



New gap-filling and partitioning technique for H₂O eddy fluxes measured over forests

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The continuous measurement of H₂O fluxes using the eddy covariance (EC) technique is still challenging for forests because of large amounts of wet canopy evaporation (EWC), which occur during and following rain events when the EC systems rarely work correctly. We propose a new gap-filling and partitioning technique for the H₂O fluxes: a model-stats hybrid method (MSH). It enables the recovery of the missing EWC in the traditional gap-filling method and the partitioning of the evapotranspiration (ET) into transpiration and (wet canopy) evaporation. We tested and validated the new method using the datasets from two flux towers, which are located at forests in hilly and complex terrains. The MSH reasonably recovered the missing EWC of 16 ~ 41 mm year⁻¹ and separated it from the ET (14 ~ 23% of the annual ET). Additionally, we illustrated certain advantages of the proposed technique, which enables us to understand better how ET responses to environmental changes and how the water cycle is connected to the carbon cycle in a forest ecosystem.

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