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Sediment sourcing based on whole sample- and magnetic inclusion-based magnetic signatures, Burdekin River, NE Queensland

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The sub-catchments of the Burdekin River, NE Australia, subjected to intense cyclonic rainfall and flashy discharge events, produce severe soil erosion and flooding problems. During high-discharge events, the Burdekin entrains, transports and subsequently deposits very large volumes of sediment, both within the channel system and into the Coral Sea. Here, we use newly-developed magnetic methods (on wholesample and magnetic inclusion-based samples) to investigate if magnetic 'fingerprinting' of the river sediments arising from the Burdekin sub-catchments is possible, in order to identify the major sources of erosion. A suite of magnetic measurements was applied to 37 modern channel sand samples (representing seven sub-catchments) and three palaeo-channel sands. Fuzzy c-means cluster analysis of selected, diagnostic magnetic variables was used to identify if sediment packages were magnetically distinctive through space and time. The approach can be extended to identify suspended sediment source signatures and their relationships with the offshore sedimentary record, to examine changes in sediment source through the Holocene.