

Development process of double ridges along the middle course of Ibi River, Mino Mountains, central Japan

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Geographical research on the deep-seated gravitational slope deformation (DSGSD) was carried out along the middle course of the Ibi River, Mino Mountains, central Japan. The study areas are NE ridge (ca. 850 m) of the Mt. Gongen (1158 m), E of Yokoyama dam (Point A), and the ridge (ca. 500 m) N of Tsukumi about 4 km SSE of Point A (Point B). Both points are ca. 400-500 m higher than the river bed levels. These points are low elevation and relief comparing with the areas of DSGSD-prone areas in central Japan. High resolution topographic maps made with the LiDAR DEM have revealed that many DSGSD-related topographic features were developed at and around the points A and B. The sediments accumulated in the ridge-top depressions are recovered by the hand auger drilling: at the point A they are dark-brown carbonaceous mud (0-20 cm) and yellowish-brown mud (20-125 cm) from top to the bottom, and at the point B dark-brown carbonaceous mud (0-40 cm), brownish-gray silty mud (40-90 cm), yellowish-brown mud (90-145 cm), dark brown mud (145-180 cm), yellowish-brown mud with clasts (180-225 cm), and heavily weathered sandstone of the basement rock. Bubble-wall type volcanic glasses in the very-fine sand fractions in the samples collected 5 cm-intervals show peak contents at 35-40 and 175-180 cm at the points A and B, respectively. Both the glasses are mixture of the Kikai-Akahoya tephra (K-Ah: 7,300 cal BP) and Aira Tn tephra (AT: 29-26 ka). Since the sediments below these horizons include only the AT volcanic glasses, these horizons are regarded as the eruption of K-Ah. The average sediment accumulation rates are calculated as 0.051 and 0.24 mm/year, and the formations of the ridge-top depressions are 25,000 and 9,400 years ago at the points A and B, respectively. At the point A, peak of AT volcanic glass is recognized at the depth of 110-115 cm, and the formation age of the ridge-top depression is calculated as 31,000 years ago assuming the horizon is the eruption age of AT. The sediments in ridge-top depressions at higher Mino mountain ranges (1,200-1,600 m) yield no AT volcanic glasses. The reasons are now under considerations.

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