

# Constraints on the timing of serpentinite emplacement from Chichibu Belt, southwest Japan

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Serpentine is an important rock in describing the geologic history development of subduction zones (Isozaki et al., 2010). Among these, it is important to constrain the tectonic background about serpentinite, and the timing of its emplacement is a highly important issue. However, there are many different views on the timing of serpentinite emplacement, and there is no unanimity on this issue, so further geological studies are needed (e.g., Hirauchi et al., 2006). The purpose of this study is to constrain the timing of serpentinite emplacement. Based on that, geological surveys were conducted in Takaoka Yusuhara, Ochimen to Yokogai areas of Kochi Prefecture.

The study area consists of Ohnogahara Unit (Permian accretionary complex), Shimagawa Unit (Triassic metamorphic rocks), Cretaceous sedimentary rocks in the central area, Ohirayama Unit (Jurassic accretionary complex) across Tanono Fault, and Torinosu Group (Jurassic sedimentary rocks) in the southern area. Serpentinite bodies are located near the southern limit fault of Ohnogahara Unit, in the central part of Shimagawa Unit, and at the boundary of Cretaceous sedimentary rocks.

The serpentinites in this area can be classified into two types (fig. 1): Type A, which includes allochthonous blocks, and Type B, which does not include them. In Type A, blocks of clinopyroxenite, olivine pyroxenite, crystalline schist and peridotite were identified. This serpentinite body shows a distribution parallel to some of the greenstone and chert of Onogahara Unit (fig. 1). In Type B, the flow structure of serpentine is partly observed and includes bastite in thin section. Furthermore, some of composite planar fabrics of serpentinite show top-to-the-South shear sense.

In addition, the outcrop of clastic rock including serpentinite conglomerates and gravels was observed. That is characterized by a black muddy matrix. That outcrop was in Cretaceous sedimentary rocks area (fig. 1). However, it is distinguished from Cretaceous sedimentary rocks by the absence of a black muddy matrix.

Type A might be correlated to the serpentinite that belong to Kurosegawa Belt that has been thought to be ~400 Ma (e.g. Maruyama, 1981). Type B might be correlated to the serpentinite that is thought to have intruded within Shimanto Belt in the Early Cretaceous (e.g. Saito et al., 2009). Type B serpentinite is located along Yokogai Formation (Kouzai et al., 1991, Kattou et al., 1984), which is dated to the Late Cretaceous Cenomanian-Turonian, suggesting that the serpentinite was emplaced after the Cenomanian-Turonian. In contrast, part of Type A forms a duplex structure that cuts through Cretaceous sedimentary rocks and the Type B. That means, Type A may have been emplaced after the Cenomanian-Turonian and the emplacement of Type B. Furthermore, the timing of Type B emplacement is constrained to before the formation of the duplex structure. In addition, the timing of the emplacement of Type A might be constrained by depositional age of the muddy clastic rock including the conglomerates of the serpentinites.

Keywords: serpentinite, emplacement, Chichibu Belt

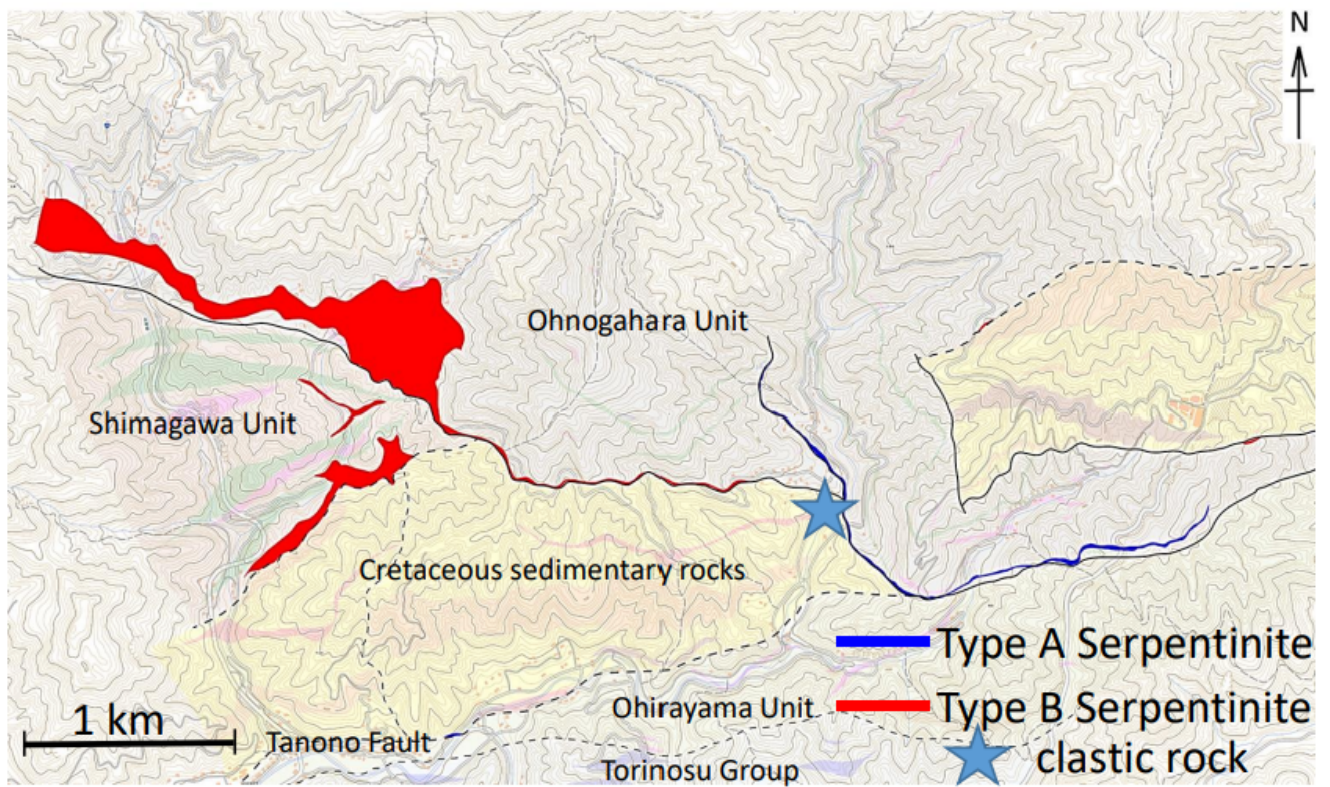


Fig 1. Distribution and Classification of Serpentines in Ochimen Area, Yusuhara, Kochi Prefecture