Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SGL41-01 Room:101B Time:May 23 14:15-14:30

U-Pb ages of sandstone-hosted detrital zircons from the Paleo-Tethyan subduction zone, northern Thailand

Hidetoshi Hara[1*], Yoshiaki Kon[1], Tadashi Usuki[2], Yoshihito Kamata[3], Ken-ichiro Hisada[3], Katsumi Ueno[4], Punya Charusiri[5]

[1]Geological Survey of Japan, AIST, [2]Institute of Earth Sciences, Academia Sinica, [3]University of Tsukuba, [4]Fukuoka University, [5]Chulalongkorn University

We investigated the U?Pb ages of detrital zircons hosted by lithic and basaltic sandstones within a melange in the Inthanon Zone of northern Thailand, in order to reconstruct the timing of accretion and arc activity related to Permo-Triassic Paleo-Tethys subduction. The majority of detrital zircons within the melange have grouped U?Pb ages around 2.5 Ga, 700?1000 Ma, 400?600 Ma, and 250?300 Ma, similar to other circum-Paleo-Tethys subduction zone sediments. We classified these sandstones into two types (Types 1 and 2) based on the youngest detrital zircon peak age. Type 1 sandstones have the youngest Late Carboniferous detrital zircon age peaks, older than Middle?Late Permian chert blocks within the melange. Assuming that the youngest peak age corresponds to the maximum depositional age, there are two explanations of why the oceanic plate stratigraphy cannot be applied to a melange containing both Type 1 sandstones and chert: 1) Type 1 sandstones within the melange were allochthonous, or 2) detrital zircons that formed during Permo-Triassic magmatism are missing from Type 1 sandstones. In contrast, Type 2 sandstones have early Middle Triassic youngest peaks, younger than the radiolarian-dated Late Permian chert, suggesting an early Middle Triassic maximum depositional age. In addition, detrital zircons with youngest peak ages in the Type 1 sandstone may be derived from an as-yet unidentified Late Carboniferous arc. In comparison, younger detrital zircons within Type 2 sandstones were sourced from an intensively active Early and Middle Triassic island arc within the Sukhothai Zone, with the majority of zircons formed between the Early and Middle Triassic.

Keywords: detrital zircon, U-Pb age, Inthanon Zone, Plaeo-Tethys, Thailand

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Geochemical feature of the basalt from the Iwatsubodani Formation in the Fukuji-Hitoegane area, Hida gaien belt, central

Kazuhiro Tsukada[1*], Manchuk Nurumkhaan[2]

[1]Nagoya Univ. Museum, [2]MUST

We describe the mode of occurrence and geochemical characteristics of the basalts of the Iwatsubodani Formation, Hida gaien belt, central Japan. The Iwatsubodani Formation includes two types of (1) basalt showing intersertal texture and (2) basalt showing porphilitic texture. These basalts greatly enriched in K, Rb, Fe, Th but reduced in Ti, P, and Nb in comparison to the composition of the mid ocean ridge basalt are clearly of island arc-type. In the discrimination diagrams with Ti and Zr, most of the data are plotted in the field of the low potassium volcanic-arc basalt. The basalts 1 and 2 are suggested to have been from magmas of tholeiite series and calk-alkaline series respectively by the SiO2 vs. FeO∗ / MgO diagram and the MnO - TiO2 - P2O5 diagram, and considering that, together with the Rb / K and Ba / Zr ratios, the basalt 1 has a BABB signature.

The lithological contrast between the Iwatsubodani Formation of basaltic rocks and the overlying Hitoegane and Yoshiki Formations of felsic tuffaceous rocks clearly indicates the rapid changing of magmatism from mafic to felsic in Ordovician. The Yoshiki Formation is overlain by the Lower Devonian to Carboniferous limestone of tropical lagoon. The Ordovician to Carboniferous stratigraphy in the Fukuji-Hitoegane area shows that the Ordovician - Silurian volcanism was likely to have been suddenly reduced to change from violent volcanic conditions to a quiet tropical lagoon in early Devonian.

Keywords: Hida gaien belt, basalt, Iwatsubodani Form, Geochemical feature

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Large-scale overturned folds of Northern Chichibu Belt, western and central Shikoku, Japan

Tomohiro Tsuji[1*], SAKAKIBARA, Masayuki[2]

[1]Shikoku Research Institute Inc., [2]Graduate school of Ehime University

Chichibu Belt which locates between Sanbagawa metamorphic Belt and Shimanto Belt consists of shallow accretionary complex is important for understanding the mechanism of deep to shallow accretionary complex and island arc. Recently, Northern Chichibu Belt has been revealed that there is a large-scale overturned structure (Tsuji and Sakakibara, 2009) that is different from previously thought low-angle simple structure (e.g. Isozaki et al., 1992). This result suggests a necessity to reconsider the geological structure and the history of the outer zone of southwestern Japan. In this study, we examined additional investigation and recognized the overturned structure distributes western to central Shikoku.

Northern Chichibu Belt of western Shikoku is divided its structure into two by low-angle Nanokawa Thrust (Kumura and Horikoshi, 1959). The hanging wall belongs to Nakatsuyama Unit and the footwall is divided as Oda-miyama, Sumaizuku (Matsuoka et al., 1998), Sawadani (Yamakita, 1998) and Yusugawa Unit (Yamakita, 1998). The strata of the hanging wall side dips low-angle to the north or the south and that of the footwall side orthogonally dips middle to high angle to the north in general. Nanokawa Unit is generally not overturned and predominantly youngs to the north or the south. In contrast, the strata within Oda-miyama, Sumaizuku Unit and the terrigenous rocks of Sawadani Unit, the footwall side, are overturned and young to the south. At the south of the terrigenous rocks, the greenstone-limestone complex and pelitic mixed rock within Sawadani Unit young to the north. Yusugawa Unit, underlying below Sawadani Unit, repeats northward younging (not overturned) and southward younging (overturned). The distribution of the overturned starata suggests the existence of large-scale overturned folds with southward vergents (overturned anticlines and synclines) between those structural boundaries. In central Shikoku, Permian, Jurassic and Cretaceous sedimentary rocks also show overturned structure (northward dipping and southward facing), inferring an overturned syncline. Some of these overturned folds have been cut by northward dipping thrusts.

The overturned folds with their structures of E-W to ESE ? WNW strike, middle to high angle south vergents and the thrusts which cut those folds suggest the north?south compression and top-to-the-southward movement. The phyllitic rocks of Nakatsuyama Unit overlying Nanokawa Thrust which suffered higher grade metamorphism than the underlying rocks is explained as a nap moved by the top-to-the-southward thrusting upon low-grade metamorphic rocks. Wide distribution of the overturned zone at the north of the Northern Chichibu Belt implies the significance of the uplifting and dragging of the rocks compared with that of the south where the distribution of the overturned zone is limited. This overturned fold-thrust structure may be related with uplifting of metamorphic rocks. The timing of folding was constrained at upper Cretaceous or later based on the upper Cretaceous sedimentary rocks that were bent by the overturned fold. The Sanbagawa metamorphic Belt consists of high pressure metamorphic rocks, distributing at the north of Chichibu Belt and its uplifting at late Cretaceous is suggested to be possibly related with the overturned fold-thrust structure. To understand the distribution, structure, kinematics and the timing of the overturned folds is very important to know the evolution of the accretionary complex and the island arc in addition to the geological structure and the history of the outer zone of southwestern Japan.

Keywords: Northern Chichibu Belt, Large scale overturned structure, overturned fold, western Shikoku, upwelling of metamorphic rocks

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