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Rainfall induced rockslides with landslide dam at the course of Miyagawa River, Mie Prefecture, Japan

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Heavy rainfall by the Typhoon Meari (No.0421) caused many landslides at the southern and central Mie Prefecture. Landslide dams were formed by large ones of them. Two cases of landslides and dams occurred at the Miyagawa Valley are described, and their characteristics are discussed.

Rockslide occurred at a tributary of Kasugadani has the volume of 330 million cubic meters. Thick chert lies on mudstone accompanied by felsic tuff and sandstone. The strata of the Chichibu Belt are gently tilted to the direction of the slope. The chert layer is loosened and becomes permeable, while the mudstone layer is less weathered and impermeable. It is inferred that such contrast of rock mass characteristics made the sliding surface at the geological boundary. The sliding mass flowed down 1.0 kilometer along the tributary and dammed the stream of Kasugadani. In the transportation area, hummocks with vegetation composed of large chert blocks are distributed. Thus the movement of the mass is inferred to be debris avalanche. The landslide dam has the dimension of 15 meters high and 75 meters wide.

Rockslide at Mochiyamadani has the volume of 300 million cubic meters. Here, porous limestone breccia promoted by weathering collapsed. Mudstone underlies, but it is uncertain whether the sliding surface exists along the geologic boundary or through the limestone breccia. The strata incline to the slope. The rotated sliding mass dammed the stream of Mochiyamadani with 40 meters high and 60 meters wide. Then a part of the sliding mass flowed to 0.5 kilometers with hummocks.

Mechanism of rockslide and movement of debris avalanche are common to the two cases. Also rapid sedimentation of upstream is common including the other cases of landslide dams formed by the rainfall, which implies that the landslides occurred right after the culmination in the state of rich sediment load. Rainfall induced landslides and dams both of the 1889 Totsugawa case and 1953 Aridagawa case were formed a half or two days after the peak of precipitation. The reason why such early collapses occurred in the 2004 Miyagawa case is uncertain. However, influence of antecedent precipitation and earthquake recorded intensity of 4 on JMA scale before 24 days is possible cause.

Keywords: rockslide, landslide dam, heavy rainfall, Typhoon Meari (No.0421), Miyagawa