



Evaluating woody material transport and deposition in alpine rivers and deducing risk mitigation approaches

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The impact levels of recent flashflood events in Switzerland and Western Austria in 2005 have significantly been accentuated by a considerable amount of transported woody material. As a consequence, either protection measures or bridges suffered considerable damage. Furthermore, cross-sectional obstructions due to woody material entrapment caused unexpected floodplain inundations resulting in severe damage to elements at risk. Until now, these woody material transport phenomena are neither sufficiently taken into account nor systematically considered, leading to a decrease in prediction accuracy during the procedure of hazard mapping. To close this gap, a procedure is proposed that (1) allows for the estimation of woody material recruitment from wood covered bankslopes and floodplains within the perimeter of the considered extreme flood event; and (2) permits the analysis of, the disposition for woody material entrainment and transport to selected critical configurations along the channel. The proposed procedure had been implemented into an ArcGIS-environment and provided indications for potential accentuation of flood hazards due to the transport of woody material. Results from a case study suggested the general applicability of the concept. The computational results can be used to devise effective risk mitigation strategies that comprise: (1) selective woody material volume reduction within the source areas, (2) thinning measures to increase the elasticity of the forest structure, (3) preventive interception of transported woody material and (4) redesign of the critical configurations.