

Large-scale landslide immediately occurred at the fallout of Aira-Tn tephra (31 cal ka BP) in the northern Tenshu Mountains, central Japan

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In the Tojiro district (Minobu Town, Yamanashi Prefecture), the northern part of the Tenshu Mountains, there is a remarkable landslide feature. However, its geological and geomorphological details have been uninvestigated yet. We clarified characteristics and historical development of this landslide based on both field and laboratory approaches. [Landforms and geology] Three horseshoe-shaped steep cliffs are present on the left bank of the Tojiro River at an elevation from 800 m to 1600 m. Below these cliffs, a gentle slope ($A=6.0 \times 10^5 \text{ m}^2$), 500 m wide and 1500 m long, is developed. Basaltic gravels larger than 2 m in diameter are seen on the gentle slope. Poorly-sorted debris consisting of basalt clasts is exposed on the eastern and western edge of the gentle slope. Therefore, the steep cliffs are considered to be originated from head scarps by landsliding, and the gentle slopes are landslide emplacement materials. Assuming that an average thickness of the landslide materials is 10 m, the volume of landslide materials is estimated to $6.0 \times 10^6 \text{ m}^3$, equivalent to a large-scale classification of landslide. On the valley side slopes in the right bank of the Tojiro River, poorly-sorted debris correlatable with the landslide materials at Tojiro remain. Around there, a fine vitric tephra was found just above the landslide materials without remarkable unconformity. This tephra, mainly composed of a bubble-walled to planar type of glass shards, is can be identified with Aira-Tn (AT: 30.8 cal ka BP) on the basis of an analysis of major chemical components. Judging from the stratigraphic relationship with AT, it is considered that the landslide materials was formed immediately at 31 cal ka. [Debris flow terrace] Terraced forms with a relative height of 5 to 6 m from the present riverbed are present on both banks of the Tojiro River downstream of the main landslide gentle slopes. These terraces consist of poorly-sorted subrounded to subangular gravel of basalt and mudstone. Imbrication is also seen. These terraces are thus considered to be debris flow terraces origin, formed simultaneously or lately the large landslide. [Historical development of landslide] Based on the above data, the historical development of the large landslide in Tojiro can be reconstructed as follows: 1) Around 31 cal ka BP, a large-scale landslide occurred on the mountainside slopes south of Tojiro, and a large amount of debris ran out, resulting in headscarp formation. 2) The moved debris formed a gentle slope around the present settlement of Tojiro. Furthermore, a part of debris climbed up to the opposite valley side of the Tojiro River. 3) The gentle slope was dissected to form a terrace feature and debris flow terraces were also formed along the downstream of the Tojiro River.

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