NOy Budget Measured on the C130 during MIRAGE

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The reactive nitrogen budget is examined by comparing the measurement of total reactive nitrogen (NOy) to the sum of measured component species and assessing their respective contributions. The components measured on the C130 are NOx (separate measurements of NO and NO2), PANs (separate measurements of PAN, PPN, PiBN, MPAN, APAN, PBzN, MoPN), gas-phase HNO3, and aerosol nitrates. The reactive nitrogen species 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 NOx is roughly 30-80%, PANs are roughly 20-40%, and HNO3 is 0-20% of NOy. Once trajectory information is included, we will examine NOy partitioning for a dependence on air mass history, especially time since emission. Also of interest is the NOy deficit frequently observed when considering only the gas phase components, that is, when considering the difference between the measured total-NOy value and the sum of measured PANs, HNO3, and NOx. We will test for an association of this deficit with fire emissions. 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. This involves the detection of sub-micron aerosols by both the AMS and NOy techniques and is the subject of a companion poster (Knapp et al.).