No formations have been formally defined within the Cretaceous clastic deposits of the regionally extensive Kuskokwim Group of southwestern Alaska. Near Cairn Mountain, in its southeastern area of exposure, the Kuskokwim Group may be divided into two distinctive stratigraphic units. The widespread lower unit (Hook Creek unit) consists mainly of shale and siltstone with interbedded sandstone turbidites and is at least 5,000 m thick. The upper unit (Cairn Mountain unit) is characterized by poorly cyclical massive sandstone and granule to cobble conglomerate. This unit is at least 6,000 m thick at Cairn Mountain, but thins dramatically to the southwest to about 750 m.

Based on measured sections and other sedimentologic data, we interpret the Cairn Mountain area as part of a Cretaceous submarine-fan complex. The Hook Creek unit consists of mid-fan channel and levee deposits that thin and fine upward, whereas the coarser grained Cairn Mountain unit comprises inner-fan channel deposits. Paleocurrent and compositional evidence indicate that the submarine fan was shed southwestward, mainly from the Mystic terrane in the western Alaska Range.

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Seismic Subsequences in Foothills Foldbelt, National Petroleum Reserve in Alaska (NPRA), Alaska

The foothills foldbelt of the NPRA takes its name from its well-developed concentric folds involving Cretaceous rocks. These folds can extend over several townships, some being 40 mi (65 km) long and 10 mi (15 km) wide, and could contain significant amounts of oil. One fundamental problem in the foldbelt is to identify good quality reservoir rocks at optimum depths of burial.

The most widespread units containing potential reservoir rocks are the Torok Formation and the Nanushuk Group. The Torok Formation, of Aptian-Albian age, consists primarily of shale and siltstone with sands interbedded locally. It was deposited as a prograding delta sequence containing both marine and transitional marine clastics. The Nanushuk Group, of Albian to Cenomanian age, is typified by marine clastics grading upward into fluvial and nonmarine clastics. The Nanushuk Group contains many intervals with good reservoir potential, but they usually lie too near the surface to allow economical recovery of oil. The Torok lies at optimum depths, but it tends to be too fine grained or "dirty" to possess good porosities and permeabilities.

The Torok does contain certain intervals with better quality and more numerous sands. These sands were probably deposited as nearshore bars during periods of higher energy deposition. Seismic subsequences within the Torok are thought to represent large deltaic lobes. The tops of the subsequences are defined by zones of toplap or truncation and tie very well with the bases of sandier intervals near the transition from Torok to Nanushuk Group where the intervals are present in outcrop.

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Electrofacies Identification of Lithology and Stratigraphic Trap, Southeast Lost Hills Fractured Shale Pool, Kern County, California

Subtle facies changes are traced vertically and laterally in the upper Monterey and Reef Ridge formations through application of the Multi-well Faciolog (mark of Schlumberger) technique. Electrofacies, representing intervals of similar log response, are identified in a key well by comparison with mud-log, conventional core, and x-ray diffraction analysis from sidewall cores and are retained in a data base. Five subsequent wells lacking detailed core or x-ray data but with similar log suites (bulk density, neutron porosity, gamma ray, and delta time) were compared to the data base and automatically assigned electrofacies. Twelve electrofacies—including diatomite, porcellanite, chert, dolomite, mudstone, and claystone, plus intermediate members—have been identified at the depth accuracy and resolution of petrophysical logs.

The lateral updip diagenetic facies changes from porous, hydrocarbon-productive diatomaceous mudstone to impermeable, low-porosity, nonproductive porcellanite are clearly illustrated by the Faciolog cross-sectional display. McGuire et al, documenting the change from mudstone to porcellanite, recognize it as a controlling factor in formation of a stratigraphic trap. Vertical electrofacies associations reflect cyclic paleoclimatic trends and provide sedimentary sequences that aid in well-to-well correlation, field studies, and mapping in otherwise nondescript shales. Lithologic characterization of fine-grained, compositionally variable reservoirs, such as the Monterey Formation and equivalent rocks, is critical in understanding diagenetically altered porosity and, therefore, production.

Comparison of average log values for each electrofacies with equivalent Miocene-age coastal basin rocks reveals decreased dolomite and increased terrigenous clay content in the Lost Hills strata. Using the Faciolog technique, combined with x-ray diffraction analysis, allows identification of average log values associated with specific lithologies.

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Stratigraphy of Endicott Mountains and Picnic Creek Allochthons, Killik River and Chandler Lake Quadrangles, North-Central Brooks Range, Alaska

Geologic mapping in the Killik River and Chandler Lake quadrangles has delineated rocks of at least three of the major allochthons found in the De Long Mountains of the western Brooks Range: the Brooks Range (Endicott Mountains), Picnic Creek, and Copter Peak allochthons. Rocks characteristic of parts of the Tpnavik River and Nuka Ridge allochthons are also present.

The Endicott Mountains allochthon forms the main crest and mountain front of the central Brooks Range. It is the structurally lowest of the allochthons in the region. Major rock units on the allochthon are: Upper Devonian Hunt Fork Shale and Noatak Sandstone, Upper Devonian–Lower Mississippian Kanayut Conglomerate, and Mississippian Kayak Shale of the Endicott Group; Alapah Limestone and Kuna formation of the Lisburne Group; and Permian Siksikpuk Formation and Triassic Otuk formation of the Etivluk group. Lower Cretaceous coquinoid limestone and, in some places, orogenic sediments of the Okpikruak Formation cap the allochthon. Total stratigraphic thickness of the Endicott Mountains allochthon is over 2,000 m (6,500 ft).

Rocks of the Picnic Creek allochthon are widespread in the "disturbed belt" of the Brooks Range foothills, and structurally overlie the Endicott Mountains (Brooks Range) allochthon in the Killik River quadrangle and quadrangles to the west. The allochthon is not recognized with certainty east of the Killik River quadrangle. Major rock units on the Picnic Creek allochthon are: Upper Devonian(?) Hunt Fork Shale, Lower Mississippian Kurupa sandstone tongue (new name) of the Noatak Sandstone, and Mississippian Kayak Shale of the Endicott Group; Carboniferous Akmalik chert (new name) of the Lisburne Group; and Pennsylvanian Imnaitchiak chert (new name) and Otuk formation of the Etivluk group. Orogenic sediments of the Lower Cretaceous Okpikruak Formation form the top of the Picnic Creek allochthon. Total stratigraphic thickness of these rock units is not over 1,000 m (3,200 ft).

Plant fossils from a number of localities in the Kurupa sandstone are dated as Early Mississippian (Tournaisian-Visean) by B. A. Thomas and R. A. Spicer and have close affinities to material from eastern USSR. Palinspastic restoration of the Picnic Creek allochthon southward to a position south of the Endicott Mountains allochthon restores the Kurupa sandstone, the Akmalik chert, and the Imnaitchiak chert to their proper basin position. In the reconstructed basin, the Kurupa sandstone appears to represent the distal, southern end of the Kanayut-Noatak coarse-clastic wedge. The Akmalik chert and Imnaitchiak chert represent basinal equivalents of the Alapah Limestone–Kuna formation of the Lisburne Group and Siksikpuk Formation of the Etivluk group.

Detailed stratigraphic and paleontologic studies of the Mississippian through Triassic rocks on both allochthons are in progress.

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Geological Mapping in Doonerak Fenster, Central Brooks Range, Alaska