STRATIGRAPHY, GEOCHRONOLOGY, GEOCHEMISTRY, AND PALEONTOLOGY OF THE MCCARTHY FORMATION, WRANGELL MOUNTAINS, ALASKA: BEARINGS ON PRE-COLLISION CRUSTAL CONDITIONS WITHIN THE WRANGELLIA TERRANE

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The Upper Triassic–Lower Jurassic McCarthy Formation (MF) of southern Alaska records sediment accumulation within Wrangellia, an accreted oceanic plateau that formed at low paleolatitudes. New sedimentologic, paleontologic, geochemical, and geochronologic data from the MF provide improved constraints on plateau subsidence and depositional conditions prior to collision with western North America.

The lower 107 m of the MF consists of organic mudstone (TOC 3–4%), micrite, glauconitic limestone, and tuff interpreted as the product of low-energy, dysoxic to anoxic marine environments influenced by nutrient-rich upwelling. New U-Pb age determinations from tuff and occurrences of the bivalve Monotis subcircularis indicate Late Norian deposition. Cycad plant fragments suggest nearby vegetated landmasses during deposition. The upper 435 m consists of fine-grained siliceous mudstone, limestone, and porcellanite with a low-diversity bivalve assemblage characteristic of low-energy, dysoxic to anoxic marine environments. Age-diagnostic ammonites, Dubariceras freboldi and D. silviesi, indicate deposition persisted through late Early Pliensbachian time. The bivalve Otapiria tailleuri Imlay, is noted for the first time from the Wrangell Mountains and represents its southernmost occurrence in Lower Jurassic strata of Alaska. Organic δ13C isotope data spanning the MF record a positive excursion following disappearance of Norian bivalves and a negative excursion prior to appearance of Pliensbachian ammonites. These data are consistent with carbon cycle perturbations from isotopic records at other localities worldwide, but higher-resolution sampling is needed.

Previous studies inferred Late Triassic subsidence within Wrangellia to account for accumulation of >4–6 km of Ladinian-Carnian flood basalts (Nikolai Greenstone) and >1 km of Carnian-Norian supratidal-subtidal carbonate strata (Nizina and Chitistone Limestone). Within the context of these data, MF deposition records subsidence below wave base by late Norian time and gradual subsidence through Pliensbachian time. Stratigraphic data record progressive decrease in Ladinian–Pliensbachian depositional rates, consistent with thermal subsidence patterns predicted by mantle plume initiation models for Wrangellia.