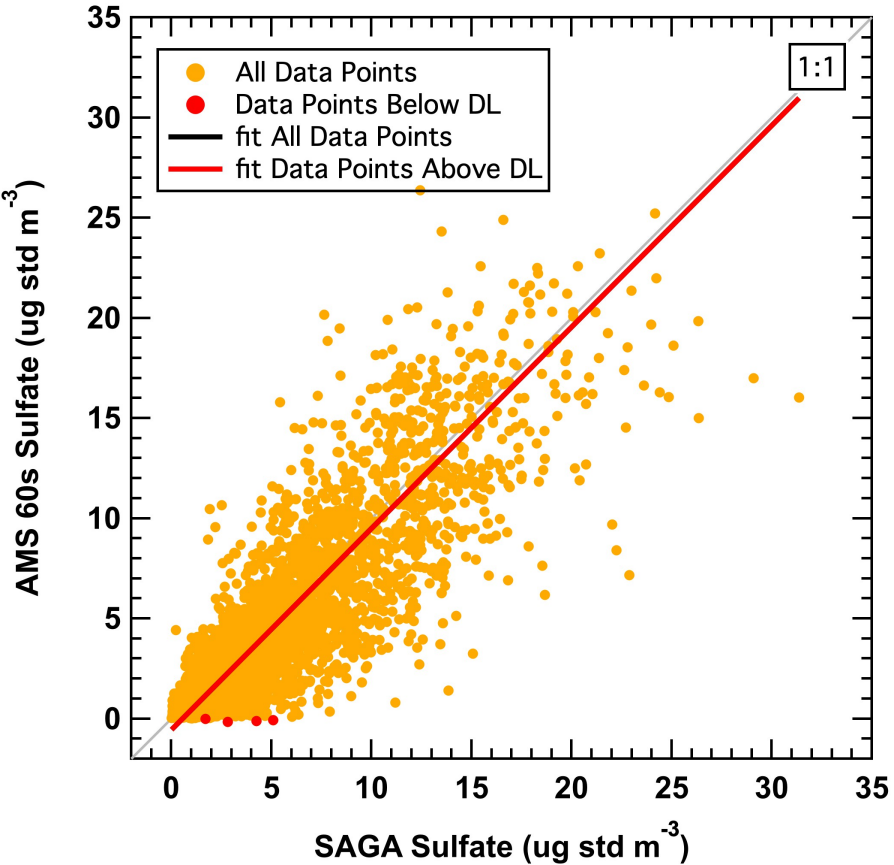
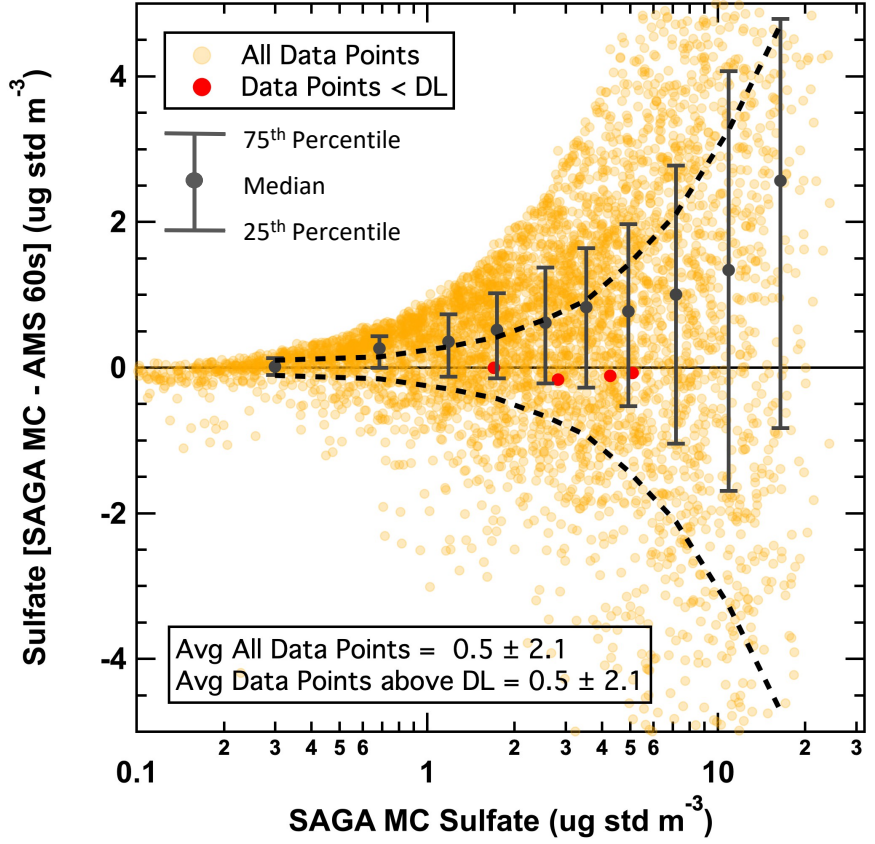


Sulfate – AMS vs SAGA-MC

AMS measurements include organic sulfate. SAGA measurements only include the inorganic ionic forms.



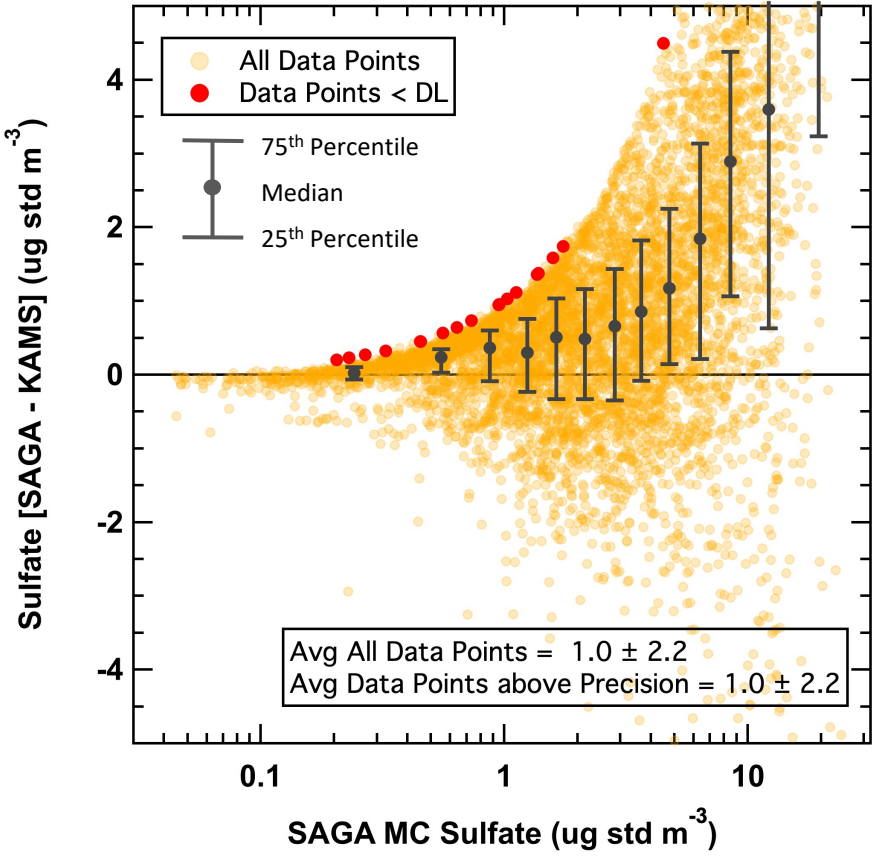
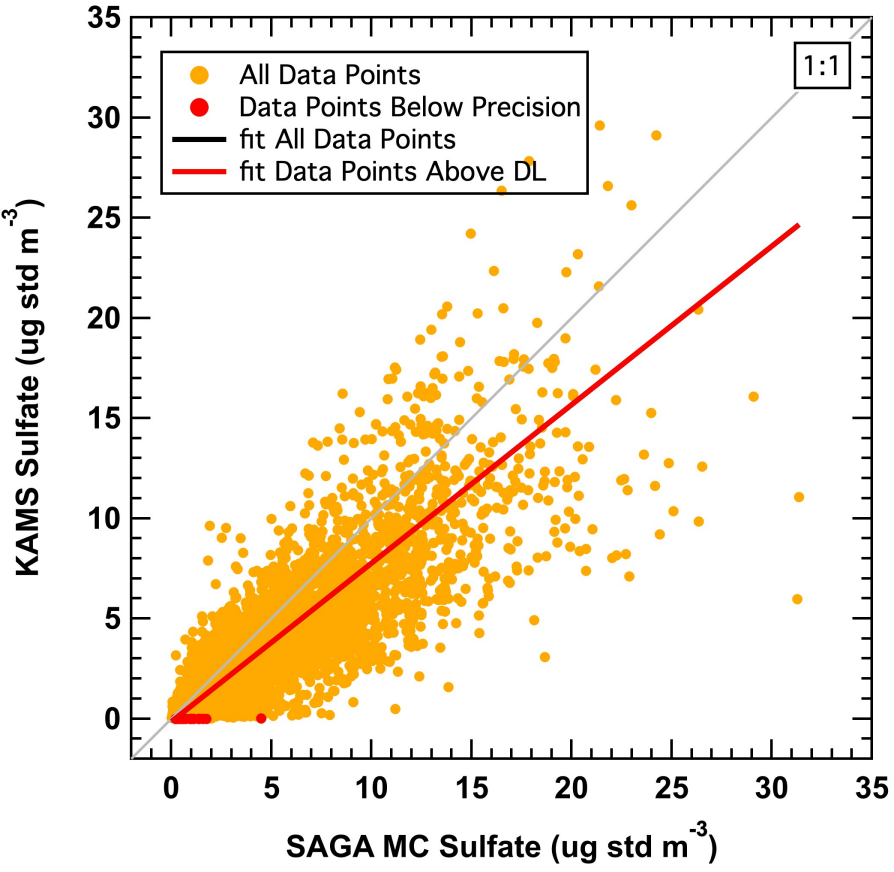
All Data Points	Data Points Above DL
$y = a + bx$	$a = -0.57 \pm 0.04$
$a = -0.57 \pm 0.04$	$b = 1.006 \pm 0.007$
$b = 1.006 \pm 0.007$	$R^2 = 0.771$
$R^2 = 0.771$	



- Uncertainty envelopes based on SAGA-AERO time base combined data uncertainty
 - AMS 60s calculated from data file
 - SAGA = $\pm (0.021 \mu\text{g std m}^{-3} + 10\%)$

Sulfate – KAMS vs SAGA-MC

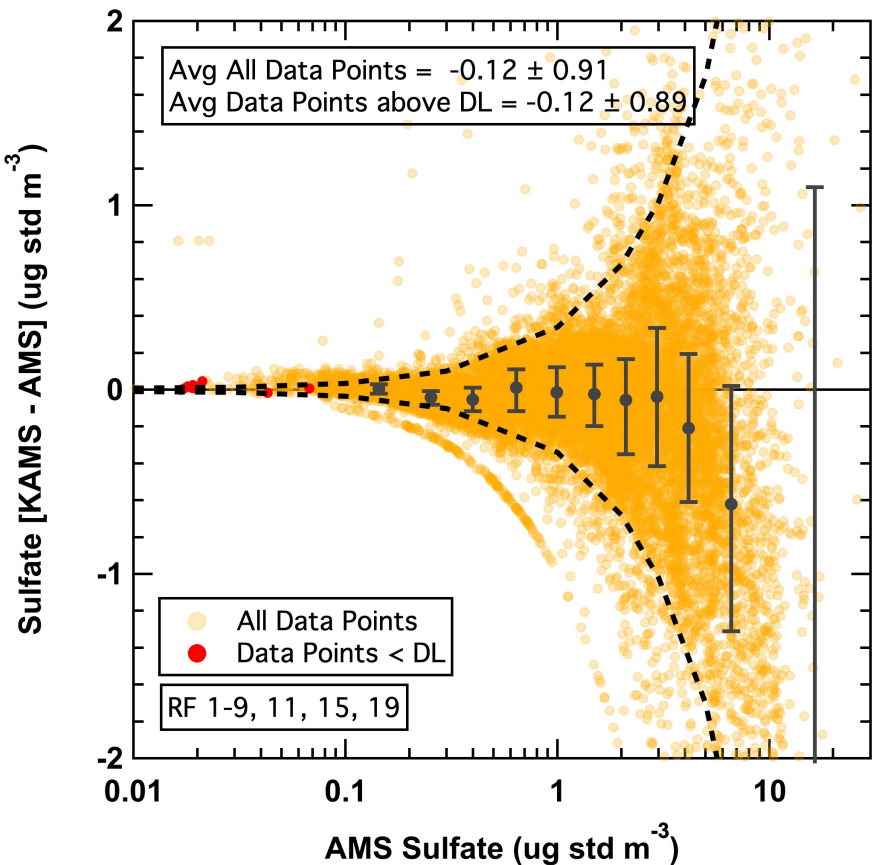
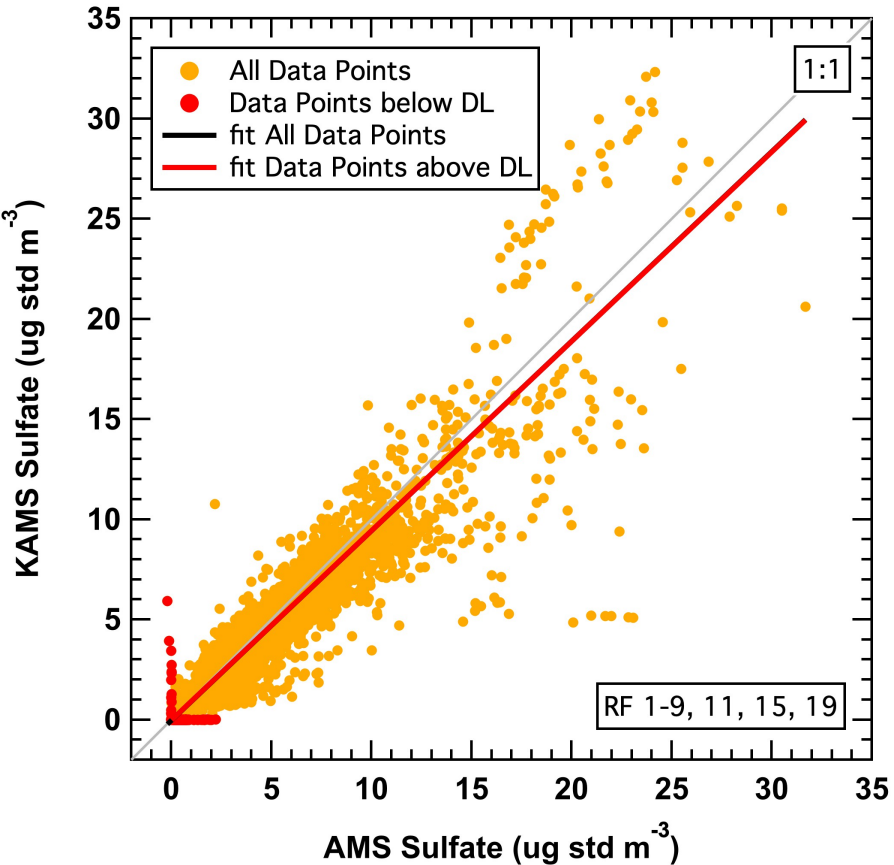
KAMS LLOD values not provided, assume values under precision level are less than the detection limit.



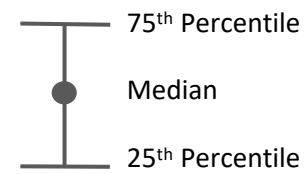
All Data Points	Data Points Above Precision Level
$y = a + bx$	
$a = -0.16 \pm 0.03$	$a = -0.15 \pm 0.03$
$b = 0.792 \pm 0.006$	$b = 0.791 \pm 0.006$
$R^2 = 0.723$	$R^2 = 0.723$

Sulfate – 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.

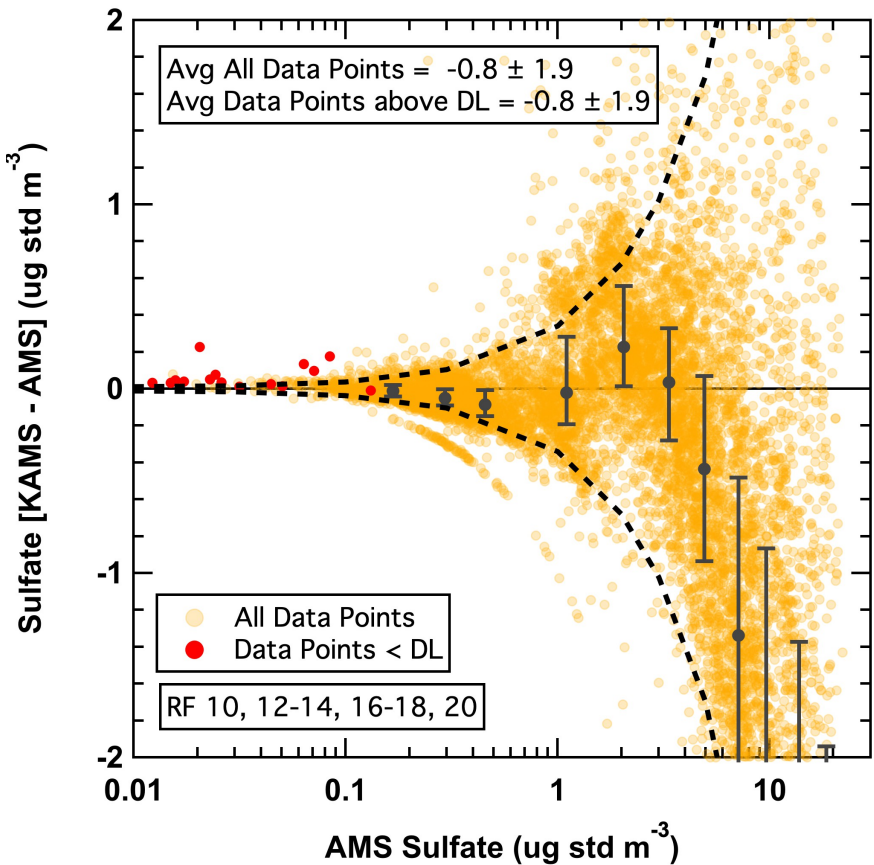
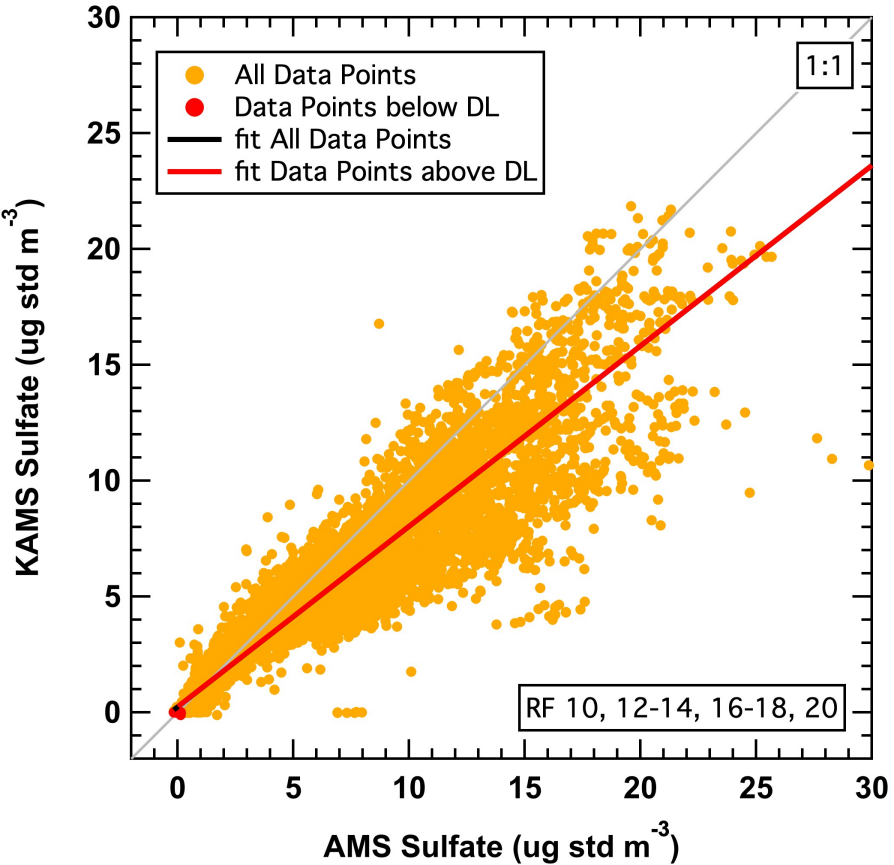


All Data Points	Data Points Above DL
$y = a + bx$	$Y = a + bx$
$a = -0.019 \pm 0.008$	$a = -0.011 \pm 0.008$
$b = 0.954 \pm 0.002$	$b = 0.951 \pm 0.002$
$R^2 = 0.901$	$R^2 = 0.906$

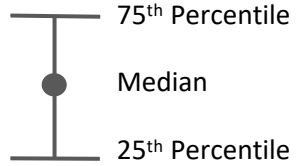


Sulfate – KAMS vs AMS (Research Flights 10, 12-14, 16-18, 20)

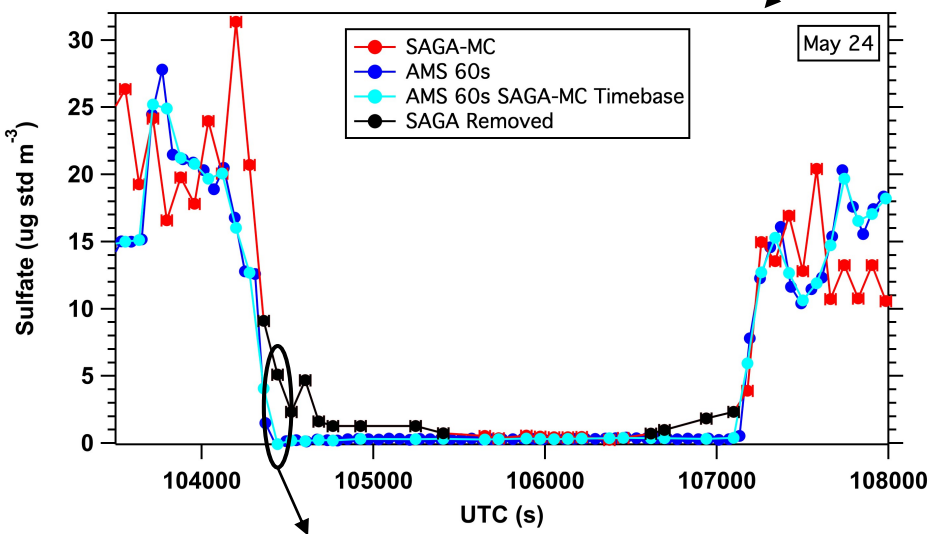
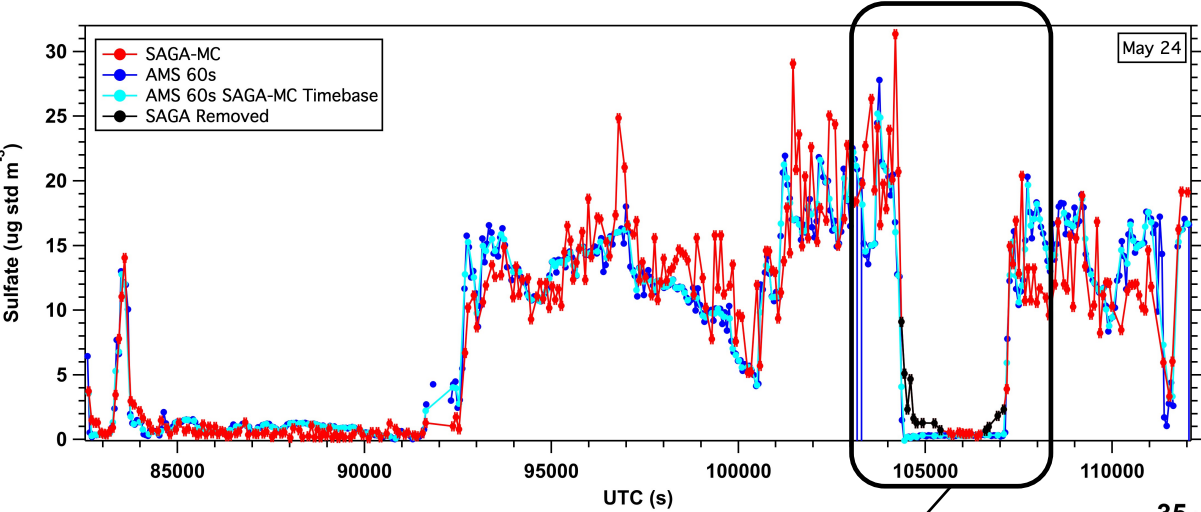
KAMS LLOD values not provided, assume values under precision level are less than the detection limit.



All Data Points	Data Points Above DL
$y = a + bx$	$Y = a + bx$
$a = 0.24 \pm 0.02$	$a = 0.26 \pm 0.02$
$b = 0.784 \pm 0.002$	$b = 0.783 \pm 0.002$
$R^2 = 0.889$	$R^2 = 0.889$

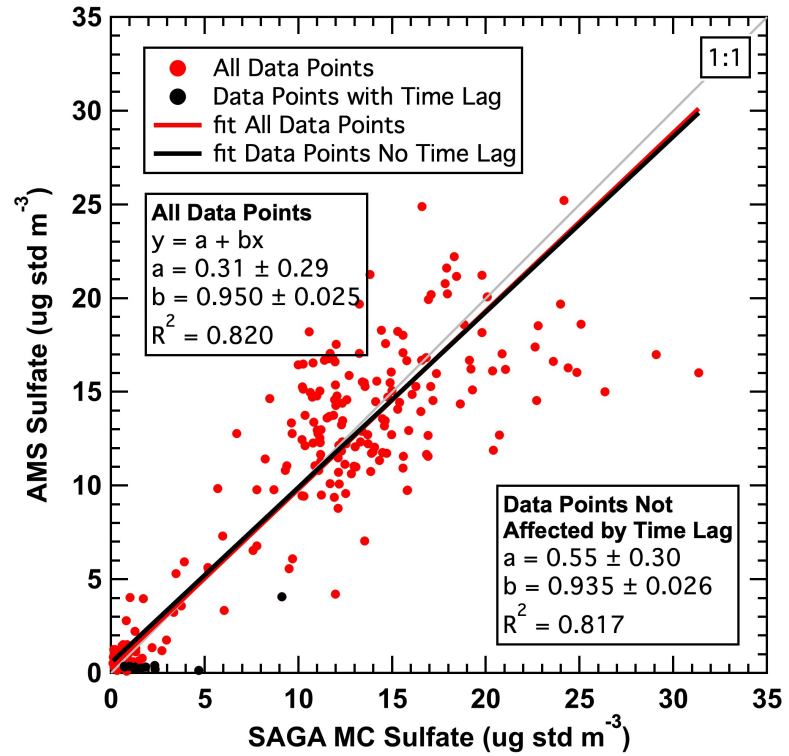


Assessment of SAGA Time Response Issue – May 24

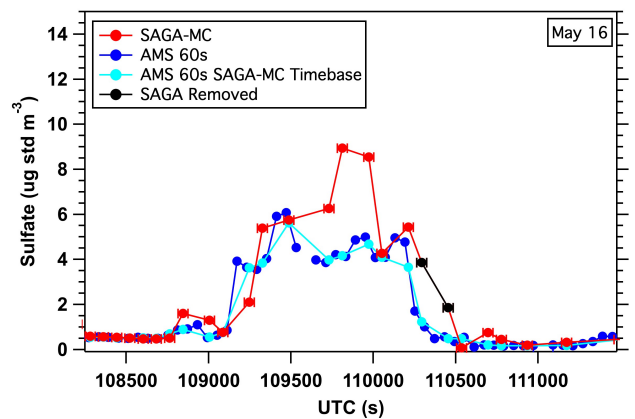
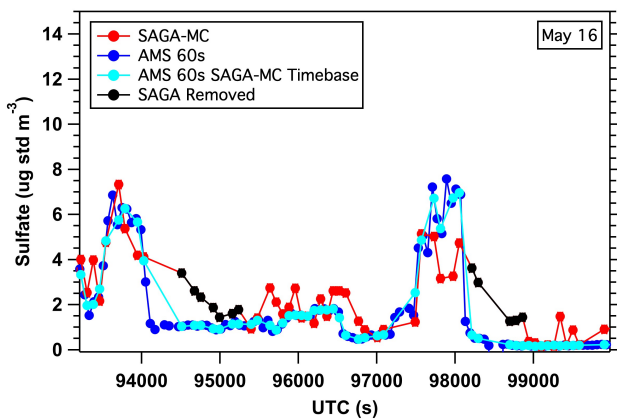
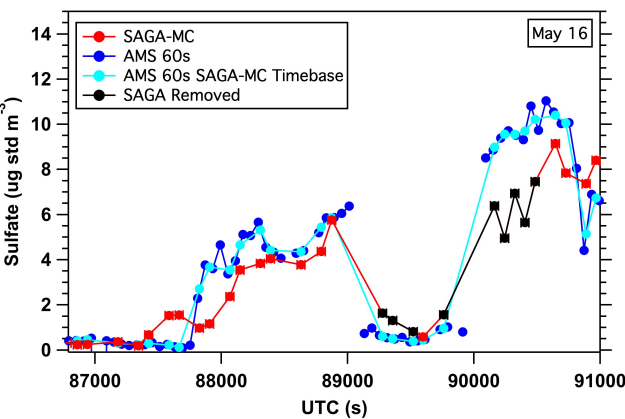
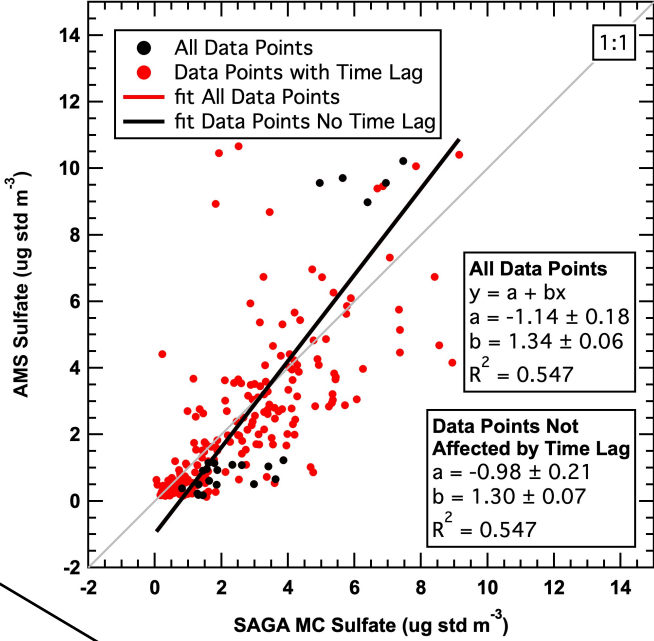
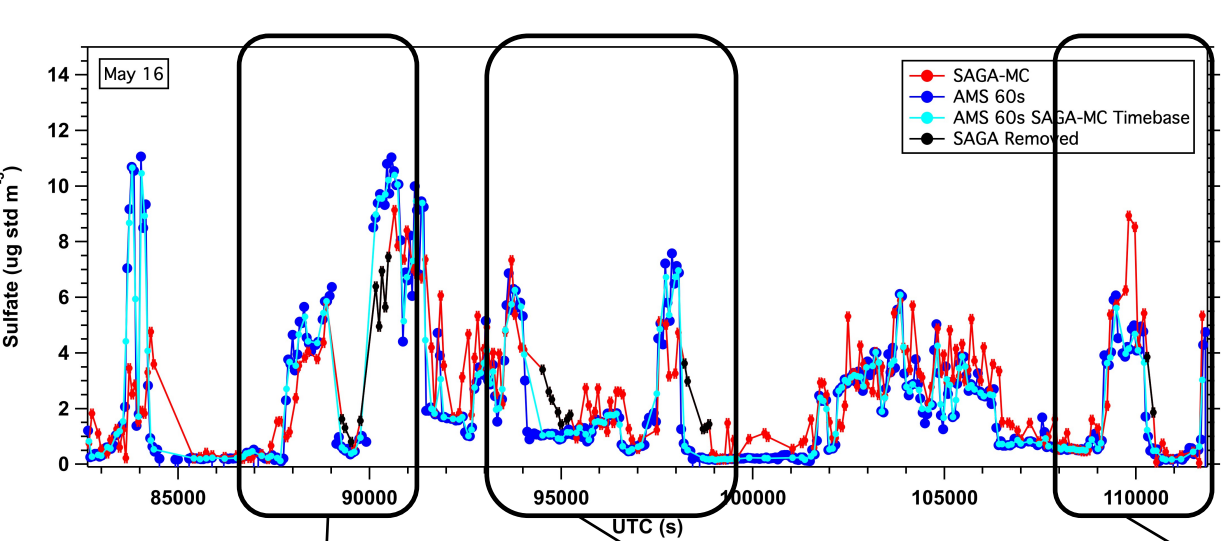


AMS 60s Data below DL

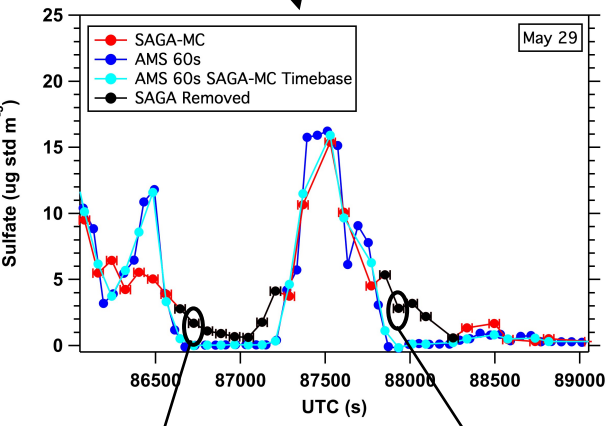
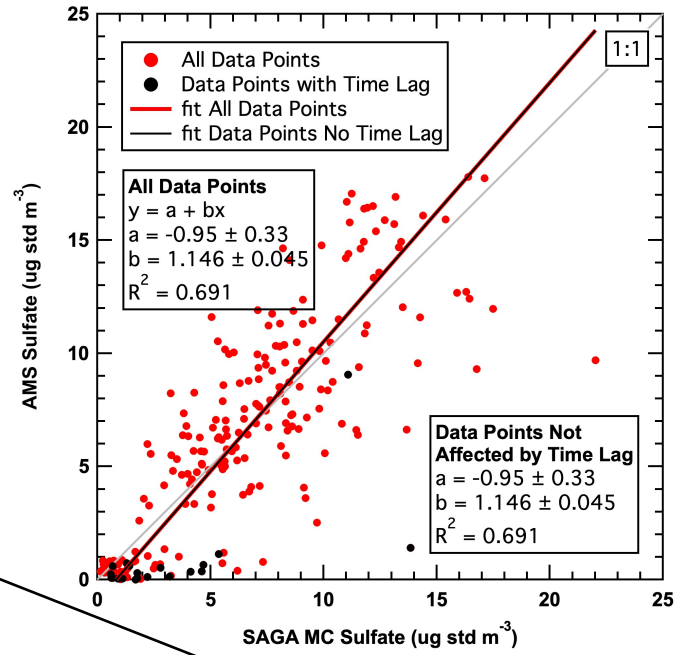
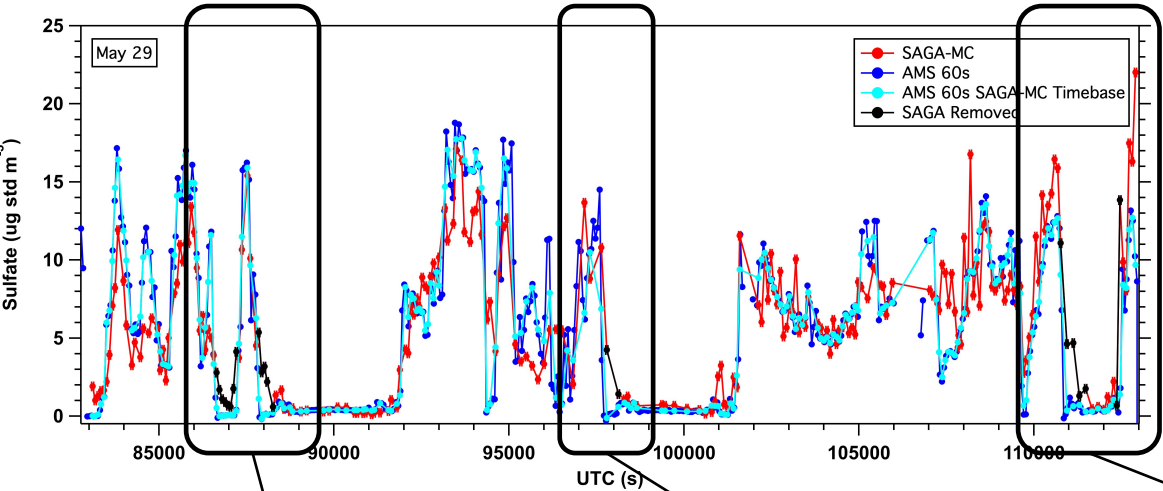
SAGA MC = 5.093
 AMS 60s = -0.06875



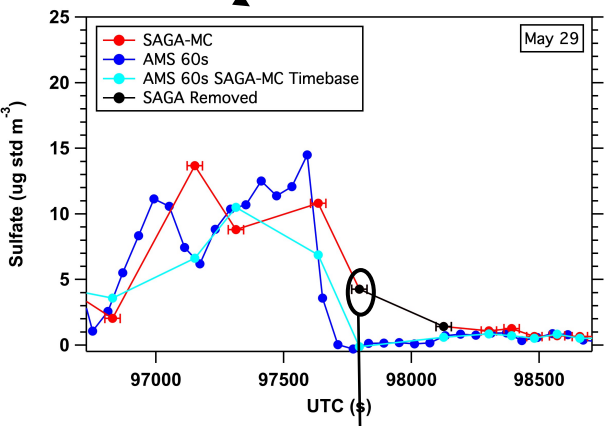
Assessment of SAGA Time Response Issue – May 16



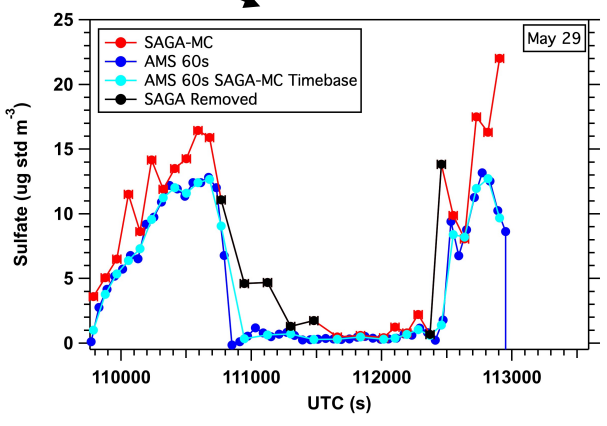
Assessment of SAGA Time Response Issue – May 29



AMS 60s Data below DL
 SAGA MC = 1.694
 AMS 60s = 0.00109409



AMS 60s Data below DL
 SAGA MC = 2.82
 AMS 60s = -0.16045



AMS 60s Data below DL
 SAGA MC = 4.26
 AMS 60s = -0.11258

Summary: AMS 60s vs SAGA-MC

Data Range	# Points	# Pts within Combined Unc.	# Pts within 2*Combined Unc.
All	4694	2212 (47%)	3322 (71%)

Summary: AMS vs KAMS (Research Flights)

Data Range	# Points	# Pts within Combined Unc.	# Pts within 2*Combined Unc.
All	15244	13949 (91%)	14955 (98%)

Summary: AMS vs KAMS (Research Flights)

Data Range	# Points	# Pts within Combined Unc.	# Pts within 2*Combined Unc.
All	10366	8598 (83%)	10135 (98%)

Data:

- KORUSAQ-AMS-60s_DC8_#####_R1.ict (##### = daily files from 20160501 – 20160609)
- KORUSAQ-AMS_DC8_#####_R1.ict (##### = daily files from 20160501 – 20160609)
- korusaq-SAGA-MC_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.
- **AMS/KAMS Comparison:**
 - Merged AMS to KAMS time interval.
 - AMS data points removed when flagged for potential inlet artifacts (IceFlag).
 - AMS 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:**
 - Merged AMS 60s and KAMS data to SAGA time base. Propagated AMS 60s DL and KAMS precision to SAGA time base.
 - AMS data filtered to only include merge intervals with at least 70% data within each merge interval. Data points removed when flagged for potential inlet artifacts (IceFlag).
 - 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-MC time interval: calculated using quadrature average.
- SAGA-MC: $\pm [0.021 \text{ ug std m}^{-3} + 10\%]$.

Difference dependence on NO₃ value:

- **AMS/KAMS Comparison:**
 - Difference calculated by AMS - KAMS.
 - Median, 25th, and 75th percentiles based on 1500 data point bins (Early Flights) and 1000 data point bins (Late Flights) after data sorted by AMS values.
- **SAGA Comparison:**
 - Difference calculated by SAGA-MC – AMS 60s and SAGA-MC – KAMS.
 - Median, 25th, and 75th percentiles based on 500 data point bins after data is sorted by SAGA-MC values.
 - Uncertainty envelopes for SAGA/AMS comparison based on reported SAGA-MC uncertainty and calculated AMS 1s total uncertainty.