Geophysical Research Abstracts, Vol. 9, 00894, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00894

Modelling spatial patterns of saturated areas: a comparison of the topographic wetness index and a distributed model

T. Grabs (1), J. Seibert (2), H. Laudon (3)

(1) Dept. of Physical Geography and Quaternary Geology, Stockholm University, Sweden, (2) Dept. of Physical Geography and Quaternary Geology, Stockholm University, Sweden, (3) Dept. of Ecology and Environmental Science, Umea University, Sweden (thomas.grabs@natgeo.su.se / Phone: +46-8-6747866)

The spatial distribution of saturated areas within a catchment is a key factor to understanding and predicting hydrological response and stream water quality at the catchment scale. The topographic wetness index (TWI, ln(a/tan(beta))) is a widely used measure for assessing the spatial distribution of wetness conditions and only requires distributed elevation data as input. The predicted pattern is constant in time because the index is a static representation of the landscape. In this study we examined the predictions of saturated areas using this static topographic wetness index and compared the spatial predictions with temporally aggregated simulations of a distributed hydrological model. The model was calibrated against discharge measured at the outlet and at two internal points of a small forested catchment in northern Sweden. After calibration the model was applied to a larger 68 km2 catchment which included the subcatchment used for calibration. The dynamic groundwater level simulations of this model were temporally aggregated into dynamic indices. These indices were compared to the static topographic wetness index (TWI). We used the ability to spatially predict the occurrence of wetlands as a validation of the static and dynamic indices. First results indicate that the dynamic approach is superior to the static TWI.