Accretion History of Basaltic Rocks of the Jurassic Northern Chichibu Accretionary Complex in the Kanto Mountains, Central Japan

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Basaltic rocks are widely distributed in the Jurassic accretionary complexes in the Japanese Islands. These rocks are regarded as fragments of ancient seamount or oceanic crust in the Panthalassa ocean. Previously, volcanic activities of oceanic seamounts and plateaux accreted to the Jurassic accretionary complex were reconstructed in the Jurassic accretionary complex of the Mino-Tamba Belt (e.g. Ichiyama et al., 2008, Lithos; Tatsumi et al., 2000, Geology). However, these studies mainly focused on specific tectonostratigraphic units containing large blocks of basaltic rock, and accretion history of basaltic rocks has not been fully discussed. In this study, we estimate the origin of basaltic rocks distributed in different tectonostratigraphic units with different accretion age in the Jurassic accretionary complex of the Northern Chichibu Belt, and reconstruct accretion history of the basaltic rocks.

The Northern Chichibu Belt in the Kanto Mountains are divided into the Kashiwagi, Kamiyoshida, Sumaizuku, and Hebiki (Yusugawa) units. The accretionary ages of these units are estimated to be Late Jurassic to Early Cretaceous, Middle Jurassic, Early to Middle Jurassic, and Early Jurassic, respectively (Matsuoka et al., 1998, Jour. Geol. Soci. Japan). The Kashiwagi Unit consists of pale green siliceous shale, while the other units are chaotic rock unit that consists of shale matrix with chert, basaltic rock, limestone, and sandstone blocks. The lower part of the Kamiyoshida Unit is dominated by basaltic rocks, while sandstone blocks are included in the upper part. The blocks in the Sumaizuku Unit are mainly basaltic rock and chert, and the unit includes huge limestone blocks of the Kano-yama, Futago-yama, and Hakuseki-san limestones. The blocks in the Hebiki Unit are dominated by sandstone. The basaltic rocks in the Kashiwagi and Kamiyoshida units are accompanied by limestone and contain Ti-augite phenocrysts. The basaltic rocks in these two units are discriminated as within-plate basalt (WPB) by bulk rock chemical composition. In contrast, the basaltic rock in the Sumaizuku Unit is accompanied by chert. The phenocrysts in the basaltic rock are composed of olivine, which are now replaced by chlorite. The chemical characteristics of the basaltic rock in the Sumaizuku Unit show both mid-ocean ridge basalt (MORB) and ocean island basalt (OIB) affinity. The occurrence of basaltic rock in the Hebiki Unit is limited but its chemical composition is similar to MORB.

These occurrence and geochemical evidences indicate that the basaltic rocks in the Kashiwagi and the Kamiyoshida units originated from OIB (=seamount). In contrast, the Sumaizuku and Hebiki units contain both OIB and MORB (=ocean floor). Compared with the previous studies of basaltic rocks in the Northern Chichibu belt, the Kamiyoshida Unit contains OIB (Fujinaga et al., 2006, *Resource Geol.*; Umeki & Sakakibara, 1998, Jour. Geol. Soci. Japan), while the Sumaizuku and Hebiki (Yusugawa) units includes MORB and OIB (Nozaki et al., 2005, Resource Geol.; Umeki & Sakakibara, 1998, Jour. Geol. Soci. Japan), implying that the relationships between the origins of basaltic rocks and the tectonostratigraphic unit division, are probably common characteristics of the Northern Chichibu Belt. Based on these characteristics of basaltic rocks and oceanic plate stratigraphy of each unit, accretion events of the basaltic rocks in the Northern Chichibu Belt are classified into three phases; 1) Ocean floor and seamount accretion in the Early to Middle Jurassic (the Sumaizuku and Hebiki units), 2) Carboniferous-Permian seamount accretion in the Middle Jurassic (the Kamiyoshida Unit), and 3) Triassic seamount accretion in the Late Jurassic to Early Cretaceous (the Kashiwagi Unit). This result contributes to understanding of volcanic activity in the Panthalassa ocean.

Keywords: Chichibu Belt, Jurassic Accretionary Complex, Ocean island basalt, Ocean floor basalt, Kanto Mountains

