



Subsurface sources contribute substantially to fine-grained suspended sediment transported in a tropical West African watershed, Burkina Faso

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Very few studies are currently available on the relative importance of surface and subsurface sediment sources in the African Environment and these are restricted to areas with pronounced gully erosion. The objective of this study was to evaluate suspended sediment sources in a typical mesoscale West African savanna watershed (580 km²) using sediment source fingerprinting, and to compare the source apportionment estimates using geochemical and radionuclide (¹³⁷Cs, ²¹⁰Pb, ⁷Be) composite signatures. The fingerprinting procedure applied herein incorporates independent statistical tests to identify more than one composite signature and therefore provides a means of evaluating consistency in source predictions, using different combinations of tracers. We showed that subsurface sources categories contributed 43% (geochemistry) and 47% (radionuclides) to the total sediment yield. The good agreement between the two methods reveals strong confidence into the results. Extrapolating our measured contribution of subsurface erosion to areas with similar yields in similar environmental settings, we can assume that subsurface source is a highly important component of sediment loss in large areas of West Africa. Subsurface erosion, primarily associated with bank rather than gully erosion, is likely to increase in the future with projected change in rainfall and runoff. Source tracing studies need to be undertaken more widely across Africa to help mitigation planning for sediment-related problems.