

Hyaloclastite of Iwo-dake volcano, Satsuma-Iwojima

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Introduction

A contact of hot magma and water greatly influences on the eruptive style and products (Wohletz and Heiken, 1992). This phenomenon is important to appear the eruptive style and process of a volcano around sea or lake.

Two volcanoes Iwo-dake (rhyolitic volcano) and Inamura-dake (basaltic volcano), on Satsuma-Iwojima Island at marginal part of Kikai Caldera, grew up after the large caldera-forming eruption of 6.3ka known as Akahoya Eruption. The Former Iwo-dake stage started from 5.6ka (Okuno et al. 2000), after that, changed into the Latter Iwo-dake stage, bordered by the Inamura-dake stage.

As a result of field survey, we discovered Hyaloclastite derived from the Former Iwo-dake stage on the southeast coast of Iwo-dake. The sea level has not greatly changed during 6.3ka to the present. It is suggested that the Former Iwo-dake has may occurred the submarine eruption. Some previous studies only discussed the eruptive style of Latter Iwo-dake stage. So, in this study, we describe this Hyaloclastite and consider the erutive style of the Former Iwo-dake.

The Characteristic of Hyaloclastite

On the southeast coast of Iwo-dake, Hyaloclastite and volcanic conglomerate were discovered. These deposits have more than 5m thickness in all and a flat terrace surface. This feature is apparently deferent from the upper talus and lava.

Hyaloclastite is composed of almost altered and grayish-white lapilli and block containing altered black lapilli with flow structure. The matrix part is composed of almost altered and grayish-white ash. Hyaloclastite is coagulated tightly and partly reddish. The matrix part is gone out often. Some blocks have more than 1m sizes. Some blocks are derived from spiracle because of many cracks filled with tuffisite developing. Pseudo-pillow lavas with radial cracks are also discovered. Almost of phenocryst of fragments are altered.

Volcanic conglomerate covered the erosion surface of Hyaloclastite and the thickness changes variously. The compositions are rhyolitic or silicified lava fragments, white pumice, banded pumice, and so on. This feature is similar to the upper talus deposit, but coagulated tightly.

Non-coagulated pebbles overlie volcanic conglomerate, and overlaid by pumice fall bearing banded pumice. Pumice fall corresponds to the lowest part of talus deposit.

Discussion and Conclusion

Fragmentation of hot lava flow quenched by seawater formed Hyaloclastite in the Fomer Iwo-dake stage. A flat terrace surface shows that Hyaloclastite was eroded by waves after deposition. Volcanic conglomerate deposited with Hyaloclastite at the almost same time because these are parts of the tarrace. After that, these deposits appeared on the land by sea level change or upheaval, while we cannot discover the evidence of such geological event on the south coast of Inamura-dake. So, it is supposed that marine terrace is older than Inamura-dake volcano and the Latter Iwo-dake, and is just as the Former Iwo-dake products. After the terrace formation, Iwo-dake erupted pumice on the land, and grew up with lava effusion or talus formation.