The importance of aerosol research: A Q&A with Alex Guenther

December 23 2013

Alex Guenther is a renowned atmospheric and ecosystem scientist, as well as a Laboratory Fellow at Pacific Northwest National Laboratory and lead scientist for atmospheric aerosol science at EMSL. He recently took time while traveling in Brazil to answer some questions about the importance of atmospheric aerosol studies.

Here's what he had to say:

Q.Why is the scientific understanding of aerosols important?

A. The scattering and absorbing of light by atmospheric aerosols, and also by clouds that are modified by aerosols, impacts the Earth's radiation balance resulting in cooling (from scattering) or warming (from absorbing) at the Earth surface. Aerosols can also degrade visibility and are harmful to human health.

Q. How will a greater understanding of aerosols improve climate models?

A. Predictive climate models need to include numerical representations of the relevant processes that influence climate. This means we need to understand aerosols well enough to account for their role in climate with numerical model code that calculates their impact on the Earth's radiative balance.

Q. What are the societal implications of aerosol research?

A. Aerosol research improves the numerical models decision makers use to develop strategies for sustainable development and to balance energy needs with the need for a stable environment.

Q. What is EMSL's role in aerosol research?

A. EMSL research provides a fundamental understanding of the molecular scale processes that determine aerosol production, evolution and fate. This knowledge forms the basis for the numerical algorithms and parameterizations in climate models.

Q. What is the next major milestone in aerosol research?

A. I view the next major milestone as identifying the specific molecules within organic aerosol responsible for absorption of light and characterizing the processes responsible for their formation and properties.

Q. What are the science priorities of aerosol research in the next five to 10 years?

A. It's critical that the scientific community develop a molecular-scale understanding of the processes that enhance the formation of biogenic organic emissions – those produced by living organisms – and determine the radiative properties of organic aerosols to improve the accuracy of climate model simulations.

Q. How does aerosol research support the mission of the Department of Energy's Office of Biological and Environmental Research?

A. It addresses BER Atmospheric System Research programmatic goals by building a physical understanding and an accurate representation of the important aerosol-cloud-precipitation processes that drive precipitation and the atmospheric radiation balance. The research is key to advancing BER priorities by successfully incorporating this understanding of aerosols into regional and global climate models.

Q. How do EMSL users fit into the aerosol research being done at EMSL?

A. Users have historically utilized some EMSL capabilities to enhance their atmospheric research. Recently, they've been considering how they can apply other EMSL tools and expertise not previously used by the atmospheric community – this opens the possibility of new and innovative discoveries. In addition, input from users helps determine future capabilities for EMSL to drive high-impact science.

Provided by Environmental Molecular Sciences Laboratory