## PRE-MISSISSIPPIAN ACCRETED TERRANES OF NORTHEASTERN BROOKS RANGE, ALASKA

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## ABSTRACT

Low-grade metamorphic rocks (Neruokpuk Formation, <u>sensu</u> <u>lato</u>) underlying a regional angular unconformity in the northeastern Brooks Range have been interpreted as a conformable Precambrian to Devonian stratigraphic succession. The pre-Mississippian rocks include not only "miogeoclinal" quartzites and carbonates, but also a variety of "eugeoclinal" lithologies such as radiolarian cherts, argillites and graptolitic shales, mafic to intermediate volcanic rocks, and volcanogenic graywackes. Fossils of Cambrian, Ordovician, and Silurian age have been identified in these lithologies. Many of these units are fault bounded and may be interpreted as pre-Mississippian tectonostratigraphic terranes. Several of the terranes are depositionally overlapped by Middle(?) Devonian clastic rocks and intruded by plutonic rocks depositionally overlain by Mississippian and younger rocks, but which yield equivocal middle Paleozoic age dates. Similar relationships are exposed in the Doonerak anticlinorium in the central Brooks Range. These features are interpreted to indicate that the lower Paleozoic rocks of the eastern Brooks Range were tectonically assembled by accretionary processes along an active continental margin prior to Middle Devonian time. Subsequent uplift and erosion occurred prior to deposition of the Mississippian to Neocomian (Ellesmerian) passive margin sequence.

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## TECTONIC SIGNIFICANCE OF THE KANAYUT CONGLOMERATE AND RELATED MIDDLE PALEOZOIC DEPOSITS, BROOKS RANGE, ALASKA

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## **ABSTRACT**

The Upper Devonian and Lower Mississippian(?) Kanayut Conglomerate, which crops out for a distance of 600 miles (950 km) across the Brooks Range, is significant for understanding of the tectonic history of northern Alaska in relation to the geology of the circum-Arctic region. The Kanayut Conglomerate is as thick as 10,000 feet (3,000 m) and consists chiefly of conglomeratic fluvial strata that were deposited as a result of southwestward progradation of a large and coarse-grained fluvial-dominated delta. Underlying and overlying shallow-marine and prodeltaic strata record the advance and retreat of the delta. The Kanayut and related deposits crop out in a series of thrust sheets in which the Paleozoic rocks were detached in the late Mesozoic from an unknown basement and transported at least several hundred kilometers northward. Detailed sedimentologic studies and measured sections in the Kanayut Conglomerate permit estimates to be made of the amount of displacement on the thrust sheets and suggest that the source area of the allochthonous middle Paleozoic deltaic deposits was the underlying autochthonous upper Precambrian and lower Paleozoic basement rocks of northern Alaska. The Kanayut Conglomerate is not palirspastically compatible with other middle Paleozoic successions in Alaska, in the Cordillera of western Canada, in the conterminous western U.S., or in the Canadian Arctic Islands. The strata do, however, resemble fluvial deposits of the Old Red Sandstone in Sylabard and East Greenland. They and their associated autochthonous basement may have been displaced from an original position contiguous with the North Greenland foldbelt by post-Early Mississippian strike-slip faulting and thus indicate an early phase of circum-Arctic tectonic displacement prior to that associated with the opening of the modern Canada Basin in the late Mesozoic.