K O L L O Q U I U M

Institut für Hydrologie, Albert-Ludwigs-Universität Freiburg

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Sediment production from forest roads

Forest roads have the potential to produce large amounts of sediment and can impact water quality and aquatic ecology. Fine sediment on road surfaces is generally derived from the breakdown of surface material and/or the upward forcing of fine-grained sediment from the road bed as traffic pushes the surface material into the bed. Runoff from the road can transport the sediment to nearby streams. Despite an increasing number of studies quantifying sediment generation from forest roads, there is no agreement on the dominant controls and physical processes affecting the amount of sediment generated from forest roads. Current datasets and models also tend to be restricted to a few study sites.

We did 24 large-scale rainfall simulation experiments on a forest road section in the Honna Watershed, Haida Gwaii, British Columbia, Canada, to examine the controls on the amount of sediment generated from forest roads during different rainfall and traffic conditions. The results from the experiments showed that precipitation intensity controled the amount of sediment generated from the road. The number of passages of loaded logging trucks during an experiment was the second most dominant control. Elevated sediment concentrations in road surface runoff persisted for 30 minutes following the passage of a loaded logging truck during low intensity rainfall events and for shorter times at higher rainfall intensities. Measurements of sediment concentrations in the Honna River showed that 5-35% of the annual sediment yield of the Honna River is derived from forest roads and that small tributaries frequently lack sufficient discharge to dilute sediment that comes from ditches or road crossings.