



Experimental investigation of runoff processes in a small catchment in the Chilean Andes - Can point data of soil moisture with high temporal resolution help us to understand rainfall runoff response?

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Extensive land use changes in Southern Chile have the potential to increase risk of floods, erosion, nutrient loss and eutrophication. In order to estimate this risk detailed knowledge and understanding of rainfall-runoff response mechanisms in disturbed as well as undisturbed catchments is mandatory. Our field investigations concentrate on a catchment (approx. 6 km²) without anthropogenic intervention in order to understand the system in its natural state. The research area is situated in the Reserva Nacional Malalcahuello in the Precordillera de los Andes (Región de la Araucanía). The catchment is located on the southern slope of the Volcán Lonquimay. Important characteristics of the catchment include native forest with a dense understory of bamboo, steep slopes and young, little developed volcanic ash soils with high hydraulic conductivities. Measurements of discharge, soil moisture and ground water dynamics, rainfall, throughfall and soil physical parameters are carried out to determine the relevant runoff processes. For a better characterization of the subsurface intrusive methods (augering/soil pits/core sampling) as well as non-intrusive methods (electrical resistivity) were employed. In this presentation we will focus on the use of point data of soil moisture for a better understanding of rainfall runoff response. Soil moisture was measured in 6 depths in 10 minute intervals in three locations along a hillslope and in irregular time intervals at 11 other points on the same slope. A novel colour map presentation of the resulting time series allows for easier detection of temporal and spatial patterns. The resulting data set indicates that preferential flow and lateral flow components could be of importance in this catchment. Hydrophobicity seems to have

an effect after extended dry periods. Response lags of soil -, ground - and stream water also imply that fast processes dominate the reaction to rainfall events.