large diurnal inequality of the tides has a striking effect on beach morphology, because wave energy is concentrated at 4 different levels during a 24-hour period.

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PLANKTONIC FORAMINIFERAL ASSEMBLAGES AND PLEISTOCENE TEMPERATURES

The faunistic compositions of recent planktonic foraminiferal assemblages from the Atlantic Ocean between 0–46°N lat. correlate with average ocean temperatures at 50-m depth. The correlation between temperature and faunistic assemblages provides the basis for an independent method of reconstructing paleotemperatures during the Pleistocene. In this model, Parks' distance coefficient is used to construct a similarity matrix comparing every recent sample station with every other station based on the abundance of species and phenotypes. Relative to the station(s) of highest diversity there is a linear relation between the similarity of all stations and average ocean temperatures at 50-m depth.

Pleistocene assemblages contain the same species and phenotypes as found in recent sediments. Comparison of the similarity of Pleistocene assemblages with recent assemblages in the manner suggested allows an estimate of the ocean temperatures at 50-m depth during deposition of the assemblages. The model, tested in an equatorial core suggests faunistic paleotemperatures which are ± 1° from isotopic paleotemperatures of *G. sacculifer* from the same core. The temperature range between glacial and interglacial periods in the equatorial Atlantic is 5–6°C. In the Caribbean, during the last 100,000 years, the faunistic paleotemperature ranged between 20 and 27.5°C, a somewhat larger variation than that found in the equatorial Atlantic.

The results of this study provide an independent estimate of paleotemperatures during the Pleistocene Epoch. Comparison of faunistic and isotopic paleotemperatures for the cores examined are consistent with Emiliani's estimate of paleotemperature variations, whereby 70% of the isotopic variation is directly related to changes in ocean temperature.

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COMPOSITE BEDDING IN LOWER ORDOVICIAN RESEDIMENTED CONGLOMERATES OF QUEBEC

Lower Ordovician conglomerates and sandstones of the Cap des Rosiers Formation occur in a sequence of fine-grained sandstone and siltstone turbidites near Grosses Roches in Quebec. The conglomerates lie on eroded turbidites, and the presence of rip-up structures, channeling of underlying sediments, grading, poor sorting, very large blocks, and some chaotic fabric in the conglomerates suggests that they were formed by deposition from gravity-controlled slides or flows.

There are 3 lithologies in the conglomeratic facies: (1) polymict conglomerate, (2) medium- to coarse-grained quartzose sandstone, and (3) fine- to medium-grained dark-gray sandstone with slump balls. Most of the conglomerate beds and many of the coarse-grained sandstones show extensive internal layering. The layering is defined by thin sandstone lenses in the conglomerates and by pebbles in the sandstone. Detailed logging of a 100-m thick section shows that layers are traceable for distances of up to 80 m along strike; but most layers are of extremely limited lateral extent. Field evidence suggests that their extent is an original depositional feature rather than the result of erosion by succeeding layers. Erosive structures such as those at the bases of conglomerate beds are not common between layers within beds. Thin turbidite beds and thick sandstone beds are present between conglomerate beds but not between layers within beds. This pattern suggests that deposition of each conglomerate bed occurred as a series of events which were closely related in time and space, and the beds therefore can be considered composite. An origin by some type of progressive failure at source is suggested.

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DEPOSITIONAL ANTICLINES OF CONTINENTAL MARGINS AND THEIR OIL-PRODUCING COUNTERPARTS

Oceanic wind-driven currents such as the Gulf Stream have shaped immense depositional anticlines at the distal edges of detrital source areas along the present and past continental margins. These currents generally parallel the continents with high velocities, commonly sweeping to the base of the slopes. In contrast, the deeper geostrophic currents shape the continental rises as they move slowly along topographic strike. Occasionally, both systems are intersected by turbidity currents flowing down the margins at extremely high velocities.

A striking example of wind-driven current deposition occurs in the Florida Strait where calcareous sands from the Florida reef vicinity are swept along a trough by the Gulf Stream and then onto a broad anticlinal rise. A similar slope-trough-rise profile is observed at the Anton Dohrn Seamount where the North Atlantic Current has shaped another rise from the available sediments as it veers around this buttress.

A wind-driven current origin can plausibly explain the Poza Rica trend in Mexico. As the Golden Lane reef contributed its Tamabra talus downslope into swift currents of the Chicontepec foredeep, anticlines were shaped at the base of the slope, simulating the Anton Dohrn Seamount.

Significant reserves in anticlines formed by wind-driven currents will be found beyond the reefs and laterally away from the deltas in the "poor" environment where the subtle slope-trough-rise has been unrecognized. Reservoirs such as Poza Rica attest to the excellent structural, reservoir, and source qualities which can be realized in an inspired search for such targets.

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PETROLEUM GEOLOGY, SWEETGRASS ARCH, ALBERTA

The Sweetgrass arch is a positive structural feature extending from central Montana into southern Alberta. Rock units ranging in age from Precambrian Belt to Late Cretaceous Montanan are exposed along the 350 mi axis. The 3 major features are the South arch, culminating in the Beltian exposures on the south end; the Kevin-Sunburst dome and Sweetgrass volcanic uplifts in the center; and a broad, northward-plunging nose in southern Alberta.

Although structural traps would be expected to be the dominant controlling factors in hydrocarbon accumulation on so large a positive feature, the fact is that stratigraphic traps predominate on this arch. Structural closure on the large Kevin-Sunburst dome does not by