

Three-dimensional deformation of tectonic *mélange* indicated by slickenlines on foliation: An example from the Cretaceous Miyama Formation in the Kii Peninsula, Southwest Japan

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Tectonic *mélanges* composing accretionary prism have systematic shear structures and are considered as indicators of subducting directions of plates. The shear direction of the Cretaceous Miyama Formation, that is an underplated accretionary body composed of duplex horizons including chert, basalt and tectonic *mélanges* of sandstones and shales, has been revealed by composite planar fabrics. Hashimoto and Kimura (1999) concluded that sinistral senses of shear dominate the central area of the formation, whereas Tokiwa (2009) found dextral shear fabrics from westernmost and eastern areas. Although they assumed a uniform shear deformation of the Miyama Formation affected by plate subduction, we should confirm whether the deformation is spatially uniform or not. To investigate more detailed spatial change of shear directions, striation lineation on the cleavage developed in the matrices of tectonic *mélange* was used. Our study area is the westernmost part of that of Hashimoto and Kimura (1999) and its adjacent area. As a result, various slip directions from strike-slip to dip-slip were found and they were distributed three-dimensionally. Furthermore, in order to ascertain whether the deformation of the Miyama Formation is random or systematic in the context of movement of the plate boundary fault, deformation inversion analysis based on the model proposed by Twiss et al. (1991) was performed. According to this model, a complicated slip direction distribution can occur due to block rotation even under a uniform deformation. As a result of the inversion analysis of all the obtained slip direction data, it is impossible to explain the entire study area by a uniform deformation. Then, the same inversion analyses were applied to the slip directions for each duplex unit. As a result, it was found that the distribution of each unit can be explained by individual uniform deformation. It is considered that the difference reflects the deformation at the time of underplating.

Keywords: subduction, underplating, striation lineation, tectonic *mélange*, Miyama Formation, plate boundary