THE TECTONIC EVOLUTION OF HIGH-ELEVATION LAKE BASINS ON THE CORDILLERAN HINTERLAND OROGENIC PLATEAU

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Abstract

The North American Cordillera provides a record of the evolution of crustal and mantle dynamics resulting from subduction-driven orogenesis and subsequent lithospheric thinning. The Cordilleran hinterland region, from eastern Nevada to western Utah, is interpreted as a Paleogene orogenic plateau that maintained distinctly higher than modern elevations (up to 3.5 km) prior to Neogene extensional collapse. The crustal and mantle response during the Paleogene-Neogene transition from shallow-slab subduction and contraction to extension is recorded in Eocene fluvial and lacustrine sediments and interbedded volcanic rocks of the Elko Formation in northeastern Nevada. Lacustrine deposits show the existence of a regionally-expansive high-elevation lake that fluctuated between balanced and evaporative conditions; however, the timing and mechanism of syncompressional basin formation, the causes of cyclicity in lake deposits, and the morphology and connectivity of lake basins is uncertain. While detailed analysis of these deposits is crucial, relatively little attention has been devoted to this strata, especially in comparison to well-documented foreland deposits in the Eocene Green River Formation. Since crustal and mantle processes influence river and lake evolution, analysis of the Eocene surface record will help reconstruct the tectonic evolution of the North American Cordillera. I will conduct an interdisciplinary study of Eocene Elko Formation sedimentary and volcanic rocks across northeastern Nevada to reconstruct the hydrology and geomorphology of the Eocene-Oligocene Cordilleran hinterland and determine the drivers for basin formation. To accomplish this, I will integrate detailed field observations and data from sedimentology and stratigraphy with geochronology, thermochronology, and stable isotope analysis.

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