

U-Pb zircon ages of the Nakanogawa Group in the southern Hidaka Belt, northern Japan: Implications for its depositional age and provenance

*Futoshi Nanayama¹, Yutaka Takahashi¹, Toru Yamasaki¹, Mitsuru Nakagawa¹, Hideki Iwano², Tohru Danhara², Takafumi Hirata³

1. Geological Survey of Japan, AIST, 2. Kyoto Fission-Track Co. Ltd., 3. University of Tokyo

We measured zircon U-Pb ages of the Nakanogawa Group in the Hidaka Belt, Hokkaido to estimate its depositional age and to investigate the development of the Paleo-Japan and Paleo-Kuril arc trench systems in the Hokkaido Central Belt, northeast Japan. Two acidic tuff samples from both the top and bottom horizons and two turbidite sandstone samples were used. The depositional age of the base of the Nakanogawa Group was determined to be 57 Ma by date of homogeneous zircon from acidic tuff. On the other hand, the youngest zircon groups indicated 55 Ma for sandstone from the upper part and 58 Ma for acidic tuff from the uppermost part, both of which are significantly older than the published zircon fission-track ages (50–48 Ma). This inconsistency probably resulted from U-Pb ages of detrital (reworked) grains, therefore these showed the maximum depositional ages. We estimate the depositional age of the Nakanogawa Group between 57–48 Ma. The resulting U-Pb age distribution of all data from the Nakanogawa Group has most of ages clustering younger than 80 Ma with a main peak at 60 Ma. This implies volcanic activities had occurred mainly after 80 Ma around Hokkaido. We also found some older grains dated to be 120–80 Ma, 180–140 Ma, 240–220 Ma, 340–320 Ma and much older (2.6 and 1.8 Ga), giving an information about the provenance of the Hidaka Belt. We also infer that the Nakanogawa Group is the protolith of the upper sequence of the Hidaka metamorphic rocks. Therefore, the depositional age of the upper sequence is the same as the depositional age of the Nakanogawa Group between 57–48 Ma.

This work was supported by JSPS KAKENHI Grant-in-Aid for Scientific Research (C) Number 16K05585.

Keywords: Depositional age, U-Pb dating, LA-ICP-MS, Nakanogawa Group, Hidaka Belt