Oral | Symbol S (Solid Earth Sciences) | S-MP Mineralogy & Petrology

[S-MP46_28PM2]Deformed rocks, Metamorphic rocks and Tectonics

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We invite all researchers who aim to understand the dynamics of the earth's crust and mantle at the plate boundaries, to discuss the latest results from various viewpoints. The scope will include contributions through petrology and structural geology as well as various techniques including rheology and transformation of heat and mass.

5:15 PM - 5:30 PM

[SMP46-P01_PG]Comparison of UHP chromitites from the Higo and Nishisonogi Metamorphic Rocks, Kyushu, Japan.

3-min talk in an oral session

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We have found microdiamond - bearing ultrahigh-pressure (UHP) chromitites from two metamorphic terranes in Kyushu: the Higo (HMR)[1] and Nishisonogi (NMR)[2] Metamorphic Rocks. This paper describes the similarity and difference between the two UHP chromitites. The HMR are located in west-central Kyushu with an E-W trend. They have undergone low P /T metamorphism, however, precursor HP or UHP metamorphism of ca. 250 Ma has been inferred[3]. The protoliths have affinity to continental shelf deposits[4], consisting mainly of pelitic gneisses and meta-carbonates with minor metabasites and metaperidotites (partly serpentinite). Chromitite occurs very rarely as a nodular form in serpentinized metaperidotites which shows spinifex-texture. The NMR is located in western Kyushu with a N-S trend. They have undergone high P /T metamorphism of epidote-blueschist subfacies. They consists mainly of pelitic and psammitic schists with minor basic schists and serpentinites, some of which show a character of serpentinite melange[5]. Detrital zircon from the pelitic schists show the age of 89-86 Ma[6], whereas zircon from jadeitites in a serpentinite melange does 136 -126 Ma in the core and 84 - 80 Ma in the rim[7,8]. Chromitite occurs as a deformed schlieren-like layer in serpentinite with no reilc minerals. The P-T condition of the HMR has been estimated to be 200 - 600 MPa and 600 - 800 ℃ [3,9,10,11,12,13]. Higher pressure and temperature conditions are reported from the following two samples: a sapphirine-bearing granulite[3,10] as a tectonic block in the spinifex-textured metaperidotite (900 MPa and 950 ℃) and a calc-silicate granulite[13] (900 MPa and 820 ℃) intercalating with garnet - biotite gneiss. We newly estimated the peak P-T condition of Al-spinel and chlorite -bearing metaperidotite as 2.0 GPa and 780 - 990 ℃. In the case of the NMR, the peak metamorphic condition of the crystalline schists is 1.4 GPa and 520 ℃ for a garnet galucophanite[14]. Jadeitites[15] as tectonic blocks in the serpentinite melange shows the peak condition of 1.5 GPa and 500 ℃. Chromite from the HMR has the composition $(Mg_{0.34}Fe^{2+}_{0.75}Mn_{0.02})(Cr_{0.81}Al_{0.06}Fe^{3+}_{0.04}Si_{0.05)2}O_4$, whereas that from the NMR has similar composition $(Mg_{0.33}Fe^{2+}_{0.65}Mn_{0.03})(Cr_{0.84}Al_{0.12}Fe^{3+}_{0.04})_2O_4$ in the core and Fe-rich composition $(Mg_{0.06}Fe^{2+}_{0.89}Zn_{0.02}Mn_{0.03})(Cr_{0.85}Al_{0.12}Fe^{3+}_{0.04})_2O_4$ in the rim. Microdiamonds occur as i*n situ* inclusions in chromite in both chromitites. They are 1 to 10 μ m in

size in HMR chromite, and those in NMR chromite is much smaller, mostly -1. NMR microdiamond, also shows a broad peak at 1331 cm^{-1} with graphite peak at around 1600 cm^{-1}, suggesting partial graphitization. Both UHP chromitites will be deep subduction origin. HMR can be an eastern extension of the Dabie-Sulu UHP terrane in China, however, NMR is more problematic. No corresponding UHP terrane of ca. 80Ma is found around Kyushu. Our findings of UHP chromitites require reexamination of micro-tectonics in Kyushu, a peculiar location of an arc-arc junction at the continental margin.References 1:Nishiyama et al., JpGU Meeting, S-MP46, 2014; 2: Nishiyama et al., JpGU Meeting, S-CG08, 2014; 3: Osanai, et al., Gondwana Res.,9, 152-166, 2006; 4: Omori and Isozaki, J.Geogr., 120, 40-51, 2011; 5: Nishiyama, Mem. Geol. Soc. Japan, 33, 237-257, 1989; 6: Kouchi, Y., J. Geogr., 120, 30-39, 2011; 7: Mori, et al., JMG, 29, 673-684, 2011; 8: Yui, et al., EJM., 24, 263-275, 2011; 9: Obata et al., Lithos, 32, 135-147, 1994; 10: Osanai et al., JMG., 16, 53-66, 199