

Zircon U-Pb geochronology of Onogawa-Izumi Group and related geological units

Takuya Harada¹, Yoshikazu Kouchi¹, Yoshimi Hayashi², Minami Murakami¹, Ikeda Takuji¹, *Mitsuhiro Nagata¹, Koshi Yamamoto³, Shigeru Otoh¹

1. Graduate School of Science and Engineering for Education, University of Toyama, 2. Development of Earth sciences, Faculty of Science, University of Toyama, 3. Development of Earth and Planetary sciences, Graduate School of Environmental Studies, Nagoya University

INTRODUCTION: Upper Cretaceous strata widely occur in Japan: e.g. the Yezo Group (Gp) in Hokkaido, Kuji Gp in the Kitakami Belt of NE Honshu, Onogawa-Izumi Gp in the Inner Zone of SW Japan (IZSWJ), and Himenoura Gp in the IZSWJ in Kyushu. Among them, the Izumi Gp narrowly occurs along the Median Tectonic Line (MTL) and has eastward-younging age polarity, suggesting that the group has filled a series of strike-slip basins along the MTL (e.g., Taira et al., 1981; Miyata, 1990). The Onogawa Gp along the MTL in Kyushu, having similar lithology and geologic structure with the Izumi Gp, is assumed to be a western extension of the Izumi Gp (Yamakita et al., 1995). We obtained the detrital-zircon-age spectra of these strata to discuss their tectonic setting and Late Cretaceous tectonics.

MATERIALS: We obtained detrital-zircon-age spectra of 13 sandstone samples from the following geologic units: Hakobuchi Formation (Fm) of Yezo Gp, Kunitan Fm of Kuji Gp, Izumi Gp (3 from Shikoku, 1 from Awaji Island, 2 from the Kii Peninsula), Inukai Fm of Onogawa Gp, Hamasato, Hinoshima, and Amura formations of Himenoura Gp, and Mitsuse Fm in W Kyushu. The detrital and igneous zircons from related geologic units were also measured: Sanbagawa Metamorphic Rocks, Usuki Granodiorite and Shonoharu Metamorphic Rocks in E Kyushu, and Nagasaki Metamorphic Rocks.

RESULTS: We separated zircons from rock samples and measured the U-Pb isotopic ratios of each grain on the LA-ICP-MS equipped in the Graduate School of Environmental Studies of Nagoya University. The results are summarized in Fig. 1.

Hakobuchi Fm: Cretaceous zircons (mainly 85-75 Ma) were more than 80% and Paleoproterozoic zircons were rare.

Kunitan Fm: Cretaceous zircons (140-80 Ma) were more than 70% and Paleoproterozoic zircons were about 20%.

Onogawa-Izumi Gp: The age of the youngest zircon becomes younger towards east: 81 Ma (Inukai Fm), 76 Ma (W Shikoku), 72 Ma (east-central Shikoku), 72 Ma (E Shikoku), 71 Ma (Awaji Island), 70 Ma (W Kii Peninsula), and 68 Ma (central Kii Peninsula). The Inukai Fm of the Onogawa Gp contains Cretaceous (95 Ma, 105 Ma; 50%) and Permian (30%) zircons.

Hinoshima Fm: Cretaceous zircons (95-85 Ma) were more than 60%.

Amura Fm: Cretaceous zircons (85-80 Ma) were more than 60%.

Hamasato Fm: Cretaceous zircons were less than 20%, and both Jurassic and Paleoproterozoic zircons were around 30%.

Mitsuse Fm: Cretaceous zircons (85-75 Ma) were around 50% and Paleoproterozoic zircons were a little less than 40%.

DISCUSSION: The hinterlands of most of the Upper Cretaceous strata of Japan were likely close to the present-day Japan, because many Late Cretaceous (90-66 Ma) igneous rock bodies occur in the southeastern part of the Korean Peninsula (e.g., Sagong et al., 2005) and the Sea-of-Japan side of Japan (e.g., Iida et al., 2015). Moreover, Jurassic and Paleoproterozoic igneous rocks are widely distributed in the Korean Peninsula (e.g., Kim et al., 2014, 2015). The age of Late Cretaceous zircons in the Izumi Gp coincides with that of the igneous rocks in the IZSWJ (from E Kyushu to the central Kii Peninsula). The detrital zircons in the Onogawa Gp, lacking in Paleoproterozoic ones,

could have been supplied from nearby hinterland where geologic units with few Paleoproterozoic zircons (Suo Metamorphic Rocks, Usukigawa Granodiorite) are distributed. The eastward-younging age polarity of the youngest zircons in the Izumi Gp coincides with the age-polarity clarified by fossils, indicating that the Izumi Gp filled a series of pull-apart basins.

Keywords: Zircon, U-Pb age, Cretaceous, sedimentary rock, metamorphic rock, hinterland

