NIEHS Conference Report

Airborne Mineral Dust Contaminants: Impacts on Human Health and the Environment.

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Co-sponsors: UA Water Sustainability Program; UA Lowell Institute for Mineral Resources

Goal: The goal of the workshop was to stimulate interaction among different research communities interested in dust and to promote better integration of research on airborne mineral dust from emissions to environmental exposure. Nearly 60 scientists came together from the academic, regulatory, and industrial sectors, with some international participants traveling from as far away as Australia, Mongolia, and China. The topics covered ranged from identifying sources and measuring characteristics of dust to understanding health and environmental impacts. Among the participants were sixteen students from the United States and Mexico. The student poster session began with an oral data blitz, in which students had 2 minutes to provide an "elevator pitch" and invite participants to view their posters. Importantly, workshop participants identified knowledge gaps in the field. Participants will be able to continue the discussion on the conference webpage blog.

Rationale: The Southwestern United States represents the "canary in the coal mine" for potential climate change impacts in the United States. National Oceanic and Atmospheric Administration climate models suggest that the Southwestern U.S. will see temperatures increase and precipitation decline over the next few decades. The warmer, drier conditions will result in increased atmospheric dust loads that could impact the health of a rapidly increasing population including a large number of retirees suffering from respiratory and cardiovascular disease.

Relevance to SRP: In semiarid environments such as the Southwestern U.S., mining operations are an important source of airborne metal and metalloid contaminants. For example, it has been estimated that 40% of the total atmospheric emissions of arsenic, an element of particular interest to NIEHS SRP, arise from smelting operations. In Arizona, the SRP is working at two Superfund mining sites associated with excessively high concentrations of arsenic, lead, chromium and cadmium in the soil - ASARCO Hayden, and Iron King Mine-Humboldt Smelter.

Outcomes: A special issue of the journal Aeolian Research has been published which features papers from the conference. Guest Editors are Jeffrey J. Whicker (Los Alamos National Lab), and David D. Breshears, Avelino Eduardo Sáez and Jason P. Field (UA).

A survey of workshop participants was conducted (click here for summary of results).

Gaps in the Field: Participants identified knowledge gaps (called "holes" in the survey report), including:

- Stronger links between the dust community and epidemiologists.
- Health impacts of dust (moving beyond generic $PM_{2.5}$ and PM_{10}; immune system suppression; biological responses of various human organs).
- Dust modeling (forecast severity of dust storms; quantitative dust fluxes; verification of model predictions).
- Effects of dust storms on public safety (highways, airports).