Cretaceous lower to middle crustal xenoliths of northern Pacific margins

V.V. AKININ[1]

[1]NEISRI FEB RAS, Magadan, Russia (akinin@neisri.ru)

Lower to middle crustal xenoliths (LCX) from Late Neogene to Quaternary alkali basalts collected along the norhern Pacific continental margins (Seward, Chukotka, Northern cost of Okhotsk Sea, Primorie, Kamchatka, and Kurile Islands) studied in terms of petrology, geochemistry and isotopic geochronology [1]. Mineral thermobarometry and calculated seismic velocities (P = 5–12 kbar, T = 740–1100°C, and Vp = 7.1 ± 0.3 km/s) suggest that LCX were transported from the lower and middle crust. Geochemistry of most LCX rocks show evidence for their formation through the magmatic fractionation of calc-alkaline magmas and subsequent granulite-facies metamorphism. The U–Pb SHRIMP ages of zircons from LCX ranges from the Cretaceous to Paleocene, clustering mainly within 107–56 Ma (147 grains from 17 samples). The absence of older inherited domains in zircons from both the xenoliths and igneous rocks of the regions is a strong argument in favor of the idea on the injection of juvenile material and underplating of calc-alkaline magmas in the lower crust during that time interval.

The oxygen isotopic composition of most dated zircons from LCX shows near mantle value of d18O [2] ranging from 7 to 5 ‰ (42 grains). Hf isotopic composition of zircons from Okhotsk sea cost LCX have near depleted mantle value (eHf(i) +10 to +11) whereas samples from Chukotka records mature crust involvement (eHf(i) +4 to +1.5; mean 2.9 ± 0.5).

Xenoliths data combined with existing surface geology allow to conclude that despite the exposures of Precambrian and Paleozoic rocks and the accretionary tectonic history of the northern Pacific, it is likely that a considerable portion of the lower crust of the continental margins is much younger and was generated by Cretaceous to Paleocene post accretion magmatic events. Yonger events which modify of lower crust under Archean cratons [3] also can be suggested.

[1] Akinin *et al*. (2013), *Petrology* **21**, 34-73. [2] Valley (2003), Rev. Min. Geochem. **53**, 343-385. [3] Rudnick and Gao (2003), Treatise in geochemistry **3**, 1-64.