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## T22E-06: Inception and Early Evolution of the Aleutian Arc

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**Tuesday, 12 December 2017**

**11:35 - 11:50**

📍 *New Orleans Ernest N. Morial Convention Center - 211-213*

Constraining the timing and style of subduction initiation in the Aleutian system is critical to model the Cenozoic geodynamic evolution of the Pacific. Until now, the oldest ages for the Aleutian arc suggest a subduction inception at c.a. 46-47 Ma. However, the compositions of these samples (arc tholeiites and calc-alkaline rocks) are different from those of typical early-arc sequences found at extensively studied subduction systems (Izu-Bonin-Mariana), dominated by FABs and boninites. Thus, if the FAB/boninite model applies to the Aleutian, the oldest units might not have been recovered yet and the arc inception could have occurred earlier than 47 Ma. To test this hypothesis, we have sampled the lowermost submarine Aleutian sequences at ten forearc and rear-arc localities during the R/V SONNE Cruise 249. We present preliminary whole-rock major and trace element concentrations, Sr-Nd-Hf-Pb isotopes as well as U-Pb zircon dating on the recovered igneous rocks.

The sample compositions range from tholeiitic to calc-alkaline. No boninites were found. Most of the samples show strong subduction signatures. However, the remaining rocks present no or minor arc-type trace element features. These samples are either depleted tholeiites with similar trace element characteristics to FABs or enriched calc-alkaline rocks. Preliminary zircon dating suggests an age of  $47.2 \pm 1.2$  Ma for one of the samples with strong arc signatures, consistent with the oldest published ages for the Aleutian so far. However, based on their compositional similarities to FABs, the depleted tholeiites should be older than the arc-type rocks, suggesting that subduction initiation could have occurred earlier than the above-mentioned age. The absence of boninite could either reflect an incomplete sampling of the early-arc sequences or a different initiation style compared to other Pacific subduction zones. Further ages and radiogenic isotope data should refine these interpretations.

### Plain Language Summary

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