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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Landscape scale remediation reduces concentrations of suspended sediment and associated nutrients in alluvial gullies of a Great Barrier Reef catchment: evidence from a novel intensive monitoring approach" *by* Nicholas J. C. Doriean et al.

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This manuscript addresses a clear knowledge gap: the evaluation of a remediation technique for alluvial gullies in a tropical setting.

The primary conclusion is given as "The multiple lines of evidence from this water quality study indicate the application of intensive landscape-scale remediation on actively eroding alluvial gullies has the potential to reduce average suspended sediment

concentrations by more than 80%."

This conclusion is made on the basis of a comparison of 2 wet seasons of suspended sediment measurement using 4 different types of water samplers for a single control (3.3 hectares catchment area) and single treated catchment (13.7 hectares catchment area) - noting that 3 treatment catchment areas are labelled in figure 1.

The recent review of gully remediation efficacy of Bartley et al. (2020) demonstrates other similar studies have combined multi-year monitoring, pre-treatment measurement and replication in a range of settings. No study was found to provide a "gold standard" BACI, multi-decadal and replicated study but conclusions and attribution were normal reduced as a result.

I looked for "multiple lines of evidence" but only found the suspended sediment sampling with 4 devices arranged side by side.

The two years of sampling does not enable any assessment of whether the hydrological forcing can be interpreted in terms of long term rainfall variability.

Furthermore this sampling does not necessarily represent the long term (decades) performance of the remediation measures.

The difference in performance between the control and treatment gullies is well-summarised in terms of the suspended sediment concentrations and the particle size distributions. The difference between these measures is then attributed to the treatment effect. While this step is intuitive, it is not formally supported given the many limitations of the methodology as noted above.

Reference: Bartley, R., Poesen, J., Wilkinson, S. and Vanmaercke, M., 2020. A review of the magnitude and response times for sediment yield reductions following the rehabilitation of gullied landscapes. Earth Surface Processes and Landforms. Available at https://onlinelibrary.wiley.com/doi/pdf/10.1002/esp.4963

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