

Geochronologic and paleomagnetic constraints on the formation of the Neo syntaxis in central Japan

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Kilometer-scale folds with a north-trending hinge plane and a subvertical fold axis occur in the Mino belt (a Jurassic accretionary complex) in central Japan. A hypothesis based mainly on geologic structural observations (Kano et al., 1990; Kano, 2002) suggests that these folds were formed in the Miocene under a horizontal compressive force exerted by the collision between the Japan and the Izu-Bonin arcs, as well as by the clockwise rotation of the southwestern Japan arc associated with opening of the Japan Sea. To test this hypothesis, we have performed a radiometric and paleomagnetic analysis of an andesite dike in the eastern wing of the Neo syntaxis, a typical kilometer-scale fold occurring north of the Lake Biwa. The host rocks have a WNW structural trend, which is significantly different from a NE trend in the western wing of the syntaxis. A fresh holocrystalline portion of the andesite dike yielded a K-Ar groundmass age of about 19 Ma (18.82 +/- 0.46 Ma and 18.75 +/- 0.46 Ma, one-sigma error), indicating early Miocene emplacement. Detailed stepwise alternating-field and thermal demagnetization to rock specimens revealed a stable characteristic remanent magnetization component, and we obtained an ESE and down site-mean direction of $D = 118.8$, $I = 54.0$, $\alpha_{95} = 5.1$, suggesting large clockwise rotation. Comparison of this direction to the coeval paleomagnetic result from the western wing of the syntaxis (Takagawa and Hoshi, 2009) suggests that the syntaxis was formed after the acquisition of the remanent magnetization at about 19 Ma. Our paleomagnetic finding is compatible with the hypothesis that the kilometer-scale folds in the Mino belt including the Neo syntaxis developed in relation to Miocene plate tectonic events.

Keywords: Neo syntaxis, K-Ar dating, paleomagnetism, Mino belt, tectonics, central Japan