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Association Round Table

AAPG-SEPM-SEG PACIFIC SECTION MEETING
Anchorage, Alaska, May 22-24, 1985
Abstracts

ADAMS, KAREN E., Univ. Alaska, and C. G. MULL, Alaska Div. Geol. and Geoph. Surveys, Anchorage, AK

Facies Comparison of Autochthonous and Allochthonous Permian and Triassic Units, North-Central Brooks Range, Alaska

Eight stratigraphic sections of Permian and Triassic rocks have been studied over a 30 km by 150 km area in the Endicott and Philip Smith Mountains of the central Brooks Range. Six of the sections are located on the Endicott Mountains allochthon, and the remaining two are parautochthonous columns in the Mount Doonerak area. The sections record a facies transition between the autochthonous Sadlerochit Group and Shublik Formation of the northeastern Brooks Range and the characteristically siliceous rocks of the allochthonous Siksikpuk and Otuk formations of the western Brooks Range.

Laterally continuous and bioturbated beds of fine-grained sandstone, siltstone, and shale dominantly compose the Permian sequence, whereas the Triassic rocks consist of black shales, thin rhythmically bedded siliceous mudstones, and fossiliferous limestones. When the allochthonous sections are restored to a position south of the Mount Doonerak area, a general shallowing trend from southwest to northeast becomes evident within the reconstructed marine basin. To the south and west, the Permian sediments show a marked increase in silica content, with the occurrence of barite and a corresponding decrease in the thickness of the basal, coarser grained clastics. The Triassic formations also document an increase in silica and the presence of barite to the south and west, while becoming significantly sooty and phosphatic to the north and east. Ongoing petrographic and micropaleontologic studies of the field data will clarify these general paleogeographic relationships.

AFFOLTER, RONALD H., and G. D. STRICKER, U.S. Geol. Survey, Denver, CO

Geochemistry of Coal from Cretaceous Corwin and Chandler Formations, National Petroleum Reserve in Alaska (NPRA)

The Cretaceous, coal-bearing Corwin and Chandler Formations accumulated in two river-dominated deltas on the North Slope. The larger Corwin delta (Corwin Formation), in the western portion of NPRA, prograded northeastward and eastward, and the smaller Umiat delta (Chandler Formation), in the southeastern part of NPRA, prograded northward.

Ninety coal samples from these formations within NPRA were collected and analyzed in order to evaluate coal quality and elemental distribution. Their apparent rank ranges from lignite A in the northern part of NPRA to high-volatile A bituminous coal in the southern part. Mean vitrinite reflectance values range from 0.65 to 0.74%. Some Corwin Formation coal samples west of NPRA have coking potential with free-swelling indexes between 3.0 and 5.0. Compared to other western United States Cretaceous coal, NPRA coal is significantly lower in ash, volatile matter, 0, Si, Al, Ca, Fe, Ti, Cu, F, Li, Mn, Mo, Pb, Sb, Se, Th, and Zn. Statistical comparisons of element concentrations indicate that the mean content of Si, Al, K, Li, Sc, Y, and Yb increases as the mean ash content increases (correlation coefficient at least 0.7). Sulfur values are extremely low (0.1%), and elements that normally show positive correlation with sulfur, such as Fe, As, Cd, Co, Cu, Mo, Pb, and Zn, are also low.

Therefore, coal from NPRA can be characterized by low ash and sulfur contents and low contents of elements of environmental concern, such as As, Be, Hg, Mo, Sb, and Se. The elements found to have positive correlations with ash content are probably present as aluminosilicate or stable oxide minerals. Variations in element content and quality of NPRA coal were probably influenced by the geochemical conditions that existed in the Corwin and Umiat delta systems.

*Denotes speaker other than senior author.

ALLISON, R. C., Univ. Alaska, Fairbanks, AK, and J. M. ARMENTROUT, Mobil Oil Corp., Alaska Exploration Group, Dallas, TX

Alaskan Peninsula Cenozoic Stratigraphy: Stratigraphic Sequences and Current Research

"Geology of the Alaska Peninsula-Island Arc and Continental Margin," by C. A. Burk, is the principal reference for stratigraphic studies on the Alaska Peninsula. Burk mapped the Phanerozoic stratigraphy and provided a geologic history and structural interpretation of the area between Wide Bay and Unimak Island. Cenozoic rocks were mapped as three unconformity-bounded sequences. Recognition of specific formations was difficult due to similarity of lithofacies, isolated outcrops, rapid facies changes, and alteration and burial by young volcanics. Consequently, megafossil assemblages were relied upon to facilitate correlations between study areas.

The three unconformity-bounded Cenozoic sequences are:

1. The Paleogene Beaver Bay Group consisting of three formations: the dominantly nonmarine Tolstoi Formation, the dominantly marine Stepovak Formation, and the volcanic Meshik Formation. Current work suggests these units are at least in part coeval facies of late Paleocene through Oligocene age.
2. The Neogene Bear Lake Formation consisting of the lower Unga Conglomerate Member and an unnamed upper member. Rapid facies changes and incorrect reports of fossil occurrence have resulted in confusion of stratigraphic relationships within this sequence of middle to late Miocene age.
3. A late Neogene informally defined upper sequence consisting of interbedded marginal marine, coastal-plain, and volcanic facies. Current work suggests this sequence is Pliocene through Pleistocene in age.

The ongoing research presented in this symposium focuses on the refinement of Burk's work using an interdisciplinary approach involving revised biostratigraphic frameworks, sedimentologic models, radiometric dating, and paleomagnetic studies. While much progress has been made, many problems remain unresolved.

ARMENTROUT, J. M., Mobil Oil Corp., Alaska Exploration Group, Dallas, TX

Depositional Environment and Geologic Age of Neogene Rocks at Cape Aliaksin, Beaver Bay, Alaska Peninsula

Neogene sandstone and conglomerate cropping out along the eastern end of Beaver Bay at Cape Aliaksin have been assigned to the Unga Conglomerate Member of the Bear Lake Formation. New data suggest that this correlation may be incorrect.

The rocks at Cape Aliaksin consist of more than 250 m of interbedded sandstone and subordinate conglomerate overlain by volcanics. Sandstones are dominately cross-stratified tabular and sigmoidal beds. Paleocurrents are bimodal with a dominant north to south transport direction. Marine fossils are dispersed through the sandstones. Conglomerates are thin beds of cobble to boulder clasts. Some show southward imbrication; others are inversely graded. Fossils are rare in the conglomerates. The sandstones are interpreted as tidal sand waves and tidal bundles; conglomerates are interpreted as storm lag and debris flow deposits.

The fossil assemblage includes gastropods, pelecypods, barnacles, and echinoids indicative of a shallow marine, cold-water biofacies. Taxa indi-