

Analysis of interaction between river and groundwater in Kurobe river fan by a grid-based hydrological model

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ABSTRACT

The Kurobe river, which runs through eastern Toyama Prefecture is one of the most famous rivers for wild water because of its steep slope in the range from 1/5 to 1/120. This river forms an alluvial fan in the range up to 13 kilometers from the sea. In this region, significant seepage flow occurs and thus the stream sometimes been intermitted. Moreover, the amount of seepage flow seems to vary with the groundwater level of the region.

To keep the river environment healthy for flora and fauna, especially to conserve good condition for spawning of fishes, an appropriate environmental flow should be maintained in the river. To achieve this target, controlling of the upstream reservoir has to be studied in depth. One of the major problems to decide the amount of water to be released from the reservoir to maintain the environmental flow is to estimate the amount of water leaked into the groundwater from the river. This phenomenon is affected by the river flow rate as well as the groundwater level in the alluvial fan and the conditions vary in space and time. Thus, a grid-based hydrological cycle analysis model NK-GHM has been applied to clarify the hydrological cycle components in this area including seepage/discharge from/to the river.

The model was tested by comparing with river flow rate, groundwater levels and other observations and found that the model described those observations well. Consequently, the seepage from the Kurobe river was found significant but it was also found that the groundwater in this region has been preserved by the recharge from the irrigation water supply into paddy fields in the alluvial fan.

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