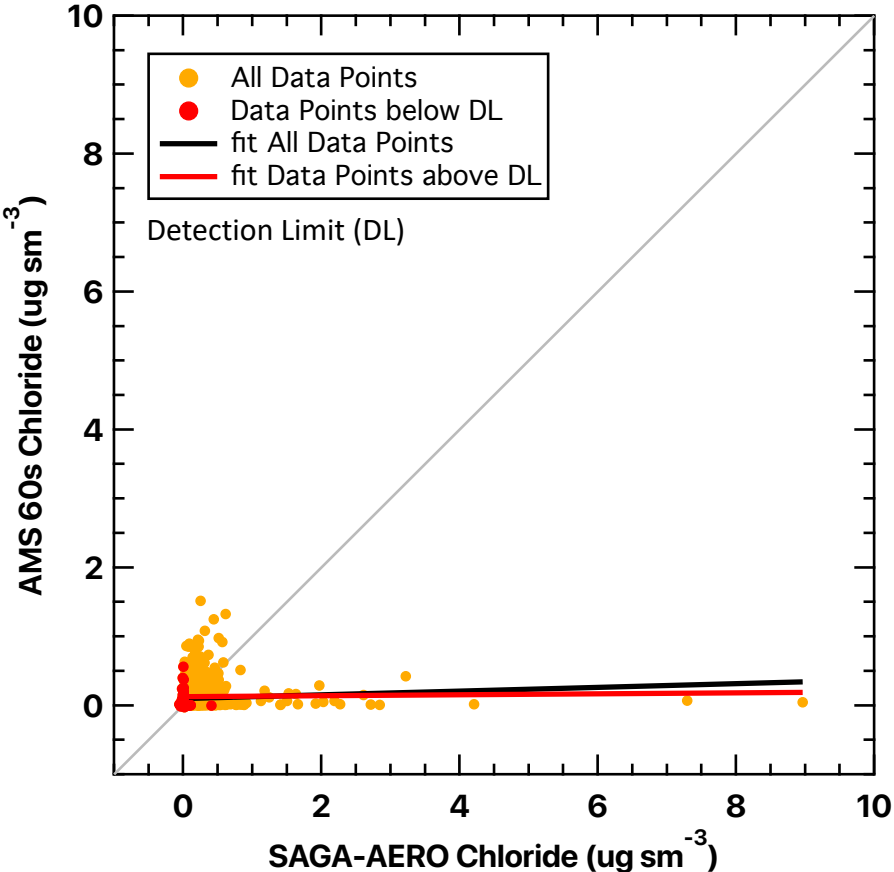


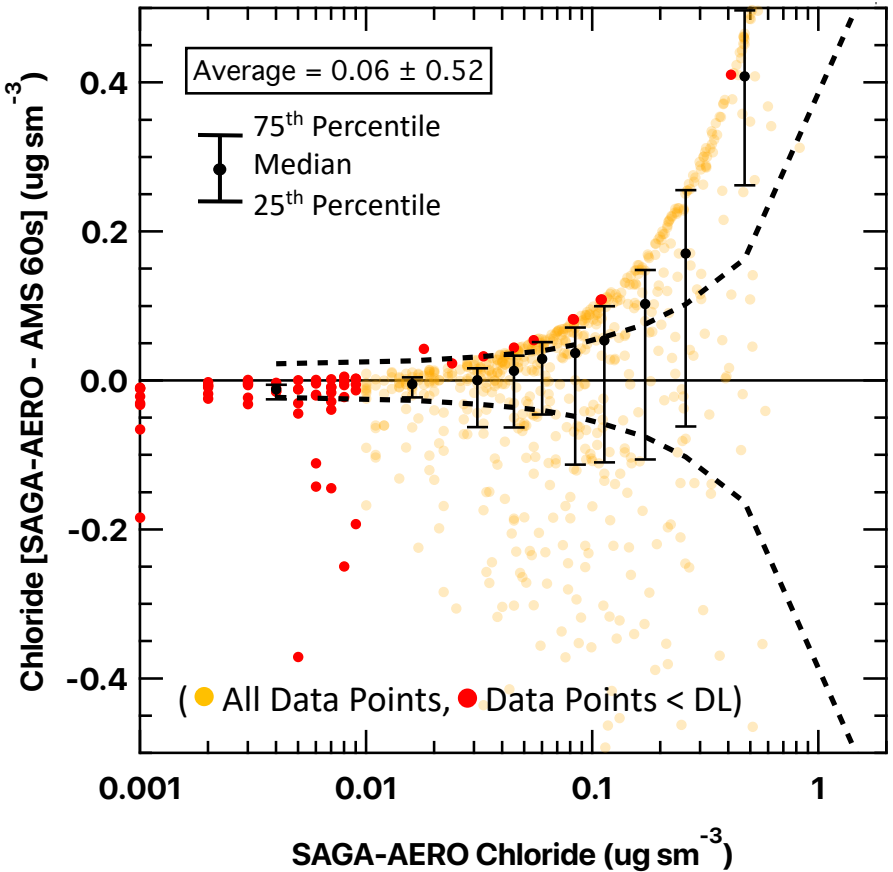
Chloride – AMS vs SAGA-AERO

AMS: non-refractory chloride (<1 μm); SAGA-AERO: bulk chloride (< ~8 μm)



All Data Points
 $y = a + bx$
 $a = 0.0989 \pm 0.0063$
 $b = 0.027 \pm 0.012$
 $R^2 = 0.0042$

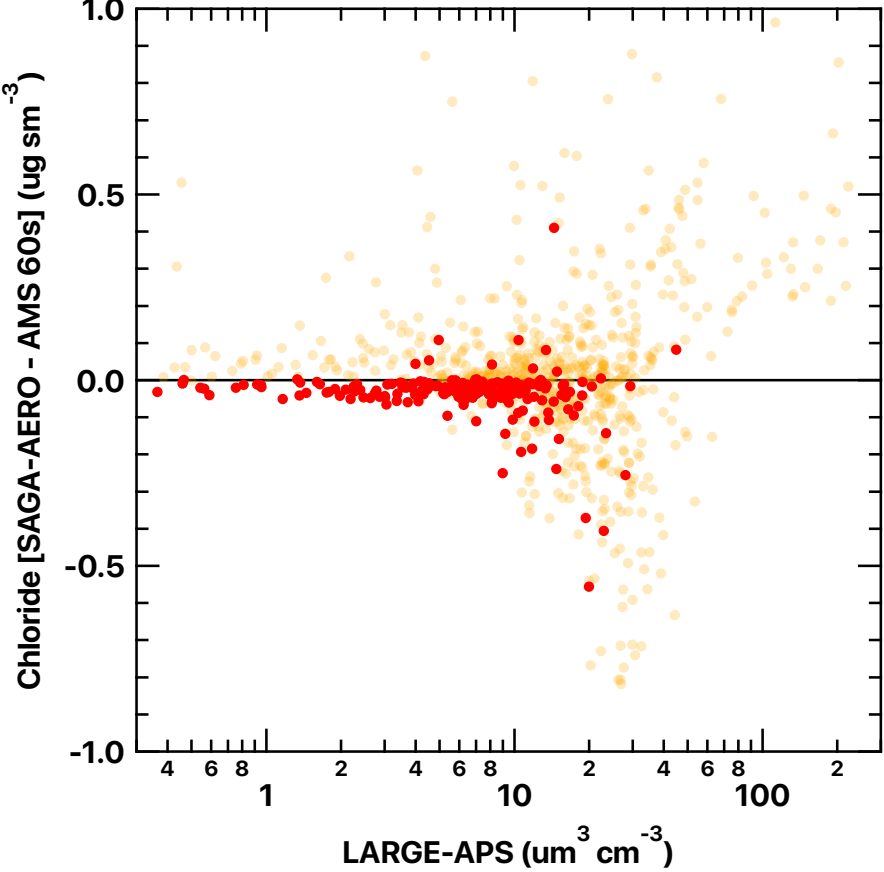
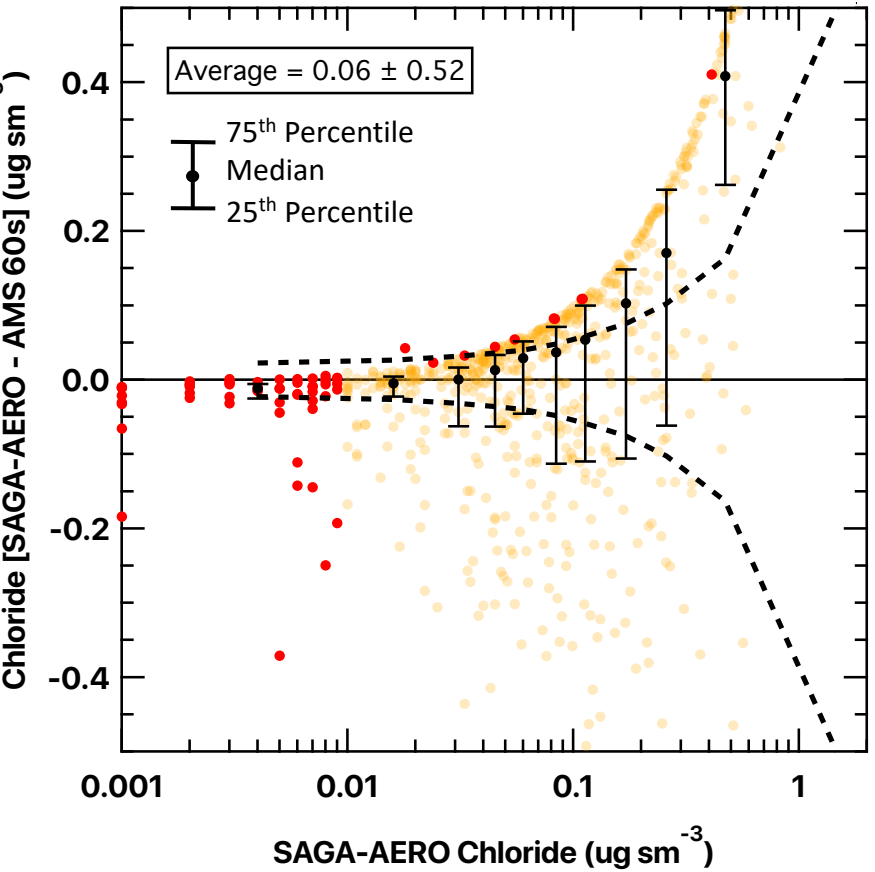
Data Points Above DL
 $Y = a + bx$
 $a = 0.127 \pm 0.008$
 $b = 0.007 \pm 0.013$
 $R^2 = 0.0003$



- Uncertainty envelopes based on SAGA-AERO time base combined data uncertainty
 - AMS 60s calculated from data file
 - SAGA = $\pm (0.02 \text{ ug std m}^{-3} + 30\%)$

Chloride – AMS vs SAGA-AERO

AMS: non-refractory chloride (<1 μm); SAGA-AERO: bulk chloride (< $\sim 8 \mu\text{m}$)

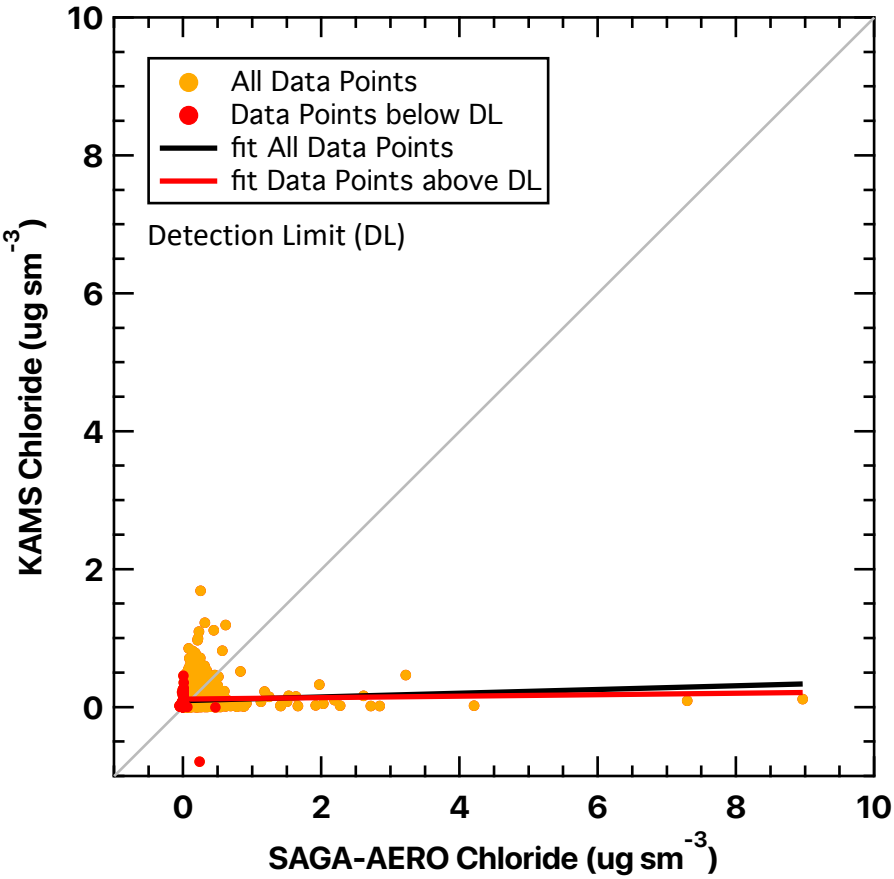


(● All Data Points, ● Data Points < DL)

Chloride – KAMS vs SAGA-AERO

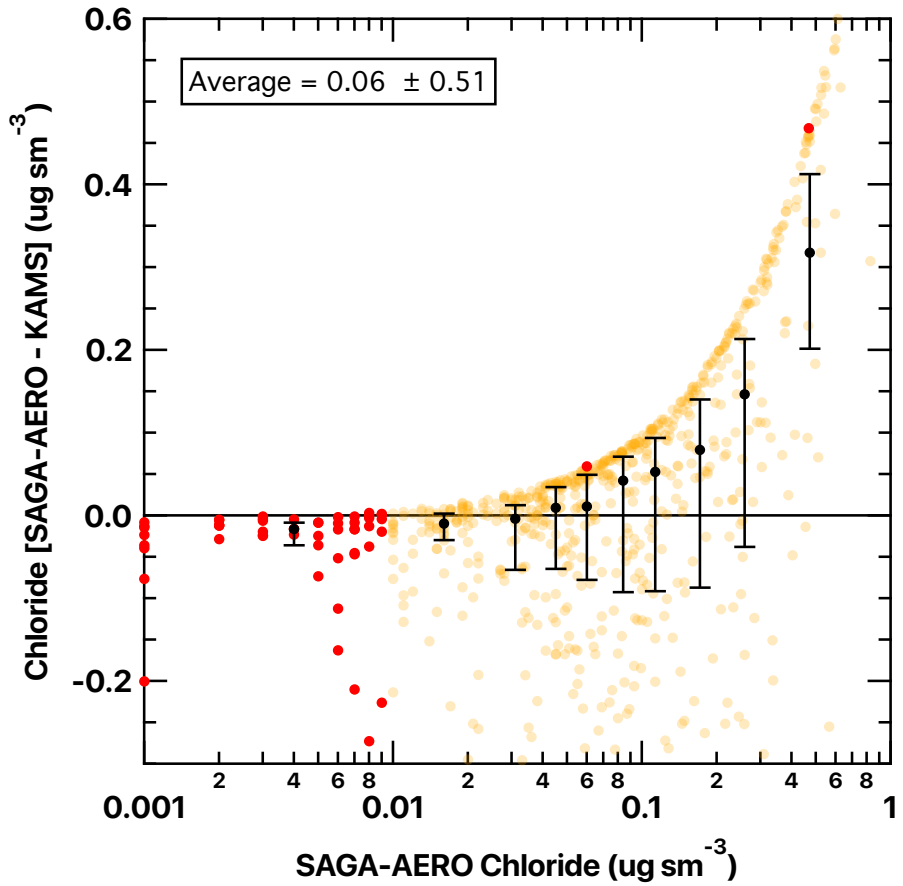
KAMS: non-refractory chloride (<1 μm); SAGA-AERO: bulk chloride (< ~8 μm)

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



All Data Points
 $y = a + bx$
 $a = 0.094 \pm 0.006$
 $b = 0.027 \pm 0.011$
 $R^2 = 0.0046$

Data Points Above DL
 $Y = a + bx$
 $a = 0.119 \pm 0.008$
 $b = 0.010 \pm 0.013$
 $R^2 = 0.0007$



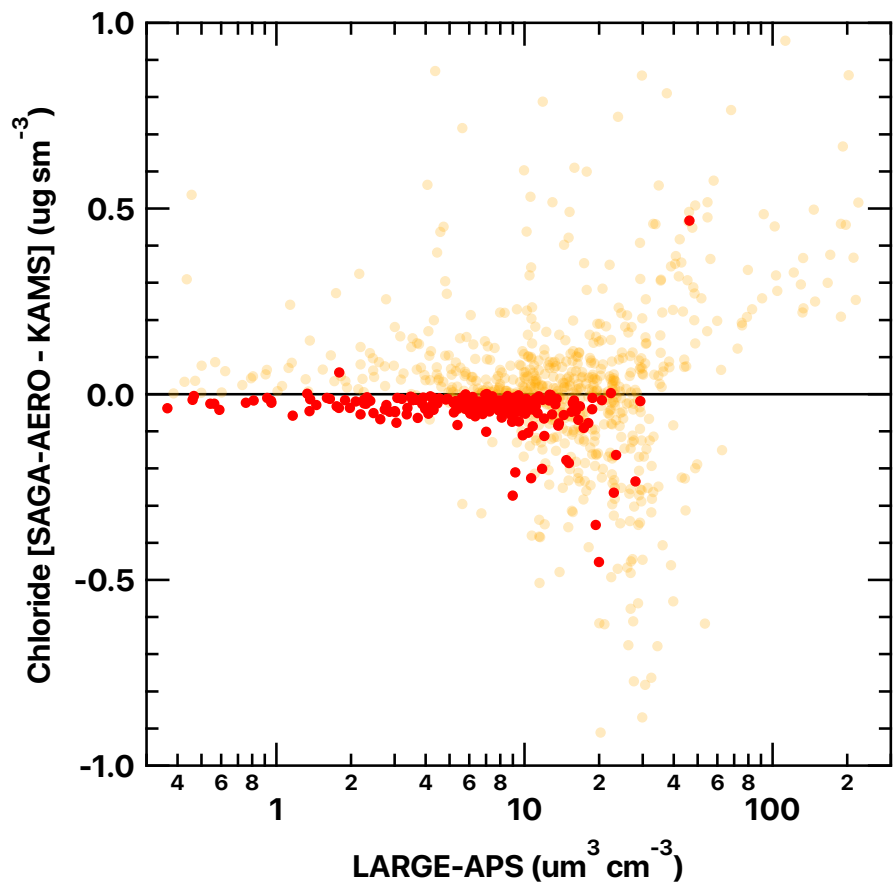
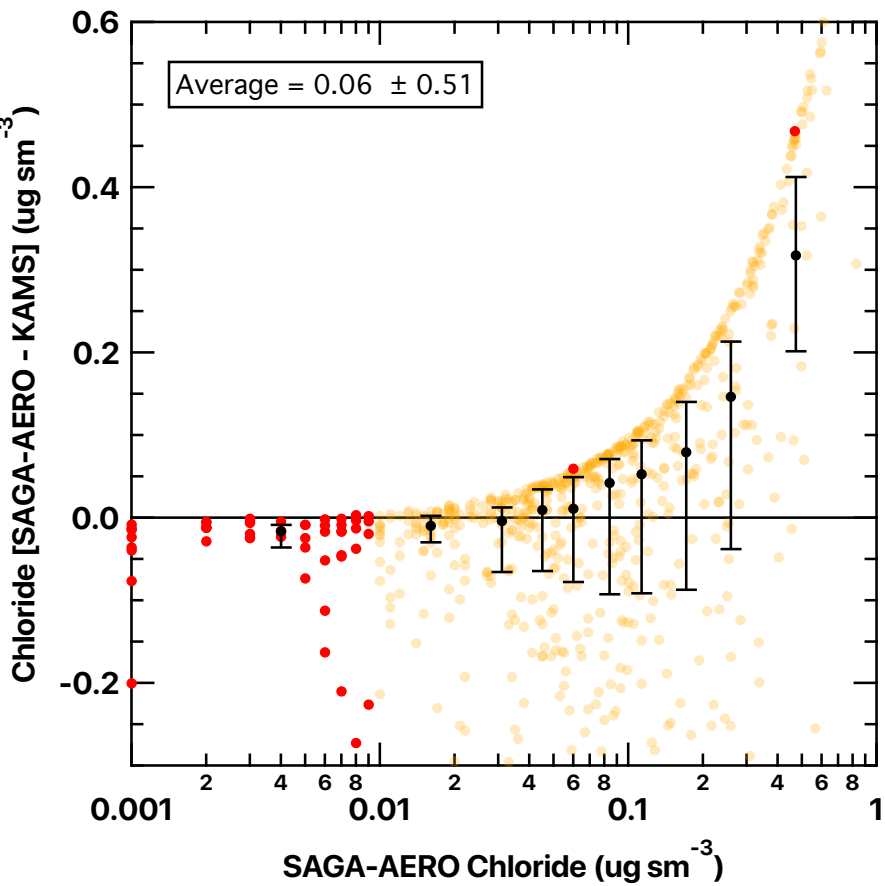
(● All Data Points, ● Data Points < DL)

┌── 75th Percentile
 │── Median
 └── 25th Percentile

Chloride – KAMS vs SAGA-AERO

KAMS: non-refractory chloride (<1 μm); SAGA-AERO: bulk chloride (< $\sim 8 \mu\text{m}$)

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

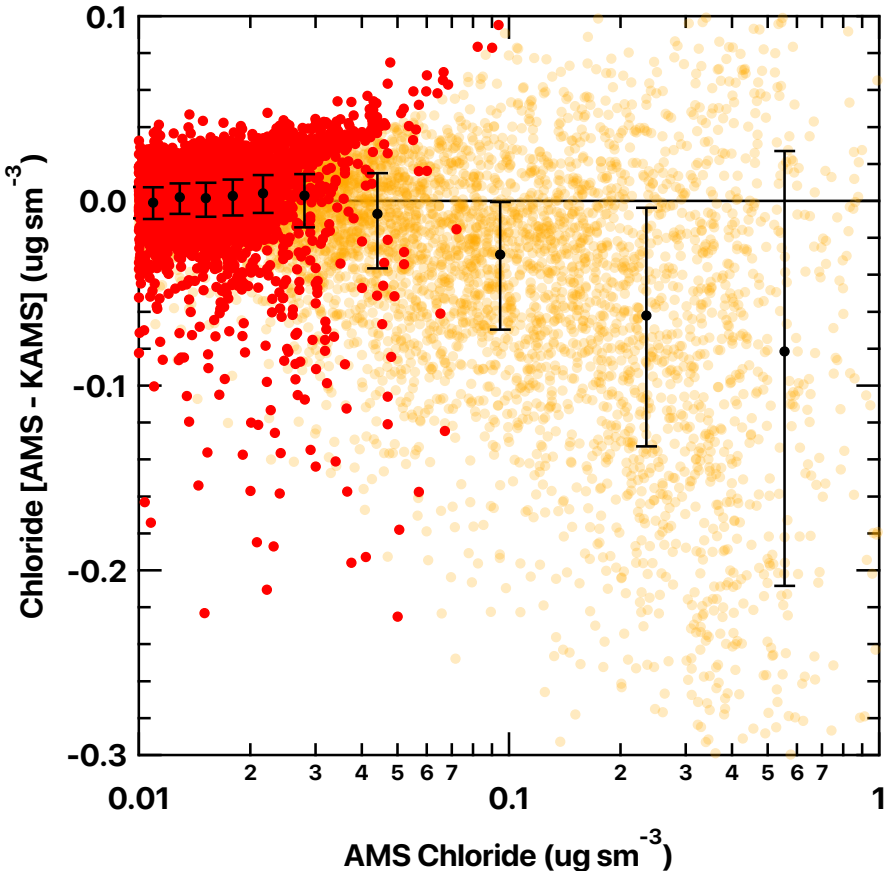
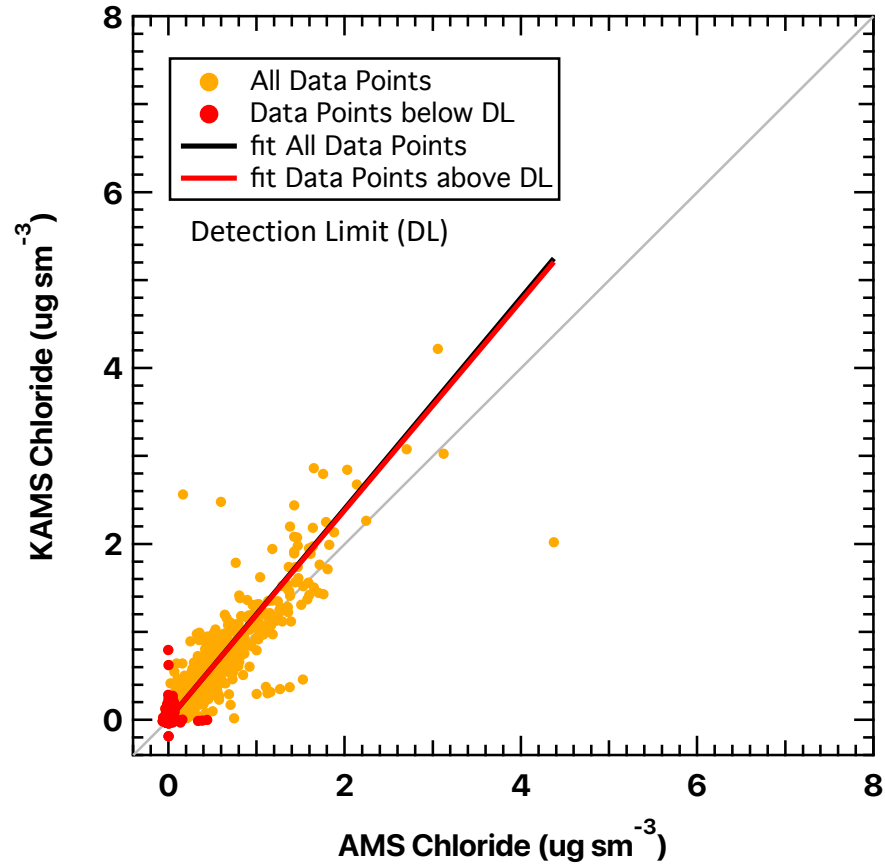


(● All Data Points, ● Data Points < DL)

┌─── 75th Percentile
│── Median
└─── 25th Percentile

Chloride – 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
 $y = a + bx$
 $a = 0.0045 \pm 0.0005$
 $b = 1.200 \pm 0.003$
 $R^2 = 0.864$

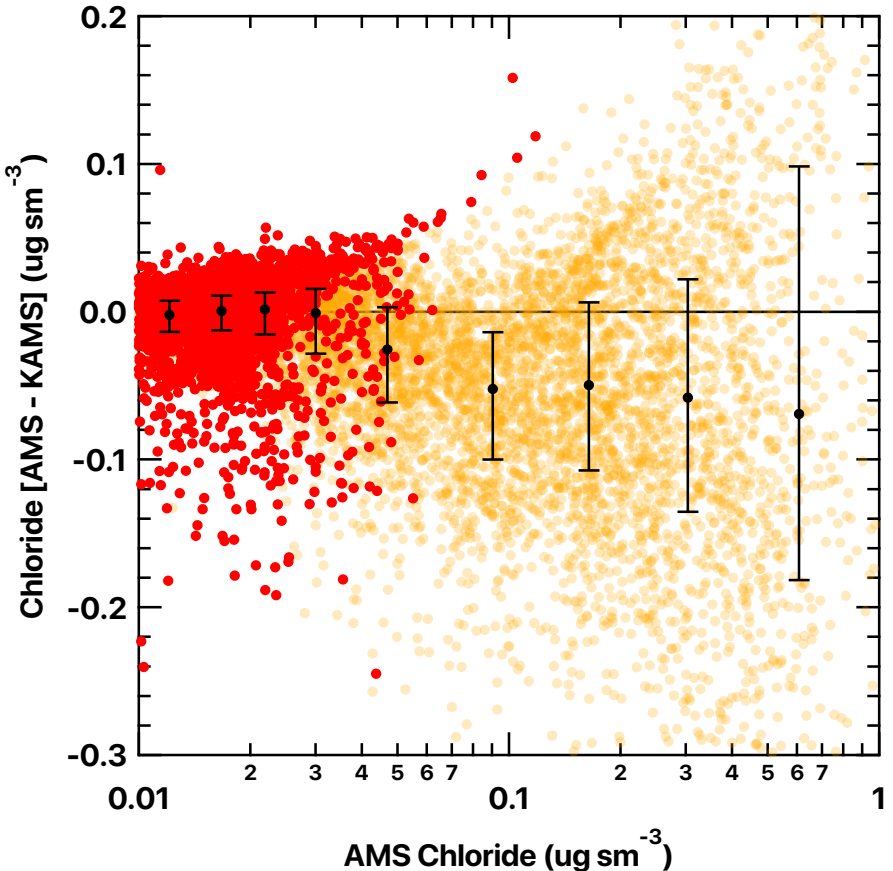
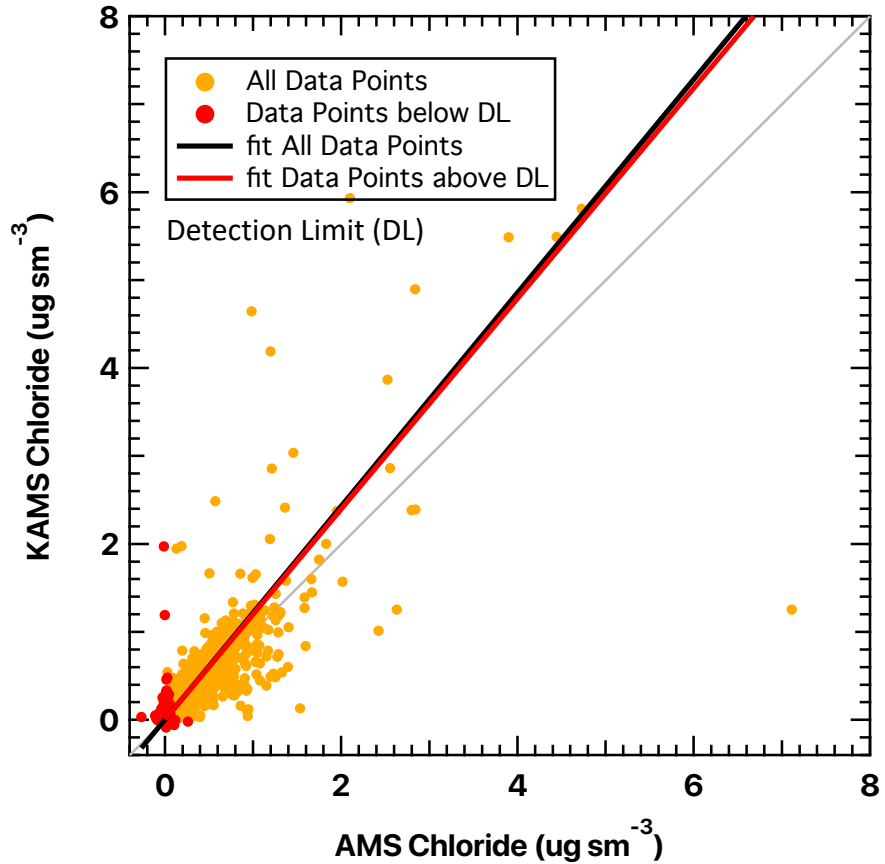
Data Points Above DL
 $Y = a + bx$
 $a = 0.007 \pm 0.001$
 $b = 1.189 \pm 0.006$
 $R^2 = 0.856$

(● All Data Points, ● Data Points < DL)

┌─── 75th Percentile
 │─── Median
 └─── 25th Percentile

Chloride – 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
 $y = a + bx$
 $a = 0.008 \pm 0.001$
 $b = 1.213 \pm 0.006$
 $R^2 = 0.721$

Data Points Above DL
 $Y = a + bx$
 $a = 0.010 \pm 0.003$
 $b = 1.196 \pm 0.009$
 $R^2 = 0.691$

(● 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.
- R² 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: $\pm [0.02 \text{ ug std m}^{-3} + 30\%]$.

Difference dependence on NO₃ value:

- **AMS/KAMS Comparison:**
 - Difference calculated by AMS 60s - KAMS.
 - Median, 25th, and 75th percentiles based on 1000 data point 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.