

Cordilleran Section - 116th Annual Meeting - 2020

Paper No. 22-20

Presentation Time: 9:00 AM-6:00 PM

THE INFLUENCE OF MIOCENE TO RECENT TECTONICS AND LANDSCAPE EVOLUTION ON GENETIC DIVERSITY ALONG THE CENTRAL BAJA CALIFORNIA PENINSULA

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The evolving volcano-tectonic landscape of the Baja California (BC) peninsula governs the diversity of its flora and fauna. Many factors control habitat distribution and the position of the Pacific and Gulf of California shorelines since the late Miocene, including older volcanic topography and vertical crustal motions driven by rift-related uplift, faulting, and magmatism. Deciphering the spatio-temporal patterns of landscape evolution and evaluating the causes of genetic divergence in central BC hinges on understanding its paleogeography through detailed geologic mapping and sedimentology. At the latitude of San Ignacio-Santa Rosalía, the peninsular topographic divide is a low (~400–500 m asl) and broad (15–20 km) pass. This topographic low continues to the SW through San Ignacio as a broad embayment between older constructional Miocene volcanic topography. At the divide we map tuff breccias of the early to middle Miocene Comondú Formation overlain by a sequence of mafic lavas, non-marine conglomerate, and eolian sandstone. Flows of the ~10 Ma basalt of Esperanza overlie this sequence above a gentle angular unconformity. West of the divide, we map newly discovered marine and tidal sediments that overlie the basalt of Esperanza and are locally overlain by Pliocene (3–4 Ma) basaltic centers. *Ophiomorpha* burrows, mangrove root casts, convex-up hummocky bedforms, and oncoid mounds suggest deposition in tidal and marine environments on the SW slope of the peninsula. These sediments occur within 5–10 km of the divide at up to ~320 m asl, similar to the highest known elevations of Pliocene marine rocks east of the divide in the Santa Rosalía basin. Several NNW-trending fault zones occur on both sides of the divide, most with 10s to 100s of m of E-side-down normal or dextral-oblique slip. Ongoing mapping will help reveal the timing and influence of vertical crustal motions on landscape change and the paleogeography of this Pacific Ocean embayment, and whether this embayment once connected across the peninsula to the nascent latest Miocene or Pliocene Gulf of California. Ascertaining whether a transpeninsular seaway or a narrow, low-relief isthmus existed has significant implications for the role of landscape change in restricting north-south gene flow that drove the genetic divergence documented along the BC peninsula.

Session No. 22--Booth# 34

[D9. Using Geological Archives to Understand and Document Earth Surface Processes and Past Climate \(Posters\)](#)

Wednesday, 13 May 2020: 9:00 AM-6:00 PM

[Fountain Ballroom \(The Westin Pasadena\)](#)

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