

GENERAL INFORMATION

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ABSTRACT

Although the spatial variability of throughfall (TF) in forest ecosystems can have important ecological implications, little is known about the driving factors of within-stand TF variability, particularly in deciduous forests. While the spatial variability of TF water amount and H⁺ deposition under a dominant beech (*Fagus sylvatica* L.) tree was significantly higher in the leafed period than in the leafless period, the spatial TF deposition patterns of most major ions were similar in both periods. The semi-annual TF depositions of all ions other than H⁺ were significantly positively correlated ($r = 0.68\text{--}0.90$, $p < 0.05$) with canopy structure above sample locations throughout the entire year. The amounts of TF water and H⁺ deposition during the leafed period were negatively correlated with branch cover. We conclude that the spatial heterogeneity of ion deposition under beech was significantly affected by leaves in the growing period and by branches in non-foliated conditions.

MATERIALS & METHODS

study area	5n (scientific zone, measuring tower)
time period	04/03/2003–04/03/2004
goal	<ul style="list-style-type: none"> - quantification of the spatial heterogeneity of TF water amount and ion deposition to the forest soil under a beech canopy - study of the temporal stability of spatial TF input - study the relationship between TF and canopy characteristics
set-up	a dominant beech tree <ul style="list-style-type: none"> - leaf emergence, fully leafed period, leaf senescence, leafless period - throughfall: 12 collectors (Fig. 5.1 p 71, Staelens_2006_PhD) measuring tower: wet-only and bulk precipitation (tipping bucket and manual rain gauges)
data collection	precipitation & TF: weekly (04/03/2003–04/03/2004) biweekly analysis: pH, conductivity, NO ₃ , SO ₄ , PO ₄ , Cl, NH ₄ , K, Ca, Mg, Na canopy cover and PAI during leafed and unleafed periods
remarks	Chapter 6 of Staelens_2006_PhD

RESULTS

The spatial variability was highest for H⁺ and NH₄⁺; intermediate for SO₄, Mg, K, and Ca; and lowest for NO₃, Na, and Cl. The spatial heterogeneity of ion deposition showed a high temporal stability during the leafless season, was similar for ions associated with dry deposition and canopy leaching, and was closely and positively correlated with the local canopy cover and plant area index.