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Benjamin M.C. Fischer, Ilja van Meerveld, Jan Seibert

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# SPATIAL VARIABILITY IN THE ISOTOPIC COMPOSITION OF RAINFALL IN A SMALL HEADWATER CATCHMENT AND ITS EFFECT ON HYDROGRAPH SEPARATION

Benjamin M. C. Fischer<sup>1</sup>, Ilja van Meerveld<sup>1</sup> and Jan Seibert<sup>1,2</sup>

[1] Department of Geography, University of Zurich, Winterthurerstrasse 190, CH-8057 Zurich, Switzerland Tel.: +41-44-63 55227, Fax.: +41-44-63 56841, corresponding author: benjamin.fischer@geo.uzh.ch

[2] Department of Earth Sciences, Uppsala University, Sweden

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## ABSTRACT

Isotope hydrograph separation (IHS) is a valuable tool to study runoff generation processes. To perform an IHS, samples of baseflow (pre-event water) and streamflow are taken at the catchment outlet. For rainfall (event water) either a bulk sample is collected or it is sampled sequentially during the event. For small headwater catchment studies, event water samples are usually taken at only one sampling location in or near the catchment because the spatial variability in the isotopic composition of rainfall is assumed to be small. However, few studies have tested this assumption. In this study, we investigated the spatiotemporal variability of the isotopic composition of rainfall and its effects on IHS results using detailed measurements from a small pre-alpine headwater catchment in Switzerland. Rainfall was sampled sequentially at eight locations across the 4.3 km<sup>2</sup> Zwäckentobel catchment and stream water was collected in three subcatchments (0.15, 0.23, and 0.7 km<sup>2</sup>) during ten events. The spatial variability in rainfall amount, average and maximum rainfall intensity and the isotopic composition of rainfall was different for each the different event. There was no

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