

Structural geology and tectonic evolution of major fault zones

Kinematic analyses of fault rocks and fault movement history
Tectonic evolution of the Median Tectonic Line, Southwest Japan
Paleostress analysis using healed and sealed microcracks in quartz



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 Doctor of Science

"I am a structural geologist with interests in the tectonic evolution of the Median Tectonic Line, the largest fault dividing paired metamorphic belt in Japan. I perform kinematic analysis using shear-sense indicators, radiogenic dating of fault gouges, and pseudotachylyte and paleostress analyses. Other interests include a wide area of topics in geology and structures and the promotion of geology for public awareness through the activities of the Geological Society of Japan."

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RESEARCH KEYWORDS

- Kinematic analysis of fault rocks and fault movement history
- Tectonic evolution of the Median Tectonic Line, Southwest Japan
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AWARDS

1986 | The Geological Society of Japan Young Scientist Award

BOOKS / PAPERS

- Earth, Environment and Resources, Kyoritsu Shuppan 2008
- Dating of fault gouges from major active faults in Southwest Japan. AAPG Memoir, 85, 2005.
- Restoration of exotic terranes along the Median Tectonic Line, Japanese Islands: overview, Gondwana Research, 6, 2003.

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Kinematic analysis of fault rocks has been performed using shear sense indicators for oriented rock samples. The analyzed faults include the major faults in Japan, including the Median Tectonic Line, Tanagura Tectonic Line, Hatagawa Fault, and Asuke Shear Zone and extending abroad to the Ailao-Shan shear zone, Yunnan, China, and the Main Central Thrust in Langtang, Nepal. Fault movement history is primarily determined using radiogenic dating techniques, including K-Ar dating of fault gouges and fission-track zircon dating of pseudotachylytes, especially from the Median Tectonic Line and the Atotsugawa Fault. Fission-track dating of pseudotachylytes is a major ongoing research project.

The tectonic evolution of the Median Tectonic Line has been discussed not just on the basis of kinematic analyses and age dating mentioned above, but also structural analyses of paired metamorphic belts, especially the Sambagawa belt (high-P metamorphic belt) where nappe structures have developed. The main region for research on nappe structures is the Kanto Mountains. The Paleo-Ryoke terrane overlying the Sambagawa metamorphic rock layer is a primary research focus.

Paleostress analysis using healed and sealed microcracks in quartz grains in granitic rocks was recently done for Ryoke granitic rocks along the Median Tectonic Line and for late Miocene granitic rocks (e.g., Tanzawa tonalite) at the site of the arc-arc collision zone in central Japan. The main focus of this analyses is also related to the tectonic evolution of the Median Tectonic Line, which was bent anticlockwise by the above arc-arc collision.



Outcrop of the Median Tectonic Line (MTL) along the Aoki River at Anko, Oshika Village, Nagano Prefecture. Three black gouge zones are visible. The boundary between the rightmost black gouge and its right side greenish rock is the MTL, the boundary between fractured and highly altered Ryoke mylonitized granitic rocks and the Sambagawa metamorphic rocks.