



*Supplement of*

## **Shortwave direct radiative effects of above cloud aerosols over global oceans derived from eight years of CALIOP and MODIS observations**

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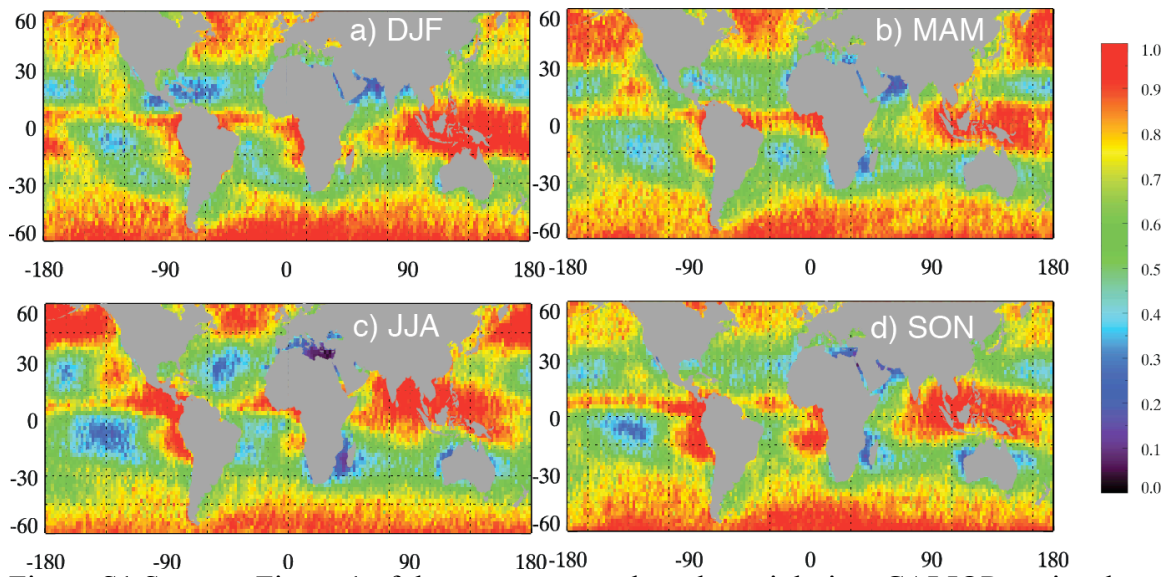


Figure S1 Same as Figure 1 of the paper, except based on nighttime CALIOP retrievals.

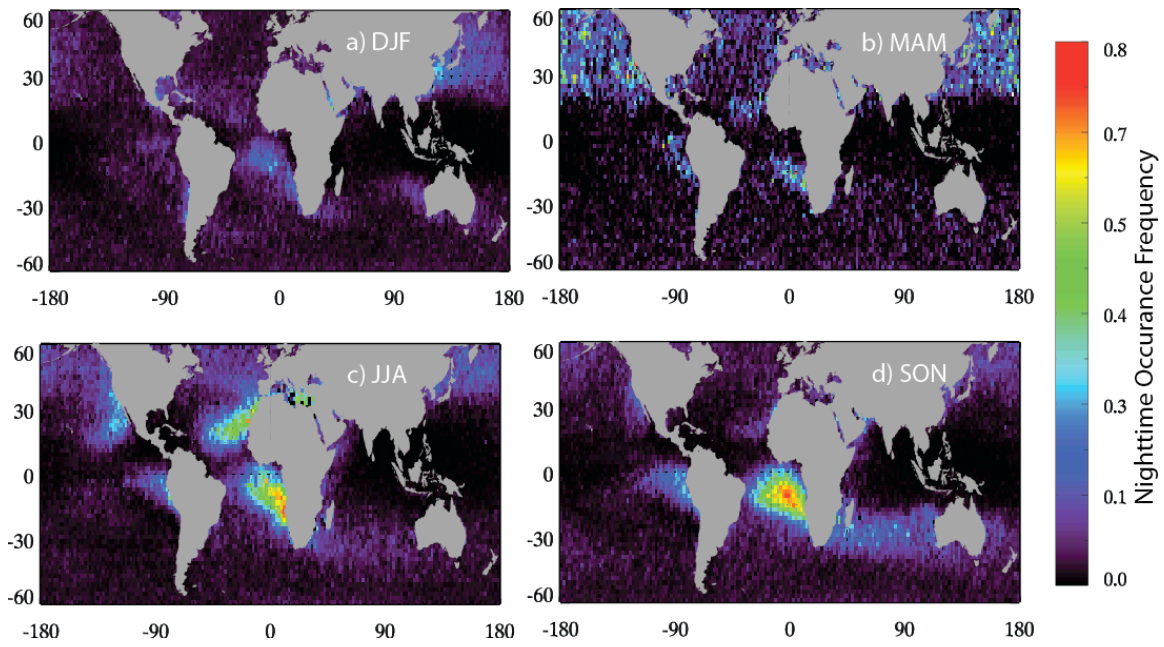


Figure S2 Same as Figure 2 of the paper, except based on nighttime CALIOP retrievals.

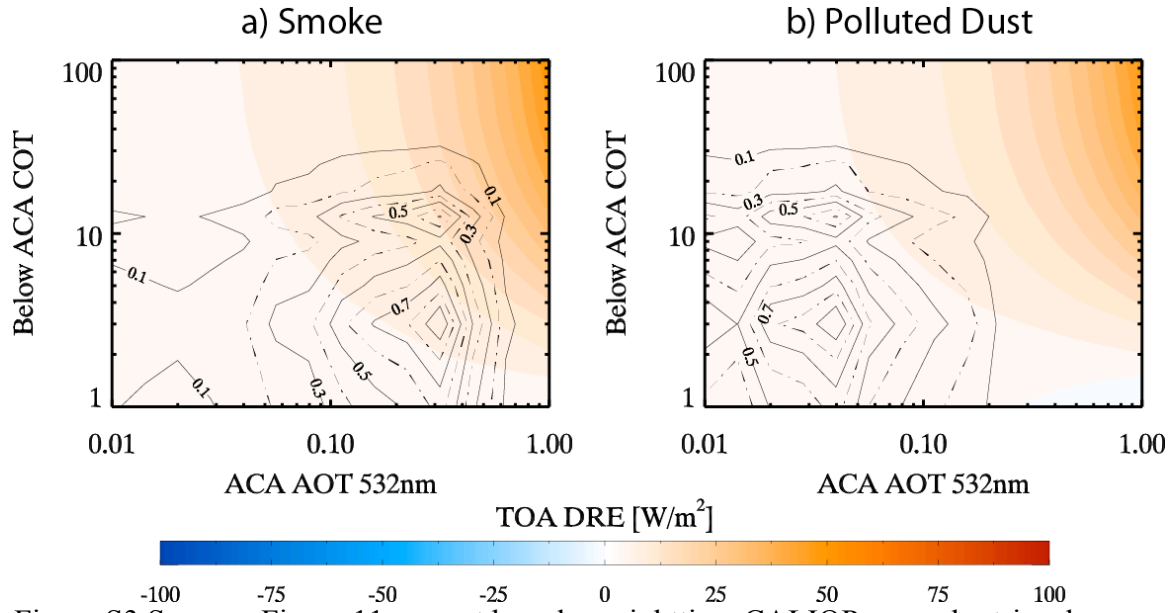


Figure S3 Same as Figure 11, except based on nighttime CALIOP aerosol retrievals

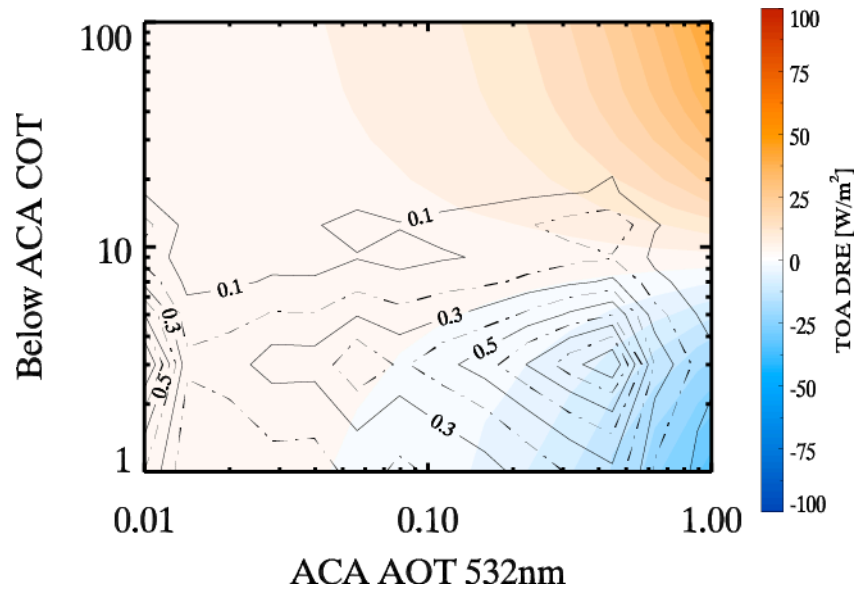


Figure S4 Same as Figure 12a in the paper, except based on nighttime CALIOP retrievals.

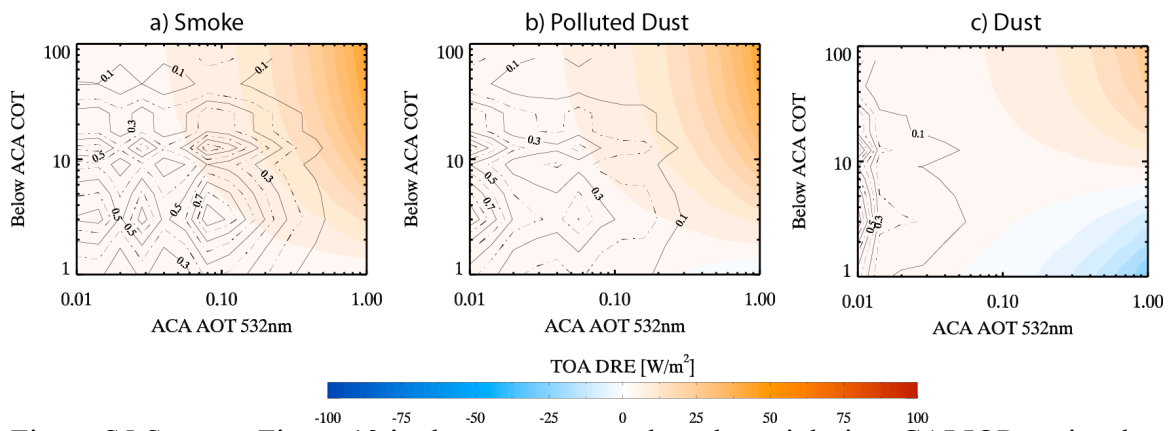


Figure S5 Same as Figure 13 in the paper, except based on nighttime CALIOP retrievals.

Table S1 Same as the Table 3 in the paper except based on the combination of nighttime CALIOP AOT retrieval and daytime MODIS COT retrieval.

Type	CALIOP smoke+OBS dust	Haywood smoke+OBS dust	CALIOP smoke+OPAC dust
Smoke	0.031 (0.054)	0.015 (0.028)	0.031 (0.054)
	-0.032 (-0.050)	-0.057 (-0.092)	-0.032 (-0.050)
	0.064 (0.104)	0.072 (0.120)	0.064 (0.104)
Dust	-0.014 (-0.016)	-0.014 (-0.016)	-0.004 (-0.004)
	-0.034 (-0.044)	-0.034 (-0.044)	-0.042 (-0.054)
	0.020 (0.028)	0.020 (0.028)	0.037 (0.050)
Polluted Dust	0.007 (0.012)	0.007 (0.012)	0.007 (0.012)
	-0.019 (-0.027)	-0.019 (-0.027)	-0.019 (-0.027)
	0.026 (0.039)	0.026 (0.039)	0.026 (0.039)

Table S2 Same as the Table 4 in the paper except based on the combination of nighttime CALIOP AOT retrieval and daytime MODIS COT retrieval.

Region	CALIOP smoke+OBS dust	Haywood smoke+OBS dust	CALIOP smoke+OPAC dust
SE Atlantic	0.38 (0.58)	0.18 (0.31)	0.38 (0.59)
	-0.48 (-0.65)	-0.79 (-1.12)	-0.47 (-0.66)
	0.84 (1.23)	0.96 (1.42)	0.85 (1.24)
TNE Atlantic	-0.32 (-0.36)	-0.32 (-0.37)	-0.14 (-0.16)
	-0.91 (-1.05)	-0.91 (-1.05)	-1.07 (-1.24)
	0.60 (0.69)	0.60 (0.69)	0.94 (1.09)
Arabian Sea	-0.08 (-0.08)	-0.08 (-0.08)	-0.04 (-0.04)
	-0.24 (-0.25)	-0.25 (-0.26)	-0.10 (-0.27)
	0.17 (0.17)	0.17 (0.17)	0.13 (0.24)
NW Pacific	0.15 (0.27)	0.12 (0.23)	0.16 (0.30)
	-0.14 (-0.24)	-0.19 (-0.34)	-0.15 (-0.25)
	0.29 (0.51)	0.32 (0.56)	0.31 (0.55)
Global Ocean	0.02 (0.04)	0.00 (0.02)	0.03 (0.06)
	-0.09 (-0.13)	-0.12 (-0.17)	-0.10 (-0.14)
	0.11 (0.17)	0.12 (0.19)	0.13 (0.20)



Table S3 Same as Table S2, except for JJA seasonal mean

Region	CALIOP smoke+OBS dust	Haywood smoke+OBS dust	CALIOP smoke+OPAC dust
SE Atlantic	0.50 (0.74) -0.67 (-0.89) 1.17 (1.64)	0.25 (0.42) -1.12 (-1.52) 1.37 (1.94)	0.50 (0.75) -0.68 (-0.89) 1.18 (1.64)
TNE Atlantic	-0.99 (-1.12) -2.84 (-3.22) 1.85 (2.10)	-0.99 (-1.13) -2.84 (-3.23) 1.85 (2.10)	-0.41 (-0.46) -3.36 (-3.82) 2.96 (3.36)
Arabian Sea	-0.14 (-0.14) -0.39 (-0.40) 0.26 (0.26)	-0.14 (-0.14) -0.39 (-0.41) 0.26 (0.27)	-0.08 (-0.08) -0.45 (-0.47) 0.37 (0.38)
NW Pacific	0.22 (0.41) -0.18 (-0.30) 0.40 (0.71)	0.18 (0.33) -0.27 (-0.48) 0.45 (0.81)	0.23 (0.42) -0.18 (-0.30) 0.41 (0.73)
Global Ocean	0.01 (0.04) -0.16 (-0.20) 0.17 (0.24)	-0.01 (0.02) -0.19 (-0.17) 0.18 (0.19)	0.03 (0.06) -0.18 (-0.22) 0.21 (0.28)