Click here for the 3D file of Figure 6. You will need Adobe Acrobat or Adobe Reader DC or later to view and rotate this file. If reading the full-text version of this paper, please download article PDF to view 3D file in these programs.

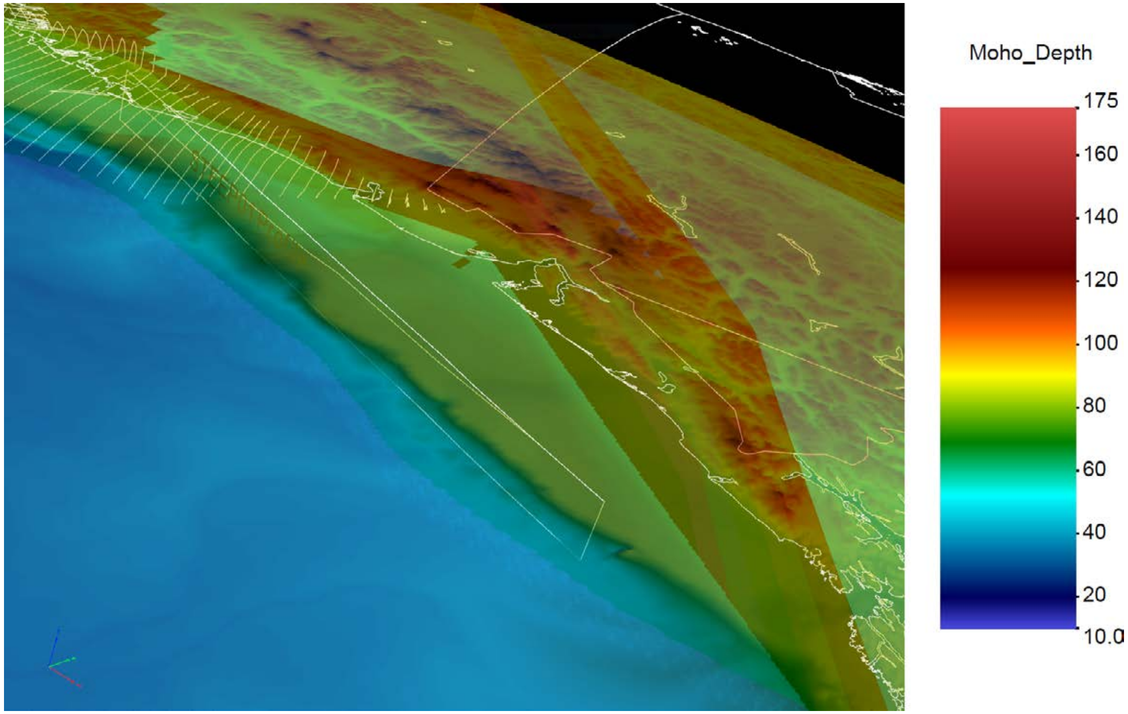

Figure 6. STEEP01 interpretation geometry in relation to lithospheric model from this paper. This figure is a 3D PDF. See general instructions in the caption of Figure 3 for suggestions on interactions with this figure and common elements of the scene. Initial view in this figure is from south of the Yakutat microplate and above the ground surface. The focus of this figure is the object with the tag "STEEP01 Basement and Moho" drawn in white. Select and deselect that tag to find this feature in the scene. The top of the rectangle is at sea level, and the bottom is an extension of the interpreted Moho. The diagonal line through the rectangle is at the depth of basement inferred by Worthington et al. (2012). Click here for the 3D file of Figure 6. You will need Adobe Acrobat or Adobe Reader DC or later to view and rotate this file. If reading the full-text version of this paper, please download article PDF to view 3D file in these programs.

gular shape (distorted by spherical geometry) with a diagonal line through it marking the interpreted basement position. Inversion of travel time data from the marine shots recorded by the onshore STEEP broadband stations shows that the depth of Yakutat Moho rapidly increases from ~30 km offshore to 40–45 km beneath the Chugach–St. Elias Mountains (Christeson et al., 2013). The thickest portion of Yakutat crystalline crust enters the St. Elias orogen north of the Malaspina Glacier where the orogen displays its highest relief and its highest exhumation rates (Worthington et al., 2012). The Dangerous River Zone is expressed as an ~8-km-thick, low-velocity (<6 km/s) crustal cap overlying the eastern third of the offshore Yakutat microplate (Worthington et al., 2012). The location, geometry, and seismic velocity of the crustal cap are consistent with the metasedimentary Yakutat Group. This assemblage has been interpreted as a remnant accretionary prism from an earlier history of the Yakutat microplate (Worthington et al., 2012).

The Transition fault delineates the southern boundary of the Yakutat microplate. It is a near-vertical, strike-slip fault separating Yakutat crust and Pacific crust (Christeson et al., 2010). Across the Transition fault, the Moho steps abruptly down from ~12 km below sea level on the Pacific plate to ~30 km below sea level underneath the Yakutat crust (Christeson et al., 2010). Figure 6 shows this geometry in three dimensions when rotated to the right perspective. The Transition fault may accommodate ~8 mm/yr of differential motion between the Pacific plate and Yakutat microplate (Elliott et al., 2010). Active deformation at the sea floor is expressed as a deformation zone encompassing three fault strands near the intersection with the Aleutian trench, narrowing to one fault strand near the intersection with the Fairweather fault (Figs. 1, 2, and 5) (Gulick et al., 2013).

The STEEP01 refraction line indicates that the sedimentary cover overlying the Yakutat basement is thickest at the western end of STEEP01, reaching ~15 km thickness near the western end of the line (Fig. 6). This thick sedimentary succession is subducted and accreted at the Pamplona Zone fold-thrust belt (Bruns and Schwab, 1983; Worthington et al., 2012; Van Avendonk et al., 2013). The décollement location was not directly imaged from the active source data but was inferred as a low-velocity zone within the sediments located at either the top or bottom of the Poul Creek Formation (Van Avendonk et al., 2013). East of the frontal faults of the Pamplona zone, the shelf sediments experience porosity loss due to lateral compaction over ~60 km, but active faulting is absent outside of the fold-thrust belt (Worthington et al., 2008; Van Avendonk et al., 2013). The sedimentary cover thins to less than 1 km at the Dangerous River Zone (Fig. 1) and eastward (Worthington et al., 2012). Although the sedimentary package is tapered from west to east, a striking feature revealed by these data is that the Moho of the Yakutat microplate appears to be at a nearly

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