

Abstract ID: 285

Title: A CRITICAL REVIEW OF THE BAJA BC CONTROVERSY

Student: No

Topic: Tectonics

Medium: Invited Oral Presentation

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Keywords: Cordilleran tectonics, Baja BC

Abstract: The “Baja BC hypothesis” states that a long sliver of the NW Cordillera, extending from Washington and British Columbia to SW Alaska, moved northward ~2500 km between 90 and 55 Ma. This interpretation was proposed to account for paleomagnetic results indicating low paleolatitudes for this tectonic sliver during the mid-Cretaceous. The idea has been hotly debated for more than 25 years now and has defied any clear resolution. What is remarkable is how difficult it has been to use local geology to test this idea. Some geologic ties have been proposed but the relationships are indirect and heavily dependent on specific tectonic scenarios. We have yet to learn of a cross-cutting pluton, an overlapping sedimentary unit, or other geologic tie that clearly defines the mid-Cretaceous location of Baja BC, whether in W Mexico or the NW Cordillera.

Why has geology failed to provide this test? One reason is that the present eastern boundary of Baja BC has been strongly modified by Eocene extension in Washington and SW British Columbia, and by Cenozoic strike-slip faulting in NW British Columbia and SW Alaska. Likewise, any potential mid-Cretaceous truncation scar in Mexico would have been overprinted by opening of the Gulf of California, and northward offset of the Salinian and Peninsular Ranges blocks. Extensive areas are also covered by young volcanics, such as Miocene flood basalts in Washington and British Columbia and the mid-Tertiary ignimbrites of the Sierra Madre Occidental in western Mexico.

Recent papers have suggested a compromise reconstruction with modest northward transport (~1500 km) of Baja BC, but this idea conflicts with our understanding of the tectonic evolution of California, indicating belt-wise accretion of Mesozoic and Paleozoic terranes during the Jurassic and Early Cretaceous. Nearly all of these terranes are present in the Baja BC block and they also show clear evidence of continental accretion during the Jurassic. Cowan et al. (1997) concluded that there are only two viable options, with Baja BC originating either north or south of the ‘California sector’. They also showed that if one uses paleomagnetic data alone to constrain paleolatitudinal positions, all of the major Western Cordilleran tectonic features restore to a simple mid-Cretaceous

convergent margin, without any overlap of the older accretionary belts. The Early Cretaceous magmatic arc trended continuously from the Klamaths and Sierra in the north, through the Salinian block, and then along the Peninsular Ranges block. The Baja BC slice was located outboard of the truncated western side of the Salinian and Peninsular Ranges blocks. This reconstruction is supported by new paleofloral data by Miller et al. (2006) that indicate a low latitude sub-tropical location for Baja BC at 105 Ma. We welcome attempts to test this reconstruction using local geology but we suspect that high-quality paleomagnetic data will continue to be the better tool for testing reconstructions.