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The surging of the liquefied lateral flow in the Aratosawa reservoir at the initiation of huge landslide masses triggere

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The Iwate-Miyagi Nairiku Earthquake in 2008 had triggered the huge landslides in the upper reach of Aratosawa reservoir. The initiation of these landslides are closely related to the strong ground motion, the geological setting, the spatial distribution of the old landslide masses, the liquefaction of the ground, and the rise-up of the groundwater after the dam construction. These particular conditions results in a chain of instabilities of mass in the watershed. The initiations of the rapid removal of the valley sediment were the liquefaction and lateral flows of the valleys which resulted in the prompt removals or disappearances of valley sediments. And the instabilities of the foot part of the slope had triggered the huge landslides in the upper reach. The Aratosawa reservoir was constructed and filled up in the year of 1998, this earthquake was the first terrible shaking of foot of the slopes with the 20 meters of groundwater rise-up. These processes were analyzed by the use of the archived observation results of water level of Aratosawa reservoir which had been missing because of power cut just after the main shock. The prompt first rise-up of the water level suggests the propagation of the hydraulic bore generated by the rush-in of the liquefied lateral flow in the reservoir, and the second slow rise-up of the water level corresponds to the creeping intrusion of the huge landslide masses into the reservoir. The density and the velocity of the first liquefied lateral flow were large enough to crash the bridge in upper reach of the Shitsumikukisawa valley.

Keywords: Iwate-Miyagi Nairiku Earthquake, Aratosawa Reservoir, hydraulic bore, liquefaction, landslide