To view the figure's layers in the PDF version of this paper, open the PDF in Adobe Acrobat or Adobe Reader. To view the layers while reading the full-text version of the paper, click https://doi.org/10.1130/GES01488.I3 to download a PDF of the figure.

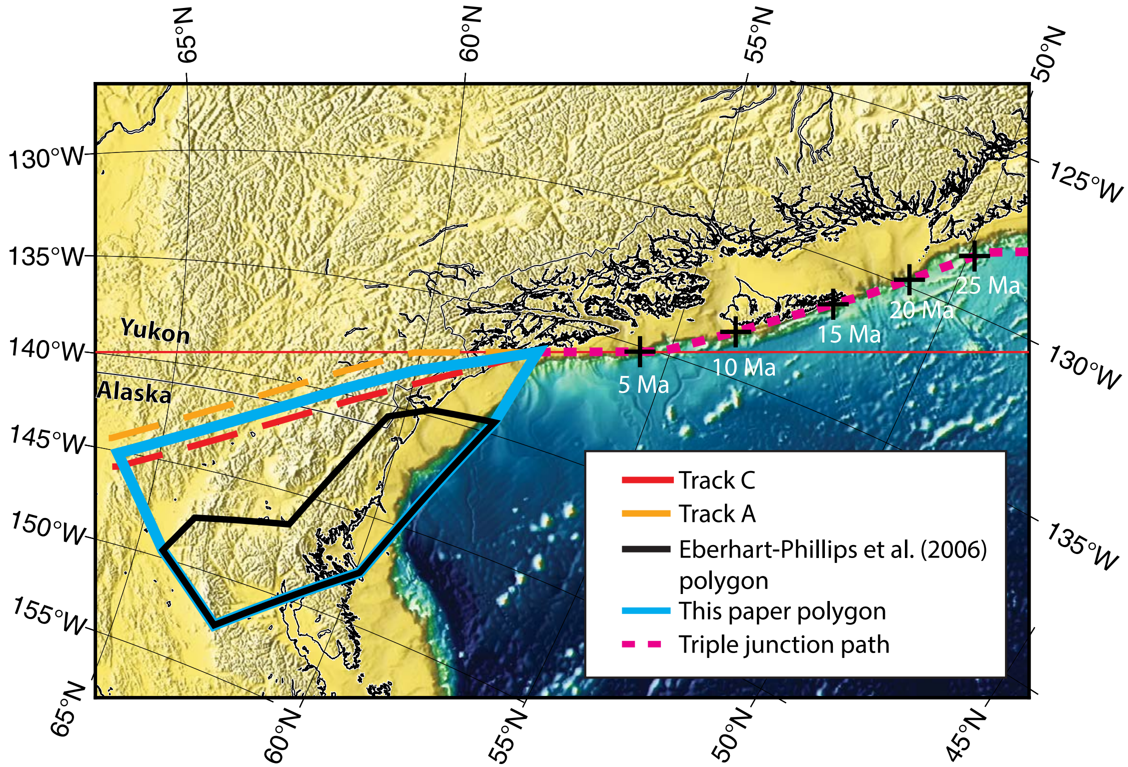

Figure 10. Map showing geometry of Yakutat lithosphere defined by the tomography model of Eberhart-Phillips et al. (2006) in relation to plate kinematics. Note this figure is a layered PDF with tags that provide an additional legend to that displayed. The base map for this figure is an oblique Mercator projection with the pole set to the 0–6 Ma interval pole of rotation for Pacific–North America relative motion estimated by Doubrovine and Tarduno (2008) and a central meridian passing through the center of the figure. With this projection, transform faults aligned with modern Pacific–North America motion will be horizontal lines. The red line in the center is the small circle arc of Pacific–North America motion drawn through the Pacific-Yakutat–North America (Pac-Yak-NA) triple junction point in the center of the figure. The dashed magenta curve is the triple junction track for the Doubrovine and Tarduno (2008) for the past 25 m.y. Crosses define time points. Other features are defined in the legend. To view the figure's layers in the PDF version of this paper, open the PDF in Adobe Acrobat or Adobe Reader. To view the layers while reading the full-text version of the paper, click https://doi.org/10.1130/GES01488.I3 to download a PDF of the figure.

The reconstruction suggests that the southern coastline of Alaska may have been much straighter 6 m.y. ago.

To understand the new constraints our results place on this 4D problem, it is helpful to review the current state of knowledge of this region. Three results from STEEP active source data provide new constraints:

1. Seismic-reflection data show that the bulk of shortening in the Yakutat microplate occurs north and west of the offshore Pamplona Zone fold-thrust belt (Worthington et al., 2008, 2012; Van Avendonk et al., 2013). The same data suggest that the interior of the Yakutat microplate south and east of the Pamplona zone is largely undeformed.
2. Seismic-reflection data collected across the Transition fault show little evidence of shortening (Gulick et al., 2013). An exception is the western end of the fault where Gulick et al. (2013) argue that the corner is evolving as an unstable triple junction that is now deforming Yakutat crust internally and may eventually accrete part of the Pacific crust to North America.
3. Structural modeling informed by seismic-reflection data and onshore geology show that the Pamplona Zone is characterized by thin-skinned, décollement style deformation. Collectively, these observations demonstrate detachment of cover from subducted basement throughout the system.

Bauer et al. (2014) used the insights from the active source data to build a regional-scale model of the top of the subducting slab that has been extended in this paper (Fig. 3). Three insights from Bauer et al. (2014) provide additional constraints on the nature of crust-mantle coupling.

1. They noted that the aerial extent of the Pamplona Zone fold-thrust belt narrows from ~75 km offshore of the Bering Glacier to zero at the Seward Glacier. This narrowing corresponds exactly with an along-strike change in sediment thickness from more than 15 km in the western Yakutat microplate to near zero at the Dangerous River Zone (DRZ in Fig. 1). They used three-dimensional P and S wave receiver function