AGU FALL MEETING
San Francisco | 12–16 December 2016

# S33F-01: Seismic imaging all along the Alaska subduction megathrust (Invited)

**Wednesday, 14 December 2016**
**13:40 - 13:55**
*Moscone South - 305*

Constraining the physical properties of plate boundary faults at subduction zones is essential to understanding downdip and along-strike changes in slip behavior. Seismic imaging remains one of the only ways to constrain spatial patterns in megathrust properties, but there are challenges. Obtaining a comprehensive picture requires seismic datasets that cross the shoreline and that constrain earth structure at a range of scales (m's to km's) and a range of depths (from the trench to >100 of km). Here we present seismic imaging results from the Alaska subduction zone from an onshore/offshore active-source seismic reflection and refraction dataset acquired during the ALEUT Project and comparisons with nearby constraints from receiver function imaging of onshore passive source data and with active/passive source imaging from other subduction zones. Near the trench, seismic reflection data acquired with an 8-km streamer constrain both complex fault geometries as well as detailed P-wave velocity structure. Reflection images and velocity models obtained by pre-stack depth migration off Alaska show along-strike variations in the thickness and velocity of subducting sediments, which have implications for the properties and slip behavior on the shallow part of the plate boundary. At larger depths the overall tectonic configuration and the depth and geometry of the plate boundary are constrained by travel time tomography using seismic refraction data, and seismic reflection data constrain detailed properties of the plate boundary at scales of 100's m. Combining these constraints off Alaska indicates that the plate boundary appears to broaden from a ~180-m-thick low velocity zone to a complex 3- to 5-km-thick zone of layering where it intersects the forearc mantle wedge. Comparisons between receiver function and seismic reflection imaging at various depths demonstrates that these independent approaches are sensitive to different and complementary scales of megathrust structure.

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