

Program for Research on Oxidants: PHotochemistry, Emissions, and Transport (PROPHET)

PROPHET is a collaborative atmospheric chemistry research venture where individual investigators come together at a permanent laboratory location in the University of Michigan Biological Station (UMBS) to study issues related to biosphere-atmosphere chemical exchange, as it relates to climate change and air quality issues. The PROPHET laboratory is situated in an undisturbed and well-characterized mixed deciduous/coniferous forest 3 km southwest of the main UMBS site and sits at the base of a 31 meter scaffolding tower, attached to which is a Pyrex sampling manifold that extends above the canopy to 34 m above the surface. UMBS provides access to research and educational facilities that facilitate remarkable opportunities for effective collaboration between atmospheric and biological researchers

PROPHET is a collaborative scientific organization that has attracted dedicated researchers who are devoted to studying the environmental issues that exist in this region of the country with the intent of generalizing results to the global scale. Three directors head a Science Team, and additional input regarding the long-term direction is obtained through interaction with a Science Advisory Committee. While the facilities are permanent, there are no permanent personnel.

Science

The general aims of PROPHET are focused on improving our understanding of gas-phase and heterogeneous oxidant chemistry, the exchange of gases and particulate matter between the biosphere and the atmosphere, how forest-atmosphere interactions influence the composition of the atmosphere, and how atmospheric variables influence the forest ecosystem. While it is well known that nitrogen is a critically important nutrient to plants, the relative role of atmospheric deposition as a source of biologically active nitrogen and the importance of individual atmospheric nitrogen compounds are poorly defined. We are also interested in the deleterious effects of deposition of oxidants and acids, such as ozone and PAN. Among current motivating issues, we wish to understand:

- how the forest and its emissions influence the prevalence and processing of atmospheric nitrogen (NO_x)
- how this in turn influences rates and speciation of nitrogen deposition to the forest canopy and soil
- how the fate of that deposited nitrogen influences rates of photosynthesis and thus carbon uptake.



There is no central funding for PROPHET; each PI brings individual funding and scientific objectives (which are typically well-linked with the general PROPHET objectives described above). Fundamentally, PROPHET success depends on the intellectual involvement of each individual PI. Synergy is generated through mutual interests and collaborations.

Research and Education

A critically important aspect of PROPHET and its philosophy is the training of students.° We believe that PROPHET and its association with UMBS provides a great opportunity to teach



young scientists to think outside of the intellectual constraints of discipline-focused pedagogy.° We are convinced that real progress in understanding Earth Systems requires teaching people to think about interactions between ecosystem components.° We have been pursuing this objective through involvement of many students in all aspects of the research, incorporation of PROPHET data in classroom activities, and the development of training programs for both undergraduates (REU) and graduate students (IGERT).

Team

The PROPHET Science Team is comprised of researchers whose goals are consistent with PROPHET's overall objectives and, generally, who provide complementary capabilities and ideas. We welcome any researchers interested in using the PROPHET facilities in collaboration to better understand the forests and atmosphere of northern Michigan. For more information contact:

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