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Impact on cloud properties of reduced-sulphur shipping fuel in the Eastern North Atlantic

Gerald G. Mace et al.

Correspondence to: Gerald G. Mace (jay.mace@utah.edu)

Table S1. Statistics of the MERRA Reanalysis data within 500 km of the ARM ENA site for the pre and post periods. The column P indicates the probability that the distributions of a quantity as indicated in Figure 1 are drawn from the same sample population (null hypothesis) according to the Kolmogorv-Smirnov test using the unique average number of days in each period (500) as the number of independent samples. When P exceeds 0.99, we can be confident at the 99% level that the null hypothesis cannot be rejected, and the data appear drawn from the same sample population.

		Mean	Median	Standard Deviation	P
Omega (mb day^{-1})	Pre	6.50	9.43	20.2	0.998
	Post	5.85	9.31	20.9	
EIS (K)	Pre	1.89	1.82	2.49	0.61
	Post	1.83	1.69	2.67	
Temp Adv (K day^{-1})	Pre	0.49	0.44	2.92	0.999
	Post	0.53	0.49	2.74	
LWP (g m^{-2})	Pre	68	60	35	0.51
	Post	73	68	35	
Mid Trop RH (%)	Pre	41.3	39.9	22.2	0.999
	Post	41.7	40.0	21.9	
Near-Surface Wind (m s^{-1})	Pre	6.56	6.13	3.31	0.999
	Post	6.39	6.12	3.04	
	Post	5.5	5.1	2.1	

Table S2. Statistics of the ENA CCN and Cloud Property Statistics for the pre and post periods. The column P indicates the probability that the distributions of a quantity as indicated in Figure 1 are drawn from the same sample population (null hypothesis) according to the Kolmogorv-Smirnov test using the average of the unique number of days in each period (150.) as the number of independent samples. When P exceeds 0.99, we can be confident at the 99% level that the null hypothesis cannot be rejected, and the data appear drawn from same sample population.

		Mean	Median	Standard Deviation	P
CCN (cm^{-3})	Pre	179	174	144	<<0.005
	Post	160	136	107	
N_d (cm^{-3})	Pre	93	77	112	<<0.005
	Post	62	40	65	
r_e (μm)	Pre	12	14	4	<<0.005
	Post	15	15	5	

LWP (g m^{-2})	Pre	81	57	64	0.30
	Post	82	58	63	
Optical Depth	Pre	9.2	8.2	4.8	0.998
	Post	9.1	8.1	4.9	
Precip Rate (mm day^{-1})	Pre	0.06	0.01	0.52	0.45
	Post	0.02	0.02	0.08	
PWV (cm)	Pre	3.1	3.0	0.74	0.91
	Post	3.1	2.9	0.78	
Wind Speed (m s^{-1})	Pre	5.4	5.1	1.9	0.92
	Post	5.5	5.1	2.1	

Table S3. As in Table S2 except for MODIS Cloud and Radiative Properties within 250 km of the ARM ENA site. Also shown is the CERES planetary albedo.

Overpasses prior:	Overpasses post:	Mean	Median	Standard Deviation	Zx	P
Nd	Pre	76	69	41	0.19	<<0.05
	Post	63	51	39		
re	Pre	13	13	3.4	0.19	<<0.05
	Post	14	15	3.6		
LWP	Pre	62	60	28	0.11	0.005
	Post	65	64	26		
Optical Depth	Pre	7.0	6.7	2.8	0.06	0.29
	Post	6.8	6.5	2.4		
CERES Albedo	Pre	0.15	0.12	0.08	0.06	0.28
	Post	0.15	0.12	0.08		

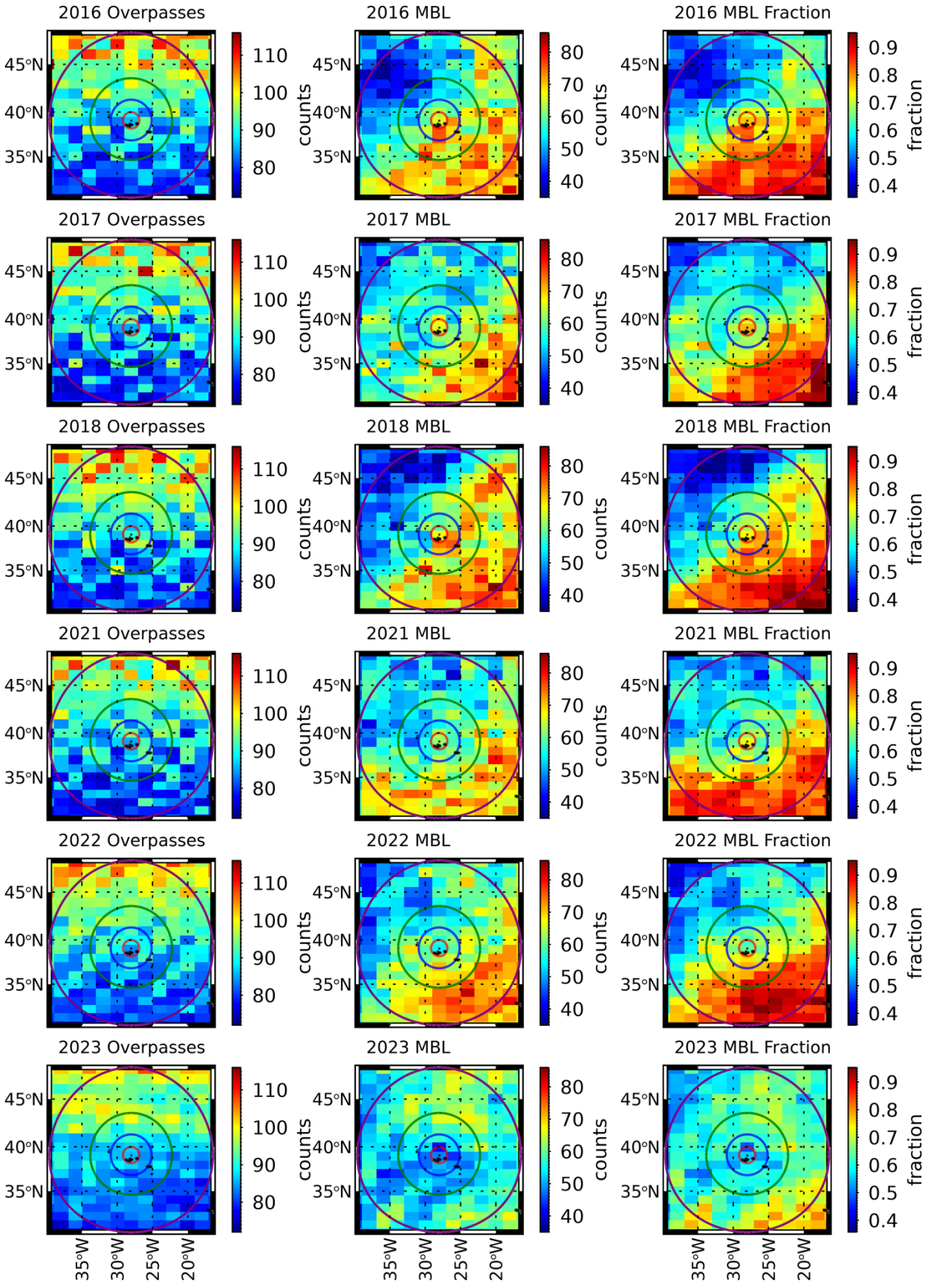
2016 Overpasses
2016 MBL
2016 MBL Fraction
2017 Overpasses
2017 MBL
2017 MBL Fraction
2018 Overpasses
2018 MBL
2018 MBL Fraction
2021 Overpasses
2021 MBL
2021 MBL Fraction
2022 Overpasses
2022 MBL
2022 MBL Fraction
2023 Overpasses
2023 MBL
2023 MBL Fraction
45°N
40°N
35°N
35°W
30°W
25°W
20°W
counts
fraction
110
100
90
80
70
60
50
40
0.9
0.8
0.7
0.6
0.5
0.4

Figure S1. The year by year analysis of the MODIS overpasses of the region surrounding the ARM-ENA site. Range rings are at 50, 100, 250, and 500 km from the ARM-ENA site. The columns from left to right show the number of overpasses of each 1x1 degree pixel, the occurrence counts of MBL clouds in each pixel, and the resulting fraction. The row from top to bottom are for 2016, 2017, 2018, 2021, 2022, and 2023.