Subduction Zone Dynamics and Overriding Plate Deformation in Alaska: Insights and Unanswered Questions

Margarete Jadamec -
NSF Postdoctoral FellowDepartment of Geological Sciences, Brown University

The Aleutian-Alaska subduction zone forms the northern boundary of the Pacific Rim of Fire. The subduction zone is greater than 3000 km in length, changes its sense of curvature from convex to the south to convex the north along its length, and terminates into plate boundary corners at each end forming lateral slab edges. In the eastern plate boundary corner, in south central Alaska, the dip of the subducting plate shallows to form a flat slab where the Yakutat block is subducting beneath the North American plate. These features result in a complex three-dimensional mantle flow field at depth and an overriding plate characterized by distributed deformation, including ongoing intra-continental mountain building and far-field seismicity. Recent high-resolution three-dimensional geodynamic models of the Pacific-North American plate boundary in Alaska are presented. The models are placed in the context of the broader subduction dynamics literature, with particular emphasis on how the upcoming EarthScope deployment in Alaska can constrain our understanding of plate tectonic processes through the lens of geodynamics.