

EGU2020-9078

<https://doi.org/10.5194/egusphere-egu2020-9078>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## Early European Observations of Precipitation Partitioning by Vegetation: A Synthesis and Evaluation of 19th Century Findings

Jan Friesen<sup>1</sup> and John T. Van Stan II<sup>2</sup>

<sup>1</sup>Helmholtz Centre for Environmental Research - UFZ, Catchment Hydrology (CatHyd), Leipzig, Germany (jan.friesen@ufz.de)

<sup>2</sup>Georgia Southern University, Statesboro, GA, USA (jvanstan@georgiasouthern.edu)

The first contact between precipitation and the land surface is often a plant canopy. The resulting precipitation partitioning by vegetation returns water back to the atmosphere (evaporation of intercepted precipitation) and redistributes water to the subcanopy surface as a “drip” flux (throughfall) and water that drains down plant stems (stemflow). Prior to the first benchmark publication of the field by Horton in 1919, European observatories and experimental stations had been observing precipitation partitioning since the mid-19th century. In this paper, we describe these early monitoring networks and studies of precipitation partitioning and show the impressive level of detail. Next to a description of the early studies, results included in this synthesis have been digitized and analyzed to compare them to recent studies. Although many early studies lack modern statistical analyses and monitoring tools that have become standard today, they had many strengths (not necessarily shared by every study, of course), including: A rigorous level of detail regarding stand characteristics (which is often lacking in modern ecohydrological studies); high-resolution spatiotemporal throughfall experiments; and chronosequential data collection and analysis. Moreover, these early studies reveal the roots of interest in precipitation partitioning processes and represent a generally forgotten piece of history shared by the hydrology, meteorology, forestry, and agricultural scientific communities. These studies are therefore relevant today and we hope modern scientists interested in plant-precipitation interactions will find new inspiration in our synthesis and evaluation of this literature.