

## Numerical experiments of mantle flow around slab edges and the possibility of trench-parallel flow in the sub-slab mantle

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We present the numerical models of subduction zones constrained by the plate velocity and a moving plate boundary. The subduction-like feature is obtained by imposing the velocity on the top and the small region around the shallow plate boundary kinematically. Except for this region, the mantle flow is obtained by solving the fundamental equations describing the mantle flow. An application of this model is made to the mantle flow around the slab edge as observed around the junction of Aleutian Islands and Kamchatka, that is, the convergent-transform fault plate boundaries.

From these numerical experiments, we found that: (1) The lateral flow from the sub-slab mantle under the subducting slab to the mantle under the neighboring plate exists always, when the trench is retreating significantly (2) In other cases, that is, the trench is more or less stationary and the trench is advancing, such a lateral flow only exists just before the slab hits the high viscosity layer, and (3) A significant lateral flow also exists, when the light and low viscosity material exists under the sub-slab mantle. These results may have important implications for the understanding of trench-parallel anisotropy of seismic velocity in the sub-slab mantle.