Anisotropy of magnetic susceptibility of rock samples near a fault plane - an example from the Muikamachi fault zone -

Kazuki Sakurai[1]; Naoto Ishikawa[2]; Haeng Yoong Kim[3]

[1] Graduate School of Human and Environmental
Studies, Kyoto University
; [2] Graduate School of Human and Environmental Studies, Kyoto Univ.; [3] ERI, University of Tokyo

A trench excavation was carried out at the Ishiuchi site in the southern part of the Muikamachi fault zone. The Muikamachi fault zone is the reverse fault dipping to west, and strikes NNE-SSW along the boundary between the Uonuma hills and Muikamachi basin, Niigata Prefecture (Kim et al., 2006). The trench walls clearly displayed a main reverse fault with subordinate faults and a fold of strata caused by fault movements. For analyzing magnetic anisotropy of the deformed structure by fault movements, we obtained 192 sediment samples at 29 points on the trench walls using plastic cubes of 7cc. We will report results of measurements for anisotropy of magnetic susceptibility (AMS) mainly in this paper.

Measurements of AMS were performed on all samples using Kappabrige KLY-3S. For each sampling point, we averaged AMS data to get a mean AMS ellipsoid. According to the distance from the main fault plane to the points, that is, deformation features on the wall, the mean AMS ellipsoids showed different aspects. The values of corrected anisotropy degree (Pj) were about 1.04 for the points in a zone near the main fault plane, about 1.02 in the folding part, and about 1.01 in a zone away from the main fault plane. The magnetic anisotropy degree seems to reflect the degree of the deformation. In a zone away from the main fault, the maximum AMS axes pointed to SSW with nearly horizontal inclination, and the minimum and intermediate axes formed a girdle in a WNW-ESE vertical plane. The directional tendency of AMS axes may reflect a paleocurrent of the sediments. In a zone near the main fault plane, each of AMS axes was grouped well. The intermediate axes pointed to north and south with horizontal inclination, which were approximately parallel to the strike of the main fault, and the maximum axes crossed to the fault plane by about 25 degrees. This may be related to the arrangement of grains influenced by the fault movement. In the folding part, the minimum AMS axes pointed to east and west with horizontal inclination, and the maximum and intermediate axes formed a girdle in a N-S vertical plane. This might have been influenced by a E-W stress.