

3D-Shape Preferred Orientation (SPO) Measurement Using Synchrotron μ -CT : Application for Estimation of Fault Moving Sense in Fault Gouge

HO SIM¹, YUNGOO SONG¹, JAEHUN KIM², EOM JI YANG³,
TAE SUP YUN³, JAE-HONG LIM⁴

¹Department of Earth System Sciences, Yonsei University, 50
Yonsei-ro, Seoul 120-749, Korea

²Department of Earth System Science, School of physical
Science, University of California, Irvine, Irvine, CA

³School of Civil and Environmental Engineering, Yonsei
University, 50 Yonsei-ro, Seoul 120-749, Korea

⁴Industrial Technology Convergence Center, Pohang
Accelerator Laboratory, 80 Jigokro-127-beongil, Nam-gu,
Pohang, Gyeongbuk 790-834, Korea

3D-Shape Preferred Orientation(SPO) measurement method of rigid grains using synchrotron μ -CT was newly developed. It was composed of oriented sampling, 3D μ -CT imaging, image filtering, ellipsoid fitting, and SPO measurement steps. After the CT imaging, all the processes are computerized and the directions of thousands of rigid grains in 3D-space can be measured automatically. This method is optimised for estimating the orientation of the silt-sized rigid grains in fault gouge, which generally indicates P-shear direction in a fault system. Since this method requires a small amount of sample, it can be suggested as an alternative to the study of fault systems where the shear sense indicators are poor in the outcrop and the fault gouge is less developed. We applied the newly developed 3D-SPO method for a fault system in the Yangsan fault, one of the major fault in the southeastern part of Korean Peninsular, and obtained the P-shear direction successfully.