Geophysical Research Abstracts
Vol. 19, EGU2017-18273, 2017
EGU General Assembly 2017

Topographic and hydraulic controls over alluviation on a bedrock template

David Milan (1), George Heritage (2), Neil Entwistle (3), and Stephen Tooth (4)

(1) School of Environmental Sciences, University of Hull, Hull, United Kingdom (d.milan@hull.ac.uk), (2) AECOM. Exchange Court, 1 Dale Street, Liverpool, L2 2ET,UK, (3) University of Salford, Peel Building, University of Salford, Salford M5 4WT, UK, (4) Department of Geography and Earth Sciences, Aberystwyth University, Llandinam Building, Penglais Campus, Aberystwyth, SY23 3DB, UK

Bedrock-alluvial anastomosed channels found in dryland rivers are characterised by an over-wide channel cut into the host rock containing a network of interconnecting bedrock sub-channels separated by bedrock influenced interfluve areas. Whilst the channels remain largely free of sediment the interfluves display varying levels of alluviation ranging from bare rock, sand sheets and silt drapes through to consolidated bedrock core bars, islands and lateral deposits. Examination of the sedimentary units associated with the bedrock anastomosed reaches of the Sabie river in the Kruger National Park, South Africa reveal a repeating sequence of coarse sand / fine gravel grading through to silt representing successive flood related depositional units. Unit development in relation to the bedrock template was investigated using pre-flood aerial imagery of bedrock core bar locations and post flood LiDAR data of bedrock anastomosed sites stripped during the 2000 and 2012 extreme flood events. This revealed a propensity for bar development associated with bedrock hollows disconnected from the principal high-energy sub-channels. 2-D morpho-dynamic modelling was used to further investigate spatial patterns of deposition over the bedrock template. Although topographic lows displayed mid-range velocities during peak flow events, these are likely to be preferential routing areas, with sediments stalling in low energy areas on the falling limb of floods. It is also likely that vegetation development plays a fundamental role in the development of alluviated zones, through increasing strength of alluvial units and capturing new sediments. With these results in mind we present a conceptual model for the development of bedrock-core bars, the fundamental unit in bedrock-alluvial anastomosed channels.