

The First Results of Detrital Zircon U-Pb Dating from the Late Cretaceous-Paleogene Sandstones in the Nemuro Belt Complex, Eastern Hokkaido: Implication for the Late Cretaceous Evolution of the Paleo-Kuril Arc in the NW Pacific Region

*Harisma Harisma¹, Hajime Naruse¹, Takafumi Hirata², Hisashi Asanuma²

1. Kyoto University, 2. The University of Tokyo

The Nemuro Belt is a tectonic belt of the Paleo-Kuril Arc system, the North Western Pacific region. The evolutionary history of the Paleo-Kuril Arc, especially of the Nemuro Belt complex, remains enigmatic. The Paleo-Kuril Arc was considered to have developed as an intra-oceanic island arc system between Izanagi (or Kura) and Pacific Plates in the Late Cretaceous. This island arc has been estimated to have moved northward at the end of the Cretaceous, collided with Eurasian Plate in the Eocene, and finally moved southward by a dextral slip to its present position in the Cenozoic. However, this study suggests that the Paleo-Kuril Arc was a volcanic arc in the continental margin from the beginning of its formation. In order to identify the origin of the Nemuro Belt during the Late Cretaceous, we present the first detrital zircon U-Pb dating (LA-ICP-MS) from the Nemuro Belt complex, involving the Nemuro and Urahoro Groups. The results of detrital zircons of U-Pb dating from ten sandstone samples showed two types of age distributions. Type 1 signature is characterized by multimodal age distributions with peaks at ca. 1.9-1.8 Ga, 350-345 Ma, 175-165 Ma, and 90-80 Ma, and was observed in the Late Cretaceous sandstones of the Nemuro Group. Type 2 signature is characterized by unimodal age distribution with range of peaks from 62 to 52 Ma, and was observed from Paleogene sandstones of the Nemuro and Urahoro Groups. These different signatures indicate a provenance transition from multiple to single source regions at the period between the Late Cretaceous to Paleogene. The presence of Precambrian zircons in the sandstone Type 1 suggests that the Paleo-Kuril Arc should have been connected with the Eurasian continental margin in the Late Cretaceous. The arc system was isolated from provenance in the continental margin at Paleocene, which could be associated with dextral movement of the system along the Hidaka Shear Zone. Therefore, the Paleo-Kuril Arc was not originated as an intra-oceanic arc in the Pacific Ocean as previously assumed. This study constrains the evolution of the Paleo-Kuril Arc system, and it is implied that the plate kinematic reconstruction in the North Western Pacific region should be largely reconsidered.

Keywords: Paleo-Kuril Arc, Nemuro Belt, Late Cretaceous, Sandstone