The Relationship Between the Coastal terrains and Geological Layers, in the Western part of Iki Island, Nagasaki Prefecture

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In western part of Iki island, many sea caves distribute facing Genkai-Nada. Especially a collapsed sea cave called Onino-Ashiato is famous for its scale and unique shape. In the regions, like Japan, where are influenced by diastrophism, the forming process of coastal terrains, linking the relationship between geological rock property and sea level changes, is very complex and difficult. Due to this, the number of research examples is limited. But Iki island has few evidence of diastrophism (Watanabe 1990), which makes the consideration of coastal terrain’ s forming process easier by limiting the factors in geological features and sea level changes. This study focuses on the distribution of coastal terrain around Onino-Ashiato, the measurement of its shape, and the discussion of forming process of it. To grasp the shape of Onino-Ashiato in 3D data, SfM (Structure from Motion) was taken. To measure the distance, a laser rangefinder was used. By using detail pictures and these tools, the layers of rock consisting Onino-Ashiato and surface weathering were researched. Also, to understand the terrain around it in detail, geomorphological maps were made through observation. By using them, the consideration of the forming process of Onino-Ashiato is discussed.

Around the research area, the layers of basalt, which were formed around 2.1-2.5 Ma (Sano 1995) and layers of breccia form the base rock. The layers of breccia are weak of erosion and are collapsed rapidly from bigger rock brocks. Basalt is harder and that forms overhang sea cliff and upper natural bridge of Onino-Ashiato. From these results, it can be said that sea caves began to be formed at the layer of breccia. Onino-Ashiato is a horseshoe shaped sea cave, with 54 m in length, 33m in width, 26 m in depth, and the height of natural bridge is 9.4 m. The unique shape might be the result of the flow of wave in the sea cave as the result of observation. The relationship of sea caves in shape and distribution of them can be a link of the rock control theory. Also, the height of sea cave is around 10 m, and there is a sea cave, which exist 5.2 m higher than today’ s sea level. This shows the possibility of sea level changes. The height of sea cave’ s existing point, 5.2 m is similar height of the tide in Holocene sea level change in Genkai-Nada (Shimomura 1994). From these evidences, 2 factors, Holocene sea level change and rock control, the possibility of relationship in forming coastal terrain is shown.

Reference

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