



Changes in catchment-scale water fluxes due to time-variant soil hydraulic properties in a subtropical agricultural watershed

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In agricultural landscapes, temporal fluxes in hydraulic properties due to tillage, grazing, crop root growth and cycles of wetting and drying influenced by irrigation, could have large impacts at catchment scale. These effects are particularly evident in tropical climates where long periods of drought are followed by intense rainfall that greatly exceeds the infiltration capacity of the soil. This work explores the impact of the seasonal development of crops and the shifts in time between crop types on soil physical properties and the relative changes in the probability distribution of the water storage and fluxes dynamics. We focussed on an agricultural catchment in south east China where the climatic conditions include periods of droughts and heavy rainfall. Using coupled 1-dimension and semi-distributed catchment modelling combined with basic water balance data and both on-site and literature values for soil and crop properties, we investigated the impact of soil physical changes in the root-zone of the soil over different time scales ranging from daily to annual. Our results also showed that the resulting time-variant spatial patterns in soil water storage and flow had an impact on the integrated catchment runoff response at different times of the year.