

Basement structure under the sediments accumulated in the ridge-top depression and landslide-dammed lake around Mt. Tsuenomine, Kumano City, Mie Prefecture: Results of integrated analyses by drilling, electrical and seismic survey methods

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Part of the deep-seated gravitational slope deformation features (DGSD) was recently indicated to be precursors of large-scale landslides, whereas part of them has been stable for more than 10,000 years. Discrimination between them is important to mitigate the landslide disasters, but impossible today, because of scarcity in case studies of DGSD. Ridge-top depression and landslide dammed-lake occur in the Tsuenomine area, Kumano City, Mie Prefecture. They are covered with sediments, and their basement structures are unclear. In order to clarify the structures and development history of DGSD and related landslide phenomena we conducted drilling, electrical and seismic surveys of these topographic features. The two cores drilled at the ridge-top depression are 7.5 and 9 m in depth, and are composed of ca. 1 m thick carbonaceous mud at the top, ca. 5 m thick gray to yellowish brown mud in the middle, and mud with clasts probably deposited on the basement in the lowermost part. Three horizons, 0.8, 4.3 and 7.7 m in depth, of tephra are identified as the Aira-Tn (28-30 ka), Kujyu-Daiichi (50 ka), and Kikai-Tozurahara (95 ka) tephra, respectively. The sediments accumulated in the landslide-dammed lake are cored until ca. 7.5 m deep, but could not reached to the basement. Together with the ca. 2.5 m thick surface exposure, the ca. 10 m thick lake sediments consist of upper massive yellowish brown mud and lower similar mud with basement rock clasts. They yield reworked volcanic glasses derived from Kikai-Akahoya tephra (7.3 ka) at all horizons. The electric and seismic surveys are performed along the two lines perpendicular to the ridge, and one line parallel to the ridge on the ridge-top depression. Same surveys are also conducted along the two lines perpendicular to the river, and one line parallel to the river on the landslide-dammed lake. The results of the both surveys are consistent and indicate that they are effective to discriminate the basement rocks from the landslide deposits, and sediments accumulated in the ridge-top depression and the dammed lake.

Keywords: Mt. Tsuenomine, deep-seated gravitational slope deformation, geophysical survey