

EGU2020-14822

<https://doi.org/10.5194/egusphere-egu2020-14822>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Uncertainty of evapotranspiration fluxes measured with eddy covariance

Felix Pohl¹, Anke Hildebrandt^{1,2}, Ulrike Werban¹, and Corinna Rebmann¹

¹Helmholtz Centre for Environmental Research, Leipzig, Germany

²Friedrich Schiller University Jena, Institute of Geoscience, Jena, Germany

The project MOMENT (Model Monitoring EveNTs) investigates the interplay between carbon and water cycles with special focus on the impacts of drought and heatwaves as well as their long-term trends. This project aims to investigate new monitoring and modeling methods to explain the interplay between carbon and water cycles of ecosystems on different time and spatial scales.

To achieve this goal, we need reliable information about the ecosystem and its drivers. We measure, for example, mass and energy exchange between the ecosystem and the lower atmosphere with the eddy covariance method, which allows us to obtain data on a half-hourly scale. Nevertheless, unfavorable weather conditions, as well as malfunctions of the instruments, can lead to a serious amount of data gaps. Different gap-filling methods are available, with the Marginal Distribution Sampling (MDS) by Reichstein et al. (2005) being the most common one. Here, we investigate, how different filling approaches influence the uncertainty of evapotranspiration (ET) data for a German forest. We especially focus on the imputation of evaporation from intercepted canopy water, because open-path EC systems rarely work correctly during and after rain events.

Even though the EC technique is a well-established method to measure ET at the ecosystem level, many approaches require rather the share of transpiration, such as the validation of some ecosystem models. Partitioning ET into its components is difficult due to the manifold drivers involved, and measuring ecosystem transpiration is challenging due to measurement limitations and assumptions, that have to be made. Therefore, we examine the possibility to retrieve information about the share of transpiration by using EC data only without additional measurement campaigns.

Reference:

Reichstein, M. et al.: On the separation of net ecosystem exchange into assimilation and ecosystem respiration: Review and improved algorithm, *Glob. Chang. Biol.*, 11(9), 1424–1439, doi:10.1111/j.1365-2486.2005.001002.x, 2005.