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Reconstruction of mid-Cretaceous oceanic plate stratigraphy in the Hidaka-cho area, South central Hokkaido

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Jurassic to Early Cretaceous accretionary complexes were formed by subduction of an old and cold oceanic plate more than 100 m.y. old. Whereas those in the Late Cretaceous and Paleogene periods formed upon a young and warm oceanic plate, which spent less than 30 m.y. from its birth to subduction. The character of the boundary between the oceanic crusts of differing ages is left unknown. Terrigeneous mudstones of the Ganpiyama Comlex (Kawamura et al., 2001) in the Kamuikotan Zone of Hokkaido Yields radiolarian fossils of late Albian to early Cenomanian (Agency for Natural Resources and Energy, 1989). This study aims to clarify the mode of connection between the old and new oceanic plates reconstructing oceanic plate stratigraphy in the Ganpiyama Complex, which might have formed in the turning point from the old to young plate subduction. This presentation will show reconstructed oceanic plate stratigraphy based on observation of fragmented sedimentary successhion and newly obtained radiolarian ages.

The Ganpiyama Complex occurs surrounded by serpentinite and underwent very low grade high-pressure metamorphism with occurenses of alkali pyroxene and aragonite (Kawamura et al., 2001). This complex consists mainly of terrigenous clastic rocks such as black mudstone and broken turbidites, with lesser amounts of oceanic rocks such as metabasalt and chert. Fragmental sedimentary successions e.g. from metabasalt to chert, and chert via alternation of chert and siliceous mudstone to terrigenous clastic rocks are observed in many sections. These allows us to complement the original full sequence of metabasalt, red mudstone (<1 m thick), bedded chert (5-10 m) with limestone intercalations, alternating beds of chert and siliceous mudstone (1-1.5 m), and terrigenous mudstone and sandstone (>15m) in stratigraphically ascending order. Metabasalts underlying bedded chert comprise volcanic breccia associated with clasts and matrices of chert. Also found are isolated bodies of pillow and massive lava, which do not accompany with chert. In addition, there is variation in sediments overlying the metabasalt there are cases in which one of red mudstone, red chert or alternating beds of chert and siliceous mudstone covered metabasalts. Volcanic breccia with chert clasts suggest existence of high reliefs on the ocean floor and mass wasting on their slopes. Diversity of sediments overlying the breccia may also have reflected rough topography. Radiolarian fossils were newly obtained from pelagic chert and hemipelagic alternation of siliceous mudstone and chert. In spite of extensive recrystallization, early Aptian or earlier Cretaceous fauna from chert, and late Aptian to early Albian fauna from alternation of chert and siliceous mudstone were identified. The oldest limit of the chert sedimentation has not been determined well. However, it feels not so old as Jurassic taking into account the small thickness is of the chert (5-10m). The age of the subducted oceanic plate in the mid-Cretaceous is estimated as 30-40m.y, as the age difference of pelagic sediments and terrigenous clastic rocks. The old oceanic plate is thus considered to have been altered by the young one until the time of formation of the Ganpiyama Complex. Early Cretaceous accretionary complexes (Iwashimizu Complex of the Kamuikotan Zone and the Naizawa Complex of the Idonnappu Zone) both formed in ˜130Ma contain Triassic chert and limestone as suggestive of the old plate subduction. Therefore, it is considered that the boundary between the two plates passed Hokkaido during 130-100Ma.

Keywords: oceanic plate stratigraphy, accretionary complex, radiolaria