



Tracing overland flow

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Certainly, it should not be assumed that fast runoff is always the result of overland flow or surface runoff on the hillslopes of a catchment. However, for short duration storm events within small alpine catchments this assumption often is correct. Under these conditions overland flow processes take part significantly in the formation of the hydrograph.

In this paper we report on the results of numerous experiments with a transportable spray irrigation installation which were performed on a great variety of soil-vegetation complexes as a means of aiming at better insight in the nature of surface flow processes. Flow paths, travel distance, infiltration hindrance, flow resistance and overland flow velocity have been investigated during these experiments, and detailed analyses of the soil vegetation complex on the experimental plots were carried out.

Frequency analysis of plants yields vegetation distribution patterns due to ecological plant requirements. Some of these patterns allow to identify flow paths at the plot scale tracing soil conditions with frequently high soil water content. The distribution of plant species therefore can be used as an environmental tracer to track concentrations of overland flow.

Standard salt / dye tracer methods during the rain simulation experiments deliver information about flow velocity and thus hydraulic resistance and roughness of the surface. Differences in vegetation cover combined with varying ways and intensities of cultivation indicate obvious varieties in surface runoff velocity. These results come up with a more detailed classification of roughness values for alpine vegetation/soil units. An accurate estimation of surface roughness is an essential requirement for computation of time of concentration of surface runoff.

The experiments with different rain intensities (between 10 and 100 mm h⁻¹) have shown that surface runoff is strongly influenced not only by the soil and vegetation conditions but also by the rainfall intensity. Thus, surface runoff can also be correlated to rainfall intensity.