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### **Thermochronologic Constraints on the Cenozoic Thermal History of the Southern North Slope Foreland Basin, Alaska**

Apatite fission track and vitrinite reflectance results from Upper Devonian through Upper Cretaceous sedimentary rocks help constrain maximum maturity, and timing of denudation and deformation within the southern flank of the North Slope foreland basin in northern Alaska. Within the highly deformed southern foothills belt of the basin, vitrinite reflectance results highlight regions of relatively low thermal maturity for rocks that have long been considered to be overmature. In a number of localities, these data indicate that allochthonous sedimentary rocks that remained relatively less mature are juxtaposed structurally with foreland basin rocks that were exposed to significantly higher paleotemperatures. Apatite fission track results from these localities record rapid cooling below maximum paleotemperatures at ~60 Ma, ~45 Ma, and ~25 Ma, and in a number of cases, probably directly record the time of deformation. To the north, within the less-deformed parts of the basin, apatite results from subsurface samples indicate that they were exposed to maximum paleotemperatures in the Late Cretaceous to early Paleocene as a result of subsidence and burial by Upper Jurassic and Cretaceous sedimentary rocks. Rapid cooling from these elevated maximum paleotemperatures subsequently occurred at ~60 Ma, ~45 Ma, and ~25 Ma. The Cenozoic episodes of rapid cooling from both parts of the basin are interpreted to reflect km-scale erosional denudation resulting from uplift due to structural thickening during episodes of shortening within the Brooks Range and its foreland basin. These results indicate timing of maximum paleotemperatures occurred prior to the timing of formation of potential trapping structures.