Abstract

Fine particulate matter, or PM$_{2.5}$, is one of six criteria air pollutants regulated by the Clean Air Act in an effort to protect environmental and human health. Due to its small size, inhaled particles are able to penetrate deep into the lungs and negatively impact respiratory and cardiopulmonary health. PM$_{2.5}$ found in the ambient atmosphere is comprised of anywhere between 20-90% organic aerosols. Aircraft emit various pollutants which react in the atmosphere to form secondary pollutants including PM$_{2.5}$. Recent sampling and smog chamber experiments have suggested this to also be the case for PM$_{2.5}$ from aircraft, i.e., organic aerosols comprise a significant fraction of total PM$_{2.5}$ formed from aircraft activities. However, a disconnect exists between these measurements and regional air quality model predictions assessing the impacts of aircraft emissions on air quality. Air quality model results indicate that the predicted impacts from aviation activities show a relatively low contribution from organic aerosols compared to other PM$_{2.5}$ species. In fact, in some instances aircraft emissions have been shown to (counterintuitively) reduce model predicted organic aerosol concentrations. This seminar examines how an air quality model currently treats predictions of organic aerosols formed from aircraft activities as well as the model processes and instances that lead to reductions in organic aerosol concentrations from aircraft emissions. It also highlights efforts to incorporate recent sampling and smog chamber results into an air quality model to bridge the gap between the model and measurements and improve the characterization of air quality impacts due to aircraft activities.