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Landslides and Sediment Production in Headwater Streams in Hong Kong

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Abstract:

Landslides commonly occur on undeveloped hillslopes in Hong Kong. Studies of landslides on "natural terrain" are increasingly providing budgets of active debris through the landslide scar and, in some cases, into the stream system. These data are reviewed and two case studies of landslide debris entering the fluvial system are reported. In the first case study, two small landslides of around 50 m³ and 7 m³ volume occurred above a stream sediment monitoring station in, 2001 and 2003 respectively. Measurements of suspended sediment concentration made during the storm events that generated the landslides, along with observations on sediment colour and C and N content, indicate that the suspended matter in streamflow was derived from the landslides, evidencing the connectivity of hillslope and channel systems. Estimates of the volume of failed material when compared to those of deposition revealed that much of the debris from the landslides remained on the slope in the drainage line. The second case study is in a 0.38 km² upland drainage basin on the western slopes of Ping Fung Shan with the drainage system flowing westwards into the Hok Tau Reservoir in the Pat Sin Leng Country Park. In the second case study debris from a 1600 m³ landslide formed a delta of approximately 200 m³ upon entering a reservoir after a storm in September, 1993. The relative paucity of fines in the delta and in the 200 m of stream channel support the idea of selective transport of material away from the failure.

Information obtained from 451 landslides recorded in the Natural Terrain Landslide Inventory for the area centered on Tai To Yan in the New Territories reveals that not all landslides deliver sediment to the drainage system. Only 151 slope failures were classified as delivering sediment to the drainage system. It should also be noted that other potential controls upon sediment production in headwater drainage basins include hill-fires.