

Examination of hinterland based on clastic rock composition and zircon U-Pb age in the Nikoro Group, Tokoro Belt

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The Tokoro Belt in eastern Hokkaido consists of accretionary complexes of the Cretaceous Nikoro Group and the Paleogene Yubetsu Group, and the overlying forearc basin sediments of the Late Cretaceous Saroma Group. It is widely accepted that the Tokoro belt rocks were formed along the southern margin of the Sea of Okhotsk. Although the Sea of Okhotsk occupies a large portion of NW Pacific and is important to make a comprehensive oceanic plate reconstruction, component and origin of its submerged crust has not been well understood. In this paper we present clastic composition and detrital zircon age of the Nikoro Group clastic rocks, which were supplied from the crust of the Sea of Okhotsk.

The Nikoro Group consists of basalt, chert, limestone, red mudstone and volcanolithic sandstone. We divided the group in western parts of the belt into clastic-dominant Unit I and basalt-dominant Unit II. Unit I is an imbricate stack of sedimentary sequences from chert to mudstone and sandstone. Unit II is a structural pile dominantly of basalt and chert.

Sandstones in the Nikoro Group are lithic wacke composed of volcanic rock fragments as well as plagioclase and clinopyroxene particles. Both chemical composition of volcanic rock fragments and detrital clinopyroxene suggest clastic supply from a volcanic arc.

Zircons extracted from a trachyte yielded ~152 Ma [u1] age suggesting the age of subducted oceanic crust. Detrital zircons from sandstone range from 80 to 154 Ma. A tonalite lens in sheared red mudstone yielded zircons of ~147 Ma, implying that the adjacent crust was juvenile rather than cratonic.

Precambrian zircons first appear in the Paleocene sandstone of the Yubetsu Group. In the Nikoro Group and Saroma Group sandstones, detrital zircons are quite scarce, and no Paleozoic or Precambrian zircon is so far found.

The clastic composition and detrital zircons ages are in general agreement with dredged volcanic and plutonic rocks from the Sea of Okhotsk floor. Since no zircons older than Jurassic are found, and no dredged rocks older than Triassic has been reported, the Sea of Okhotsk crust probably originated from Mesozoic island arc rather than a continental arc or rifted continental margin.

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