**A New Gap-Filling Strategy for Evapotranspiration - Application to the Multi-Year Observation at the Gwangneung Forests**

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Under wet canopy conditions, surface conductance becomes infinity and evaporation approaches its potential rate. Even though the characteristic of energy partitioning under wet canopy condition is different from that under dry condition, current gap-filling method for evaporation is usually applied without distinction of wet canopy condition. In our previous (i.e., from September 2007 to August 2008) analysis in Gwangneung deciduous and coniferous forests (i.e, GDK and GCK, respectively), we reported that wet canopy evaporation ($E_{WC}$) estimated by a traditional (modified lookup table, MLT) gap-filling consistently and significantly underestimated those estimated using $E_{WC}$ numerical model (i.e., the algorithm of Variable Infiltration Capacity land surface model (VIC LSM)) due to the failure of considering aerodynamic coupling, advection of sensible heat, and heat storage. Accordingly, a different gap-filling strategy based on canopy wetness conditions is proposed as follows. As a first step, calculate the intercepted canopy water ($W_c$) using the $E_{WC}$ algorithm of VIC LSM. Then, fill in all the missing gaps using the gap-filling method (e.g., MLT) in which only the data from dry canopy conditions (i.e., when $W_c$ = 0). Then, for wet canopy conditions (i.e., when $W_c$ > 0), replace the gap-filled data with the sum of $E_{WC\_VIC}$ and the gap-filled data multiplied by $1-(W_c/S)^n$ (i.e., contribution from transpiration; where $S$ is the canopy storage capacity, and $n$ is an empirical coefficient). The application of the proposed new gap-filling strategies would improve the reliability of the gap-filled ET. In this study, we tested the new gap-filling strategy to the multi-year dataset from 2006 to 2010 at the GDK and from 2007 to 2010 at the GCK.

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