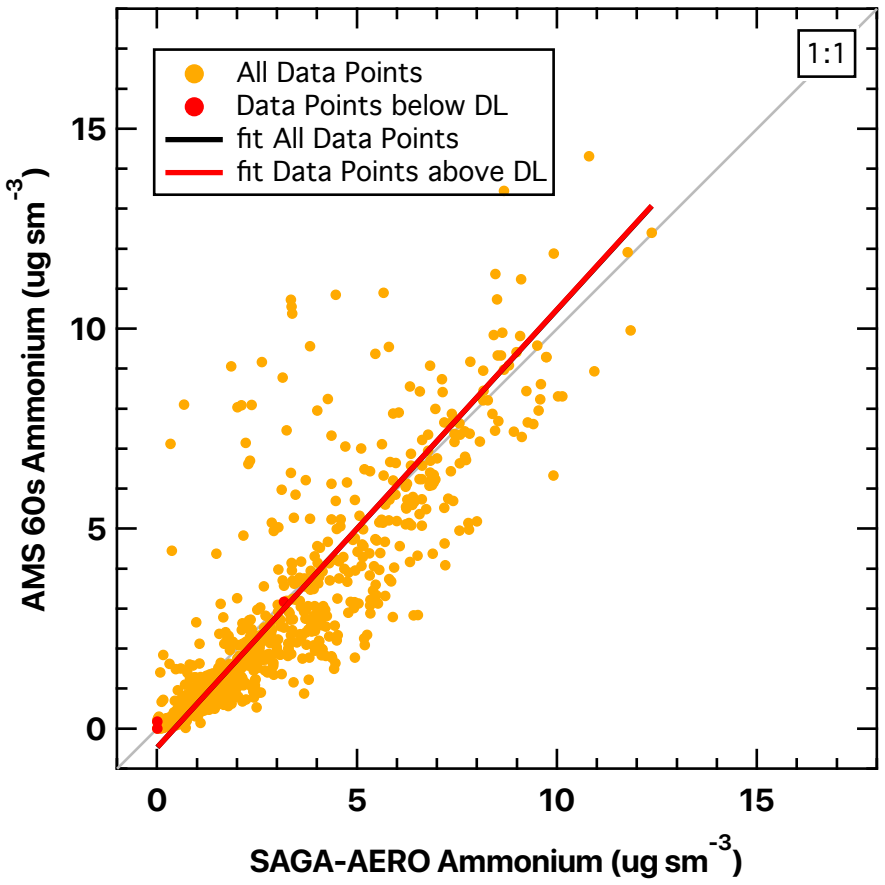
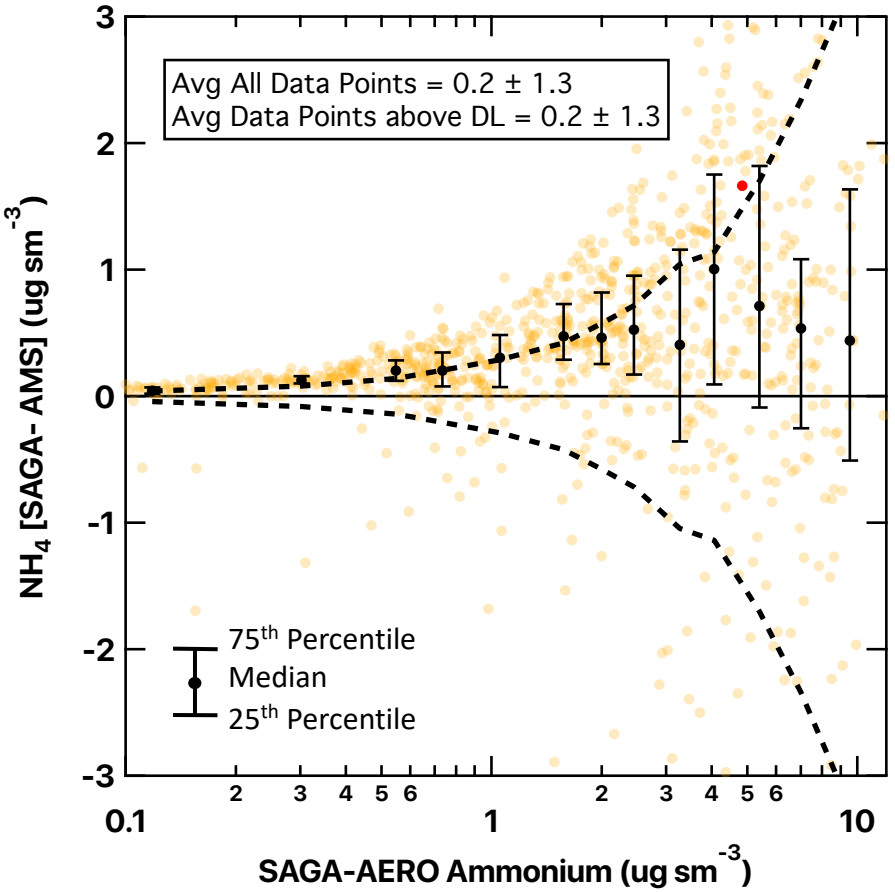
Ammonium – AMS vs SAGA-AERO

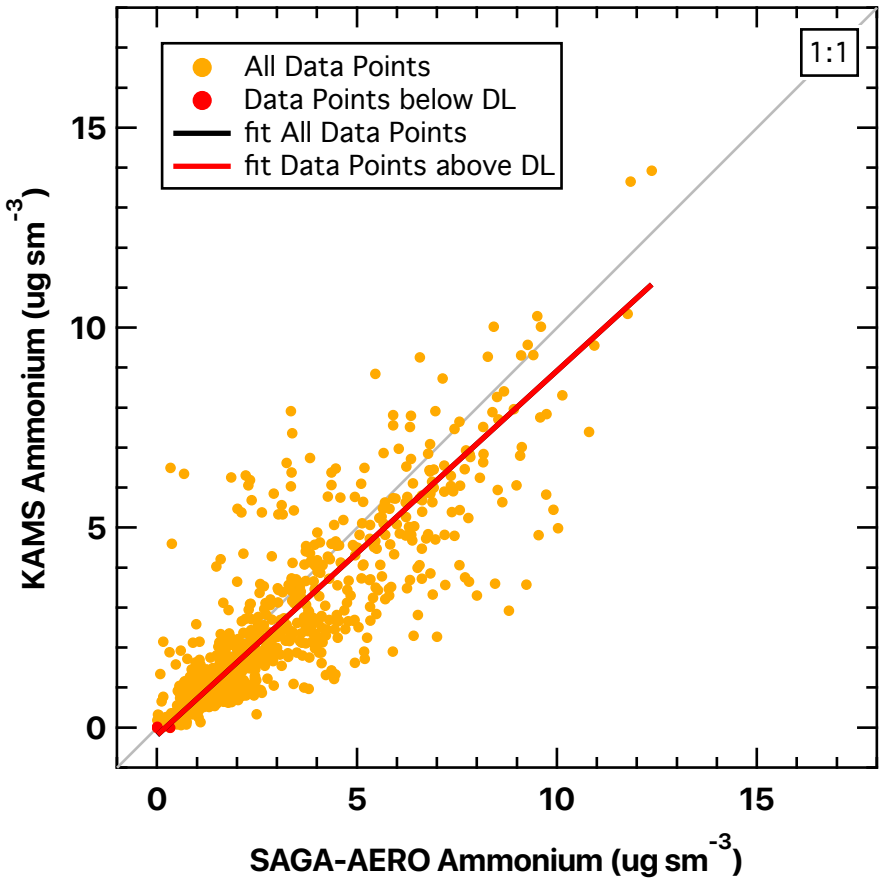


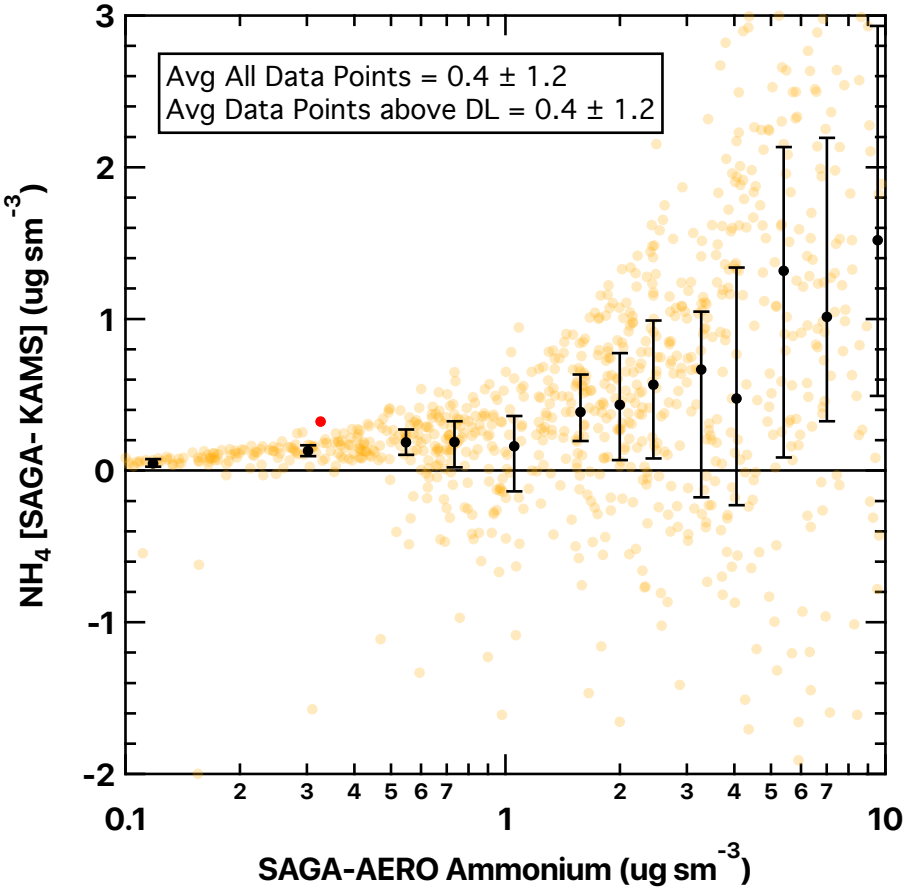


All Data Points	**Data Points Above DL**
y = a + bx	y = a + bx
a = -0.471 ± 0.065	a = -0.475 ± 0.065
b = 1.095 ± 0.018	b = 1.096 ± 0.019
R^2= 0.767	R^2 = 0.766

- Uncertainty envelopes based on SAGA-AERO time base combined data uncertainty
  - AMS 60s calculated from data file
  - SAGA = ± (0.02 ug std m-3 + 11%)

Ammonium – KAMS vs SAGA-AERO





All Data Points
y = a + bx
a = -0.188 ± 0.053
b = 0.911 ± 0.015
R^2= 0.763

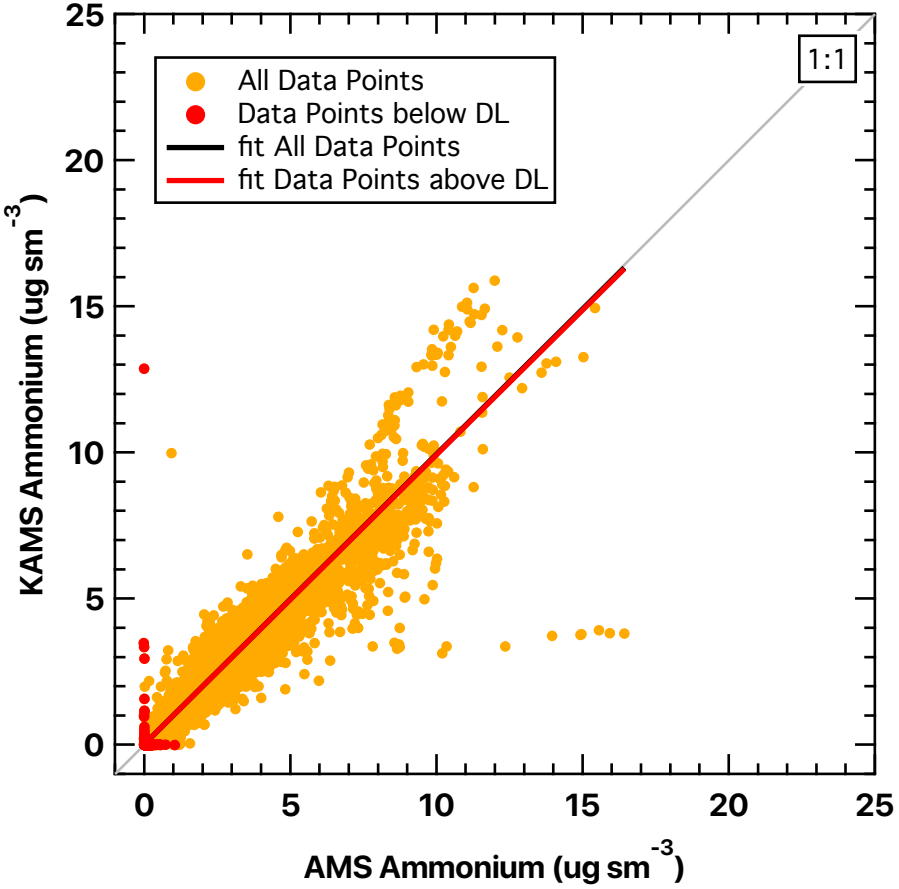
Data Points Above DL
y = a + bx
a = -0.189 ± 0.053
b = 0.912 ± 0.015
R^2 = 0.762

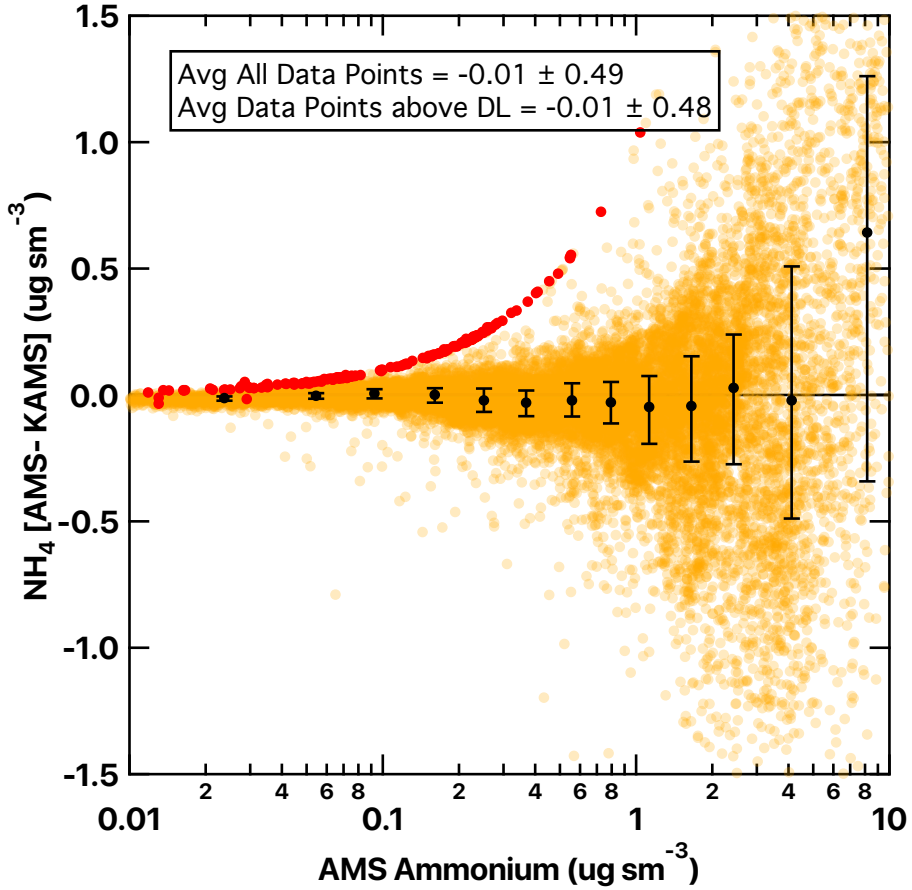
(All Data Points, Data Points < DL)

75th Percentile
Median
25th Percentile

Ammonium – KAMS vs AMS (Research Flights 1-9, 11, 15, 19)

KAMS LLOD values not provided, assume values under precision level are less than the detection limit.





All Data Points
y = a + bx
a = 0.021 ± 0.004
b = 0.992 ± 0.002
R^2 = 0.923

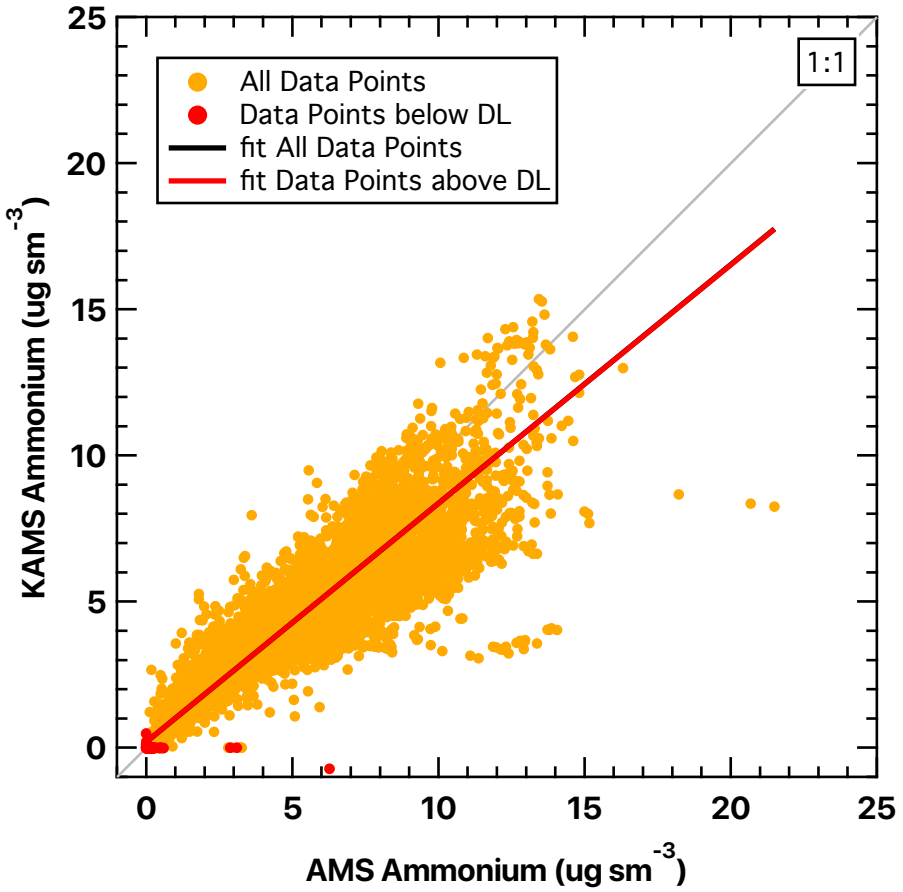
Data Points Above DL
y = a + bx
a = 0.023 ± 0.004
b = 0.991 ± 0.002
R^2 = 0.926

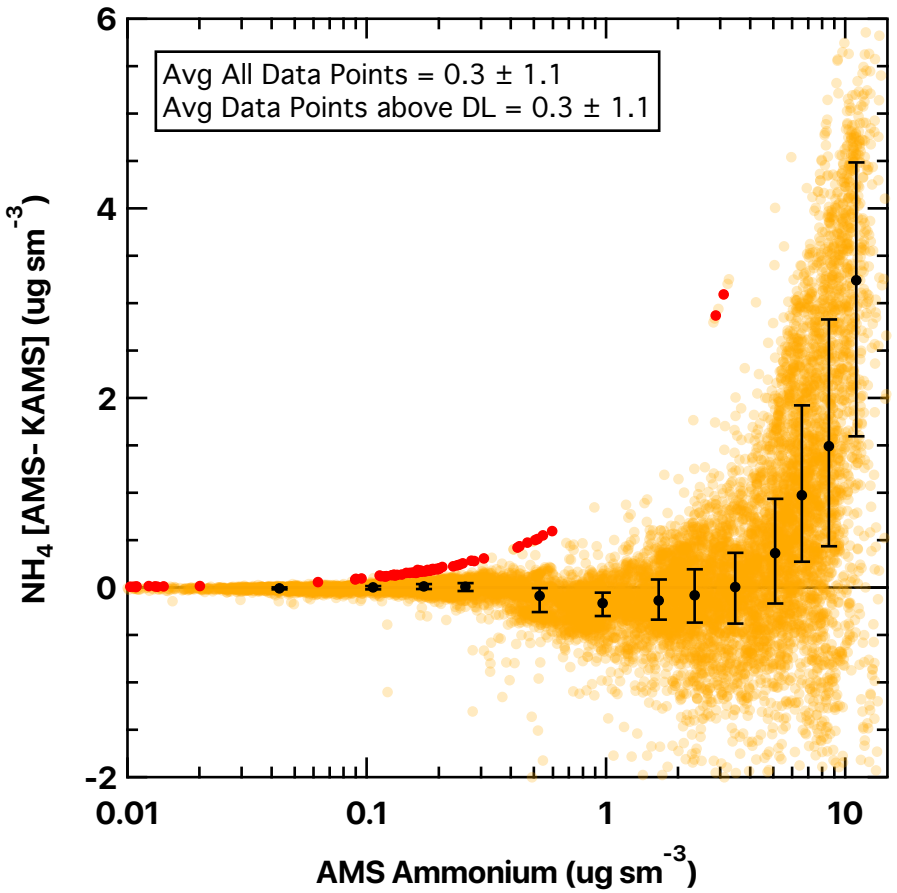
(All Data Points, Data Points < DL)

75th Percentile
Median
25th Percentile

Ammonium – KAMS vs AMS (Research Flights 10, 12-14, 16-18, 20)

KAMS LLOD values not provided, assume values under precision level are less than the detection limit.





All Data Points
y = a + bx
a = 0.204 ± 0.011
b = 0.817 ± 0.002
R^2 = 0.891

Data Points Above DL
y = a + bx
a = 0.210 ± 0.011
b = 0.816 ± 0.002
R^2 = 0.891

(All Data Points, Data Points < DL)

75th Percentile
Median
25th Percentile

Data:

- SAGA-AERO Merge: korusaq-mrgSAGA-AERO-dc8_merge_20160426_R3_thru20160609.ict (only data from flights 20160501-20160609 used in analysis – non-transit flights).
- KORUSAQ-AMS-60s_DC8_########_R1.ict (######## = daily files from 20160501 – 20160609)
- korusaq-SAGA-AERO_DC8_########_R1.ict (######## = daily files from 20160501 – 20160609)
- KORUSAQ-KAMS_DC8_########_R3.ict (######## = daily files from 20160501 – 20160609)

Correlation:

- Data reported at STP (273 K & 1013 mb).
- Fit lines are derived from orthogonal distance regressions.
- R^2 values are calculated independently, not from orthogonal distance regression.
- Data points below the DL/precision are colored red.
  - **AMS/KAMS Comparison:**
    - Merged AMS 60s to KAMS time interval.
    - AMS 60s DL: reported in data file, propagated to KAMS time interval.
    - KAMS DL: LLOD values not provided, assume values under precision level are less than the detection limit.
    - Research flights separated per the recommendation of PIs, Research flights (1-9, 11, 15, 19) and Research Flights (10, 12-14, 16-18, 20).
  - **SAGA Comparison:**
    - AMS and KAMS reported DL and precision, respectively, propagated to SAGA time interval.
    - AMS/KAMS measurements include organic nitrate, whereas SAGA measurements only include the inorganic ionic forms.

Uncertainty propagation (Uncertainties provided by PIs).

- AMS 1s precision reported in data file with 34% accuracy; SAGA-AERO time interval: calculated using quadrature average.
- SAGA-AERO: $\pm$ [0.02 ug std m-3 + 11%].

Difference dependence on NO_3 value:

- **AMS/KAMS Comparison:**
  - Difference calculated by AMS 60s - KAMS.
  - Median, 25th, and 75th percentiles based on 1500 data point bins (Early Flights) and 1000 data point bins (Late Flights) after data is sorted by AMS 60s values.
- **SAGA Comparison:**
  - Difference calculated by SAGA-AERO – AMS 60s and SAGA-AERO – KAMS.
  - Median, 25th, and 75th percentiles based on 75 data point bins after data is sorted by SAGA-AERO values.
  - Uncertainty envelopes for SAGA/AMS comparison based on reported SAGA-AERO uncertainty and calculated AMS 1s total uncertainty.