

Jurassic intraoceanic arc offshore Japan

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The Sorachi-Yezo Belt in central Hokkaido is based on ophiolitic rocks represented by the lower Sorachi Group including the Horokanai Ophiolite. Controversy of their origins is responsible for many unsolved problems such as reconstruction of oceanic plates and correlation to SW Japan. This paper tests a marginal basin model with a Jurassic intraoceanic arc, introducing petrology of the Gunkanyama Ophiolite complex in the Mitsuishi area, southern Sorachi-Yezo Belt.

The Mitsuishi area has been known as a locality of serpentinite melange with high-pressure (HP) metamorphic blocks representative of the Kamuikotan Zone. This study has revealed that the pre-Neogene rocks of this area comprise a three parallel zones of low-grade HP metamorphic accretionary complex, the Gunkanyama Ophiolite, and serpentinites melange. These rocks are unconformably overlain by Neogene deposits, and folded together. The Gunkanyama Ophiolite is regarded as an amalgamate of fault-bounded slices of plutonic-hypabyssal complex, ultramafic cumulate, and partly serpentinitized harzburgite. No effusive and sedimentary rocks are found.

The plutonic-hypabyssal complex consists mainly of mafic cumulates and dikes, associated with minor dikes and small bodies of diorite and tonalite. 160-165 Ma (late Middle Jurassic to early Late Jurassic) zircon U-Pb ages have been obtained from these felsic rocks. Igneous rocks are dominated by basaltic andesite poor in HFS elements, suggestive of volcanic arc. Some of them are classified as boninites in composition. Taking into account the absence of continental basement rocks, the ophiolite probably originated from immature intraoceanic arc. It might have existed ocean-ward from the trench which produced the Jurassic accretionary complex in Japan, and lay upon a distinct plate from the Triassic or older oceanic plate responsible for Jurassic and Early Cretaceous accretionary complexes and the Kamuikotan blueschist metamorphism.

The lower Sorachi Group (& Horokanai Ophiolite) shows no trace of island arc activity in the Jurassic period, with basalts with MORB or OPB chemical affinity. Genetic relationship between the Gunkanyama and Sorachi ophiolites are thus left unknown. However, it is not difficult to speculate that these coeval ophiolites with similar geotectonic positions together belonged to a single plate. This leads to a hypothesis that they comprised an arc - backarc system.

Keywords: oceanic plate paleogeography, Jurassic, ophiolite, intraoceanic arc