3D Numeric modeling of slab-plume interaction in Kamchatka

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Volcanic rocks located in the central segment of the Eastern Volcanic Belt of Kamchatka show a high variability, both in age as well as in the geochemical composition. Three principal groups have been identified, an older group (7-12 my) represented by rich alkaline and transitional basalts, a 7-8 my group exemplified by alkaline basalts of extreme plume type, and a younger group (3-8 my) characterized by calc-alkaline andesites and dacites rocks. Moreover, the younger group shows an adakitic signature.

The magmas are assumed to originate from two principle sources: from a subduction modified Pacific MORB-type and from plume-type mantle.

In this paper we study the interaction of a cold subducting slab and a hot plume by means of 3D numeric modeling integrated 30 my back in time. Our preliminary modeling results show a short episode of plume material inflowing into the mantle wedge at ~10 my consistent with the second rocks group (plume like). Also our models predict slab edge melting consistent with the youngest group.