Measuring the Dynamic Flow of Water in the Soil-Plant-Atmosphere Continuum: Case of Young Model Trees. (A03-steppe054728-Oral)

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Abstract:

The plant compartment in the SPAC models cannot longer be regarded as a simple pathway for stationary water flow (e.g. rigid tube with equal input and output). An experimental set-up was designed to gather the experimental data needed to design a more realistic and dynamic model, incorporating the variable water flow patterns (including storage). The set-up permits step changes of the microclimate (radiation, vapour pressure deficit and temperature) around young model trees (Fagus sylvatica L. and Quercus robur L.). The plant-water responses are deduced from the transpiration rate (measured at leaf level with a branch-bag), the sap flow rate at stem, branch and root level (measured with sap flow sensors) and the diameter fluctuations at stem and branch level. The analysis of the data has already shown the true dynamic nature of the plant-water relations in young model trees, such as a time lag between the water uptake by the roots and the water loss by the leaves, the water storage capacity of the model trees and the use and refilling of the internal water reservoirs. This data set is now used to design a model for non-stationary flow of water in the SPAC.

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