south. The general paucity of clay minerals and dominance of feldspars in size fraction $<4\mu$ is indicative of lack of intense chemical weathering in the subarctic hinterland. Biogenic contributions to the sediments decrease from nearshore (30%) to offshore (15%); tests of benthonic and planktonic organisms are found but do not dominate any environment. The percentage of organic carbon in sediments is uniformly low and is related closely to the amount of clays in sediments.

The sediment character and distribution in Bristol Bay reflects two distinct sedimentary environments of deposition. Sediments on the shallow shelf are controlled by the storm-generated-wave drift currents, are moderately well sorted, and are devoid of silt and clay. In protected bays, and at water depths prohibiting elutriation by storm waves, the silt-clay content in sediments increases significantly. Local influences of fluvial, tidal, and wind-driven currents on sediments are also apparent. Long waves generated by frequent storms roil shelf sediments with a net seaward movement. The absence of silt and clay sediments and abundance of fine sand on the shelf and seaward prograding blankets of mud near the slope reflect midstage of shelf grading. Sedimentation in Bristol Bay shelf may well be an analogue to the widespread, uniform epicontinental clastic deposits that were formed in the past.

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Biostratigraphy of Marine Triassic in Northern Alaska

Marine Triassic sedimentary rocks crop out in northern Alaska at scattered localities in a belt that extends from Cape Thompson and the DeLong Mountains on the west, eastward along the north front of the Brooks Range across the drainages of the Colville and Sagavanirktok rivers, and then northeastward to the Shublik and Romanzof Mountains of northeasternmost Alaska. Respective parts of this outcrop belt are designated as western (W), central (C), or eastern (E). Although highly condensed, especially on the west, the Triassic is nearly completely represented. From study of the U.S. Geological Survey collections, distinctive successive ammonoid and pectenacid bivalve faunas, with their ages and stratigraphic occurrences, are: (1) *Otoceras* of early Griesbachian and *Ophiceras* and *Claraia stachei* of late Griesbachian age, lower Ivishak Member of Sadlerochit formation (E); (2) *Euflemingites romunderi* fauna of early Smithian age, upper Ivishak Member of Sadlerochit formation (E) and "shale member of Shublik formation" (C); (3) *Leiophyllites* fauna of probable early Anisian age, "shale member of Shublik" (C and W?); (4) *Daonella frami* and/or *D. degeeri* of early Ladinian age, lower Shublik formation (E) and lower "chert member of Shublik" (C and W); (5) *Leptochondria nationalis* fauna of probably early Karnian age, middle of Shublik formation (E), correlative in part with *Halobia* cf. *H. zitteli* occurrences in "chert member of Shublik" (C and W); (6) *Arctosirenites canadensis* fauna of late Karnian age, middle of Shublik formation (E), correlative in part with *Halobia* cf. *H. ornatissima* occurrences in ""chert member of Shublik" (C and W); (7) *Monotis typica* of early (?) and early middle Norian age, "Shublik formation" (W); (8) *Monotis pinensis, M. obtusicostata,* and/or *Halobia fallax* of middle Norian age, upper Shublik formation (E) and "limestone member of Shublik" (C and W); (9) *Monotis ochotica ochotica* and/or *M. subcircularis* of late Norian age, upper Shublik formation (E) and "limestone member of Shublik" (C and W); and (10) *Monotis ochotica* pachypleura of late Norian or younger Triassic age, uppermost "Shublik formation" (C and W).

These faunas have much in common with those from along the Yukon River in east-central Alaska and from the Canadian Arctic Archipelago and eastern Asia, but they contrast strongly with Triassic faunas of southern Alaska and the Pacific margin of North America.

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Cretaceous Floral Sequences in Alaskan Arctic

The Albian to Maestrichtian plant sequence in northern Alaska is well documented stratigraphically and regionally, by megafossil assemblages from more than 250 localities through about 23,000 ft of strata (about 7,000 m), in 11 homoclinally-dipping sections, and from 7 study areas across more than 350 mi (about 600 km) of the North Slope. Common interbedding of marine and nonmarine units provides data for (1) inferring continuous coastal-plain environments for the Cretaceous vegetation, and (2) referring the floral records to European stages through marine fossil correlations.

About 380 species have been recognized, but this total will undoubtedly increase as the detailed morphologic analyses continue. There are examples of species that appear to be widely ranging through time; but upon closer examination they are recognized as complexes of similar species, commonly occurring in stratigraphic sequence. Only a few of these complexes have been examined in detail, and such studies are currently in progress.

The sequential plant records are divisible into 7 biostratigraphic zones based on proportional representation of general taxonomic categories: I (oldest) = pteridophyte-ginkgophyte-cycadophyte assemblages; II = pteridophyte-ginkgophyte-cycadophyte-coniferophyte assemblages; III = pteridophyte-ginkgophyte-cycadophyte-coniferophyte-dicotyledon assemblages; IV = coniferophyte-dicotyledon assemblages; V–VII = predominantly dicotyledon assemblages with coniferophytes subdominant.

Certain taxonomic and morphologic data obtained at numerous levels are interpreted to indicate rapidly changing and widely fluctuating climates over the Cretaceous coastal plain during the Albian to Maestrichtian interval: (1) records of cycadophyte representation and of entire-margined dicots as warmer climate indicators; and (2) records of coniferophyte representation and of maximum size of Ginkgo leaves as cooler climate indicators. When plotted on stratigraphic charts, the cycadophyte-dicot peaks correspond to each other as well as to the stratigraphic positions of coniferophyte-Ginkgo troughs (warmer climate trends). The coniferophyte-Ginkgo peaks correspond to each other and to the cycadophyte-dicot troughs (cooler climate trends). On the basis of such data it is suggested that later Mesozoic climates may have fluctuated as widely and as rapidly as those of later Cenozoic time; that is, at intervals of about 100,000–250,000 years. Warming trends appear to have peaked in the subtropical range with no evidence to indicate climates as warm as tropical. Cooling trends appear to have "bottomed-out" in the cool-temperate range with no evidence to indicate climates as cool as boreal.