

# Field Trip to Observe the SABO Works of the Tateyama Caldera

Takao HONDA<sup>1</sup>, Kotaro FUKUI<sup>1\*</sup>, Hajime IIDA<sup>1</sup>, Toshiaki SHIRAIISHI<sup>1</sup>  
and Hiromi MOTOHARA<sup>1</sup>

<sup>1</sup> Tateyama Caldera SABO Museum, Japan

\*Corresponding author. E-mail: fukui@tatecal.or.jp

## TATEYAMA CALDERA

The Tateyama Caldera is an erosion caldera that formed on the southern part of the Tateyama volcano. Landslides and debris flow events, of which the Tombi-kuzure landslide on 9 April 1858 was the largest, have occurred in this caldera since the late Pleistocene. The Tombi-kuzure landslide was caused by strong ground motion associated with the 1858 Ansei–Hietsu earthquake. The landslide had an estimated volume of  $1.3\sim 4.1\times 10^8$  m<sup>3</sup>, and a vast amount of debris was displaced across the Joganji River, ultimately causing the devastating flooding of the Toyama Plain. There have been 21 major landslides, debris flows, and flooding events between 1891 and 1969.

To mitigate the risk from natural disasters related to debris discharged from the Tateyama Caldera, SABO (erosion-control) work has been performed in the area since 1906. The initial SABO work was undertaken by Toyama Prefecture, but the SABO work has been performed by the Tateyama Mountain Area SABO Office, which is part of the Ministry of Land, Infrastructure, and Transport, since 1926.

## FIELD TRIPS TO THE TATEYAMA CALDERA

Toyama Prefecture and the Tateyama Caldera SABO Museum, in cooperation with the Tateyama Mountain Area SABO Office, have been organizing field trips to the Tateyama Caldera since 1998 to familiarize the public with the history of sediment disasters and the role of SABO works in the Joganji River Basin. We conduct approximately 45 field trips annually from early July until mid-October.

First, the participants attend a talk at the museum regarding the history of disasters and the role of the SABO works in the Joganji River. Then, they visit tour sites in the Tateyama Caldera via the Torokko train (**Fig. 1**) or bus. The field trip involves three tours (**Tab. 1**), all guided by volunteers.

Approximately 900 people participate in the field trips each year (**Fig. 2**), and there have been roughly 18,000 participants in the past 20 years. This field trips are considered to be an effective way to introduce the role of SABO works in the Tateyama Caldera.

Torokko tours for groups were added as a new option in 2009. In this field trip, the Toroko train in the Torokko tour is the most popular tour site for participants. The bus tour has a relatively small number of the tour sites that are popular among participants. Because some bus tour participants have begun to participate in the Torokko tours for groups, the number of participants in the bus tours has decreased. Therefore, the attractiveness of the bus tour should be improved, such as by adding detailed guidance on two SABO dams that were recently designated as national important cultural properties.

Previously, participants from Toyama Prefecture accounted for about 70% of participants (**Fig. 3**). Since the Hokuriku Shinkansen opened in 2015, the number of participants from outside Toyama Prefecture has increased from 30% to 50%.

## CONCLUSION

In the last 20 years, approximately 18,000 people have participated in the field trips, which are considered to be an effective way to introduce the role of SABO works in the Tateyama Caldera.

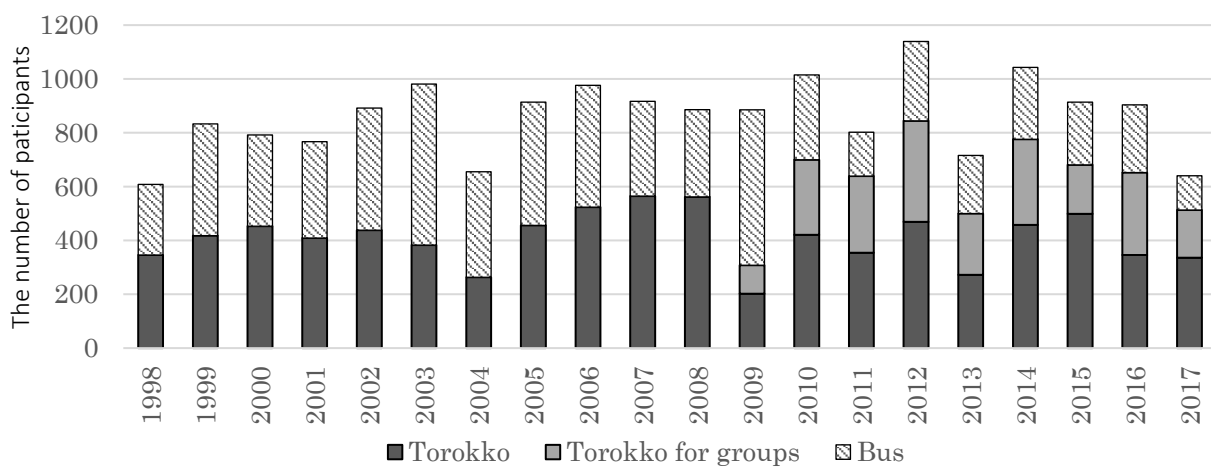


**Fig. 1** Torokko train of Tateyama SABO Office

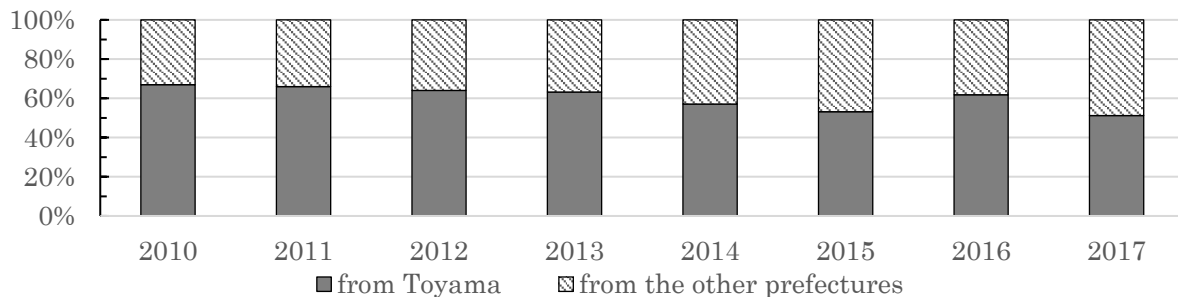
**Tab. 1** Field trips overview

Tour	Day of the week	Capacity	Transportation	Number of held in 2017
Torokko	Wednesday	40*	Torokko and bus	15
Torokko for groups	Thursday	40	Torokko and bus	15
Bus	Friday	40	Bus	14

\*The capacity in the busy season is 80.



**Fig. 2** Changes in the number of participants by tours of the field trip from 1998 to 2017



**Fig. 3** Changes in the rate of participants of the field trip from Toyama prefectures and outside Toyama

**Keywords:** Tateyama Caldera, SABO, Joganji River, Landslide