Classification of quartzite pebbles based on the cathodoluminesence observation

Ken-ichiro Hisada[1], Ryoko Shimura[2], Kosei Komuro[3]

[1] Inst. Geosci., Univ. Tsukuba, [2] Earth Sci,Tsukuba Univ, [3] Geoscience, Tsukuba Univ

Classification of quartzite pebbles based on the cathodoluminesence observation

The cathodoluminesence microscopic observation is very useful to study the diagenesis of quartzose sandstone and the provenance for detrital quartz grains. In this study, we classified quartzite pebbles into five types based on the polarization-microscope and cathodoluminesence observations. These quartzite pebbles were collected from Yanbara and Akaiwa Formations of the Tetori Group and the Tomisawa Formation of the Somanakamura Group. Types 1, 2 and 3 are characterized by two steps overgrowth, presence of microstylolite and subgrain, and polygonal texture, respectively. These types can be regarded as a sequence of diagenetic stages, because the contact surface and deformation style of grains seem to represent the successive change. This is also supported by a line of evidence of the gradual diminishing in blue cathodoluminesence. Type 4 presents a nearly constant cathodoluminesence color and alignment of grains. Thus, types 1, 2 and 3, and type 4 are grouped into orthoquartzite and metaquartzite, respectively. Type 5 is due to hydrothermal process, because the zonal overgrowth is detected in a single grain.