Garnet metagabbro-ultramafic complexes in the Pekulney Range, northeast Russia: their age and geological significance

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The Pekulney Range stretches along E175^o from N65^o to N67^o in Chukotka, Northeast Russia. The Pekulney garnet metagabbro-ultramafic complex, 12 x 2 km in size, occurs as a fault-bounded sliver between the Middle Jurassic to Early Cretaceous accretionary complex (chert-basalt sequence) on the east and the Late Jurassic-Early Cretaceous island arc volcano-sedimentary rocks and the associated basalt-picrite melange on the west, and consists of three units: garnet metagabbro, spinel clinopyroxenite, and dunite-wehrlite-clinopyroxenite. The metagabbro is layered, and commonly bears large garnet grains of up to 10 cm in size, though plagioclase is completely altered to clinozoisite and pyroxene is mostly replaced by hornblende. The spinel clinopyroxenite is characterized by clinopyroxene containing up to 10 wt.% of Al_2O_3, and its aluminous spinel is mantled by garnet. This texture suggests cooling or burial from the Seiland facies to the ariegite facies. The dunite, wehrlite and olivine clinopyroxenite show conspicuous layering, contain chromian spinel, but are free from garnet. This complex, along with the associated smaller satellite bodies, may represent Moho level of the thick oceanic crust, and may be the largest of such deep-crust exposures among the circum-Pacific ophiolites such as Yakuno, Oeyama, Tonaru-Higashi Akaishi-Iratsu-Nikubuchi (Japan), Bikin (Russian Primorye) and Tonsina (Alaska). Although existing geochronological data (mainly from the associated gneisses) indicate Archean-Proterozoic ages for the Pekulney complex, we obtained Monazite CHIME ages of 236.7+/-8.6 Ma for garnet-biotite gneiss and 196+/-32 Ma for granodiorite. These ages correspond to Middle Triassic and Earliest Jurassic, respectively, and are older than that of hornblende K-Ar (154-168 Ma) and ^{40}Ar-^{39}Ar (175-180 Ma) ages of gabbros from the garnet metagabbro-bearing Tonsina Complex, Alaska. It is possible that the Pekulney complex was metamorphosed during the Permo-Triassic period.

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