E05

# Impact of road generated runoff at a zero-order basin scale

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The impact of road-generated runoff on the hydrological response of a zero-order basin was monitored for a sequence of 24 storm events. The study was conducted in a zero-order basin influenced by a mountain road (C1; 0.5ha). Since pre-road runoff data were not available the result from the adjacent natural zero-order basin (C2; 0.2 ha), sharing similar lithology and environmental conditions, were used to simulate the hydrological behavior of the affected zero-order basin before the installment of the road. The impact of the road at the zero-order basin scale was highly dependent on the antecedent soil moisture condition, total precipitation and to some extent on the rainfall intensity. At the beginning of the monitoring period during dry antecedent conditions, road generated runoff contributed 50% of the total runoff and 70% to the peak flow from the affected catchment (C1). The response from the natural catchment was insignificantly small during dry antecedent conditions. As soil moisture conditions increased the impact of the road on the total runoff from the disturbed catchment was less prominent. For the very wet conditions the influence of the road-generated runoff on total outflow from the disturbed catchment diminished to only 5.4%. This increase in wetness was limited to changing the timing and magnitude of peak discharge. Both the disturbed and the natural catchments produced an equivalent amount of outflow .for very wet antecedent conditions on a unit area basis. The lag time between the rainfall and runoff peak observed in the natural catchment for the monitored period ranged from none to 4 hours of delay depending on the amount of precipitation and antecedent conditions, mainly owing to much slower subsurface flow pathways in the natural zero-order basin. In contrast, the lag time in the roaded zero-order basin was virtually nil. In contrast to previous studies, our findings indicate that the impact of road generated runoff on peak flows from smaller linked basins would be greatest during dry antecedent soil moisture conditions.