

PETROLOGY OF HARZBURGITE AND RELATED XENOLITHS FROM AVACHA VOLCANO, KAMCHATKA ARC, AND ITS IMPLICATIONS FOR WEDGE-MANTLE PROCESSES

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Ultramafic xenoliths derived from the upper mantle of arc settings are rare relative to those from the other settings (continental rifts, cratons and oceanic hotspots) (e.g., Nixon, 1987). Avacha volcano from Kamchatka arc, Russia, has erupted arc magmas (calc-alkaline and tholeiitic) which sometimes have ultramafic and mafic xenoliths (e.g., Shcheka, 1986;). The ultramafic xenoliths from Avacha are derived from the upper mantle beneath the Kamchatka arc. The peridotite xenoliths from Avacha are very special; they are more refractory ($Cr\#$ of spinel = 0.5-0.7; Cpx 2 vol.%) than any peridotite xenoliths documented from continental rifts and oceanic hotspots and any abyssal peridotites obtained from the ocean floor. They are expected, therefore, to record mantle processes which are special to wedge mantle. Rather unusual ultramafic xenoliths were found in Avacha and other volcanoes from Kamchatka (Shcheka, 1986). They are almost white in hand specimens and very fine-grained. Two of them were examined in detail. One is leucocratic dunite which has fine-grained olivine and subordinate amounts of orthopyroxene, opaque spinel and tremolitic amphibole. The other is orthopyroxenite with fine-grained prismatic orthopyroxene and small amounts of interstitial plagioclase and hornblende. These xenoliths are tentatively grouped as ultramafic hornfels according to Shcheka (1986). Spinels in the ultramafic hornfels are higher both in $Cr\#$ (0.7- 0.8) and in $Fe^{3+}\#$ (0.1-0.3) than those in peridotites.