quartz (40-50%) and rock fragments (22-39%) and less for feldspar (17-27%). The KOR population is characterized by high proportions of polycrystalline quartz and low proportions of sedimentary rock fragments. Interpretation of detrital modal analyses suggests a complex source terrane involving orogenic recycling and mixing of sediments from a magmatic arc and a subduction system.

In contrast to KOR samples, CC samples have an average Q:F:L of 16:11:73 and Qp:Lv:Ls of 11:34:55. Total grain populations vary most for rock fragments (56-85%) and quartz (6-27%) and to a lesser degree for feldspar (8-17%). The high variation in rock fragments suggests variable volcanic and sedimentary sources. Interpretation of detrital modal analyses also suggests complex sources but with a significant arc-orogen component.

Both populations are characterized by varying proportions of diagenetic products, which include albite, calcite, chlorite, sericite, and epidote.

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Meshik and Aleutian Arcs—Tertiary Volcanism on Alaska Peninsula, Alaska

The Meshik and Aleutian arcs of the Alaska Peninsula are magmatic arcs of predominantly calc-alkaline affinity. The Meshik arc, primarily of Eocene and Oligocene age, is in part stratigraphically equivalent to "early series" rocks of the Aleutian Islands. Its northeasternmost outcrops lie south of Mother Goose Lake, but rocks of the arc occur in the subsurface as far north as Becharof Lake. The Aleutian arc is of middle Miocene to Holocene age; it extends from Hayes Volcano in the southern Alaska Range to Buldir Island in the Aleutians. On the Alaska Peninsula, the dominant major volcanic-rock types in both arcs range from leuco basalt to dacite. Plutonic rocks of the Aleutian arc crop out in many places on the peninsula, including the Devils and Agripina Bay batholiths. Rock types of the plutons are commonly quartz diorite, granodiorite, and lesser tonalite. Plutonic rocks of the Meshik arc are less common, though compositionally similar to Aleutian-arc plutonic rocks.

Both the Aleutian and Meshik arcs exhibit a shift in the locus of magmatism over time. Available data document a shift in the magmatic locus of the Aleutian arc about 50 km northwestward from the Pacific Coast in the middle Miocene to its present position. Less definitive evidence suggests that the Meshik arc shifted a similar distance to the southeast during Eocene and Oligocene time. Although segmentation of the Aleutian arc is well described, less evidence exists to suggest similar segmentation of the Meshik arc.

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Lateral Variability in Coals in Western North Slope, Alaska

Results of our investigation of foot-by-foot sections from drill cores of two North Slope coals of Cretaceous age from Cape Beaufort and Kukpowruk River indicate drastic changes in environment during formation of the seams. Indicative of these changes are unusually wide variations in the petrographic composition and ash characteristics within the seam. For instance, the Kukpowruk samples showed an increase in semifusinite from 1.3% at the bottom to 32% at the top. Furthermore, the concentrations of Fe_2O_3 + CaO + MgO in the Kukpowruk seam ranged from a low of 7.2% to a high of 80.9%. Similar changes were found in the samples from Cape Beaufort.

The variability in these coals was further identified by changes in the swelling behavior of the coal and to a lesser extent by rank characterization. Changes in the coal structure and its low temperature ash were also studied by means of Fourier transform infrared spectroscopy.