

## Development history of sagging geomorphology: examples from Mt. Kanmuriyama, Gifu Pref. and Mt. Tsuenomine, Mie Pref.

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Recently sagging geomorphic features like double ridges and uphill-facing scarps attract attention as precursors of large-scale landslides. Many types of large- and small-scale sagging landforms have been ubiquitously found in the Japanese mountainous regions by the analyses of detailed topographic maps made by LiDAR survey. The development history and processes, however, are unclear. We report the results of field and coring surveys on sagging geomorphology in Mt. Kanmuriyama area, Etsumi Mountains of Gifu-Fukui prefecture boundary and Mt. Tsuenomine area in Mie Prefecture, Kii Peninsula.

Chert and sandstone formations of the Jurassic accretionary complex of the Mino terrane are widely distributed in the Mt. Kanmuriyama area. Sediments accumulated in the ridge-top depression (altitude: 1,131 m) northwest of Mt. Kanmuriyama were drilled by hand auger equipments in order to characterize the deposits. The sediments are composed of 1) conglomeratic orange mud, 2) light-yellow mud, and 3) alternating beds of dark-gray mud and carbonaceous mud/leaf litter mixture, in ascending order. The thickness of the sediments, increasing from east to west and 3 m in maximum, suggests that the depression has been resulted from the eastward slumping of the ridge-top. On the basis of the Kikai-Akahoya tephra (K-Ah) of 7.3 ka and AMS-14C ages measured on the wood fragments embedded in the sediments and the sediment accumulation rate estimated by these ages, the depression was formed about 11,000 years ago, and has been constantly filled up with the sediments.

Miocene sandstone and mudstone with minor amounts of conglomerate occur in the Tsuenomine area. There are several types of deformation landforms such as double ridge on top, uphill-facing scarps, landslide dam and buried dammed lake. Sediments accumulated in the ridge-top depression about 9 m thick were drilled, and they are massive mud changing to the muddy conglomerate at the bottom. Although the sediments include no plant remains suitable for the AMS-14C age determination, three layers of tephra at 0.8, 4.3 and 7.8 m depths are sandwiched, which are correlated to the Aira Tn (AT, 28-30 ka), Kuju-Daiichi (KJ-P1, 50 ka) and Kikai-Kuzuhara (K-Tz, 95 ka) tephtras, respectively. These ages indicate that it takes more than 60,000 years for the sedimentation of the massive mud about 7 m in thickness.

Keywords: sagging geomorphology, landslide, Mt. Kanmuriyama, Mt. Tsuenomine