Fast airborne aerosol size and composition measurements from the HR-ToF-AMS on board the C-130 during MILAGRO

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A high mass resolution time-of-flight aerosol mass spectrometer (HR-ToF-AMS) was deployed y the University of Colorado for the first time on an airborne platform during the MIRAGE-Mex campaign on the NCAR C-130 research aircraft, for measurements of size-resolved sulfate, nitrate, ammonium, and organics. Onboard the C-130 the HR-ToF-AMS was operated in a medium resolution mode known as "V-ToF mode," allowing added chemical resolution of the measured aerosol, while still maintaining good spatial (time) resolution and allowing the measurement of size distributions. The study focused on the pollution plume originating from the Mexico City metropolitan area in a pseudo-Lagrangian framework in order to study the chemical aging of the ambient aerosol and the gas-to-particle conversion processes that resulted in increased aerosol mass. Comparisons with submicron light scattering and other instruments on board the C-130 will be shown. The high sensitivity of the instrument allows for well defined aerosol chemistry for vertical profiles. One additional focus in the analysis will be placed on the added information that the high mass resolution of the instrument can provide in the context of the other gas phase and aerosol instruments measurements made aboard the NCAR C-130.