

Topographical and geological features of the deposits derived from the sector collapse at 24 ka of Asama volcano, Central Japan

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Asama volcano, Central Japan, collapsed approximately at 24 ka probably triggered by the phreatic explosion. The present study discusses the debris transport mode by means of topographical and geological characteristics of the deposits.

A collapsed sector often moves as a 'debris avalanche' whose deposits consist of 'blocks' and 'matrix'. The debris avalanche blocks form hummocky topography that indicates the flow being debris avalanche under relatively dry condition. The hummocks are distributed over Ohkuwa, Karuizawa, Saku and Nakanojo districts. They are larger in size as close to the source indicating the cohesive blocks had contracted irreversibly according to travel distance. This means the debris flowed as the debris avalanche at Nakanojo district, even though the debris had channelized into the Agatsuma River valley.

A series of the blocks and matrix constitutes the deposits of the sector collapse event throughout the depositional area. The blocks are characterized by unique jigsaw cracks and patchwork structures with their size strongly regulated by the distance from source resulted in absence of the hummocks there. The chemical composition of the deposits expresses that the regional difference is negligible together with a close resemblance between the blocks and the matrix. Judging from the values of SiO₂ concentration, the deposits originate in the basaltic andesite which constitutes Kurofu-yama, the oldest conical stratovolcano of the Asama volcanic range. And the matrix was mainly derived from the volcanic body, with an only part being produced from the blocks. Thus, we conclude that the debris had attained to the northwestern corner of the Kanto Plain through the Agatsuma River valley as a catastrophic debris avalanche.