SEDIMENTOLOGY, STRATIGRAPHY, AND SUBSURFACE EXPRESSION OF UPPER CRETACEOUS STRATA IN THE SAGAVANIRKTOK RIVER AREA, EAST-CENTRAL NORTH SLOPE, ALASKA

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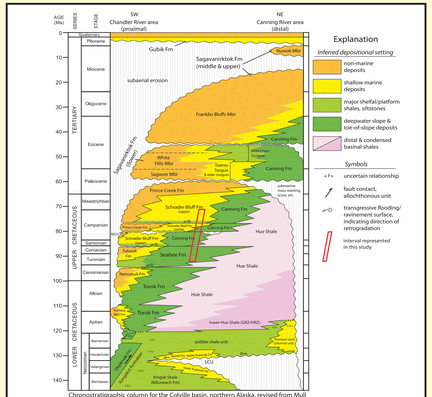
ABSTRACT

Alaska's North Slope remains one of the most promising onshore oil and gas provinces in all of North America. However, much of the Colville foreland basin remains only lightly explored and many key stratigraphic relationships remain poorly understood. In an effort to improve Brookian sequence stratigraphic models and codify regional formation nomenclature, we have begun integrating detailed outcrop observations with available well and 2-D seismic data.

This study presents measured sections from Upper Cretaceous rocks exposed along an unnamed drainage between the Sagavanirktok and Ivishak rivers in the Sagavanirktok A-3 quadrangle, and relates these strata to well log data from the Echooka Unit 1 well approximately 30 km to the northeast. The base of the outcrop section consists of lower Turonian deepwater sandstones and recessive weathering shales; sandstones exhibit a strong, fresh hydrocarbon odor. The middle part of the succession includes thin- to medium-bedded, fine-grained turbidites and associated sediment gravity flow deposits of Santonian to Campanian age. Notably present in this middle interval are brown, organic-rich paper shale and tuffaceous claystone with strong hydrocarbon odor. The upper third of the exposure belt includes sandstones with abundant trace fossils of the Cruziana ichnofacies and physical structures indicative of deposition above storm wave-base in a low-energy setting. The stratigraphic top includes fine-grained sandstones of Campanian age with abundant wave ripple cross lamination and other structures suggestive of deposition in shorezone settings.

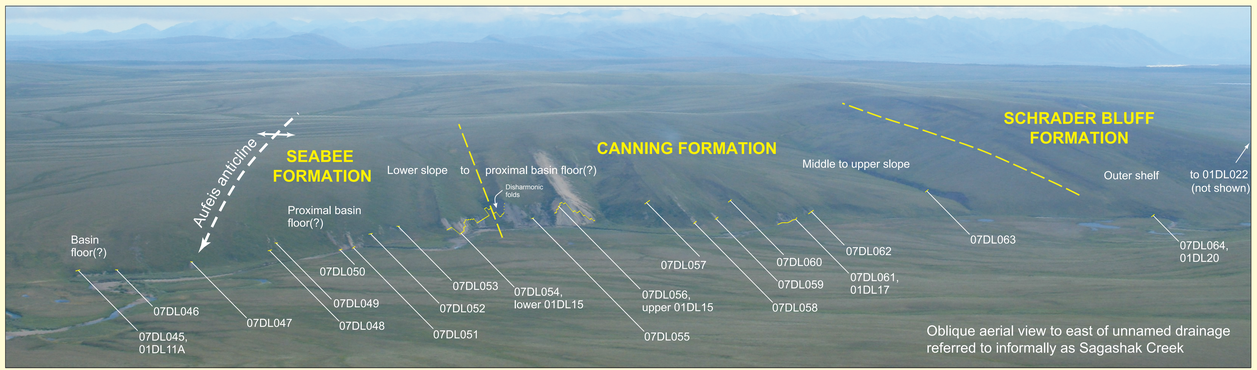
This important succession provides insight into the time-transgressive northeastward progradation of genetically related shelf, slope and deep water facies. In particular, this area allows an examination of seismic scale, internally regressive depositional sequences recorded by the Upper Cretaceous Tuluvak-Seabee and Prince Creek-Schrader Bluff-Canning Formations.

CHRONOSTRATIGRAPHY

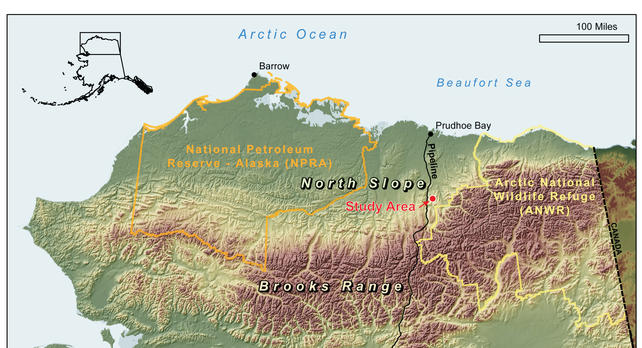


Chronostratigraphic column for the Colville basin, northern Alaska, revised from Mull and others (2003, USGS Professional Paper 1673) and Garrity and others (2005, USGS Open-File Report 2005-1182). Abbreviations as follows: Fm, Formation; Mbr, Member; Mtn, Mountain; LCU, Lower Cretaceous unconformity; MCU, mid-Campanian unconformity; cs, Cobblestone sandstone of Fortress Mountain Formation (informal); ms, manganiferous shale unit (informal).

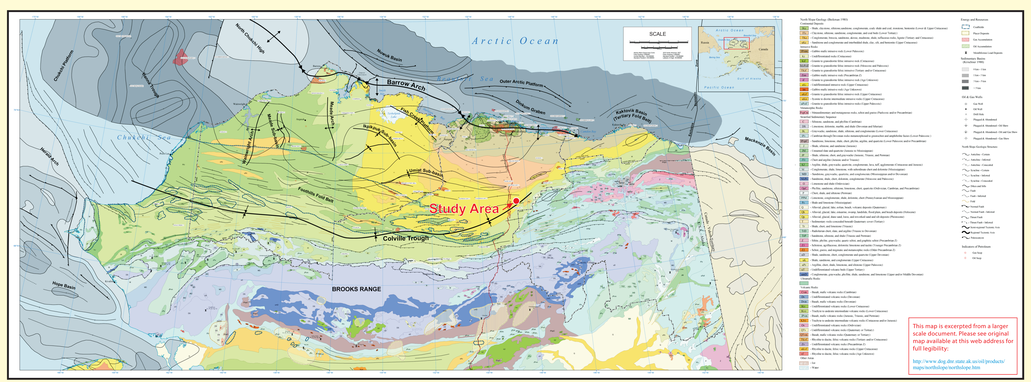
DETAILED MEASURED SECTIONS



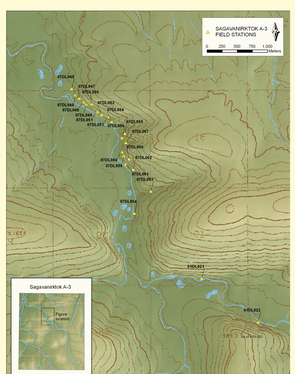
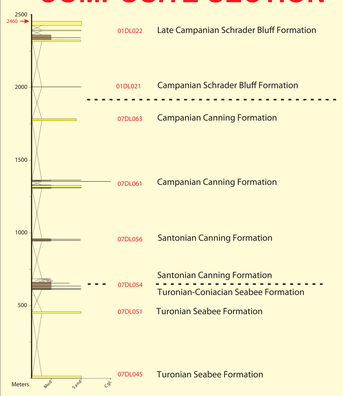
REGIONAL LOCATION



REGIONAL GEOLOGY



STATION LOCATIONS



COMPOSITE SECTION