have been more active in exploiting these properties than have sedimentary petrologists interested in understanding the processes of diagenesis and lithification of calcareous and siliceous sediments.

Lithologic criteria indicate very small volumes of oceanic biogenous sediments of post-Jurassic age are exposed on land, and it is questionable if any but relatively tiny amounts of any age have ever been added to the continents.

WISE, SHERWOOD W., Florida State Univ., Tallahassee, Fla.

Deep-Sea Drilling in Antarctic—Late Tertiary Paleoclimatic History

Bold efforts by *Glomar Challenger* to drill in little explored regions of the southern ocean and its environs have considerably advanced knowledge of the earth's paleoclimatic history despite notable logistic problems encountered in working at high latitudes. Of special interest has been the discovery of evidence for the initiation of Southern Hemisphere glaciation during the Oligocene (DSDP Site 270) and the documentation of a particularly severe late Miocene glaciation of Antarctica which may have exceeded all others in intensity. Paleontologic evidence for reduced sea levels and sea temperatures associated with late Miocene glaciation was early noted among foram assemblages from New Zealand, and subsequently confirmed by oxygen isotope analysis (DSDP Site 284). Closer to the continent, late Miocene deep-sea sediments are characterized by strong bottom-current winnowing and multiple hiatuses; contained microfossils are highly fragmented and of low diversity (DSDP Sites 266 and 274). Farther away on the Falkland Plateau, the upper Miocene section is more complete but separated from the overlying Pliocene by a marked disconformity produced by a climatically intensified Antarctic Circumpolar Current (DSDP Site 329), whereas in an adjacent basin, the unconformity was probably produced by accelerated Antarctic Bottom-Water flow (DSDP Site 328).

Equally important to the definition of major climatic events has been the establishment of high-latitude biostratigraphic zonations based on prevalent microfossil groups, particularly diatoms, radiolarians, and silicoflagellates. Keyed into paleomagnetics and the less well-represented calcareous microfossil zones, these new high-latitude biostratigraphies set the stage for future exploration in this area.

WOJTAL, AILEEN M., and ROBERT S. TYE, Univ. South Carolina, Columbia, S.C.

Stratigraphic Models for Modern Back-Barrier Environments

Kiawah Island, South Carolina, is a mesotidal barrier island composed of prograding beach ridges backed by extensive salt marshes, tidal creeks, and muddy tidal flats. The salt marsh–tidal creek complex is well developed along the length of the island and between bifurcating beach ridges. The major subenvironments of the back barrier are sandy high marshes adjacent to relict beach ridges, rooted and burrowed low marshes, tidal flats and associated oyster bars, active tidal creeks with sandy point bars, and inactive tidal-creek channels (cutoffs) being filled with fine-grained sediment.

Four stratigraphic models based on examination of 60 vibracores penetrating up to 6 m, 20 box cores, numerous channel cutbanks and surficial sediment distributions have been developed to describe the relations of Kiawah's back-barrier environments. (1) The active tidal-channel model consists of a coarse, cross-bedded shell lag underlying muddy-sand point-bar deposits. Bioturbated muddy sand containing shell hash and organic material commonly overlies the point-bar deposits and is capped with rooted, highly burrowed, fine-grained low marsh deposits. The basal unit of this entire sequence and of most cores is a lagoonal-bayfill mud containing *Rangia*. (2) The cutoff channel model contains a fining-upward sequence developed as a result of decreasing flow through the abandoned channel. Low marsh may also cap this sequence. (3) The tidal-flat model is best developed in shallow, open lagoonal areas. In this sequence, active channel-fill and point-bar deposits are capped by thick tidal-flat sediments. (4) The "mature" marsh model is developed where beach ridges are absent and low marsh is predominant. This sequence consists of channel-fill, fine-grained point-bar deposits, tidal-flat deposits, and very thick, rooted and burrowed low marsh sediments. The predominance of sandy point-bar and channel-fill deposits in this low-energy back-barrier area is significant and can be related to the reworking of beach ridges by meandering tidal creeks.

WORNARDT, WALTER W., JR., Univ. Redlands, Redlands, Calif.

Utility of Diatoms in Petroleum Exploration

Within the past decade diatoms have played a new and important role in the multidisciplined biostratigraphic approach to the search for petroleum. Diatoms have characteristics unique to the microfossil world. They are microplants; their tests are composed of silica; they live as sessile and vagile benthic and planktonic organisms; their optium environment is in the cool to cold water in the middle and high latitudes in addition to areas associated with nutrient-rich upwelling oceanic waters; and they are widely distributed geographically. Therefore, diatoms have been used biostratigraphically to date and correlate Mesozoic and Cenozoic rocks in various geographic areas where they occur to the exclusion of other microfossils. They also serve as a check on other microfossils where they do occur together. They can be used to determine whether rocks are of marine, brackish, or nonmarine origin and to determine if these rocks were deposited in shallow or deep water. One of the most important biostratigraphic uses of diatoms is in dating various sparker lines on a sparker profile. They can also be used to define the limits of various types of zones and to determine important datum levels.

WORZEL, J. LAMAR, RICHARD T. BUFFLER, F. JEANNE SHAUB, Univ. Texas Marine Sci. Inst., Galveston, Tex., and JOEL S. WATKINS, Gulf Research & Development Co., Houston, Tex.