十和田火山，平安噴火に伴うラハール堆積物中からの遺跡の発見

Finding the ruins from lahar deposit induced by the Heian eruption of Towada volcano, northeast Japan

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At least 12 dwelling sites constructed during the Heian era was discovered at Katagai-Ienoshita ruins (Odate city, Akita prefecture) that is located 40 km far from the Towada volcano. These dwelling sites were buried by pyroclastic deposits, suggesting the occurrence of an ancient volcanic disaster. In this study, we describe and report these pyroclastic deposits. The pyroclastic deposits consist at least two layers: lower brownish orange volcanic ash and upper grayish lapilli tuff. The volcanic ash layer is four to seven cm thick and consisting of volcanic glass, pyroxene crystals, quartz crystals, and clasts of pumice, obsidian, and agate. Thickness of the volcanic ash is constant even on slopes such as the roof of the dwelling (up to 34°). The mantle bedding suggests that the layer is typical of ash fall deposits. The facies of the grayish lapilli tuff layer is massive and poorly sorted, consisting of clasts of pumice, mudstone, and alluvium conglomerate. The pumice clasts are 5 mm to 3 cm in diameter. Matrix of the lapilli tuff is composed of fine to medium sized clasts of volcanic glass, obsidian, agate, and quartz crystals. The grayish lapilli tuff is 100 to 150 cm thick. The lapilli tuff is thicker in depressions of the paleosurface, in other words, it ponded in the depressions. The lapilli tuff fills all the dwellings. Basal contact with the underlying volcanic ash layer is planar and shows no evidence of erosion or hiatus. The dwellings are mainly filled with the lapilli tuff and maintain their architectural structures such as roofs, walls, and floors that partly remain original wood without scorches. The lack of burned charcoal on the wood indicates that the lapilli tuff emplaced in low temperature. The general characteristics of the lapilli tuff indicate debris flow deposition. Poor sorting and massive facies are suggestive of rapid deposition of sediments. Lack of significant destruction in the ruins implies that the debris flow flowed in quite gentle manner. The Heian eruption of Towada volcano caused abundant ash falls (To-a and OYU pumice), pyroclastic flow (KPf), and lahar (Atsumiya flood deposits; Hayakawa 1985). The volcanic ash layer and the lapilli tuff layer at the Katagai-Ienoshita ruins can be correlated with To-a and Atsumiya flood deposits, respectively.

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