ples from numerous surface sections measured in considerable detail from localities throughout the east-west outcrop band of the Nanushuk are also being studied.

The results thus far are preliminary. Distinctive relations among assemblages are emerging, suggesting correlations from the surface to subsurface and delineating ages of middle Albian to early Cenomanian for the units studied. This palynologic work represents a pioneering effort in North Slope biostratigraphy. One interesting aspect of the overall Nanushuk Group project is that the same samples used for paleontology are also used for sedimentologic and other analyses, making possible multidisciplinary studies on a sample-to-sample basis.

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Diagenetic Alteration in Eocene Alluvial-Plain Deposits, Sierra Nevada Foothills, California

Cobbles in Eocene alluvial-plain deposits of California indicate that major changes have occurred in these first-cycle sediments. Migrating pore water has caused diagenetic alteration in the upper parts and authigenic iron sulfide growth in the lower parts of these braided-river gravels. Analysis of thin sections and X-ray diffraction patterns reveals that mica, amphibole, and feldspar in cobbles of various compositions are replaced predominantly by kaolinite. Original minerals found in fresh cores of some cobbles are replaced completely in altered rims by hematite and limonite. Sand samples from the upper parts of the gravels contain abundant quartz with kaolinite pseudomorphs of biotite and feldspar and hematite pseudomorphs of iron sulfide. The heavy-mineral suite consists of chemically stable minerals including zircon, ilmenite, tourmaline, and the alteration products anatase and leucoxene. Sand in the basal Eocene gravels contains abundant detrital iron-bearing silicates and authigenic sulfides. Cobbles in the lower unit show little evidence of alteration. Apparently, decomposition of trapped organic matter and pyritic slate clasts reduced the pH and Eh of the pore water percolating through the gravels, causing the hydrolysis of silicate minerals. Some constituent ions migrated in solution away from reaction sites, and iron was precipitated as sulfides as it reached saturation. At some later time, lowering of the water table permitted oxidation of the sulfides in the upper parts of the gravels. This interpretation suggests that the subtropical alluvial-plain environment is ideal for elimination of chemically unstable minerals and rock fragments from sediment being transported through the river system.

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Shell Borings in Upper Miocene–Pliocene Tamiami Formation, Collier County, Florida

Borings of common marine organisms such as algae, bivalves, polychaetes, and echinoids are potentially useful in sedimentologic and paleoecologic studies. A variety of spectacular shell borings is preserved in the upper Miocene–Pliocene Tamiami Formation exposed in Collier County, Florida. Paleontology of the richly fossiliferous Tamiami Limestone is difficult to study because leaching has selectively removed aragonitic shells. However, this selective shell removal has revealed excellently preserved shell borings as mud-filled molds. Characteristic, interconnecting, subspherical galleries of clionid sponges are the most common borings. The ichnogenus *Entobia* is applied to fossil borings similar to modern clionid sponges. Essentially all of the thick-shelled bivalves, as well as many of the thinner shelled species show evidence of sponge borings. Borings of two polychaete worms are also abundant in Tamiami fossils. Excavations similar to those produced by the genus *Polydora* are the most common, and the second appears unlike modern forms and is tentatively placed in the ichnogenus *Meandropolydora.* Most thick shells contain distinctive borings of two species of bivalves. These borings have a calcareous lining, and are similar in form to borings of the modern mytilid genus *Lithophaga.* The Tamiami Limestone has been described as of shallow-water origin, because of the contained oysters, pectens, and echinoderms. Information derived from the abundant shell borings is consistent with this interpretation, indicating a shallow, warm, low-energy environment.

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In-Situ Formation of Botryoidal Aragonite on Permian Seafloor

Botryoidal masses of (former) aragonite make up the core facies of some Lower Permian phylloid algal mounds in the Sacramento Mountains of New Mexico. These mounds were deposited along a shelf edge in shallow, gently current-swept environments. The aragonite appears to have been precipitated inorganically as in-situ seafloor growths, with individual vertical relief as much as 5.0 cm above the substrate. As such, they represent the first reported occurrence of marine aragonite formation at the sediment/water interface. The lateral and vertical coalescence of botryoids created a three-dimensional network of interbotryoid and internal cavities that were simultaneously filled with fossiliferous marine sediment and/or aragonite-fan cements. The volume of marine aragonite in these inorganic boundstones is as high as 85% in some samples.

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Petrology of Miocene Catahoula Formation, Central Texas Coastal Plain

In the central Texas coastal plain, the Catahoula Formation consists of a basal Chita Sandstone Member (fluvial-channel facies) and an overlying and/or laterally contiguous Onalaska Clay Member (flood-plain and levee facies). The basal unit of the Chita Sandstone is typically a channel deposit of ash-gray, conglomeratic, medium to coarse-grained sandstone in graded to poorly laminated beds containing silicified wood chips. Fining-upward sequences of moderately sorted sandstone units consist of (McBride classification): sublitharenite (42%), quartz-arenite (29%), subarkose (16%),