River red gum response to avulsion

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# ABSTRACT

Flow variance in dryland rivers due to hydroclimatic fluctuation leads to changes in channel-floodplain geomorphology, where both downstream declines in flow and/or high discharge events may give rise to an avulsion (e.g., Hancock and Coulthard, 2011). In these dryland environments, the growth and establishment of vegetation in and near channels is also driven by above and below average rainfall (e.g., Pietsch and Nanson, 2011). Vegetation can reflect, respond to and influence fluvial processes and channel behavior.

Here we show a field study on the relationship vegetation and changes in flow over the long-term, using the stand structure of river red gums (*Eucalyptus camaldulensis*), and the short-term, using instances of imbrication. The study took place at Mundi Mundi Creek, an ephemeral stream in far western NSW which avulsed just over a decade ago, leading to mass recruitment of river red gums along the new channel. To assess channel differences, belt transects were established along a 1km section of the creek. River red gum stem density, diameter at breast height (DBH) and the height of imbricated organic material against trunks were recorded, and trees stratified by DBH into defined aged categories. Topographic mapping was conducted with a DJI drone photogrammetry, and images processed to produce a DEM and extract channel cross sections.

Using river red gums to establish both long and short-term variations to Mundi Mundi’s flow regime, we link the dependence of river red gums on bankfull flows (e.g., Wen et al. 2009) with their capacity to record these flows by imbrication. We show the bidirectional nature of biogeomorphic changes, the avulsion having greater stem density and mean imbrication height than the old channel, and a lesser bankfull depth. We found no observable age class pattern for either channel. Further evaluations are essential to understanding Mundi Mundi and dryland creek flow.

# REFERENCES

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