

Using ^{239}Pu as a tracer for fine sediment sources in the Daly River, Northern Australia

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The Daly River drains a large (52500 km²) and mainly undisturbed catchment in the Australian wet-dry tropics. Commencement of large scale clearing and cropping since 2002 have raised concerns about possible increased sediment input to the River and motivated this study of fine sediment sources. Using ^{239}Pu as a tracer for modern sediments, it is shown that, the fine sediment originates mainly from erosion by gully and channel change. The results of this study indicate surface soil input from sheet erosion of 5-22% for the Daly River and 7-28% for the Douglas River (a tributary of the Daly River) in 2009 vs. 3-6% for the Daly River and 4-9% for the Douglas River in 2005 [1]. The increased inputs of top soil from the cleared land adjacent to the Daly River since 2005 is likely from changes in land use since then i.e., increase in land clearing and cultivation activities. However, channel widening largely as a result of hydrologic change is still the dominant sediment source in this catchment. Channel widening from the collapse of channel banks and the apparent shallowing of bed of the Daly and Douglas, seem to be responses to increased overbank flows.

[1] R.J. Wasson, L. Furlonger, D. Parry, T. Pietsch, E. Valentine, D. Williams, (2010). *Geomorphology* **114**: 161–174.

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