

Validation and interpretation of spatial soil-water modelling in the tropical subcatchments of Mae Chaem basin

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Abstract The characteristics and implications of spatial soil moisture variation and the occurrence of saturation excess runoff in catchments are significant for understanding the behaviour of the catchments and for land management. The distribution of water content in space at the soil surface had been investigated on the small subcatchments of Mae Chaem basin with two field surveys corresponding to different moisture statuses. For each survey, more than 250 measurements of soil moisture spaced 20 m apart were collected along the axes parallel to the greatest slope for analysis of soil moisture spatial variability. A Time Domain Reflectometry (TDR) probe was used to measure the average soil moisture to determine soil moisture conditions for rainfall–river flow modelling. A geostatistical analysis was then performed to examine the soil moisture for spatial characteristics. Kriging indicated that the areas on the boundary of the catchment had small soil moisture values. The plateaux situated between the valleys were characterised by mean values. In the valleys, the soil moisture values were high. The TOPMODEL simulation provided the reality of modelled saturated areas as checked by the spatial soil moisture measurements. The value of saturated areas given by the TOPMODEL simulations on the same days of the field survey for Huai Daf was 29–42%, and for Huai Pacha was 24–52% of the catchment areas. It can be concluded that there was potential for saturation to occur along the stream channels and in the valley.

Key words spatial soil–water modelling; tropical catchment
