G123-013 **Room: 301B** **Time: May 16 13:45-14:00**

Developments of migmatites and role of viscous segregation in the Ryoke Metamorphic Complex in the Mikawa Plateau, Central Japan

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The Ryoke Metamorphic Complex in the Mikawa Plateau (RMC-M), central Japan, well preserves geological and thermal structures formed by Cretaceous high-T metamorphism. The apparent thickness of the RMC-M, which is measured perpendicular to schistosity, is about 10 km. Petrological estimation of P-T conditions of the RMC-M shows that pressure and temperature increases toward lower structural levels. The conditions of biotite, K-feldspar - sillimanite and garnet - cordierite zones are P = 2.9 - 3.7 kbar (D = 11-12 km) and T = 506 - 593 C, P = 3.7 - 4.3 kbar (D = 14-17 km) and T = 574 - 709 C, and P = 4.3 - 5.7 kbar (D = 17-22 km) and T = 715 - 801 C, respectively. Petrological estimated depth difference is consistent with the apparent thickness. The pervasive melt migration model explains these conditions and pervasive development of migmatites and sheet-like intrusions of gneissose granitoids at lower structural levels of the complex. Estimated flux is 3.57 x 10^-3 m^3/y/m^2, and duration is 5-10 m.y. U-Pb ages of migmatite in garnet-cordierite zone yield ca. 150, ca. 100, ca. 85 clusters. Age cluster around 150 Ma is obtained from leucosome and mesosome, and may represent youngest age of detritus zircon in protolith. Age cluster around 100 Ma is obtained form mesosome, and may represent overgrowth of zircon at amphibolite facies metamorphism. Age cluster around 85 Ma is obtained from leucosome, and represent precipitation of zircon form felsic melt. These age data suggest duration of high-T metamorphism is 10-20 m.y, and order of magnitude of the duration is the same as that estimated by the pervasive melt migration model. However, estimated flux of melt migration is much higher than that expected for compaction flow of felsic melt. Additional tectonic force and/or melt segregation to veins or layers which form network are required. The numerical results for simple shear deformation of immiscible viscous fluids show that less viscous fluids segregate to lenses and layers, and finally less viscous fluids segregate along moving plates. This segregation is a type of the viscous segregation, and takes place due to minimizing energy dissipation in the system. The energy dissipation is minimized when the lower viscosity component flow in the region of the highest shear. The rate of energy dissipation is proportional to viscosity. Therefore, this process is expected to occur universally in immiscible viscous fluids with large viscosity contrast, and is important to focusing of the melt in partially melted rocks. The textures produced by numerical simulation are similar to those of migmatites. Results of numerical simulation suggest that leucosomes distributed randomly in mesosomes will segregate to lenses or layers with progress of simple shear deformation. During the deformation enhanced segregation, melt network will be formed dynamically. If this process takes place at small to large scales in the high-T metamorphic complex, melt will effectively transport upward due to buoyancy force. Pervasive occurrences of migmatites at lower structural levels of high-T metamorphic complexes are possibly fossils of melt pathway formed by the deformation enhanced melt segregation.