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Contextualising impacts of logging on tropical rainforest catchment sediment dynamics and source processes using the stratigraphic record of an in-channel bench deposit.

W.H. Blake (1), R.P.D. Walsh (2), K. Bidin (3), and K.V. Annammala (3)

(1) School of Geography, Earth and Environmental Sciences, Plymouth University, United Kingdom (william.blake@plymouth.ac.uk), (2) Department of Geography, Swansea University, United Kingdom, (3) School of Science and Technology, Universiti Malaysia Sabah, Malaysia

While rivers draining tropical rainforested catchments are considered to be relatively stable in terms of their hydrological regime, forest disturbance due to logging can lead to extreme, non-linear responses in both flow and sediment load. With growing concern regarding the downstream impacts of enhanced sediment loads and, in particular in tropical regions, the impacts on coastal habitats, data are required to set recent human impacts on drainage basin response into a longer-term natural response context. Landforms that are constructed incrementally by fluvial processes offer sedimentary archives of river basin sediment responses to disturbance. In this regard, floodplain deposits have been used extensively, but less attention has focussed on mid-catchment lateral channel bench deposits. This study reports the stratigraphic record of a mid-catchment lateral bench deposit in the rotationally logged Segama catchment in eastern Sabah, Malaysian Borneo. Accretion rates derived from fallout radionuclide depth profiles (excess Pb-210 and Cs-137) indicate a significant increase in accretion rates since the 1980s when logging operations began and peaks in accretion match known periods of intensive disturbance. Within this framework, downcore profiles of mineral magnetic and geochemical properties are used to infer switches in sediment source from surface/near-surface (slopewash and pipe erosion) to deeper subsurface (landslide) processes in line with the impact of logging operations. The wider role of in-channel bench deposits as sediment stores in disturbed tropical rainforest catchments is considered.