Origin and tectonic evolution of the accretionary complex in central and north-central Mongolia

*Tetsuya Ueda[1], Shigeru Otoh[1], Tatsuya Fujimoto[1], Yoshikazu Kouchi[1], Koshi Yamamoto[2]

1.Graduate School of Science and Engineering for Education, University of Toyama, 2.Graduate School of Department of Earth and Environmental Studies, Nagoya University

Introduction We aim to clarify the origin and tectonic evolution of accretionary complexes (ACs) in central and north-central Mongolia. **Geologic setting** **North-central Mongolia (NCM)** consists of the following three terranes: the **Haraa** and **Bayangol terranes** consisting of an AC and minor volcaniclastic cover rocks of Early Paleozoic times, and the **Khentei terrane** consisting of an AC and shallow-marine cover of Middle Paleozoic to Early Mesozoic times. The Khentei AC strikes NE and dips to N. The pelagic chert of the AC yields Late Silurian and Early-Late Devonian microfossils (Kurihara et al., 2009). The overlying Lower Carboniferous mudstone yields brachiopods, and the Middle-Upper Permian Urmegtei formation is a periglacial formation. **Central Mongolia (CM)** consists of the following two terranes: the **Zag terrane** consisting mainly of Early Paleozoic crystalline schists, and the **Khangai terrane** consisting of an AC and terrestrial cover. The terranes of CM and NCM are separated by a sinistral shear zone, whereas the boundary between the Zag and Khangai terranes trends NWN and dips N. A NWN-trending syncline runs in the middle of the Khangai terrane, where plant-bearing Carboniferous sediments with horizontal conglomerate occur with andesite pebbles. The Carboniferous sediments are thus terrestrial sediments. The Zag terrane collided with the terranes on the south in Permo-Triassic times (Jian et al., 2010). **Method** We extracted detrital zircons from 21 sandstone samples of the AC and terrestrial sediments: from the Khentei (8 samples), Haraa (5), Bayangol (2), Khangai (5), and Zag (1) terranes. We then measured their U-Pb ages with the LA-ICP-MS equipped in the Graduate School of Environmental Studies, Nagoya University. **Results** We recognized two types of detrital-zircon-age spectra. One was a multimodal pattern with small peaks at 420-650 Ma, 700-1000 Ma, 1600-2200 Ma, and 2300-2700 Ma and had 75 % or more Precambrian zircons. Three samples from the upper part of the AC in NCM and the Zag terrane showed this pattern. The other was a unimodal pattern with the youngest peaks (YP) between the Devonian and the Early Permian and has virtually no Precambrian zircons, indicative of an island-arc setting. The Khangai terrane and lower part of the AC in NCM, and the terrestrial sediments in CM showed this pattern (17 samples). **Discussion** We assumed, from the volcaniclastic nature of most of the sandstone samples, that the YP of the spectrum is the depositional age (DA) of each sample (YP of meta-samples is the upper limit of the DA because of the absence of volcaniclasts). The DA of the multimodal-type sandstone clustered at 526-426 Ma, whereas those of the unimodal-type sandstone clustered at 409-374 Ma (Early Devonian), 358-332 Ma (Early Carboniferous), and 304-259 Ma (Early Permian). Moreover, the DA clearly showed a downward-younging polarity in the **Khangai Terrane of CM** and **NCM**. Moreover, the older interval in the DA (374-348 Ma) and the hiatus of Paleozoic igneous activity in the Tuva-Mongol Massif (385-350 Ma) roughly coincide with each other. These facts indicate that the studied AC intermittently grew downwards in front of the Tuva-Mongol Massif. The Zag sample is similar with the Cambro-Silurian sediments in NCM and contained Pan-African (550-750 Ma) zircons, indicative of their derivation from Gondwana. In particular, the zircon-age spectrum of the Cambo-Ordovician sandstone of the Kufra Basin in the Saharan Metacraton has a close affinity with the multimodal-type of NCM. The YP of the terrestrial sediments (322 Ma) indicates that CM became land by early Carboniferous, and the later collision of the Zag and southern terranes produced the syncline of CM.

Keywords: U-Pb age, (detrital) zircon, LA-ICP-MS, Gondwana continent, Paleozoic

