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Title: EVOLUTION OF THE TECTONIC CONNECTION BETWEEN
THE KAMCHATKA AND ALEUTIAN ARC-TRENCH SYSTEMS-
-AN HYPOTHESIS

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Author 1 (CONTACT AUTHOR)

Name: DAVID SCHOLL

Org: University of Alaska and USGS

Country: USA

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Abstract: SETTING: The Kamchatka and Aleutian arc-trench systems meet orthogonally at Cape Kamchatka Peninsula (CKP). The junction (KAT) is the meeting of two segments of the PAC/NAM plate boundary, the NE-striking Kamchatka subduction zone (SZ) and the NW-striking transform of the Komandorsky sector of the Aleutian Ridge. This sector is effectively moving at Pacific plate speed toward collision with Kamchatka at the CKP.

HYPOTHESIS: Deciphering the evolution of the KAT connection is challenging because constraining information about the formative age and paleolatitude of major crustal blocks of the Aleutian-Bering Sea region is lacking. Scenarios range from the consequence of subduction zone jamming by the accretion of far-traveled terranes to formation in response to the SW extrusion of Alaskan crust. It is proposed that in the middle Eocene (~50 Ma) the combined tectonic machinery of subduction zone obstruction (phase 1) and continental margin extrusion (phase 2) established the architecture of the Aleutian-Bering Sea region and guided the evolution of the KAT connection.

PHASE 1: Eocene accretion of the northward migrating Olyutorsky arc complex to the NW corner of the Pacific Basin is posited by many author to have forced the offshore formation of the Aleutian subduction zone (SZ). Its construction accreted a large sector of Pacific crust--Aleutia- (Kula plate?)--to the North America plate and created the deep water Bering Sea Basin by abandoning the more inboard PAC/NAM boundary connecting Alaska and Kamchatka. Abandonment required a NW-striking oceanic transform to link the Komandorsky end of the new Aleutian SZ to the Kamchatka SZ, a linkage that established the KAT connection.

PHASE 2: It is posited that also in the Eocene southwest extrusion of Alaskan crust toward the Beringian continental margin, the former obliquely underthrust PAC/NAM boundary connecting Alaska and NE Russia, forced within the Bering Sea the offshore formation of the Shirshov and Bowers subduction zones and arc massifs. Extrusion was driven by northward oblique convergence along the margins of British Columbia and SE

Alaska. Plate boundary forces drove a 600-800 km wide swath of crustal material, dubbed the north Pacific rim orogenic stream (NPRS), CCW through Alaska and extrusively toward the Beringian margin. The flow of the NPRS is traced by the slip-lines of the regional shear systems of British Columbia that curve through central Alaska to connect with right-slip shears that radiate outward toward the Beringian margin.

OVERVIEW: Effectively, in the Eocene, trench occlusion forced the formation of the Komandorsky transform linking the Aleutian and Kamchatka SZs. NW-moving Pacific lithosphere was absorbed at them and SW extruding crust of the NPRS was accommodated at the Beringian margin and the offshore Shirshov and Bowers subduction zones. Extrusion may have caused the arc-arc collision of the KAT connection to migrate southwestward to reach the CKP.