

Landform development of bedrock river focusing on the planform : Laboratory experiments

TSUZUKI, Yuuki^{1*} ; ENDO, Noritaka¹

¹Graduation School of Natural Science and Technology, KU

Generally, development of fluvial landform is known to be strongly affected by surface slope, climate and tectonics. In field study, it is necessary to take accounts of developmental stage of individual rivers when discussing relations between various factors and landforms, because we need distinguish between spatial and temporal variations. In this study, we conducted flume experiments focusing mainly on temporal (developmental) change of bedrock river. The flume was about 1 m square and a weir with a slit at the center was installed at the downstream end to prevent change of base level during the run due to uncontrolled sedimentation. Parameters discussed in this study are initial surface slope, precipitation and tilting rate. Findings are as follows. Temporal increase of drainage area occurred through two stages, which is considered to correspond to the formerly reported two-staged development of channel network. Unlike temporal change of drainage area (drainage area vs. time), the relation between drainage area vs. trunk-stream length for each data of different time in an identical basin fell on a single power function. Number in the range of these functions obtained in this study, was $n = 0.38 \sim 0.83$. The drainage basin under smaller precipitation had a power number (power-law exponent) larger than 0.5, meaning that the basin became elongated longitudinally with its development, which is considered to be because tributaries could not grow largely and laterally owing to smaller precipitation. The drainage basin neighboring a larger basin had also a power number larger than 0.5, which can be attributed to suppression of later growth of basin due to small influx of water.

Keywords: laboratory experiment, bedrock river, precipitation rate, drainage area