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TITLE: Permian and Triassic Sedimentation in the Northeastern Brooks Range

ABSTRACT

The Sadlerochit Group is separated from limestones of the Lisburne Group by a regional unconformity with as much as 15 m of erosional relief. In the Sadlerochit and Shublik Mountains, nonmarine conglomerate composed of chert and carbonate clasts of the basal Echooka Formation fill erosional channels and valleys. Channel-fill sequences pass upsection into graded beds of fossiliferous and highly burrowed quartzarenite deposited during episodic storm-surge in an inner shelf environment. Near Bathtub Ridge, equivalent rocks lack erosional relief along the unconformity and record storm-influenced sedimentation in deeper water conditions of the middle shelf. Retrograding environments and increasing isolation from detrital sources culminated in deposition of shale and siltstone of the overlying Kavik Shale.

Deposition of the Ivishak Formation records an abrupt reversal of environmental migration patterns and the rapid progradation of coalescing wave-dominant delta systems. Quartzarenite of the Ledge Sandstone Member is internally plane-parallel laminated and cross-laminated, and was deposited within continuously agitated, shallow marine delta platform environments. Equivalent rocks along the Sadlerochit and Aichilik Rivers are characterized by alternations of graded sandstone beds containing slump and dewatering structures, intraformational truncation surfaces, and distinctive shale partings between sandstone beds. The sandstone units are a record of episodic downslope grain flow in a platform slope environment. The Ledge Sandstone at Bathtub Ridge is thinly interlaminated, very fine-grained quartzarenite and siltstone deposited in distal outer shelf environments at depths beneath storm influence. The overlying Fire Creek Member is composed of interbedded sandstone and siltstone beds of variable thickness and lateral continuity. Multiple intraformation truncation surfaces, soft-sediment deformational and dewatering structures, and rare graded beds characterize the lower 70 percent of the member and record retrograding platform slope environments. This pattern reverses in the upper beds of the Fire Creek where changes in stratification style, increasing bioturbation and interference ripples record a return to shallow environments. This shallowing culminated in the development of a subaerial unconformity separating the Ivishak from phosphatic sandstone and shale of the lower Shublik Formation, deposited in middle or outer shelf conditions.