

## **Aircraft-based Measurements of NH<sub>3</sub> during MIRAGE-Mex**

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Platform: C-130

Instrument: SICIMS in Four- Channel MS System

Quantities: 30 second average NH<sub>3</sub> concentrations

Group: NCAR/ACD/POP

We will deploy a CIMS-based instrument to quantify the concentration of ammonia (NH<sub>3</sub>). It is based on the reaction of gas phase NH<sub>3</sub> with protonated water vapor (H<sub>3</sub>O<sup>+</sup>) reagent ions. These reagent ions are produced in the inlet through reactions of H<sub>2</sub>O with ions such as N<sub>2</sub><sup>+</sup> and O<sub>2</sub><sup>+</sup> that are produced when the reagent gas is exposed to Americium-241 radioactive foil. The reagent ions and product ions enter the vacuum system, which has ion optics and differential pumping followed by mass separation using a quadrupole filter and detection with a channel electron multiplier. Calibration is accomplished by continual addition of a known amount of isotopically labeled NH<sub>3</sub>.

The instrument will make use of one channel of our group's four-channel mass spectrometer system (other channels for OH/H<sub>2</sub>SO<sub>4</sub>/MSA, HNO<sub>3</sub>, and peroxy radicals).

These measurements will address several MIRAGE-Mex scientific objectives, including helping to assess the extent of influence of the MC outflow as a product of anthropogenic activities and biogenic processes, and assessment of the role of NH<sub>3</sub> in the reactive nitrogen budget through helping to neutralize acidic aerosols. Ammonia also plays a role in the nucleation and growth of aerosols, and may have regional influences through deposition.