

PRE-MISSISSIPPIAN ACCRETED TERRANES OF NORTHEASTERN BROOKS RANGE, ALASKA

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ABSTRACT

Low-grade metamorphic rocks (Neruoqpuq Formation, *sensu lato*) 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 palinspastically 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 Svalbard 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.

Executive Order

WHEREAS there are large seepages of petroleum along the Arctic Coast of Alaska and conditions favorable to the occurrence of ~~valuable petroleum fields~~ on the Arctic Coast and,

WHEREAS the present laws designed to promote development seem imperfectly applicable in the region because of its distance, difficulties, and large expense of development and,

WHEREAS the future supply of oil for the Navy is at all times a matter of national concern,

NOW, THEREFORE, I, WARREN G. HARDING, President of the United States of America, by virtue of the power in me vested by the laws of the United States, do hereby set apart as a Naval Petroleum Reserve all of the public lands within the following described area not now covered by valid entry, lease or application:

Commencing at the most northwestern extremity of the point of land shown on the maps of Alaska as Icy Cape, approximately lat. $70^{\circ} 21'$, long. $161^{\circ} 46'$; thence extending in a true south course to the crest of the range of mountains forming the watershed between the Noatak River and its northern tributaries and the streams flowing into the Arctic Ocean; thence eastward along the crest of this range of mountains to a peak at the head of the northernmost of the two eastern forks of Midas Creek (Pl. 1, U.S.G.S., Bull. 536), at approximately lat. $67^{\circ} 50'$, long. $156^{\circ} 08'$; thence in a true north course to a point at the highest high water on the western or right bank of the Colville River; thence following said highest highwater mark downstream along said Colville River and the western bank of the most western slough at its mouth to the highest highwater mark on the Arctic coast. From here, following the highest highwater mark westward to the point of beginning.

The coast line to be followed shall be that of the ocean side of the sandspits and islands forming the barrier reefs and extending across small lagoons from point to point, where such barrier reefs are not over three miles off shore, except in the case of Plover Islands, from Point Tangent to Point Barrow (Pl. 3, U.S.G.S., P.P. 109), long. approximately $154^{\circ} 50'$, where it shall be the highest highwater mark on the outer shore of the islands forming the groups and extending between the most adjacent points of these islands and the sandspits at either end. In cases where the barrier reef is over three miles off shore the boundary shall be the highest highwater mark of the coast of the mainland.

Said lands to be so reserved for six years for classification, examination, and preparation of plans for development and until otherwise ordered by the Congress or the President.

The reservation hereby established shall be for oil and gas only and shall not interfere with the use of the lands or waters within the area indicated for any legal purpose not inconsistent therewith.

WARREN G HARDING

THE WHITE HOUSE,
Feb. 27, 1923.

[No. 3797-A.]

DEPARTMENT OF STATE

March 19, 1923

▲ true copy.

[Signature]
Chief, Division of Publications

