Relationship between AMS and strain in mudstone from the Muroto-hanto Group, Kochi Prefecture. Shikoku

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Understanding of the deformation system and strain distribution within the accretionary complex is very important to propose a model of the development of accretionary complex in order to have a quantitative understand of the inside processes such as fluid flow within the complex. In this study, Anisotropy of magnetic susceptibility (AMS) was measured for sedimentary rocks in the Shimanto belt distributed in Shikoku area, and the measured AMS fabrics were compared with deformation structures such as slaty cleavage.

The AMS-fabrics of the coherent sandstone and mudstone in the Susaki formation at Ryu-misaki located in the east end of Yokonami peninsula were measures as an example for AMS-fabric of non-deformed rocks. Results showed that the characteristic AMS ellipsoids of undeformed sedimentary fabric have oblate component with its minimum AMS axes oriented perpendicular to the bedding plane. On the other hand, AMS from the Muroto formation at Gyoto-misaki located in the west side of Muroto peninsula, where slaty cleavages are developed, the minimum AMS axes are not parallel to the orientation normal to the bedding planes, but are slightly rotated towards the orientation normal to the slaty cleavage. The bigger the difference of the directions between slaty cleavage plane and bedding planes, the minimum AMS axes rotated more to the poles of the slaty cleavage planes. This AMS-fabric may be affected by the deformation correlated with development of the cleavage planes. Strain analysis was made at every point where orientations of cleavage planes and bedding planes were measured. As for strain markers for the analysis, 11 to 15 AMS ellipsoids were used at each point. One of the principal directions of the strain ellipsoid was assumed to be the direction to the poles of the slaty cleavage planes. The calculated strain ellipsoids have oblate shape indicating that the deformation associated with the deformation of AMS ellipsoid was uniaxial shortening. This result is consistent with the result of strain analysis previously reported for different slate areas.

The strain analysis using AMS ellipsoids in this study yielded the shapes of the strain ellipsoids but not the magnitudes of them. Experimental studies using natural rock specimens to find the relationships between the magnitude of the AMS ellipsoids and that of the strain ellipsoids is desired to calculate the magnitude of the strain ellipsoids.