

## Structural and Tectonic Elements of the North Slope Depicted in New Tectonic Map of Alaska

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### ABSTRACT

We present a new tectonic map of Alaska north of 60°N that shows the age and present-day distribution of known contractional and penetrative extensional deformational events as well as major faults and folds, magmatic bodies, and tectonically significant sedimentary, igneous, and metamorphic complexes. This map is the result of construction of the Alaska segment of the Tectonic Map of the Arctic, now nearing publication through the Commission for the Geologic Map of the World (CGMW) in Paris. Our new map indicates that Alaska can be divided into three general deformational domains: a northern domain consisting of terranes lying generally north of the Tintina and Kaltag faults characterized by north-vergent arc-continent collision events formed during the Late Jurassic to Early Cretaceous early Brookian orogeny; a central domain consisting principally of the large continental Farewell and Yukon-Tanana terranes, both of which feature Permian deformational events of different origins but displaying different subsequent deformational histories; and a southern domain lying south of the Denali fault that consists of the Alexander, Wrangellia, and Peninsular (AWP) island-arc terranes and the adjoining southern Alaska accretionary complex which were amalgamated by Permian and Middle and Late Jurassic tectonic events before collision against the western margin of North America in the mid- to Late Cretaceous. Various Cretaceous and Cenozoic successor basins overlie these domains but except for the northern Colville Basin all Cretaceous basins and many Cenozoic basins are themselves deformed by subsequent deformational events. The remainder of this presentation focuses on the northern domain on the North Slope. Early Brookian deformation in northern Alaska resulted from the subduction of the northern margin of North America beneath oceanic arcs of the Paleo-Pacific Ocean and was followed by counter-clockwise rotation of Arctic Alaska as a consequence of rotational rifting of the Amerasia basin in the Early Cretaceous. The termination of this collisional event resulted in widespread ductile extensional deformation in interior Alaska. Late Brookian thrusting began in the Paleogene after about 30 m.y. of tectonic quiescence, forming a thick-skinned north-vergent thrust belt in the Brooks Range and a thin-skinned fold belt in the Colville Basin. Later in the Cenozoic, this deformation became restricted to northeastern Alaska and the adjacent Beaufort Shelf where north-vergent deformation continued into the Neogene and Quaternary. In addition to these principal events, north-vergent folding and thrusting of Devonian age (Romanzof Orogen) is evident in the basement rocks of the northeastern Brooks Range and in the subsurface of the North Slope. This deformation was acquired during an earlier collisional event while the North Slope was still part of the Ellesmerian orogenic belt along the northern margin of Canada.