



## Was depth of magma generation in the Baikal rift controlled by extension?

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A puzzling thing with the origin of the Baikal rift is the relationship between extension and volcanism. Extension started in the Late Eocene and volcanism initiated at some 25 to 14 Ma in different parts of the rift system. This favors a passive rifting and decompression origin of the volcanism. However, two major rift basins occupied by the Baikal Lake are amagmatic, a fact which casts doubt on the decompression melting model. Recently, recycling of fertile material via stagnant Pacific slab subduction was suggested as a cause of plumes (diapirs), melting, and active rifting. In the northeastern part of the rift there are two volcanic fields smaller than 100 km in diameter; the Udokan and Vitim. The Udokan volcanic field is located at the southern shoulder of the Chara basin at the termination of the rift. The Vitim volcanic field buries small basins outside the rift axis in the central part of the rift. In the southeastern part volcanic rocks are spread over a region about 300 by 500 km forming a number of distinct volcanic fields (Tunka, Hamar-Daban, Dzhida, Khubsugul, Oka and Tuva) within basins, on their shoulders, and in regions without surface expression of extension. We calculated the depth of origin of the primary basaltic melt for these fields based on rock chemistry. It appears that the depth of melting linearly decreases from the Udokan (94±17 km) to Tuva (67±10 km) and can be described by the equation:  $\text{Depth}(\text{km})=95-0.02L$  ( $r = 0.94$ ,  $n = 6$ ), where  $L$  is the distance in km from the Udokan along the rift. Gravity-based crustal extension data for 4 profiles across the rift yields the equation:  $\text{Extension}(\text{km})=0.018L+0.5$  ( $r = 0.96$ ,  $n = 4$ ). Thus, the greater the crustal extension, the shallower the depth of melting. However, the dry-mantle-xenolith-based geotherm for Oka shows that passive melting of the mantle is impossible at the estimated depth. Extension did not cause melting, it increased melt

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