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Geomorphic variability and sediment dynamics in small catchments of dryland environments: Application into sand mining

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The understanding of the sediment routing system and source-to-sink dynamics in a catchment is vital as it helps to assess areas undergoing erosion and deposition. This is significant in catchments which undergo active mining activities especially natural sand materials. The role of climate and natural erosional processes is vital in this as mining of sand is also affected by natural replenishment. In present study, we take a case study of a small catchment of 30km length ~ Chharri, situated in arid landscape of Kachchh of western India. Using geomorphic assemblage mapped using remote sensing and field investigation, we identified natural sub-sinks (depocenters) in the Chharri river valley. The investigation was validated by studying sediment profiles of the depocentral landforms in seasonal time series (pre-monsoon and post monsoon sessions). The changes in morphology, sediments accumulations were integrated to assess the natural sand replenishment in areas which had been undergoing mining activity. Based on time series data it was deduced that the small catchments in dry-land environments, the sand production and dynamics is modulated by type of vegetation, pattern in precipitation and human intervention. The results of such source-to-sink study have long-term implications on sand replenishment, mining activity and landscape evolution of such river basins.