



An overview of J-31 aircraft measurements in the Megacity Initiative—Local and Global Research Observations (MILAGRO) experiment

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In the March 2006 MILAGRO experiment the Jetstream 31 (J-31) aircraft flew an integrated suite of instruments aimed at measuring solar energy in the atmosphere and how it is affected by aerosols, water vapor, clouds, and Earth's surfaces. The overall goal was to better understand the impacts of these constituents and surfaces on climate and to advance spaceborne and airborne measurement science. Specific objectives of the J-31 were to:

* Characterize the distributions, properties, and effects of aerosols and water vapor advecting from Mexico City and biomass fires toward and over the Gulf of Mexico, including

- Aerosol optical depth and extinction spectra (354-2138 nm)
- Water vapor columns and profiles
- Aerosol radiative impacts in clear sky (direct effect) and via clouds (indirect effect)

* Quantify the ability of Aura, other A-Train and Terra satellite sensors, and airborne lidar to retrieve aerosol, cloud, and water vapor properties

* Characterize surface spectral albedo and bidirectional reflectance distribution function (BRDF) to help constrain satellite retrievals

* Quantify the relationships between the above and aerosol amount and type

To address the above goals the J-31 carried a payload of the following six instruments:

- * Ames Airborne Tracking Sunphotometer (AATS-14), PI Jens Redemann
- * Solar Spectral Flux Radiometer (SSFR), PIs Peter Pilewskie and Sebastian Schmidt
- * Research Scanning Polarimeter (RSP), PI Brian Cairns
- * Cloud Absorption Radiometer (CAR), PIs Charles Gatebe and Michael King
- * Position and Orientation System (POS), PI Rose Dominguez
- * Meteorological Sensors and Nav/Met Data System (NavMet), PI Warren Gore

The J-31 made 13 flights out of Veracruz, Mexico, between 3 and 20 March 2006. Flights were coordinated with overpasses by the satellites Aura (carrying OMI and TES), Aqua (carrying MODIS and AIRS), Terra (carrying MODIS and MISR), and Parasol (carrying POLDER). Four flights were over Mexico City and nine over the Gulf of Mexico. Several J-31 flights were coordinated with the NASA Langley King Air B-200, which carried a High Spectral Resolution Lidar (HSRL) and two passive remote sensors, the HyperSpectral Polarimeter for Aerosol Retrievals (HySPAR) and the Langley Airborne A-Band Spectrometer (LAABS). One J-31 flight coordinated with the DC-8 over Mexico City and one with both the C-130 and the B-200 over the Gulf of Mexico.

Several presentations containing early J-31 results are being submitted to this conference. This overview presents a summary of J-31 goals, operations, and example results, to provide context for the other presentations.