



## **Airborne In-Situ Measurements of Formaldehyde over California: First Results from the COFFEE Instrument**

Josette Marrero (1,2), Jason St. Clair (3,4), Emma Yates (1,5), Andrew Swanson (2,3), Warren Gore (1), Laura Iraci (1), and Thomas Hanisco (3)

(1) NASA Ames Research Center, (2) Universities Space Research Association, (3) NASA Goddard Space Flight Center, (4) Joint Center for Earth Systems Technology, (5) Bay Area Environmental Research Institute

Formaldehyde (HCHO) is one of the most abundant oxygenated volatile organic compounds (VOCs) in the atmosphere, playing a role in multiple atmospheric processes. Measurements of HCHO can be used to help quantify convective transport, the abundance of VOCs, and ozone production in urban environments. The Compact Formaldehyde Fluorescence Experiment (COFFEE) instrument uses Non-Resonant Laser Induced Fluorescence (NR-LIF) to detect trace concentrations of HCHO as part of the Alpha Jet Atmospheric eXperiment (AJAX) payload. Developed at NASA GSFC, COFFEE is a small, low maintenance instrument with a sensitivity of 100 pptv and a quick response time (1 sec). The COFFEE instrument has been customized to fit in an external wing pod on the Alpha Jet aircraft based at NASA ARC. The instrument can operate over a broad range of altitudes, from boundary layer to lower stratosphere, making it well suited for the Alpha Jet, which can access altitudes from the surface up to 40,000 ft.

We will present results from flights performed over the Central Valley of California, including boundary layer measurements and vertical profiles in the tropospheric column. This region is of particular interest, due to its elevated levels of HCHO, revealed in satellite images, as well as its high ozone concentrations. In addition to HCHO, the AJAX payload includes measurements of atmospheric ozone, methane, and carbon dioxide. These results will be presented in conjunction with formaldehyde. Targets in the Central Valley consist of an oil field, agricultural areas, and highways, each of which can emit HCHO primarily and generate HCHO through secondary production. Formaldehyde is one of the few urban pollutants that can be measured from space. Plans to compare in-situ COFFEE data with satellite-based HCHO observations such as those from OMI (Aura) and OMPS (SuomiNPP) will also be presented.