

Characteristics and ages of sediments accumulated in the ridge-top depression northwest of Mt. Kanmuriyama, Gifu, Japan

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Many numbers and styles of small-scale sagging geomorphic features have been found along the ridges between Gifu and Fukui prefecture by the analyses of 1 m-mesh DEM and detailed topographic maps (provided by the Etsumi Sankei Sabo Office, Chubu Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism) made by using the airborne laser mapping technology (Kojima et al., 2011), although such small-scale landforms could not be recognized by the analyses of 1:25,000 scale topographic maps and air photos. Sediments accumulated in one of such sagging geomorphic features, ridge-top depression (altitude: 1,131 m), northwest of Mt. Kanmuriyama were drilled by hand auger equipments in order to characterize the deposits, determine their ages, and discuss the development history of the sagging geomorphic feature.

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 increases from east to west for the four boring cores: about 280, 225, 150 and 90 cm from west to east. This results from the increase of the thickness of the formation 3), as 245, 220, 110 and 70 cm. The westernmost and longest core intercalates 3 cm-thick tephra at 148 cm depth composed mainly of glass fragments (refractive index: 1.510-1.513), which is correlated with the Kikai-Akahoya tephra (K-Ah) of 7.3 ka. Plant fragments at 82, 138 and 195 cm depth yield AMS 14C ages of 1210±25 BP (1234-1060 cal BP), 5320±30 BP (6191-5996 cal BP) and 6990±30 BP (7931-7731 cal BP), respectively. These age data indicate that the average sediment accumulation rate is about 0.25 mm/year.

On the basis of the facts described above, the depression is estimated to have formed by slumping of the ridge-top to the east. This estimation is consistent with the geomorphic features observed around the depression. The basement, sandstone of the Mino terrane, of the sediments is estimated to be located just below the conglomeratic orange mud. The accumulation of the sediments and the slumping started about 10,000 years ago, assuming the average sedimentation rate calculated above could be applicable to whole of the sediments. This age estimation suggests that the mountain range of this area became unstable during the warm and wet climate after the last glaciation.

Keywords: sagging geomorphology, landslide, Gifu