

Geological provenance based on detrital chromian spinels from the Lower Cretaceous in the Kurosegawa Belt, SW Japan

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The Lower Cretaceous sediments in the Kurosegawa Belt are characterized by different lithofacies, stratigraphy and fauna. In particular, a part of molluscan fossil assemblages can be divided into northern and southern types. The main cause of the difference has been discussed and are divided into the following two hypotheses. One is that different fossil assemblages was caused by gap of latitude, and large scale strike-slip fault moved after the deposition of the Lower Cretaceous (e.g. Tashiro, 1994). On the other hand, the other is that the main cause was due to deferent ocean currents from northward and southward (e.g. Matsukawa and Tsuneoka, 1993). The latter interpreted that sedimentary environment of the Lower Cretaceous sediments was not so much different from the present, while the former was assumed that large scale strike-slip fault moved after the deposition of the Lower Cretaceous sediments. Thus, the former and the latter differ in the interpretation of the paleogeography during the Early Cretaceous. However, there is a limit in the estimation of the paleogeography only with conventional approach using bivalve fauna.

The Lower Cretaceous of the Kurosegawa Belt divided into following four groups; the Monobegawa, Nankai, Pre-Sotoizumi and "Nankai" groups. The Monobegawa and Nankai groups yield the northern and southern type molluscan fauna, respectively. Meanwhile, the Pre-Sotoizumi and Nankai groups yield mixed northern/southern type molluscan fauna. On the paleobiogeography, it is considered that the Monobegawa basin was in an area relatively higher in latitude than the Nankai basin, and the Pre-Sotoizumi and "Nankai" basin was in an intermediate position between the others two. Therefore, they made arrangement in a row in order of the Monobegawa, Pre-Sotoizumi/"Nankai" and Nankai basins from high- to low-latitude areas along the eastern margin of the Asian continent.

Chromian spinels are an important component mineral of serpentinite and peridotite. Since the Kurosegawa Belt consists mainly of serpentinite mélangé. If detrital chromian spinels would be found in clastic rocks, it can be expected that the mafic-ultramafic rocks occurred nearby as a source rock. Thus, the mafic-ultramafic rocks might be probably brought up as a part of serpentinite mélangé. In this case, serpentinite mélangé might play the tectonic role of large scale strike-slip faulting. In this study, we describe newly found detrital chromian spinels from the Lower Cretaceous sediments in western and eastern Kyushu, SW Japan, and discuss their paleogeography.

In this study, it is confirmed that detrital chromian spinels occurred from the Monobegawa, Nankai and Pre-Sotoizumi groups in the Oita and Kumamoto Prefectures, western and eastern Kyushu. The chemistry of most of spinels are very similar to those from serpentinite in the Kurosegawa Belt (low Ti, Cr#=0.5-0.7). In addition, some chromian spinels coming from island arc basalt (high Ti, high YFe³⁺) were obtained in the Pre-Sotoizumi sandstones. Therefore, considering paleobiogeography based the molluscan fauna analysis and occurrence of detrital chromian spinels, it might be concluded that the Lower Cretaceous deposited in each basin making North-South arrangement in a row was transferred into the present position by the sinistral displacement along the mélangé zone in the Kurosegawa Belt after the Cretaceous.

Keywords: Kurosegawa Belt, detrital chromian spinels, Lower Cretaceous sediments, Monobegawa Group, Nankai Group, Pre-Sotoizumi Group

