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# Long-term multi-scale changes in erosion and sediment transport with rotational selective logging in the Segama catchment, Sabah

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The upper parts of the Segama catchment form part of a tropical rain forest area that is selectively logged in annual coupes on a rotational basis as part of a sustainable forest management policy, but also contains an area of protected primary forest (the Danum Valley Conservation Area - DVCA). Two small catchments, one selectively logged in late 1988/early 1989 and one under primary forest in the DVCA, have been instrumented to measure river flow and sediment transport since mid-1988. Flow and sediment transport of the much larger upper Segama has been assessed since 1985. Slope erosion has been assessed using the repeat-measurement erosion bridge technique at over 100 sites within the logged catchment and the primary forest DVCA since installation at various dates (principally in 1990, 1995 and 1998-99). The instrumentation at the three catchment stations was upgraded in late 2002 or early 2003 with the installation of Analite turbidity sensors; Campbell Scientific conductivity/temperature and water depth sensors; data loggers recording these parameters every 15 minutes; and ISCO automatic water samplers triggered when threshold suspended sediment values from the Analite sensors were exceeded. The paper 1) assesses long-term changes in slope erosion and sediment transport inhe small logged catchment as forest regrowth has progressed; 2) draws comparisons with the slope erosion rates and sediment dynamics of the primary forest catchment; and (3) assesses changes in sediment transport along the Segama, particularly in response to selective logging in part of the headwaters area in 1999. Differences in the role of extreme events in erosion and sediment transport at the various slope/catchment scales studied and between primary and selectively logged terrain and catchments are examined. Changes in the relative importance and spatial pattern of sediment sources within the small selectively logged catchment with increasing time since logging are also described and discussed.

Keywords: Sediment transport, extreme events, Segama, Danum Valley, Sabah, slopewash, landslides, punctated recovery, tropical rain forest, selective logging