

INTEX-A and B Mission Science and Field Deployment: Measurement of Oxygenated and Tracer Chemicals, Satellite Validation, and Integrated Data Analysis

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During the spring 2006 INTEX-B/MILAGRO deployment, our efforts will be dedicated to two main activities: (1) H. Singh will carry out the duties of the Lead Mission Scientist; and (2) we will perform measurements of PANs (PAN, PPN), oxygenated volatile organic chemicals (OVOC), and tracers (C_6H_6 , HCN, CH_3CN) using the PANAK (PAN/Aldehyde/Ketone) instrument aboard the NASA DC-8.

The mission science role will involve leading and coordinating the overall INTEX-B scientific effort to achieve stated project objectives and to perform several pre- and post mission activities. Lead Mission Scientist responsibilities will require working closely with co-mission scientists, mission meteorologist, forecasting team, members of the science team, navigators, and pilots to plan and coordinate day-to-day activities. The aim will be to accomplish INTEX-B/MILAGRO goals of inter-comparisons, large-scale characterizations, large-scale outflow events, chemical aging over the Gulf of Mexico and the Pacific Ocean, satellite validation, and several other targeted activities. These activities will require close coordination of the DC-8 with satellites (especially Aura) and other airborne platforms such as the NSF C-130, DLR Falcon, and J31. An additional responsibility will be to complete the scientific analysis of INTEX-A data and coordinate the publication of INTEX-A Special Issues.

The Ames PANAK instrument will be integrated aboard the NASA DC-8 and operated during the entire duration of the intensive phase. This is a computerized 3-channel Capillary Gas Chromatographic system designed for the collection and analysis of low ppt (10^{-12} v/v) levels of peroxyacyl nitrates (PANs), alkyl nitrates, and tetrachloroethene in Channels 1 and 2; and C_2 - C_3 aldehydes, C_1 - C_2 alcohols, C_3 - C_4 ketones, and C_1 - C_2 nitriles in channel 3. Channels 1 and 2 use ECD detectors and have a sampling frequency of 2.5 minutes. Channel 3 uses a Photo Ionization detector placed in series with a Reduction Gas detector and has a sampling frequency of 5 minutes. The main manifold draws 5 SL/min of ambient air through a heated Teflon lined probe from

which each of the three instrument channels draws a 200 ml aliquot of sample air. This aliquot is dried by passing it through a $-35\text{ }^{\circ}\text{C}$ cold trap, cooled to $-140\text{ }^{\circ}\text{C}$ for constituent pre concentration, and then heat desorbed into the gas chromatographic columns. All calibrations are performed in-flight by using an installed dilution system and in a manner that mimics ambient air sampling. Primary standards are generally referred to a series of permeation tubes. In addition high concentration standards are also carried on board. Sensitivities under typical conditions are: 1-3 ppt PANs, 1-5 ppt alkyl nitrates, 5-20 ppt OVOC, and 20-30 ppt nitriles. Accuracies and precisions of the order of $\pm 20\%$ and $\pm 10\%$ are expected. A schematic of this instrument is provided below.



