

Mechanisms and Effects of Pollutant-Transfer into Forests

edited by

H.-W. GEORGII



Kluwer Academic Publishers

Mechanisms and Effects of Pollutant-Transfer into Forests

*Proceedings of the Meeting on
Mechanisms and Effects of Pollutant-Transfer into Forests,
held in Oberursel/Taunus, F.R.G., November 24-25, 1988*

edited by

H.-W. GEORGII

*Institute of Meteorology and Geophysics,
University of Frankfurt, F.R.G.*



KLUWER ACADEMIC PUBLISHERS
DORDRECHT / BOSTON / LONDON

TABLE OF CONTENTS

PREFACE

ix

DEPOSITION INTO FOREST AREAS

W. Michaelis, M. Schönburg, R.-P. Stöbel

Deposition of atmospheric pollutants into a north German forest ecosystem

3

U. Herrmann, W. Jaeschke

Determination of dry deposition of gases over tree tops by measured data and a numerical model

13

G. Enders, U. Teichmann, G. Kramm

Profiles of ozone and surface layer parameters over a mature spruce stand

21

G. Baumbach, K. Baumann

Ozone in forest stands - Examinations to its occurrence and degradation

37

W. Fricke

Annual variation of wet deposition at non-urban sites in central Europe

45

S. Grosch, H.-W. Georgii

Deposition by rain and snow - Dry deposition on snow

51

A.W.M. Vermetten, P. Hofschreuder

Deposition of gaseous pollutants in a douglas fir forest: First results of the ACIFORN project

61

B. Fährnich, H.-W. Georgii

Experimental estimation of the SO₂-deposition on an artificial surface

69

A. Waraghai, G. Gravenhorst

Dry deposition of atmospheric particles to an old spruce stand

77

S. Barth, D. Klockow

A contribution to the experimental quantification of dry deposition
to the canopy of coniferous trees

87

H. Puxbaum, Ch. Rosenberg, M. Gregori

Occurrence of HNO_3 , NH_3 and NH_4NO_3 in two forested regions
in Austria

97

DEPOSITION OF ORGANIC COMPOUNDS

W. Elbert, M.O. Andreae

Deposition of organic anions at a semi-rural site in central Europe

111

K. Bächmann, J. Hauptmann

Determination of organic peroxides

119

K. Bächmann, J. Polzer

The determination of phosgene in the lower troposphere

125

J. Müller

Aromatic and chlorinated hydrocarbons in forest areas

133

CASE STUDIES

R. Jaenicke

The deposition of aerosol particles in a forest using an atmospheric
residence time model

143

P. Winkler

Intercomparison of wet-only collectors and precipitation sensors

151

T. Sattler, W. Jaeschke

Transmission of automobil exhaust within a forest

157

K. Baumann, G. Baumbach

Determination of the gaseous air pollutant uptake of a spruce branch
by means of the enclosure technique

169

- F.-W. Badeck, G.H. Kohlmaier, M. Plöchl*
 Modelling the uptake of SO₂ into leaves of forest canopies
 - Dynamic and steady state considerations 177
- M. Plöchl, F.-W. Badeck, G.H. Kohlmaier*
 Modelling the effect of sulfur dioxide, hydrogen sulfite and sulfite
 on the metabolism of plants 185
- F. Queirolo, P. Valenta, S. Stegen, S.-W. Breckle*
 Accumulation of heavy metals in oak wood from polluted regions 193

INVESTIGATIONS ON FOG AND DEW

- G. Kroll, P. Winkler*
 Trace substance input to coniferous forests via cloud interception 205
- G. Schmitt*
 Comparison of wet deposition inputs via rain and fog interception at
 a high elevated forest site 213
- D. Schell, H.-W. Georgii*
 Design and operation of a two-stage fogwater collector 221
- B.G. Arends, S. Eenkhoorn*
 The influence of manganese on the oxidation of sulfite in dew water 231
- F. Dröscher, J. Nickel, E. Mikisch*
 Measurement of dew and fogwater deposition in forest stands 239

EFFECTS OF ATMOSPHERIC POLLUTANTS ON VEGETATION

- H. Rennenberg, A. Polle*
 Effects of photooxidants on plants 251
- A.M.R. Högbe, K. Mengel*
 Effect of acidic fog on epicuticular wax layer and water status of
Picea abies Karst. 259

<i>G. Masuch, H.G. Kicinski, A. Kettrup</i> Effects of H ₂ O ₂ on spruce needles - Results of outdoor fog chamber experiments	267
<i>J.M. Eichhorn</i> Interactions between root and crown in 90 - year old spruce under documented conditions of deposition	277
<i>N. Neikes, M. Kazda, R. Wittig</i> Different cation exchange in the canopy of two neighbouring beech stands with regard to soil chemistry	285
<i>M. Kazda</i> Spatial variation of stress factors and their influence on Norway Spruce nutrition	295
<i>G. Seufert</i> Experiments on tree canopy deposition of SO ₂ and resulting leaching effects	305
<i>R. Jurat, U. Knorre, J.Dähne, M. Kuprian, J. Henrich, H. Schaub</i> Effects of exhaust gas on various plant species in fumigation chambers under controlled conditions	315
<i>J. Mooi, H.-J. Ballach</i> Studies on poplar clones after exposure in open-top chambers to flue gas from an atmospheric fluidised bed-boiler (AFBB)	323
<i>J. Godt, M. Weyer</i> Input of sulphur and acidity in three spruce stands in the vicinity of a strong SO ₂ -source	333
LIST OF PARTICIPANTS	345
SUBJECT INDEX	355