

The Volcanic history of the Lower Cretaceous Kanaegaura Formation in Oshima Island, Kesenuma, south Kitakami belt, Japan.

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Tsuchiya et al., (1999) mentioned that the volcanic activity of the Lower Cretaceous igneous rocks in Kitakami belts begin with the intrusive rocks activity include high Mg andesitic rocks, and later begin the activity of adakitic plutonic and calc-alkaline to tholeiitic volcanic rocks. It is important to reveal to the volcanic history of these igneous rocks for elucidating tectonic setting of the Lower Cretaceous age. Kanaegaura Formation, consisting mainly of Lower Cretaceous volcanic rocks, are distributed in the Oshima Island Kesenuma, Japan. Sedimentary rocks of Upper Jurassic to Lower Cretaceous age are widely distributed in this area (Shiida, 1940; Onuki, 1956; Sato, 1958; Koube and Shimazu, 1961; Takahashi, 1973). Nara et al., (1994) mentioned that the Kanaegaura Formation rests unconformably upon the Isokusa and Nagasaki Formation of Valanginian age. However Tsuchiya et al., (1997) regarded Kanaegaura Formation has been formed almost contemporaneous to the sedimentation of the Isokusa and Nagasaki formations. This study presents the results of detailed studies of occurrence of the volcanic rocks in the Kanaegaura Formation.

The volcanic rocks of Kanaegaura Formation are divided into four units. Unit 1 is made up of epiclastic rocks consisting mainly of olivine augite basalts breccia, and the hornblende andesite breccia included only the lower part of epiclastic rocks. Irregular blocks of basaltic epiclastic rocks are included in black mudstone near the boundary between the unit 1 and the Isokusa Formation. The similar occurrences are shown in the mudstone near boundary of unit 1 and Nagasaki Formation. It regarded that the unit 1 has been formed almost contemporaneous to the sedimentation of the Isokusa and Nagasaki formations. Unit 2 consists of olivine augite basaltic rocks. The most of these rocks occurs as intrusive rocks but a part of these rocks occurs as lavas. The relationship between the other units remains unknown. Unit 3 consists of olivine augite basaltic to andesitic lava and olivine hypersthene augite andesitic lava. The olivine hypersthene augite andesite rarely has reaction rims of pigeonites around orthopyroxene. The basaltic lava in unit 3 is interstratified with two sedimentary formations. This occurrence shows that the volcanic activity of unit 3 has two periods of extinct. The mudstone of lower part of Yokonuma formation contains the andesitic breccia formed child margin. The basaltic lava of unit 3 and the Lower part of Yokonuma formation are regarded as of the same geologic age. Unit 4 consists of olivine augite basaltic lava. Almost lava formed hyaloclastites and a part of lava formed pillow structures. The mudstone of upper part of Yokonuma formation contains the basaltic breccias formed child margin. These occurrences suggest that the upper part of Yokonuma formation and basaltic lava of unit 4 are regarded as of the same geologic age.

Geochemical studies of Kanaegaura volcanic rocks show that the unit 1, 2 and 4 shows 48 to 52wt% SiO₂ contents, while unit 3 shows 52 to 60wt% SiO₂ content. The unit 4 characterized by higher in Mg, Cr, Ni, P₂O₅ and Zr contents than the basaltic rocks of other units in the Kanaegaura formation. These indicate that the origin of unit 4 is different from those of another units. It cannot explained as formed by fractional crystallization. The discrimination diagrams after Miyashiro (1974) shows that the volcanic rocks of Kanaegaura Formation are tholeiitic series. Shimazu(1979) mentioned that these basaltic rocks are alkaline basaltic series. But the presence of pigeonites in olivine orthopyroxene augite andesites of unit 3 support that these volcanic rocks are tholeiitic series.