indicative of the extreme youth of large parts of the Arctic Ocean and of the formation of the ocean by oceanization of continental crust as a result of large vertical subsidence movements.

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MESOZOIC STRATIGRAPHY, SEDIMENTOLOGY, AND PALEOGEOGRAPHY OF NORTHERN YUKON, CANADA

Data derived from reconnaissance field work in 1962 and published data indicate that the Mesozoic succession is divided into 5 major cycles which reflect important events in the geologic history of the region: (1) Late Triassic transgression across a low shelf; (2) widespread Jurassic transgression and development of the Richardson trough; (3) earliest Cretaceous regression and basin filling that ended with local minor(?) uplift and erosion; (4) Albian transgression and development of the early Late Cretaceous regression; and (5) Late Cretaceous and early Tertiary nonmarine sedimentation in local tectonic basins. Within each of these major cycles several diastems and unconformities are present which increase in magnitude toward the basins' margins.

During Jurassic and earliest Cretaceous times, the Richardson basin was filled with marine shale and bordered on the east by a landmass (probably mountainous) which shed sand westward. The sands now form a series of Lower, Middle, and Upper Jurassic and Lower Cretaceous nearshore sandstone bodies. During the earliest Cretaceous some sand in the Babbage River region was derived from the underlying Mesozoic and upper Paleozoic clastic sediments in the western Brooks Range geanticline.

The earliest Cretaceous clastics filled the basin so that nonmarine conditions prevailed in the northernmost (Blow River) part. Moreover, slight uplift and erosion took place at that time. By the end of Aptian time, much of the eastern landmass had been peneplaned.

The tectonic and sedimentary patterns changed drastically during Albian to early Tertiary times. Sediments were derived from a rising cordillera which formed the western and southern margins of the new foreland basin and developed across the previous eastern Jurassic and Lower Cretaceous landmass. A thick succession of largely silty Albian shale was deposited in this basin. The thin Upper Cretaceous sedimentary sequence consists of nonmarine strata (Eagle Plain Formation) and marine shale. Much of the deformation and uplift of the Richardson Mountains took place during middle Late Cretaceous time. During the late stages of the cordillera deformation on the south and southwest, several small, partly fault-bounded basins developed in which thick sequences of coarse clastic materials were deposited.

A similar but thicker Mesozoic succession appears to extend beneath the Mackenzie delta. One of the best prospective hydrocarbon zones is the sequence of well-sorted sandstones near the base of the Lower Cretaceous, if these sandstones do not grade to shale on the north.

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SEDIMENTARY PROCESSES IN ARCTIC OCEAN

Two unusual Arctic Ocean sedimentary processes involve deposition of clay-size particles and deposition of glacial-marine erratics. The clay suite identified by X-ray diffraction in 50 cores from the Chukchi Rise and Alpha Cordillera consists mainly of illite with almost equal combined amounts of chlorite and kaolinite. Similar clays are present in atmospheric dust in permanent snow fields of northern Greenland. In addition, dust separated from snow samples of the Arctic ice pack contains these same clay minerals. This dust finds its way into leads during summer melting where it contributes an estimated 0.4 mm of sediment per 1,000 years. This is almost ½ of the total sedimentation rate for parts of the Arctic and up to 90% of the 2-μ size fraction sediment.

Pebbles have been found in 36 cores. Few striations have been noted but ice rafting is a believable mechanism to explain pebbles in the central Arctic Ocean. Twenty-three cores contain erratics at more than 1 level and as many as 7 are present in 300-cm cores; 38% are sandstone, 29% carbonate, 15% metamorphic, and 18% chert or unidentified clasts.

Distribution of the erratics shows no pattern that can be explained by known currents or events in time. Erratics are present in brown cores but no erratic has been found in gray cores. Turbidity structures characterized some of the gray cores. Probably, erratics were deposited randomly over most of the Arctic basin from melting glacial ice, but they appear to be less common in deeper parts of the ocean (Canada plain) where high sedimentation rates associated with turbidity flows mask their presence.

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TEXTURE, ORGANIC CARBON, AND CLAY MINERALOGY OF WESTERN BEAUFORT SEA SEDIMENTS

In the western Beaufort Sea the shelf sediments differ significantly from the slope and basin sediments in texture and in carbon and carbonate contents. The shelf is generally carpeted by positively skewed, platykurtic gravelly, sandy mud, whereas the slope and basin mostly have sandy or clean mud with symmetric and mesokurtic size-distribution curves. The predominance of muddy gravels on the shelf suggests that ice-rafting is important in transporting sediment to this region. Possibly the presence of the permanent pack ice across the slope and basin acts as an effective barrier for the movement of ice-rafted gravels to those regions. Probably the well-sorted and rounded sands associated with the slope and basin muds have been transported by turbidity currents from the shelf margin, where it is believed they were deposited originally under turbulent conditions during geologically recent lowered sea levels.

The shelf sediments have relatively lower organic carbon contents (average, 0.95%) than those of the slope and basin (average, 1.19%). However, the amount of carbonate in the shelf is higher (average, 4.8%) than in the slope and basin (average, 2.75%). The organic content is related to the clay percent whereas the carbonate content is related to the amount of calcareous shelly and lithogenous components.

Clay mineral composition of the less than 2- and 4-μ sediment sizes consists predominantly of illite with significant amounts of kaolinite and almost no chlorite. It is suggested that the use of clay minerals in the inference of paleoclimates must be made with great caution because the generally accepted view related to marine