

## **Effects of different land-use on suspended sediment dynamics in Sabah (Malaysian Borneo) – a view at the event and annual timescales**

### **ABSTRACT**

Suspended sediment concentrations (SSC) and the duration of high SSC are important for river ecology and water resource conservation. Using annual and storm-event datasets, this paper explores the hypothesis that key suspended sediment variables increase along a land-use disturbance gradient in hilly terrain in Sabah (Malaysian Borneo). Five small (1.7–4.6 km<sup>2</sup>) catchments of increasing disturbance history – primary forest, old growth virgin jungle reserve, twice-logged forest, multiple-logged forest and mature oil palm – were instrumented from late 2011 with dataloggers and sensors to record river stage, turbidity and rainfall. The oil palm catchment had 4–12 times greater mean discharge-weighted SSC (587 mg L<sup>-1</sup>), annual sediment yield (1128 t km<sup>-1</sup> y<sup>-1</sup>), median event peak SSC, and duration of SSC above 1000 mg L<sup>-1</sup> than in the other catchments. The multiple-logged catchment (last logged around 2004) has SSC characteristics close to values for primary forest, possibly due to increased ground protection against erosion afforded by low understory regrowth and/or depletion of erodible sediment by multiple logging episodes. Results demonstrate that in hilly terrain even heavily logged rainforest has high value in safeguarding water quality and reducing erosion, whereas oil palm requires careful land management, especially of road runoff and ground cover.