Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

MIS30-P01 Room:Convention Hall Time:May 26 18:15-19:30

Establishment of pelagic deep-sea sedimentary sequence of lower Permian in the Tamba belt, Southwest Japan

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The Carboniferous and following early Permian are associated with climate changes related to tectonics and glaciations. The development of ice-sheets occurred on the Gondowana continent, which was placed around the southern polar region. Repeated increase and decrease in the volume of such ice sheets have been suggested by the oxygen isotope ratio variations of carbonate fossils (e.g., Chen et al., 2012). According to previous researches, the fluctuation of ice-sheet volume occurs in the time interval of from one million years to several million years. Contemporaneous pelagic deep-sea sediments would provide materials available for the reconstruction of environmental conditions such as oceanic ventilations and biotic productivity, but their records have been poorly known. The delay in the establishment of Carboniferous and lower Permian pelagic deep-sea stratigraphy is the main reason of this problem. The Paleozoic to Mesozoic deep-sea sedimentary rocks including the lower Permian are preserved in Japanese accretionary complexes. Among previous researches, Ishiga et al. (1982) reports one of the best lithologic sections of lower Permian deep-sea. This section is named the Funaeda section, and located in Yagi area, Northwest of Kyoto city. The Funaeda section is composed of grey and red colored bedded chert. Although Ishiga et al. (1982) examined the age diagnostic radiolarian fossils, the Permian biostratigraphy has recently been updated, and therefore more detailed discussion on the age assignment of this section is required.

In this study, detailed field works on the Funaeda section were conducted, and the section was divided the Funaeda section into five subsections, namely Fd-A˜E sections. We found conodont fossils from the uppermost and the middle part of the Fd-B section. Some specimens are identified *Mesogondolella* sp.. Occurrences of these species are limited within the Cisuralian, suggesting that the Fd-B section belongs to the Cisuralian. To observe each stratum in detail, we made polished rock specimens for the Fd-B section. We found periodic variations in the thickness of bedded chert, rock color and lamina preservation. Thickness, rock color, and lamina preservation of the Fd-B section vary every ca.50, 4 and 48 beds, respectively. In this presentation, we will discuss these lithologic features and their relationship with the paleo-environmental conditions at the early Permian pelagic ocean.

Keywords: early Permian, pelagic deep-sea, bedded chert

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Fault zone structure in pelagic sedimentary rocks: an example from the thrust fault in the Jurassic accretionary complex

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The Integrated Ocean Drilling Program (IODP) Expeditions 343 revealed that the plate-boundary faulting including the shallow coseismic slip during the 2011 Tohoku-Oki earthquake was highly localized along the smectite-rich pelagic clay of less than 5 m thick. This suggests a stratigraphic control on long-term evolution of plate-boundary faults and coseismic slip in shallow portions of subduction zones. However, little is known about deep portions of subduction zones. Here, we examined how the fault zone structure develops in pelagic sedimentary rocks based on detailed structural analysis of the thrust fault in the coherent chert-clastic sequence of the Jurassic accretionary complex in central Japan. The studied thrust is thought to branch from the plate-boundary fault, which separates the early Middle Triassic cherts and carbonaceous claystone above from the Middle Jurassic siliceous mudstone below. The stratigraphy at the base of the hanging wall (i.e., carbonaceous claystone and black chert in the base, gray chert, and red chert in ascending order) represents the mid-Triassic recovery from the deep-sea anoxic event that occurred across the Permo-Triassic boundary, with its total carbon content increasing from 0 to 8.5 wt% toward the base. The fault zone is ~20 m in thickness, and the footwall siliceous mudstone is widely damaged forming foliated cataclasite. In contrast, only ~1 m-thick chert is fractured and brecciated in the hanging wall. In particular, the faulting is concentrated into the 5 cm-thick cataclasite defined by the fragments of black chert in the carbonaceous clay matrix. Notably, a few millimeters-thick dark layer sharply cuts the cataclasite. On microscopic scale, this dark layer shows the appearance of fault and injection veins, rounded and embayed vein boundaries, and the presence of muscovite microlites in amorphous matrix, which are the characteristics of pseudotachylytes. Our results indicate the faulting including seismic slip is highly localized along the carbonaceous claystone and black chert. This suggests that a stratigraphic control on fault localization also occurred in deep portions of the subduction zone, which appears to be related to deposition of carbonaceous material during deep-sea anoxia.

Keywords: pelagic sedimentary rocks, carbonaceous material, deep-sea anoxic event, pseudotachylyte, chert-clastic sequence

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Geology and radioralian fossils of the Misogawa Complex of the eastern Mino Terrane in the Kaida area, Nagano Prefecture

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The Sawando, Shimashima and Misogawa Complexs are exposed in the eastern part of the Mino Terrane. The Sawando and Misogawa Complexs are regarded to be formed by off-scraping accretion. On the other hand, the Shimashima Complex distributed between the Sawando Complex and the Misogawa Complex is considered to be formed by different processes. In this study, we intended to clarify whether the Shimashima Complex exists around the boundary between the Sawando Complex and the Misogawa Complex in the Kaida area, Nagano Prefecture.

The study area is composed by the A, B and C formations. The A formation is dominated by siliceous rocks, forming an imbricate structure. Cherts in the A formation yielded radiolarian fossils indicative of the Middle Norian to Early Rhaetian. The B formation is dominated by sandstone and alternating beds of sandstone and mudstone. The C formation is dominated by mudstone. These lithologic features are similar to those of the Misogawa Complex. No geological unit similar to the Shimashima Complex in lithology has been found in the Kaida area.

Keywords: Sawando Complex, Shimashima Complex, Misogawa Complex, Late Triassic, radiolaria

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Deformational environment of the Pleistocene Ashigara group along the northern margin of the Philippine sea plate

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On the northern convergence border of the Philippine Sea plate, Pleistocene Ashigara group (1.6-0.5Ma) filled a trough. Miocene Tanzawa group is distributed on the north side, and both are bounded with the Kannawa fault system. The Kannawa fault system is divided into five groups of active faults (e.g. Shiozawa fault system: NE-SW, sinistral-reverse). The Shiozawa formation (conglomerates) which is the high-end strata of the Ashigara group is distributed over the southeastern side of the Shiozawa fault. Parts of the conglomerates are deformed remarkably. P-R1 cataclasites are distributed over the range of 600m from the Shiozawa fault. The shear sense is reverse fault mainl. Quartz grain becomes fine fragment by crush, and biotite does basal slip, it is thought that this cataclasite was formed under environment of 250-300 oC, and 10km in depth. It is necessary to assume uplift rate more than 10m/Ka or an abnormally high geothermal gradient.

Keywords: Kanagawa Prefecture, Ashigara group, Shiozawa formation, cataclasite, coalification, Philippine sea plate

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Reconsideration of the Tanakura shear zone north extension in the Oisawa tectonic zone, Yamagata Prefecture

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In recent studies, it is thought that the northern extension of the Tanakura tectonic line receives flexure or the modification of the base in the Nagai Basin western margin fault zone and lies behind in the east of Asahi mountainous, after having gone along the Ringo area, Yamagata Prefecture. On the other hand, possibility to extend the Tanakura shear zone formed with the activity of the Tanakura tectonic line in the Oisawa tectonic zone of the Asahi mountainous eastern margin is suggested in some studies.

Therefore I investigated the Oisawa area for the purpose of the elucidation of the geological structure history to reconsider the Oisawa tectonic zone as northern extension of the Tanakura shear zone.

As a result of investigation, I elucidated that there are ten actual faults in this area and is able to estimate one fault. Also, according to the geological map which I made in this investigation, in perspective this geological feature has the tendency of the N-S direction and the fold axis develops in the NNE-SSW direction. The fold axis of NNW-SSE direction developing along the fault exist locally. In addition, the stratigraphy of the Oisawa area is different every block divided by faults, and the western block and an eastern and southern difference divided by Sagaegawa fault are particularly clear. Once more, I elucidated a shear sense of each faults and elucidated that Sagaegawa fault and Oisawa fault were affected by dip-slip and strike-slip inversion tectonics.

From those results, the basin of the Oisawa area had a characteristic same as the Yamatsuri Basin of a strike-slip basin formed in the southern part of Tanakura tectonic line when Oisawa area examined the possibility that it was a strike-slip basin. Therefore I judged Oisawa area to be more likely to be a strike-slip basin and made the tectonic development model of the Oisawa area based on a shear sense of each faults. When strike-slip inversion tectonics influences a basin of the Oisawa area like the model that I made, it is limited in 15-12Ma in a timing of strike-slip inversion tectonics in the Oisawa area, and Oisawa tectonic zone is more likely to be the north extension of the Tanakura shear zone.

Keywords: Oisawa tectonic zone, Tanakura shear zone, Tanakura tectonic line