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Controls on the extent of sediment cover in bedrock-alluvial channels

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The amount and location of sediment cover in a bedrock-alluvial channel is a key factor that controls the morphological evolution of the channel, sediment transport pathways and channel roughness. The amount of sediment cover is often predicted as a function of relative sediment supply (sediment supply over transport capacity). However, several different forms of this relationship have been produced using a range of different approaches, and there is not yet agreement as to the controlling factors that need to be included. Part of this lack of agreement is because of the need for a more processed-based understanding of the way in which sediment cover is formed and eroded in bedrock-alluvial channels. We start to address this knowledge gap by assessing the factors that control the location of sediment cover in a field setting. We present field data from two channels in the Henry Mountains, USA. The field data includes measurement of channel geometry, slope, sediment cover location, bedrock roughness, grain size and boulder occurrence. Relative sediment supply is estimated by assuming that downstream changes are primarily accounted for by changes in transport capacity, rather than sediment supply. Preliminary results suggest that there is a relationship between local sediment cover extent and relative sediment supply, but that this relationship is altered as a function of local bedrock roughness. We consider the implications of our findings for the form of sediment cover relationships.