

FOLD-NAPPES AND POLYPHASE THRUSTING IN THE NORTH-CENTRAL BROOKS RANGE, ALASKA

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ABSTRACT

Ongoing study involving inch-to-the-mile mapping of a geologic transect along the Ikillik-Koyukuk Rivers is providing new information on the structural style and kinematic development of the central Brooks Range. The principal structures controlling north-directed structural telescoping are three detachments. These detachments are stratigraphically controlled and occur in: (1) the Devonian Hunt Fork Shale, (2) the Mississippian Kayak Shale, and (3) Permian and Triassic shale. The detachments and the subsidiary thrusts that branch from them form a thrust complex that developed in two stages. During the first stage, duplexes consisting of horses of Mississippian Lisburne Group platform carbonates formed where the Kayak Shale detachment ramped up to Permian and Triassic beds, imbricating the intervening Lisburne Group. In the second stage, alpine-style fold nappes involving Devonian Kanayut Conglomerate and elements of the underlying Hunt Fork Shale were emplaced sequentially from south to north on thrust faults soring in the Hunt Fork Shale. Thrust faults that emplace the fold nappes merge with the previously formed detachment in the Kayak Shale. Complex deformation associated with both stages include: (1) ramping of duplexes in Lisburne Group rocks over previously imbricated Lisburne Group rocks; (2) regional folding of imbricated Lisburne Group rocks; (3) folded individual subsidiary faults within the duplexes of Lisburne Group rocks; (4) warping, folding, and thrusting of the Kayak Shale detachment associated with generation and emplacement of the underlying fold nappes; and (5) faults that cut through the hinge area of fold nappes and thrust the trailing limbs of the fold nappes over the overturned leading limbs of the fold nappes.

