

ICAM8 Abstracts

Marine geology & geophysics

Exploring wonderments about the ~synchronous Early Eocene (50-55 Ma) creation and reconfiguring of plate boundaries in the Arctic Basin, along the rim of the north Pacific, and at north Pacific spreading centers

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INTRODUCTION: In the early-Eocene Arctic (chrons 25-24, 53-56 Ma), a new North American(NA)-Eurasian(EU) plate-boundary was created at the nascent Gakkel Ridge spreading center. Spreading, initiated by rifting along Eurasia's Barents-Leptev continental margin, opened the Eurasian Basin. Opening progressively separated the rifted crustal ribbon of the Lomonosov Ridge from its birth place along the Eurasian margin. In the Paleocene north Pacific, the only subduction zone (SZ) bordering the Arctic Basin was the Alaska SZ where Pacific crust had been underthrusting Alaskan continental crust since at least the Permo-Triassic. However, In the early Eocene (50-55 Ma), the Alaska SZ extended offshore and westward to the Kamchatka SZ as the Aleutian SZ. The Aleutian SZ and it's overlying arc massif cordoned off the NW corner of the Pacific Basin to form the backarc Aleutian Basin and, to the north, to tectonically shutdown the former oblique convergent plate boundary connecting Alaska and Siberia via the Beringian continental margin. To the south in the north Pacific Basin, birthing of the Aleutian SZ was ~synchronous with a CW (~20 degs) rotation of the Pacific-Farallon spreading ridge and a CCW (~37 degs) reorienting of the Pacific-Kula spreading ridge.

WONDERMENTS: These observations prompt the wonderment if, in the early Eocene, a Northern Hemisphere plate-driving mechanism was causatively involved in plate boundary creation and reconfiguring. Neither the NA or EU plates are structurally connected to a lengthy sector of plate-driving subducting slab. But, at ~50-60 Ma, the NW motion of the NA plate turned to the SW, a change ascribed to a convecting mantle's drag on NA's cratonic root. The turn would have worked to pulled open the Eurasian Basin and compressively force the Alaska SZ to extend westward as the intra-oceanic Aleutian SZ.