Three phases of deformation in the Mineoka ophiolite and their implications for the formation of the Mineoka belt

Yujiro Ogawa[1], Akiko Takahashi[2]

[1] Inst. Geoscience, Univ. Tsukuba, [2] Earth Evol. Sci. Univ. Tsukuba

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The Mineoka ophiolite is composed chiefly of Eocene oceanic rocks which were emplaced into the unique area between the Honshu and Izu two forearcs by means of convergent tectonics around the Boso TTT-triple junction during middle Miocene. Three deformation phases were verified within and between basaltic rocks based on careful mapping and observation in the two large basaltic rock blocks in the Kamogawa harbor area (Takahashi et al., 2003 GS London spec. Pub.; Ogawa & Takahashi, 2003 Tectonphysics). The first phase is faulting under hydrothermal activities, forming shear zones and breccciation with or without calcite or zeolite veining. Strike-slip and normal fault sense characterize this phase, probably attributed to the spreading ridge formation and transferring of faulting. The second phase is characterized by shear zones with Riedel shear without mineral vein between basaltic rocks (including dolerite dykes) of different chemical affinities. Faulting is mostly of strike-slip dominant oblique thrust, probably in a convergent type faulting cutting the whole region from the spreading ridge to island arc tholeiite. The Sofugan fault may be the present analogy. The third phase still continues at present as a forearc sliver fault zone formation, arranging all the different kinds of lithologies from ophiolite, Eocene to Miocene limestone/chert, middle Miocene alkali basalt, middle Miocene andesitic pumice fall deposits, middle Miocene serpentine sandstone, and other continental crust- (Honshu arc-) derived clasitic rocks. Only the ophiolitic rocks are strongly deformed and veined, and middle Miocene sedimentary rocks are only slightly indurated, strongly suggesting that the Mineoka belt firstly formed before middle Miocene deposition. Therefore, the landward obduction stage must be at some time of middle Miocene when the Boso triple junction came to the present area.