G122-005 **Room: 202** **Time: May 20 11:45-12:00**

Metamorphic reaction and pattern formation: Evolution of curvature distribution of domain structure

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Metamorphic reactions widely occur in deeper part of the curst. Progress of metamorphic reaction should be affected by heterogeneity of metamorphic texture at microscopic scale. Reversely, metamorphic texture will be evolved by progress of metamorphic reaction. Therefore, there is a possibility that strong positive feedback exists between progress of metamorphic reaction and evolution of metamorphic textures. To confirm this idea, I evaluate metamorphic rock texture with curvature distribution of domain structure in metapelite from the Sanbagawa, Ryoke, and Shimanto metamorphic complexes.

Curvature distribution of quartz grains in the Shimanto metapelite has high frequency peak at positive value and bell-shape pattern. The high frequency peak corresponds to mean radius of quartz grains. On the other hand, curvature distributions of quartz-domains from the Sanbagawa and Ryoke metapelites have high frequency peak around zero value. Before metamorphism, the Sanbagawa and Ryoke metapelites also have very small quartz grains. Therefore, disappearance of large positive curvatures may be caused by progress of metamorphic reaction.

Using petrological estimation of P-T conditions, 1-sigma upper limits of curvature distributions of quartz grains and domains decrease with increasing metamorphic temperature. However, the rate of decreasing is not uniform. The 1-sigma upper limit drastically drops between 250 C and 350 C. This drastic drop may be explained by increasing of reaction and grain coarsening rates, which are controlled by dissolution and precipitation of minerals in H_2O-rich fluid. Using dissolution-precipitation and quartz grain-growth rates, activation energy of these reactions can be obtained and the values predict that these reaction rates drastically increase between 250 C and 350 C.

Curvature distributions of quartz-domains from the low- and high-grade Sanbagawa metapelites have high frequency peak at small negative value and positive skewness. On the other hand, those of Al-minerals have high frequency peak at positive position and negative skewness. These differences in curvature distributions show that spatial distribution of the Al-minerals forms cluster structures. Formation of the quartz-domain and Al-mineral cluster may characterize the high-pressure metapelites and enhance progress of metamorphic reaction.