

The River-Bed Slope Discontinuity in Alluvial River Channels

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Yatsu (1954) and Yatsu (1955) pointed out for the first time that the river-bed slope discontinuity occurs between a gravel-bed reach and a sand-bed one in an alluvial river. In addition, Kodama and Inokuchi (1986) clarified the fact that the slope discontinuity of the lower Watarase River, Central Japan, occurs within a gravel-bed reach. They stated that the mobility of mixed-size sediments has a great influence on the slope discontinuity in an alluvial river. The purpose of this study is to examine sedimentary structures in some rivers and consider the reason why the slope discontinuity occurs.

We conducted following investigations in 3 rivers (the Kiso River, the Nagara River and the Sendai River) where the slope discontinuity occurs and the Yahagi River where doesn't. According to Kodama (1994), we classified surface sedimentary structures into 4 types and surveyed them by a line grid method with 5 m intervals. Gravel particles on bar surfaces are often in contact with one another, forming an open-work gravel layer (Type1). Surface gravel particles rest on matrix-supported gravel layers (Type2 or 3) and sand-covered areas (Type4).

In the 3 slope discontinuity rivers, Type1 existed upstream but decreased rapidly downstream, while Type2~4 increase rapidly downstream. On the other hand, in the Yahagi River, only Type2~4 existed and Type1 didn't.

Considering these facts, the slope discontinuity which occurs within a gravel-bed reach was and confirmed in the 3 rivers. As bed-load mobility depends strongly on the surface sedimentary structures, slope discontinuity occurs in gravel bed reach in sand starved rivers.

Keywords: river-bed slope discontinuity, bed surface sedimentary structure, The Kiso River, open-work gravel layer, The Sendai River, The Yahagi River