like silts and clays have provided considerable insight into the dynamics of sedimentary and mass-movement processes. Time-series measurements taken along the coast of Surinam using pressure-sensitive instruments indicate that periodic density variations may range in frequency from that of waves (~10 sec) to that of the tide (~12.4 hour). The density fluctuations are the result of sediment suspension, loss and gain of pore waters, and subaerial and subaqueous mass-movement processes.

In muds where density is less than 1.20 g/cc and water depth is less than 5 m, clouds of sediment are suspended as shallow-water waves propagate shoreward. Although suspended-sediment concentrations may reach 50,000 ppm under wave crests, rapid settling takes place before the next wave arrives. Wave-by-wave suspension is superimposed on a lower frequency process whereby accumulations of fluid mud up to 80 cm thick are suspended and redeposited during a tidal cycle.

In muds where density exceeds 1.20 g/cc, less than 1 cm of the bottom is suspended by incoming waves or by tidal currents. Measurements indicate that cyclic density variations result from pore-water loss during a falling tide followed by pore-water gains during a rising tide.

Spectral analysis shows the presence of a third frequency of density perturbation, typically 1 to 5 minutes, which we hypothesize to be the result of mass movement of fluid mud offshore. Observations on mud flats at low tide reveal well-formed shear planes bounding linear mudflow failure chutes. Sediment-flux determinations indicate that most of the estimated 2×10^8 m^3/year of sediment moved onshore by waves can be roughly balanced by a slow, periodic mass-movement offshore. The result may be a sawtoothed pattern of sediment movement to the northwest.

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Pore Systems in Jurassic Carbonate Reservoirs, United States Gulf Coast

Common pore types in Jurassic carbonate reservoirs in the Gulf Coast include lime grainstones of the Smackover Formation in southern Arkansas and northern Louisiana with interparticle and grain-moldic pore systems, dolomitized pelletal packstones, and grainstones from the Jay field in Alabama and Florida with mainly pelmoldic porosities, and Haynesville oolitic grainstones from east Texas with partial grain-moldic pores. Reservoir quality in all these examples is a function of both primary depositional and secondary diagenetic processes.

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Correlation of Subsurface Middle and Upper Devonian Rocks in Appalachian Basin

Widespread, highly radioactive Devonian shales in the Appalachian Basin contain abundant organic matter and commonly contain hydrocarbons that are sources of natural gas. The shales are gas-productive in eastern Kentucky and southwestern West Virginia. Correlation of subsurface shale units in the basin is difficult because of unconformities and complicated facies changes, but such correlation may lead to the location of additional amounts of gas.

A series of stratigraphic cross sections through the western half of the Appalachian Basin depicts the subsurface relations between tongues of dark shale on the east and massive thick shale units farther west.

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Effect of Biogenic Methane on Sediment Instability in Modern Delta Sediments

Biogenic methane is produced in rapidly deposited Mississippi delta sediments in concentrations sufficient to create excess pore pressures. These excess pressures, interacting with underconsolidated clays, can induce submarine mudslides and other phenomena which are hazardous to offshore platforms and pipelines. By utilizing a geochemical model for methane production, an estimate can be made of the total amount of gas that could be generated. Calculations of theoretical in-situ CH_4 were made on the basis of the concentrations of pressure-independent species, that is, dissolved $SO_4{}^{2-}$ and dissolved inorganic carbon, in the pore waters of modern Mississippi delta sediments. The maximum theoretical CH_4 value was 4.65×10^5 ppm. Depth profiles of observed and theoretical CH_4 values were similar. From theoretical CH_4 concentrations and the pressure-solubility relationship, a maximum gas-pressure expression was developed. Gas pressures, P_o, attained a maximum value of 57.8×10^4 dynes cm^{-2} (8.5 psi) at the depth of 20.4 m below the sediment-water interface. Because of surface tension, in-situ P_o decreases with bubble size. However, near-maximum gas pressures may be released during storm waves, mudslides, or other changes in hydrostatic pressure, where bubble combination can occur. Gas pressures are important in decreasing the effective stress, especially in regions of rapid sediment deposition, and should be considered when implanting bottom-mounted structures.

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Early Pleistocene Submarine Canyon, Boso Peninsula, Japan

The Boso submarine canyon was one of the first "fossil" canyons to be described. It is also one of the best exposed, because careful quarrying of the economically useful gravel fill has exposed the noneconomic marly rocks into which the canyon was cut. These country rocks (Umegase Formation) are gently dipping, cream-colored siltstones and mudstones. In contrast, the canyon fill (Higashi-higasa Formation) consists of brown to yellow sandstones with marked lenses of polymodal and polymictic conglomerates (with small pebbles of granites, basalts, cherts, and basic tuffs from the Chichibu terrane and much larger clasts of marlstone up to 1 m in diameter). There are also some boulder beds and armored mud balls and many early Pleistocene shelly fos-