

Effects of Dam Removal on the Riverbed Configuration and Flow-fields- A Case Study of Arase Dam

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Abstract

Dam removal is a world-wide concern now a day. Many dams have been detached so far in the USA. Japan is no exception. Many low dams have recently been taken away from Japan. Arase dam is the first high dam that has recently been removed in Japan. Therefore, the consequences of this high dam removal are no doubt matter of interest and concern to the researchers. Partial removal method was adopted for the purpose and this method was first time applied for dam removal in Japan. When the partial removal started, a gravel bar was formed immediately 200 m away from the downstream. Then the flow is severed into two channels. The main channel was formed at the left side and the secondary channel at the right side. In this study, flow fields were measured at both primary and secondary channels. River bed material survey was conducted, diameter was analyzed and also fine sediment accumulation on the gravel was measured. The flow fields were measured with Acoustic Doppler Current Profiler (ADCP) and Unmanned Aerial Vehicle (UAV). The results show that multi cellular secondary currents exist in the main channel. The secondary channel flow volume decreased over time between 2017 and 2018. The particle size of river bed materials was also decreased and reduction of fine sediment volume was also found. Finally, it might be concluded that the flow at the downstream of the dam were diversified after the dam removal.