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PROGRAMME AND ABSTRACTS

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$\delta^{13}\text{C}$ provides a robust indicator of the sources of suspended sediment in a tropical river traversing forested and agricultural land

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Degradation of freshwater and marine ecosystems by sediment and associated pollutants is widespread. We set out to determine the sources of suspended sediment, using composite fingerprinting, in the Tully River, which discharges into the Great Barrier Reef lagoon. Samples of suspended sediment combined over a whole wet season were taken from the Tully River and two of its main tributaries. Samples of potential source material were taken from 102 sites covering several land use and geological categories. When all 23 measured properties (mostly total elemental contents) were included in the fingerprint, 50% of the suspended sediment in the Tully River was attributed to sugarcane surface soil, 15% to other land uses, and 35% to channels, which are all in sugarcane growing areas on Quaternary alluvium and colluvium. However, mean relative errors were quite high. When mineral properties were excluded from the fingerprint, land use sources could be discriminated with reduced mean relative errors. $\delta^{13}\text{C}$ separated forest versus sugarcane, and $\delta^{13}\text{C}$ in combination with C:N ratio separated surface soil versus channels. Fingerprints based on organic properties attributed >60% of suspended sediment to channel erosion. The results show that caution is needed when applying and interpreting the composite fingerprinting approach in some environments.

