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Characteristics of bedrock-alluvial anastomosed rivers: the Mekong River in Cambodia

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The Mekong River is the 12th largest river in the world in terms of its length and mean annual discharge and yet it is poorly investigated. In the north eastern regions of Cambodia the Mekong River develops a multichannel pattern. It is characterised by a complex of intersecting bedrock channels, well vegetated alluvial and seasonally inundated islands, various types of sand bars, numerous bedrock exposures, rapids, waterfalls and deep bedrock pools which can be classified as a large mixed bedrock-alluvial anastomosed river of a tropical monsoonal climate zone. In order to complete a portrait of the river at the high level of details new data on morphology, geology and sediments were obtained during field surveys of a 120 km river section in Cambodia and combined with information from published literature and interpretation of available remote sensing images. This process has enabled to update and clarify knowledge on morphology of observed islands and floodplain, comprehensive geology and tectonic structures, hydrological regime and land cover. Complex analyses of the collected data have distinguished several geomorphological zones accordingly to frequency of morphological elements, the planview configuration of channels and vertical profile characteristics. The occurrence of each zone is a subject of variable controlling factors such as local topography, channel gradient, structural and tectonic elements and intercalating geological units. Evolution of the channel pattern has been considered at both short- and long term time scales. Historical cartographic and remote sensing materials were applied to determine planform channel changes over the last 50 years revealing the channels stability and cases of occasional, local erosion and deposition. The channel network was extracted from vector layers to examine channels and islands width and length parameters, bifurcation angles at the upstream end of islands and to obtain main channel network indices such as braiding intensity and channel sinuosity. In addition, luminescence dating of the sediments from a palaeochannel and the sediments constituting the surfaces of alluvial islands and an adjacent plain elucidate paleo-the development of the Mekong in this region.
Finally, the description of the channel planform and the network metrics provide a quantitative means to describe the distinctive character of the Mekong in comparison with other well known large alluvial anastomosed river systems in similar environmental settings.