

3D Shape Preferred Orientation(SPO) analysis of rigid grains at fault gouge using micro-CT in synchrotron

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In fault gouge, which is the result of fault activation in shallow deep environment, relatively rigid quartz, feldspar grains and ductile clay matrix are distributed. The rigid grains are rotated along a given shear in the ductile matrix and finally have a specific orientation. In this study, a micro-CT image of a fault gouge sample is taken using the 6C BMI beam line of the Pohang Accelerator Laboratory(PAL), and the process for measuring the direction of the major axis by identifying grains from the obtained 3D image is presented.

Many of the grains are oblique because they are samples taken from a natural fault gouge, and various methods can be applied in setting the major axis direction of the grains. In this study, three methods will be applied; mean Intercept(MIL), Star Length Distribution (SLD) and Star Volume Distribution (SVD). And we will compare the direction of major axis counted by direct hand on 2D image, with the result from automatic method to examine the reliability of the method. We derive the fault moving sense of the fault through the orientation of the major axis obtained in 3D, the size and aspect ratio of the grains to be investigated. Furthermore, it is expected that local analysis can be added by measuring a large number of samples of a wide fault zone and measuring the SPO.

Key Words: shape preferred orientation(SPO), fault moving sense, brittle fault zone,
3D- μ -CT imaging