



Seasonality in meteorological forcing and nonlinear hydrological response explain bimodal soil moisture distribution

A.J. Teuling (1), P.A. Troch (1) and **R. Uijlenhoet** (1)

(1) Wageningen University, Chair of Hydrology and Quantitative Water Management
(Ryan.Teuling@wur.nl)

In a recent study (D'Odorico and Porporato, 2004, PNAS, 101(24)) it was suggested that the observed bimodality of summer (May-September) soil moisture in Illinois reflects two preferential states resulting from a soil moisture-precipitation feedback. However, other studies have not been able to provide convincing evidence for the existence of such a strong soil moisture-precipitation feedback in this region. Here we show that non-stationarity in the meteorological conditions during the Illinois summer in combination with the non-linearity of the soil moisture loss function also leads to the observed bimodality. We argue that this bimodality is a consequence of the Illinois climate, and that the observed bimodality is not necessarily the result of a strong soil moisture-precipitation feedback.