

Geology of the Kavik River Area, East-central North Slope, Alaska: Preliminary Results of the 2006 Statemap Project

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Northern Alaska remains one of the most prospective exploration frontiers in onshore North America. In 2006, The Alaska Division of Geological & Geophysical Surveys conducted a field program in the Kavik area of the east-central North Slope, providing new constraints on the evolution of the petroleum system. This region includes two undeveloped gas discoveries (Kemik and Kavik fields) and is one of few areas that permit examination of all three depositional megasequences (Ellesmerian, Beaufortian, and Brookian) in close association.

The focus of this project was to: 1) better constrain the timing and nature of regional burial and Tertiary exhumation events affecting the hydrocarbon maturation and migration history, and 2) further define the depositional environments and sequence stratigraphy of selected Brookian and Beaufortian source and reservoir units.

Detailed stratigraphic and structural data, in conjunction with some of the first 1:63,360-scale geologic mapping in the area, provide insight on the complex deformation history in the region. The southern, well exposed portion of map area is dominated by detachment folding. Key structures in the Cretaceous and Tertiary strata to the north (including the trapping structure at the Kavik field) are poorly exposed, although newly acquired 2-D seismic and existing well data will allow for a more robust structural analysis. New observations of Beaufortian stratigraphy (associated with the rift-related opening of the Arctic Ocean Basin) indicate a potentially more complex paleogeography than previously assumed. Within the Cretaceous Brookian foreland succession, facies considerations suggest possible structural telescoping emplacing the informally named "Juniper Creek sandstone" along a detachment within the Jurassic Kingak Shale.

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