

ATMOSPHERE-FOREST EXCHANGE OF CLIMATE-FORCING CHEMICAL SPECIES



Michigan Tech
School of Forest Resources
and Environmental Science

A McIntire-Stennis supported project

Gas-phase substances emitted by forests react in the atmosphere and form particles of micrometer and sub-micrometer dimensions. The particles are called secondary aerosol because they are formed in the atmosphere and are not directly emitted as particles by vegetation. Secondary aerosol affects climate by directly scattering light that cools the atmosphere and by contributing to formation of clouds, which also cool the atmosphere by reflecting light.

The objectives of the proposed activity are (1) to develop methods to measure levels of the biogenic substances in the atmosphere and in emissions, (2) to measure seasonal variations of the biogenic substances in the atmosphere and precipitation, and (3) to develop models to estimate emissions from forests.

The goal of this project was to advance understanding of emissions of gaseous chemical species from forests that react in the atmosphere to form particles (i.e., secondary aerosol). The composition of gaseous emissions from vegetation is specific to taxonomic classification and includes, e.g., ammonia, amino acids, terpenes, and terpenoids.



About McIntire-Stennis

The McIntire-Stennis program, a unique federal-state partnership, cultivates and delivers forestry and natural resource innovations for a better future. By advancing research and education that increases the understanding of emerging challenges and fosters the development of relevant solutions, the McIntire-Stennis program has ensured healthy resilient forests and communities and an exceptional natural resources workforce since 1962.



COLLABORATION



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researchers, USDA,
Northern Research Station

IMPACT

The data was compiled to develop a conifer emission inventory for terpenes and terpenoids, allowing a greater understanding of the impact on the atmosphere of different tree species based on their emissions.



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subfamilies of the families Pinaceae and Cupressaceae were included in the emissions data



1 Ph.D

in Environmental Engineering was trained on this project



\$500K

Value of research funded by National Institute of Food & Agriculture which expand on this study