Mudflow deposits distributed on the eastern foot of Iwate Volcano, northeast Honshu, Japan

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Many volcanic mudflow deposits are distributed on the eastern foot of Iwate Volcano, northeast Honshu, Japan. This study is aimed at revealing the stratigraphic horizon, age, distribution and lithological characteristics of each mudflow deposit, and we will discuss the origin or flow mechanism of these mudflow deposits. The geological survey was performed both in artificially excavated trenches and on a ground surface, with the cooperation of Japan Ground Self-Defence Force.

A large part of the mountain collapsed and the horseshoe-shaped caldera were formed in ca. 6000 year before present. Since this event, Yakushi-dake central cone have been formed with the eruptions of scoria and lavas. The main surveyed area is located around the downstreams of Koborizawa, the headstream of which is in the outer rim of the caldera, and Ohorizawa, the headstream of which is in the younger central cone (Fig. 1).

At least 29 mudflow deposits above the horizon of Sugo Scoria erupted in ca. 4800 year before present were found in the study. These deposits are divided into three types on the basis of lithological characteristics and distribution. The first type, most of 29 mudflow deposits, consists mainly of poor sorted fine-grained sand and subangular pebbles to cobbles and is often accompanied by thin layer of fine-grained sand or clay. This type of mudflow deposits is distributed to the south of Koborizawa, around the upstream of which there are many slope failures.

The second type of mudflow deposit includes blocks of unconsolidated sediment such as black soil or scoria in the matrix of poor sorted sand as well as hard blocks of lava. We considered that this type originated in mudflow with slightly higher viscosity rather than debris avalanche, because it has laminated structure in the main part of the deposits and is accompanied by thin layer of relatively well-sorted fine-grained sand.

The third type is characterized by many volcanic bombs included in the matrix, and is found in the trenches of nos. 02-1 and 02-3 to the north of Ohorizawa, and in those of nos. 05-1, 05-2 and 05-3 to the south. These bombs have not been ground and are irregular-shaped. There are concentric ring-like fractures and small vesicles within the bombs. And the bombs do not show the sign of high temperature oxidation. These facts possibly suggest that this type of mudflow originated in melting snow caused by the volcanic eruption. Mudflow deposits of this type widely distributed to the south of Ohorizawa, the stratigraphic horizon of which is the youngest in the trenches, include very large blocks of lava, more than 2m in diameter. Therefore we conclude that very large mudflow occurred in the latest period and resulted in this type of deposits.

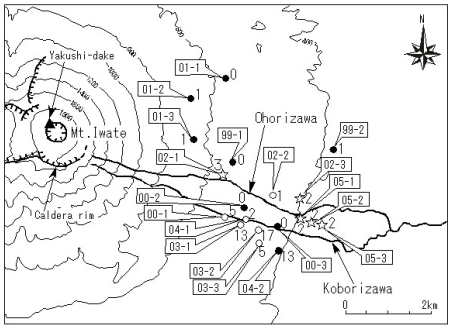

Fig. 1 Map showing trench sites and the number of mudflow deposits
The numbers in rectangules such as "05-1" and the numbers near symbols denote trench numbers and the number of mudflow deposits after ca. 4800 y.b.p., respectively. Stars indicate trench sites in which a mudflow deposit includes volcanic bombs. Open circles and stars represent sites where a mudflow deposit including unconsolidated sediments such as black soil or scoria layer is distributed.