

"NO_y Partitioning Measured on the C130 during MIRAGE"

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The partitioning and budget of reactive nitrogen are examined by comparing the measurement of total reactive nitrogen (NO_y) to the sum of measured component species and assessing their respective contributions and their evolution over time. The components measured on the C130 are NO_x (separate measurements of NO and NO₂), PANs (separate measurements of PAN, PPN, PiBN, MPAN, APAN, MoPN), gas-phase HNO₃, and aerosol nitrates. Total reactive nitrogen and NO_x are measured via chemiluminescence, the PANs and HNO₃ using CIMS, and aerosol nitrates using a high-resolution time-of-flight aerosol mass spectrometer. Over the city NO_x is roughly 30-80%, PANs are roughly 20-40%, and HNO₃ is 0-20% of NO_y. With inclusion of trajectory information, we will examine NO_y partitioning for a dependence on air mass history, especially time since emission. Also of interest is the NO_y deficit frequently observed when considering only the gas phase components, that is, when considering the difference between the measured total-NO_y value and the sum of measured PANs, HNO₃, and NO_x. For some cases this deficit shows a very strong correlation with aerosol nitrates, and other times not. So, at times it appears the deficit may be somewhat resolved by the inclusion of the aerosol component that is included to some degree in the measurement of total reactive nitrogen. This involves the efficiency of detection of sub-micron aerosols by both the AMS and NO_y techniques and is the subject of ongoing work.