History of fault activity considered from the brittle shear zone and the geological structure near the Cape Otachi, Kumamoto Prefecture

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[Introduction] The Hinagu fault zone is located in the western Kyushu and is an active fault zone extending 81 km roughly in the NE-SW direction. The Hinagu fault zone is a dextral slip fault with the east side uplift [URL]. The fracture zones of the Hinagu fault zone have been reported in two places in the Higo metamorphic rock distribution area and in the lower Cretaceous distribution Area near the cape Otachi (Matsumoto・Kanmera, 1964). The core of the fracture zone at Sabagami pass shows dextral slip and its outer rim shows sinistral slip (Kobayashi・Koshiwa, 2016). In addition, the geological fault parallel to the Hinagu fault is apparent sinistral slip fault (Saito et al., 2005). These facts suggest the possibility that the Hinagu fault zone was active differently from the past and the present. Analysis of the fracture zone and surface survey around the fracture zone are important for elucidating the history of fault zone activity. In addition, since Kyushu is an important area which is the meeting part of the Southwest Japan arc and the Ryukyu arc, clarifying the activity history of the Hinagu fault zone leads to the understanding of the tectonics of Kyushu. In this research, for the purpose of elucidating the history of activity of the Hinagu fault zone from the brittle shear zone and geological structure found near the Cape Otachi, Kumamoto Prefecture, the ground surface survey, the structure observation of the fault rock, the XRD analysis, the small fault Analysis and so on.

[Ground Surface Survey] As a result of the ground survey around the Cape Otachi, small faults constituting the fracture zone were observed in the lower Cretaceous Hinagu Formation, and it was roughly classified into 4 strains from the strike of the fault, the sense, and the cutting relationship. F1 is NNE-SSW trend sinistral slip fault, F2 is NNE-SSW trend dextral slip fault, F3 is NNW-SSE trend sinistral slip fault, F4 is E-W trend dextral slip fault.

F2 is a small fault group found in the brittle shear zone consisting of cataclasite. F1 is seen outside the brittle shear zone and part forms a planar cataclasite zone with a width of 5 cm. F3 and F4 are small fault groups which mutually cut. F3 deform the dike group described later. F4 cuts the brittle shear zone. Apart from the fault, we identified a folding group with a hinge in the ENE-WSW direction on the southeast side of the brittle shear zone. In addition, an andesitic dykes group with a dominant ENE-WSW strike was observed on the east side of the brittle shear zone. We confirmed the cutting and bending of the dike by F3, the injection of dike along the F3. This dike is believed to be related to the Neogene Igneous rocks in Amakusa area (Matsumoto ·Kanmera, 1964).

[Small Fault Analysis by Multiple Inverse Method (Yamaji, 1999)] Compressive Stress Field in NW-SE direction from F1, Compressive Stress Field in ENE-WSW direction from F2, Compressive Stress Field in NW-SE direction from F3 and F4 Was detected.

[Stage Segmentation] The time of formation of the fault, dike and fold observed in the vicinity of the Cape Otachi is divided into three stages, D1, D2, D3 from the stress field obtained from the cutting relation.
In D1, F1 was activated in the compressive stress field in the NNW-SSE direction. Considering the compression axis direction, fold group with fold axis in NE-SW direction is thought to be formed in D1.
In D2, F2 was activated in the compressive stress field in the ENE-WSW direction, forming a wide brittle

shear zone.
In D3, F3 and F4 were active in the compressive stress field in the NW-SE direction.
We thought that the bending and the injection of dike along F3 indicate that the dikes were deformed by F3 before consolidation. Considering the above-mentioned thing, we thought that the dike group had formed between the terminal stage of D2 and the beginning of D3.

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