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INFLUENCE OF THE COVID-19 PERIOD ON THE ATMOSPHERIC DEPOSITION IN FOREST ECOSYSTEMS FROM ROMANIA

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Abstract

Monitoring atmospheric deposition in forest ecosystems through precipitation measurement and laboratory analysis provides a robust approach to estimating pollutant ion inputs from the atmosphere while elucidating the role of forests in pollutant transformation processes. This study investigates the impact of atmospheric pollutants on forest health, focusing on the period from 2017 to 2021, which includes the pre-pandemic, pandemic, and post-pandemic phases. The primary hypothesis explored in this research was the extent to which atmospheric pollution influences tree and forest health, particularly in the context of reduced anthropogenic activity during the COVID-19 pandemic. Five ICP Forests plots in Romania were selected for long-term monitoring, allowing for a comprehensive assessment of pollutant concentrations in precipitation. The data indicate a significant decline in pollutant levels, particularly for ammonium (N-NH₄⁺), nitrate (N-NO₃⁻), and sulphate (S-SO₄²⁻), during the COVID-19 period, when human activities, including industrial operations and transportation, were restricted. This decrease in pollution levels was followed by a slight rebound in the subsequent years as economic activities resumed.

The study highlights the positive effects of reduced anthropogenic emissions on forest ecosystems, demonstrating improvements in air quality and, consequently, in forest health and biodiversity. The findings suggest that forests function as natural filters, mitigating atmospheric pollution and contributing to ecosystem resilience. Furthermore, the observed trends underscore the necessity of long-term environmental policies aimed at controlling emissions and preserving ecosystem integrity. Beyond the ecological implications, these findings carry broader significance for human well-being, reinforcing the interconnectedness between air quality, environmental sustainability, and public health. The results support the development of strategic environmental management practices that leverage nature-based solutions to maintain air quality improvements observed during the pandemic period.

Key words: atmospheric deposition, air pollution reduction, COVID-19 impact, environmental monitoring, forest ecosystems

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