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Detrital zircon Fission-Track analysis from accretionary complex in the Nankai Trough, Japan

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We applied fission-track dating on detrital zircons separated from folded turbiditic sediments of the accretionary complex in the Nankai trough, off Southwest Japan. We succeeded to separate fractions with different ages from zircon populations (Table 1): Pliocene ~ Latest Messinian (2.3 ~ 5.4 Ma), Middle Miocene (12.5 ~ 15.2 Ma), Middle Eocene (50.9 ~ 53.3 Ma), Cretaceous (69.1 ~ 130 Ma) and older ages (>200 Ma). The fraction with the youngest ages approximates the age of deposition. Middle Miocene ages correspond the Miocene volcani-plutonic activities in the Outer Zone of Southwest Japan and the Middle Eocene ages coincide with depositional age of the Southern Shimanto Group. The fraction with Cretaceous ages could be derived from the Northern Shimanto Group, or rocks of the Ryoke and/or Sanbagawa belts. Proportion of age groups differs from place to place. Eighty-nine percent of zircon crystals separated from samples in the landward-most ridge nearby the splay fault were of the Middle Miocene to Pliocene fractions. In contrast, a sample from a seaward ridge contains only 60 % of zircon population that classified to the Middle Miocene to Pliocene fractions. We attribute this contrast to different depositional environment. The latter sediments must have deposited in a trench environment where terrigenous fragments were continuously supplied from rapid uplift zone in Central Japan through axial channel of the Suruga - Nankai trough system or through the Tenryu submarine canyon. The former sediments must have deposited in a trench-slope basin isolated from input of deeply dissected arc. Recycling of sediments on the trench-slope must have played important roles on deposition and accretion of sediments in the accretionary complex of the Nankai trough (Fig. 1).

Table 1: Distribution of fission-track ages of clastic zircons

Session/ Sample	Grains	Range of distribution (Ma)	Group A	Group B	Group C	Group D	Group E
1-1. 6K#891R2	30	6 ~ 125	n.d.	13.0 ± 0.8 Ma (76 %)	50.9 ± 6.6 Ma (17 %)	116 ± 19 Ma (7 %)	n.d.
1-2. 6K#579R4	30	6 ~ 77	n.d.	13.7 ± 1.0 Ma (90 %)	69.1 ± 7.3 Ma (10 %)	n.d.	n.d.
1-3. 6K#889R4	30	3 ~ 27	3.1 ± 0.6 Ma (20 %)	12.5 ± 0.7 Ma (80 %)	n.d.	n.d.	n.d.
2-1. 6K#889R4	132	0 ~ 197	3.8 ± 0.3 Ma (23 %)	12.9 ± 0.5 Ma (73 %)	53.3 ± 9.8 Ma (2 %)	130 ± 28 Ma (2 %)	n.d.
1-4. 6K#890R3	30	5 ~ 90	5.4 ± 1.4 Ma (10 %)	15.1 ± 0.8 Ma (80 %)	n.d.	82.5 ± 11.9 Ma (10 %)	n.d.
1-5. 6K#890R4	30	3 ~ 72	2.8 ± 1.5 Ma (7 %)	12.5 ± 0.8 Ma (83 %)	52.7 ± 5.8 Ma (10 %)	n.d.	n.d.
1-6. 6K#522R2	30	1 ~ 381	2.3 ± 0.7 Ma (20 %)	15.2 ± 1.1 Ma (40 %)	n.d.	86.3 ± 7.4 Ma (33 %)	296 ± 98 Ma (7 %)
2-2. 6K#522R2	73	0 ~ 350	3.5 ± 0.6 Ma (22 %)	16.4 ± 0.9 Ma (47 %)	n.d.	80.7 ± 5.3 Ma (30 %)	349 ± 162 Ma (1 %)

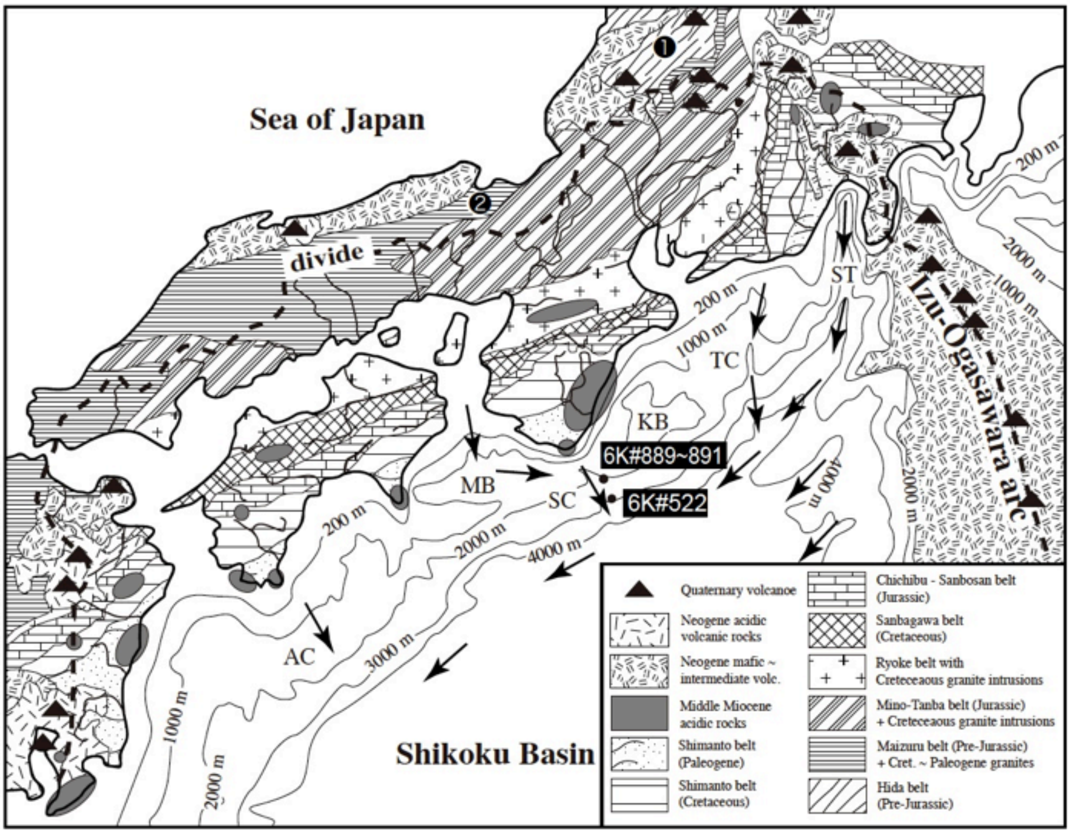

Fig. 1. Sediment inputs (arrows) and sample locations (solid circles)