

Stratigraphy, Sedimentology and Paleoenvironments of the Cantwell Formation, Denali National Park, Alaska

A Field Guidebook

In Memory of Phil Brease, Denali National Park Geologist from 1985 to 2010



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Between Mile 30 and 53, the Denali National Park Road winds through exposures of Late Cretaceous to early Eocene Cantwell Formation. These rocks are the target of our field trip. The formation comprises an older fluvial sequence and a younger, chiefly bimodal volcanic sequence. Complex structural offset, copious intrusions, as well as differential erosion and intrinsic mineral weathering properties have given the land a hallmark physiography: Canyon walls, precipitous slopes and pinnacle-studded ridgelines are cast in vibrant shades of auburn, yellow and dark grey—hence feature names like *Cathedral Mountain*, *Polychrome Pass*, *Polychrome Mountain*, and *Sable Mountain*.

The lower Cantwell Formation is a fossiliferous, dinosaur and bird track-bearing alluvial sequence that consists of numerous successions of conglomerate, sandstone, mudstone, and local thin coal seams and altered tuffs. **T**he lower Cantwell Formation contains abundant plant impression and compression fossils and lithified wood. Dinosaur tracks are common in the finer-grained, heterolithic sections of the lower Cantwell Formation. Tracks are typically preserved in what is interpreted as floodplain, lake margin, and small channel facies.

The upper Cantwell Formation is an up to 2,750 m thick volcanic, subvolcanic and volcanoclastic sequence that intrudes and overlies the lower Cantwell Formation. The upper Cantwell consists here of a lower, predominantly mafic sequence and an upper, mainly felsic sequence consisting of subintrusive rhyolite flows and successive pyroclastic deposits. Chill margins, baked rims, and hydrothermal alteration zones mark the contacts around the intrusions and provide clues as to the order and timing of events.