy conditions existing at the time of deposition rather than structural dip. Beds deposited in a high-energy marine environment tend to exhibit a great scatter of dip magnitudes. Conversely, low energy environments cause "layer-cake" deposition and uniform dip magnitudes. Recent studies have identified 3 distinct environments from dip plots.

The first environment lies between the bench and the seaward edge of the continental shelf. This shoreward energy band shows dip magnitude scatter which can be divided into high, medium, or low dips corresponding to deposition in high-, medium-, or low-energy environments. Most of the energy is supplied by wave and current action.

The second environment lies between the seaward edge of the continental shelf and the abyssal zone. This seaward energy band shows dip magnitude scatter similar to the shoreward energy band. Its high-energy zone is found on the upper slope and the medium-energy zone on the lower slope. Most of the energy is supplied by gravity. Dip patterns are more cyclic in this environment.

The third environment is near an active delta. The rules for water depth identification in the other energy bands do not apply. Beds deposited in such an environment show mainly "current patterns" on the dip plot. The direction of dip of these "current patterns" defines the direction of transport and the dip pattern magnitude indicates the most probable shape of the distributary-front sand body.

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Landward Movement of Carbonate Mud: New Model for Regressive Cycles in Carbonates

Repeated regressive cycles are characteristic of the Paleozoic shallow-water carbonates of North America; similar cycles are present, although less abundant, in Mesozoic and Cenozoic strata worldwide. Several of these cyclic carbonates contain major hydrocarbon reservoirs: Permian, Central Basin platform; Mississippian, Saskatchewan; Ordovician and Silurian, Montana. Studies of comparable recent deposits in Florida, the Bahamas, and the Persian Gulf suggest an alternative to the accepted tectonic explanation of these cycles.

The Florida Bay lagoon and the tidal flats of the Bahamas and Persian Gulf are traps for fine sediment produced on the large adjacent open platforms or shelves. The extensive source areas produce carbonate mud by precipitation and by the disintegration of organic skeletons. The carbonate mud moves shoreward by wind-driven, tidal or estuarinelike circulation, and deposition is accelerated and stabilized by marine plants and animals.

Because the open marine source areas are many times larger than the nearshore traps, seaward progradation of the wedge of sediments is inevitable. This seaward progradation gives a regressive cycle from open marine shelf or platform to supratidal flat. As the shoreline progrades seaward the size of the open marine source area decreases; eventually reduced production of mud no longer exceeds slow continuous subsidence and a new transgression begins. When the source area expands so that production again exceeds subsidence a new regressive cycle starts.

The seaward progradation suggested by this model should be observable in ancient deposits.

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Slide-Block Geology, Coyanosa and Adjacent Areas, Pecos and Reeves Counties, Texas

A large-scale submarine slide occurred in early Wolfcampian (Permian) time in the Coyanosa and adjacent areas of the southeastern Delaware basin of West Texas. The slide, which bisects the Coyanosa field, comprises all rocks above the Upper Devonian Woodford Shale, the surface of detachment. Maximum dimensions were 16 mi from east to west, 9 mi north to south, and 2,000 ft thick. Lateral displacement from east to west was about 7 mi.

Wildcat and development drilling in the area has revealed many paradoxical structural and stratigraphic conditions in the Mississippian through Wolfcamp interval. These sequences include repeated sections, exotic blocks, displaced facies, and abrupt stratigraphic hiatuses.

The sole of the allochthonous plate was a thick, competent Mississippian limestone. Thick Permo-Pennsylvanian conglomerates shed from the rising Central Basin platform on the eastern side of Coyanosa, coupled with steepening of the flexure on the western and southwestern flank of Coyanosa, triggered the slide.