

“Cenozoic exhumation history of the northern Richardson Mountains”

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Abstract:

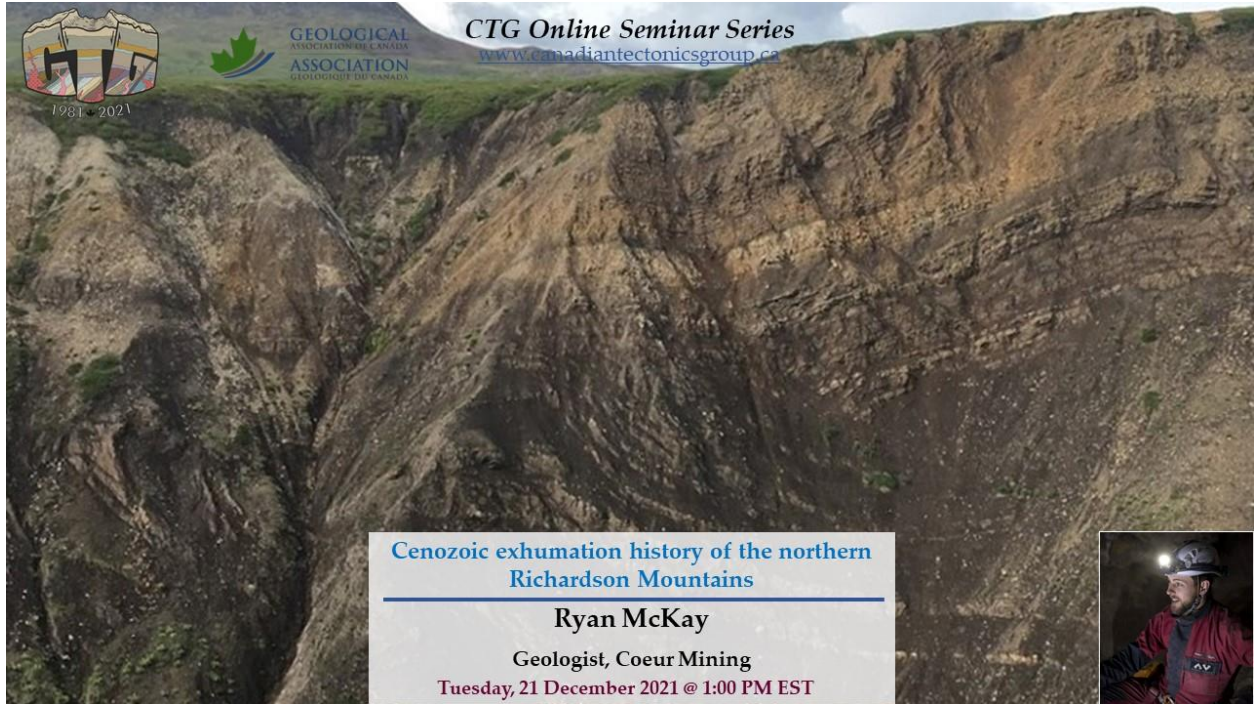
New low-temperature thermochronology data from clastic sedimentary rocks in the northern Richardson Mountains, Canada, indicate significant exhumational cooling during late Eocene–early Oligocene time. Apatite (U-Th-Sm)/He (AHe) data were collected from 19 Proterozoic–Paleocene rocks across a 115 km transect. Single-grain AHe dates range from 16–300 Ma and are generally younger than stratigraphic ages, indicative of thermal resetting by burial. Additionally, zircon (U-Th)/He (ZHe) dates from two Proterozoic–Cambrian rocks range from 49–123 Ma and suggest burial to $>160^{\circ}\text{C}$. In contrast, ZHe dates from Jurassic sandstones are older than the stratigraphic age, which limits maximum burial to $<160^{\circ}\text{C}$. Thermal history modeling reveals three phases of cooling, during the Paleocene–early Eocene (>65 –50 Ma), late Eocene–early Oligocene (40–30 Ma), and late Oligocene–early Miocene (30–15 Ma). Most samples cooled during the first and second phases, whereas the third phase is less well constrained. In general, most rocks were near surface since the early–middle Miocene. The results suggest a previously unrecognized phase of inferred deformation in the northern Richardson Mountains between 40–30 Ma. Our findings contribute to previous work that recognizes Late Cenozoic deformation along the eastern margin of the Northern Cordillera. We further investigated the potential mechanisms of this widespread deformation and suggest exhumation may relate to kinematic changes of the North American plate relative to structural trends along the margin of the Northern Cordillera.

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