

U-Pb geochronology of detrital zircons from the Lower Cretaceous formations of the Chichibu-Shimanto belts, SW Japan

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Introduction The Japanese Islands record signs of Cretaceous igneous activity and crustal movements. To decode the Cretaceous tectonic evolution, we have started the provenance analysis of the Lower Cretaceous formations in the Chichibu-Shimanto belts from detrital-zircon-age spectra.

Samples

Northern Chichibu Belt:

Sebayashi Formation (Fm.) (01) and Sanyama Fm. (02) of the Sanchu Cretaceous; Idaira Fm. (03); Ryoseki Fm. (04), Monobe Fm. (05), Yunoki Fm. (06), and Hibihara Fm. (07) of the Monobegawa Group; Haidateyama Fm. (08)

Kurosegawa Tectonic Belt:

Birafu Fm. (09), Funadani Fm. (10), and Hagino Fm. (11) of the Nankai Group; Yamabu Fm. (12)

Southern Chichibu Belt: Torinosu Group (13)

Shimanto Belt: Doganaro Fm. (14)

Results We measured the U-Pb age of zircons with the LA-ICPMS equipped in the Graduate School of Environmental Studies, Nagoya University. We discriminated three patterns of detrital-zircon-age spectra.

Pattern I contains some 70% of Early Cretaceous zircons (02 and 07).

Pattern II contains more than 40% of Jurassic zircons and minor (15%) Early Cretaceous zircons (01, 05, 06, 09, and 11).

Pattern III contains some 70 % of Permo-Triassic zircons (03, 04, and 08).

Pattern IV contains all the remaining spectra (10, 12, and 14). See the attached figure for details.

Age distribution of igneous rocks in East Asia

Paleoproterozoic: Widely in the North China Block and Korean Peninsula; sporadically in the South China Block.

Permian: Hainan Province in SE China to the Malay Peninsula and the Maizuru and Akiyoshi Belts in SW Japan.

Triassic: Western Guangdong and Hunan provinces in SE China, Northeast China, the Korean Peninsula, and Hida-Hida Gaien Belts in SE Japan.

Jurassic: Northeastern to eastern Guangdong Province, Northeast China, and the Korean Peninsula.

Early Cretaceous: (140-120 Ma) Part of Guangdong Province and Anhui-Zhejiang provinces in China, and Kitakami Mountains in NE Japan; (120-110 Ma) Zhejiang Province and Kitakami Mountains; (110-90 Ma) Zhejiang-Fujian-Guangdong coast and the Abukuma and a part of the Higo-Ryoke belts in Japan.

Provenance analysis The 158-110 Ma magmatic hiatus in Korea (Sagong *et al.*, 2005 *Tectonics*) precludes the Korean Peninsula from the provenance of the sandstone with Early Cretaceous zircons. The pattern I spectrum indicates the deposition **near the Zhejiang Province** with abundant Early Cretaceous (120-110 Ma) igneous rocks.

The pattern II spectrum indicates the deposition **near the Guangdong-Fujian provinces** with abundant Jurassic and minor Early Cretaceous (130-120 Ma) plutons.

Among the pattern IV samples, the provenance of 10 and 12 was likely the Guangdong-Hainan coast, because the two samples contained Permian to Jurassic zircons. For sample 13, the inclusion of 48% Paleoproterozoic zircons likely indicates its deposition near the **Korean Peninsula**, although the derivation of Jurassic zircons (34%) from the **Guangdong Province** cannot be ruled out.

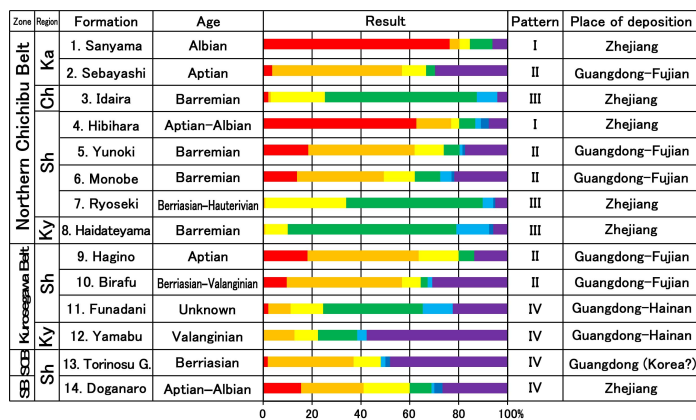
In the pattern III spectrum, on the other hand, only Permian (270-240 Ma) peak predominated. However, there is no place in and around China where Permian igneous rocks predominate. We propose that the Permian zircons in pattern III were originated from the Permian sandstones in the accretionary complex (AC) of the Northern Chichibu Belt, because 1) the Ryoseki Fm. unconformably covers the Permian AC (Yamakita, 1998 *JGSJ*) and the clasts in the Monobegawa Group were likely supplied from the AC (Matsukawa and Tsuneoka, 1993 *Mem. GSI*), and 2) the sandstone in the Permian AC contains abundant Permian zircons (Morita, 2012 *JpGU*). Moreover, the Idaira Fm. (03) of pattern III contains small amounts of 120 Ma zircons, suggesting that the Permian AC was in front of the Early Cretaceous igneous rocks of the **Zhejiang Province**.

Keywords: U-Pb age, detrital zircon, LA-ICP-MS, SW Japan, Lower Cretaceous

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SCB: Southern Chichibu Belt, SB: Shimanto Belt, Ka: Kanto region, Ch: Chubu region, Sh: Shikoku region, Ky: Kyushu region
 ■ Cretaceous ■ Jurassic ■ Triassic ■ Permian ■ 540-300 Ma ■ 1600-540 Ma ■ -1600 Ma