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Simulating Evapotranspiration in Green roofs using a Multifractal approach

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Abstract

Several equations and their simplified versions already exist for estimating evapotranspiration. Still, the practical difficulty in using them is that they contain too many variables and empirical parameters including some non-atmospheric vegetation-based ones which may not be appropriate for all plant types. Therefore, a simple empirical equation is suggested here to approximately estimate evapotranspiration loss in a deterministic manner as a function of the green roofs water content, ambient air temperature, wind speed, relative humidity, and total net radiation flux. For nonlinear processes such as evapotranspiration clearly, such deterministic estimates are not representative of the extreme values observed in evapotranspiration losses. Therefore, a universal multifractal-based simulation procedure is proposed here to improve such deterministic estimates, so that the simulated evapotranspiration loss has realistic intermittency and temporal scaling behaviour, while preserving its diurnal variability.

Keywords

Multifractals, Non-linear geophysical systems, Cascade dynamics, Scaling, Hydrology, Meteorology.