

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

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Platform: C-130

Instrument: SICIMS in Four- Channel MS System

Quantities: 10 second average HNO<sub>3</sub> concentrations

Group: NCAR/ACD/POP

We will deploy a CIMS-based instrument to quantify the concentration of HNO<sub>3</sub>. It is based on the reaction of gas phase nitric acid with methanesulphonate ions (MS<sup>-</sup>). MS<sup>-</sup> ions are produced in the inlet by the interaction of gas phase MSA with alpha particles produced from Americium-241. The reaction between MS<sup>-</sup> and HNO<sub>3</sub> leads to small clusters in equilibrium with the reactants. The reagent ion and product ion clusters 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 HNO<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, NH<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 reactive nitrogen oxidation, an assessment of the changing oxidizing capacity and ozone tendency of the MC outflow by examining ratios of NO<sub>x</sub>/HNO<sub>3</sub>, and assessment of the role of HNO<sub>3</sub> in the reactive nitrogen budget. Nitric acid may also play a role in the nucleation and growth of aerosols, thereby impacting the gas phase reactive nitrogen budget, and may have regional influences through deposition.