

CONTENT

1. Introduction	1
2. Air Pollution	8

SECTION I: FOREST FUNCTION AS SOURCES AND SINKS FOR AIR CONTAMINANTS-CLASS I INTERACTIONS

3. Role of forests in Major Element Cycles: Carbon, Sulfur, and Nitrogen	55
4. Forests as Sources of Hydrocarbons, Particulates, and Other Contaminants	83
5. Forests as Sinks for Air Contaminants: Soil Compartment	113
6. Forests as Sinks for Air Contaminants: Vegetative Compartment	147
7. Class I Summary: Relative Importance of Forest Source and Sink Strength and Some Potential Consequences of these Functions	181

SECTION II: FORESTS ARE INFLUENCED BY AIR CONTAMINANTS IN A SUBTLE MANNER-CLASS II INTERACTION

8. Forest Tree Reproduction: Influence of Air Pollutants	209
9. Forest Nutrient Cycling: Toxic Ions	225
10. Forest Nutrient Cycling: Leaching and Weathering	269
11. Forest Nutrient Cycling: Rhizosphere and Symbiotic Microorganisms	292
12. Forest Tree Metabolism: Carbon Dynamics	313
13. Forest Biotic Agent Stress: Air Pollutants and Phytophagous Forest Insects	347
14. Forest Biotic Agent Stress: Air Pollutants and Disease Caused by Microbial Pathogens	366
15. Forest Abiotic Agent Stress: Symptomatic Foliar Damage Directly Caused by Air Contaminants	398
16. Class II Summary: Forest Responds by Exhibiting Alterations in Growth, Biomass, Species Composition, Disease, and Insect Outbreaks	435

SECTION III: FOREST ECOSYSTEMS ARE INFLUENCED BY AIR CONTAMINANTS IN A DRAMAIC MANNER-CLASS III INTERACTIONS

17. Forest Ecosystem Destruction: A Localized Response to Excessive Air Pollution	485
18. Forest Dieback/Decline: A Regional Response to Excessive Air Pollution Exposure	501

SECTION IV: GLOBAL ATMOSPHERIC STRESS AND FOREST

RISK ASSESSMENT

19. Alterations in Global Radiation Fluxes: Implications for Forest Health	527
20. Forest Quality and Air Quality: Forest Health Risk and Future Needs	558
Index	611