

## New gap-filling and partitioning technique for H<sub>2</sub>O eddy fluxes measured over forests

Minseok Kang (1), Joon Kim (2,3,4), Bindu Malla Thakuri (5), Jung Hwa Chun (6), and Chunho Cho (7)

(1) National Center for AgroMeteorology, Seoul, South Korea (ms-kang@ncam.kr), (2) Program in Rural Systems Engineering, Department of Landscape Architecture & Rural Systems Engineering, Seoul National University, Seoul, South Korea (joon@snu.ac.kr), (3) Interdisciplinary Program in Agricultural & Forest Meteorology, Seoul National University, Seoul, South Korea (joon@snu.ac.kr), (4) Institute of Green Bio Science and Technology, Seoul National University Pyeongchang Campus, Pyeongchang, South Korea (joon@snu.ac.kr), (5) Department of Atmospheric Sciences, Yonsei University, Seoul, South Korea (aasthamalla@gmail.com), (6) Department of Forest Conservation, National Institute of Forest Science, Seoul, South Korea (chunjh69@korea.kr), (7) National Institute of Meteorological Sciences, Seogwipo, South Korea (choch0704@korea.kr)

The continuous measurement of H<sub>2</sub>O 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 H<sub>2</sub>O 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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