Deformation structures of seamount fragments of the Funabuseyama Unit,in the Mino accretionary complex

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Subducting seamounts have been reported along the active convergent margins around the world. Seismic reflection profiles, bathymetric data and sandbox experiments modeled the effects of seamount subduction on the deformation of overriding accretionary wedge. Moreover, subducted seamounts are considered to work as asperity of large earthquake occurrence. However, deformation and accretion processes of the subducted seamounts are still ambiguous. In this study, we focus on the Funabuseyama Unit of the Jurassic accretionary complex of the Mino terrane. The Unit is characterized by abundant greenstones and limestones of Permian age, which are interpreted to be of seamount origin. Greenstones in this Unit are mainly composed of weakly metamorphosed basaltic lava, hyaloclastite, volcaniclastic rocks, and dolerite. Illite crystallinity values of pelitic rocks around the greenstone also suggest diagenetic zone. Hence the Unit is a product of shallow level accretion.

The Unit has different lithologic assemblages between two study areas. The Unit to the west of the Neo River is composed of thick pile of thrust sheets that consists of melange and large greenstone slab. Whereas the Unit to the east of the Neo River is a coherent sequence, consists of greenstone of 100 m to several hundred meters thick and limestone of several hundred meters in ascending order. The melange in the former is composed of muddy matrix and abundant fragments of sandstone, siliceous mudstone, chert, limestone and greenstone of variable sizes. Based on mesoscopic and microscopic observations, several deformation patterns are recognized in the greenstone in the melange zone. Some greenstone fragments are aggregations of smaller lenticular clasts of micro scale to a few meters in size. These clasts arrange to form S-C like asymmetric fabrics. Some angular fragments of less than 1 m in size are also aggregations of smaller angular clasts containing variolites, and irregularly-shaped dolerite blocks of several meters in size are weakly fractured. Such melange zones, more than 20 m thick, lie adjacent to the large greenstone slab of several hundred meters in thickness in which no remarkable deformations are recognizable.

Limestones in the coherent sequence are poorly deformed, whereas two strongly deformed zones, several to 20 m thick, are recognized in the basal parts of greenstone. One is a melange-like zone that consists of foliated greenish fine-grained matrix and irregularly-shaped limestone fragments of less than 1m in size. The other is a cataclastically-deformed basalt zone containing lenticular limestone fragments of less than 30 cm in size.

These features indicate that the difference of the mode of deformations of greenstones in the Funabuseyama Unit may depend on the difference of lithofacies and mixing stages of seamounts incorporated into the accretionary complex.