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Partial melting of deeply subducted metasediment -discovery of the melting textures from the quartz bearing eclogite in

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Study of dehydration process of the subducting crust is important to understand the Island arc magmatism and recycling water to deep mantle. We have systematically done UHP experiments, petrology and geochemistry on natural UHP eclogites from the Kokchetav and Dabie-Sule UHP belts (Okamoto and Maruyama, 1999, 2004; Okamoto et al., 2000, 2006) . The results have suggested that decomposition of phengite would produce melt (or super critical fluid) in coesite and diamond stability depths. That is, migration of K-rich melt might be rather dominant in overlying mantle wedge in deep mantle. Quartz bearing eclogite from the Sanbagawa belt has been considered as subducted metasedimentary rocks down to upper mantle (e.g. Okamoto et al., 2004; Utsunomiya et al., 2011) . Recently we have discovered partial melting texture from the quartz bearing eclogite body in central Shikoku, Japan. The outcrop reveals that plagioclase-quartz rich veins in the eclogite. The veins contain large garnet overgrown with Fe-rich, red coloured rims. The sample was carefully collected and observed under microscope, SEM-EDS at Saitama Univ. and EPMA at Waseda Univ. Under BSE image, the eclogite exhibit well equilibrated texture consisted of garnet, clinopyroxene, phengite and quartz. Garnet has inclusion free core and rims. Ca content is high in the core, however, there is no chemical zonation in Fe, Mg and Fe/Mg ratio. Garnet from the melt portion suffered extensive brittle fractures and shows obvious zonal textures. In the core of the garnet, clinopyroxene, epidote, rutile and quartz are included. In the mantle, phengite is included and matrix quartz is included in the rims. There is no Ca variation from core to rims although there is an increase of Fe and Ti from core to rims. From these lines of evidence, we conclude that melt were produced due to decomposition of phengite with clinopyroxene and quartz. P-T estimates using phengite-garnet-clinopyroxene geothemobarometer give that P, T exceed 2.5 GPa, and 750 oC.

Keywords: Deep subduction zone, Metapelite, Eclogite, Partial melting