



The role of livestock-poached pasture as a sediment source

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Historically, the occurrence of sediment-laden runoff has almost exclusively been associated with cultivated hill-slopes and particularly with arable land. This association was commonly accompanied by the presumption that, in comparison with cultivated slopes, erosion from intensively-managed lowland pasture was relatively low. Recent developments in sediment source tracing and fingerprinting techniques have, however, challenged these assumptions by demonstrating that soil loss from grasslands may be greater than previously assumed. In attempting to identify potential source areas within grassland environments, attention has frequently focused on areas of livestock poaching where herd animals tend to congregate. However, the role of poached grassland as a sediment-source remains uncertain. Reasons include the difficulties associated with accurately documenting the movement or redistribution of small quantities of fine sediment over relevant spatial and temporal scales. Motivated by an urgent need for such information, this communication presents preliminary results from a tracing study aimed at measuring sediment redistribution within areas of poached pasture over short (i.e. event-based) timescales using the artificial radionuclides, caesium-134 (^{134}Cs) and cobalt-60 (^{60}Co). The approach involved labelling six small areas (0.2×0.2 m) of poached soil, each with a contrasting gradient, with either ^{134}Cs or ^{60}Co , and then measuring changes in the radiometric inventory at predetermined points before and after periods of rainfall. Each labelled area of poached pasture was measured on three separate occasions over a 65 day period. At the end of the monitoring phase, the mean net soil redistribution depth (mm) was negative for all plots, with values ranging from -6.8 mm to -15.2 mm. This is interpreted as evidence of the removal, or erosion, of surface material. The findings indicate that areas of livestock-poached pasture can act as significant sediment sources. These findings are discussed with regard to the potential contribution of poaching to the off-site transfer of fine-sediment from affected grasslands, and to the implications for the water quality of receiving streams.