



## **Distributed assessment of contributing area and riparian buffering along stream networks: a new approach to separate contributions from different sides**

T. Grabs (1), **J. Seibert** (1), K. Jencso (2), B. McGlynn(2)

(1) Department of Physical Geography and Quaternary Geology, Stockholm University (thomas.grabs@natgeo.su.se, jan.seibert@natgeo.su.se) (2) Department of Land Resources and Environmental Sciences, Montana State University

Due to their position and distinct hydrological and biogeochemical properties, riparian zones are key landscape elements for understanding stream hydrologic response and water quality at the catchment scale. There is increasing interest in assessing the hydrological and biogeochemical buffering capacity of riparian zones with indices derived from hydrologic landscape analysis of digital elevation data. Upslope accumulated area (UAA) is a commonly used surrogate for lateral water flows. Variations of UAA along the stream network can be used to describe the spatial variation of lateral inflows to riparian zones and streams. However, riparian zones are, by their very nature, on two sides of the stream and hence it is necessary to distinguish between UAA inflows on each side. In this study we propose a new algorithm to solve this problem. This new method significantly affects variations of UAA along stream networks and the values and distributions of secondary topographic indices, including the riparian-hillslope buffer ratio. We describe the new algorithm and illustrate the importance of distinguishing between lateral inflows on each side of streams. Water table and UAA data from the 22 km<sup>2</sup> Tenderfoot Creek catchment, Montana, demonstrated clearly the importance of the new method. Only when contributions from the two sides were separated, were UAA values able to predict the hydrological connection between hillslope and riparian water tables as observed in 24 transects along the stream network.