

## **Evolution of Aerosol Hygroscopicity, Mixing State, and Cloud Activation Efficiency**

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This project will deploy and operate a suite of aerosol instruments at surface sites inside and downwind of Mexico City, and on board the NSF/NCAR C-130 aircraft, as part of the Megacity Impacts on Regional and Global Environments (MIRAGE) – Mexico City experiment and the Intercontinental and Megacity Pollution Experiment (IMPEX). The primary objective is to operate high-flow tandem differential mobility analyzers both at surface sites within and outside of Mexico City area as well as on board the aircraft to obtain measurements of size-resolved hygroscopicity and volatility. Submicron and supermicron aerosol size distributions will be measured at the surface sites using differential mobility analyzers and aerodynamic particle sizers. The tandem differential mobility analyzers operated at the main surface site northeast of Mexico City will be augmented to permit measurement of size-resolved aerosol hydration state. The concentration and properties of cloud condensation nuclei will be measured at the main site using a cloud condensation nuclei counter together with a recently developed cloud condensation nuclei separator.

The collected data will be integrated to provide a comprehensive description of the size, hygroscopicity, volatility, and cloud nucleating efficiency of the aerosol as it evolves over a period of hours or days. The results of these measurements are expected to lead to an improved understanding of the impact of emissions from a major urban area on the downwind environment. Mexico and other countries will benefit from this knowledge, which may help guide decisions regarding environmental management. The project will also foster partnerships between researchers in the United States and Mexico.

Two graduate students will gain field experience through this project. At least one student from Mexico City will be engaged to assist in the data collection and analysis.