

Characteristics and production processes of coastal huge blocks in the Miyako Island

SHIMAZU, Hiroshi^{1*} ; SETO, Masayuki²

¹Rissho University, ²Fukushima University

There are many coastal huge blocks in the Miyako Island. Some were brought from the sea bottom by tsunamis. Most of others were made by landslides of the coastal cliffs. Previous studies showed the dynamics of the production of such huge blocks from the coastal cliffs of Ryukyu limestone. Development of notches formed near the sea level and vertical cracks on the surface of the marine terraces near the cliffs caused the instability of the rock mass and finally it were torn into coastal huge blocks. This process indicates that the height of the cliff relates the block form and size. However there are large variety of form and size of coastal blocks in Miyako Island. Although smaller blocks are distributed in front of the higher cliff in the Boraga beach, huge blocks with vegetated top are distributed in front of the 20 meters high cliff in Higashi-hennazaki. This Study aims to describe the characteristics and distribution of coastal blocs and discuss production processes of the blocks.

In the Miyako Island the Ryukyu limestone covers the semi-consolidated sandstone or mudstone called the Shimajiri formations. These are unconformable. The Ryukyu limestone is hard and permeable rock and the Shimajiri formations are soft and impermeable rocks. These two layers outcrop on the cliffs and their boundary usually occurs high above the sea level. Groundwater springs or seeps from the boundary on the cliff. The water erodes the Shimajiri formations along the boundary. This process causes the notch-like form at the boundary. At the Braga beach the height of the cliff is more than 40 meters and the boundary of the layers, where groundwater springs, locates 14-20 meters high above the sea level. Development of the notch-like form caused instability of the limestone layer. And then the layer collapsed and produced limestone blocks. They rolled down to the beach breaking into smaller blocks. At the Aragusuku and Urasoko fishing port coasts the blocks were produced by same process. At the Higashi-hennazaki the boundary locates several meters above the sea level. Groundwater sapping forms notch-like form at the boundary. At the Shimajiri coast the Ryukyu limestone appears on all the cliff. A notch was formed at the sea level by the wave process. On these type of coasts the limestone cliffs were torn into huge blocks. The blocks with vegetation on the top of them were deposited along the coast.

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