

Supplement of

**Dust aerosol optical depth at thermal infrared wavelength from an
AeroCom/AeroSat study: Comparative analysis and perspectives**

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Introduction

This supporting material includes the additional tables and figures that complements the main text.

Table S1. Global means of dust parameters from models averaged for 2009–2012. Coefficient of Variation (CV) is the ratio of standard deviation to mean in percentage. rDOD is the ratio of DOD₁₀ to DOD_{0.55} and rMEE is the ratio of MEE₁₀ to MEE_{0.55}.

Name (unit)	EMI (Tg)	LOAD (Tg)	Lifetime (day)	DOD _{0.55}	DOD ₁₀	rDOD	MEE _{0.55} (m ² /g)	MEE ₁₀ (m ² /g)
CESM2	2705	30.55	4.122	0.033	0.010	0.292	0.557	0.162
CAM5-ATRAS	4031	33.16	3.002	0.026	0.020	0.764	0.395	0.302
GEOS	1419	20.72	5.331	0.025	0.012	0.476	0.603	0.287
GEOS-Chem	1131	11.14	3.595	0.012	0.007	0.609	0.557	0.340
GFDL-AM4	1385	13.49	3.555	0.019	0.009	0.497	0.702	0.349
SPRINTARS	1755	10.90	2.268	0.016	0.002	0.118	0.741	0.087
DustCOMM	3672	24.29	2.415	0.026	0.013	0.505	0.545	0.276
Mean	2300	20.61	3.470	0.022	0.010	0.466	0.586	0.258
STD	1178	9.17	1.056	0.007	0.005	0.210	0.114	0.097
CV (%)	51.21	44.50	30.42	32.24	52.44	44.99	19.41	37.58
R _{max/min}	3.56	3.04	2.35	2.74	10.50	6.47	1.78	3.88

Table S2. Global estimations of the fraction of fine dust to total dust (EMI, LOAD, DOD_{0.55}, and DOD₁₀) and actual values (Lifetime, rDOD, MEE_{0.55}, and MEE₁₀) from models averaged for 2009~2012. Coefficient of Variation (CV) is the ratio of standard deviation to mean in percentage.

Name	EMI	LOAD	Lifetime (day)	DOD _{0.55}	DOD ₁₀	rDOD	MEE _{0.55} (m ² /g)	MEE ₁₀ (m ² /g)
CESM2	0.011	0.034	12.651	N/A	N/A	N/A	N/A	N/A
CAM5-ATRAS	0.089	0.202	6.802	0.535	0.181	0.258	1.049	0.271
GEOS	0.143	0.244	9.092	0.508	0.192	0.180	1.255	0.226
GEOS-Chem	0.150	0.263	6.309	0.637	0.200	0.191	1.352	0.259
GFDL-AM4	0.186	0.337	6.450	0.700	0.317	0.225	1.460	0.328
SPRINTARS	0.210	0.376	4.060	0.756	0.197	0.031	1.488	0.046
DustCOMM	0.047	0.169	8.652	0.510	0.167	0.165	1.640	0.271
Mean	0.119	0.232	7.717	0.608	0.209	0.175	1.374	0.233
STD	0.073	0.113	2.736	0.106	0.054	0.078	0.206	0.098
CV (%)	61.12	48.79	35.45	17.43	25.95	44.66	14.96	41.85
R _{max/min}	19.07	11.12	3.12	1.49	1.90	8.39	1.56	7.17

Table S3. Global estimations of the fraction of coarse dust to total dust (EMI, LOAD, DOD_{0.55}, and DOD₁₀) and actual values (Lifetime, rDOD, MEE_{0.55}, and MEE₁₀) from models averaged for 2009~2012. Coefficient of Variation (CV) is the ratio of standard deviation to mean in percentage.

Name	EMI	LOAD	Lifetime (day)	DOD _{0.55}	DOD ₁₀	rDOD	MEE _{0.55} (m ² /g)	MEE ₁₀ (m ² /g)
CESM2	0.989	0.966	4.027	N/A	N/A	N/A	N/A	N/A
CAM5-ATRAS	0.911	0.798	2.631	0.465	0.819	1.348	0.230	0.310
GEOS	0.857	0.756	4.703	0.492	0.808	0.781	0.393	0.307
GEOS-Chem	0.850	0.737	3.117	0.363	0.800	1.344	0.274	0.368
GFDL-AM4	0.814	0.663	2.895	0.300	0.683	1.130	0.318	0.359
SPRINTARS	0.790	0.624	1.791	0.244	0.803	0.388	0.290	0.113
DustCOMM	0.953	0.831	2.106	0.490	0.833	0.859	0.322	0.276
Mean	0.881	0.768	3.039	0.392	0.791	0.975	0.304	0.289
STD	0.073	0.113	1.030	0.106	0.054	0.373	0.055	0.093
CV (%)	8.29	14.74	33.89	26.98	6.85	38.23	17.98	32.20
R _{max/min}	1.25	1.55	2.63	2.01	1.22	3.47	1.71	3.27

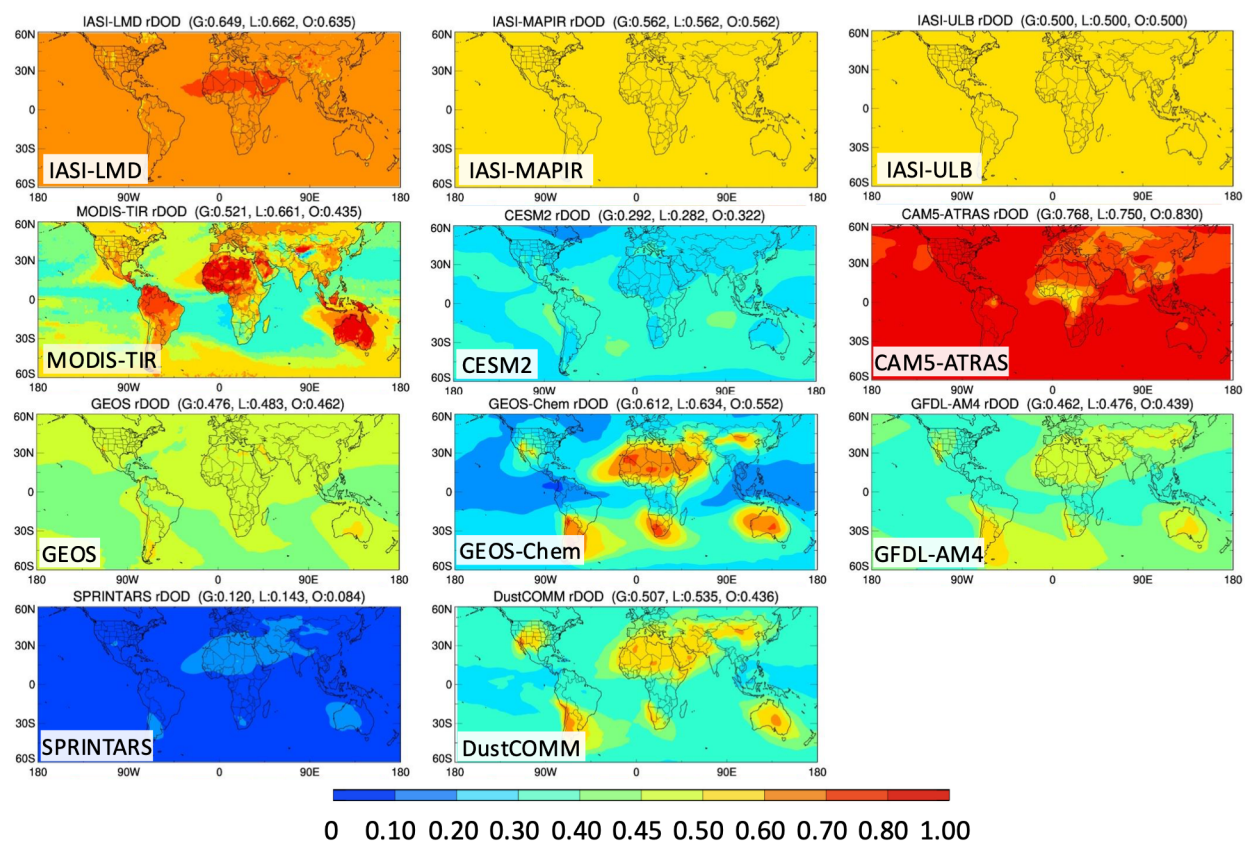


Figure S1. Horizontal distribution of the ratio of dust optical depth at 10 μ m to 550nm (rDOD) for satellites and models averaged for 2009-2012. The mean values for global, land, and ocean domains over 60°S–60°N are listed in the parenthesis on top of each panel.

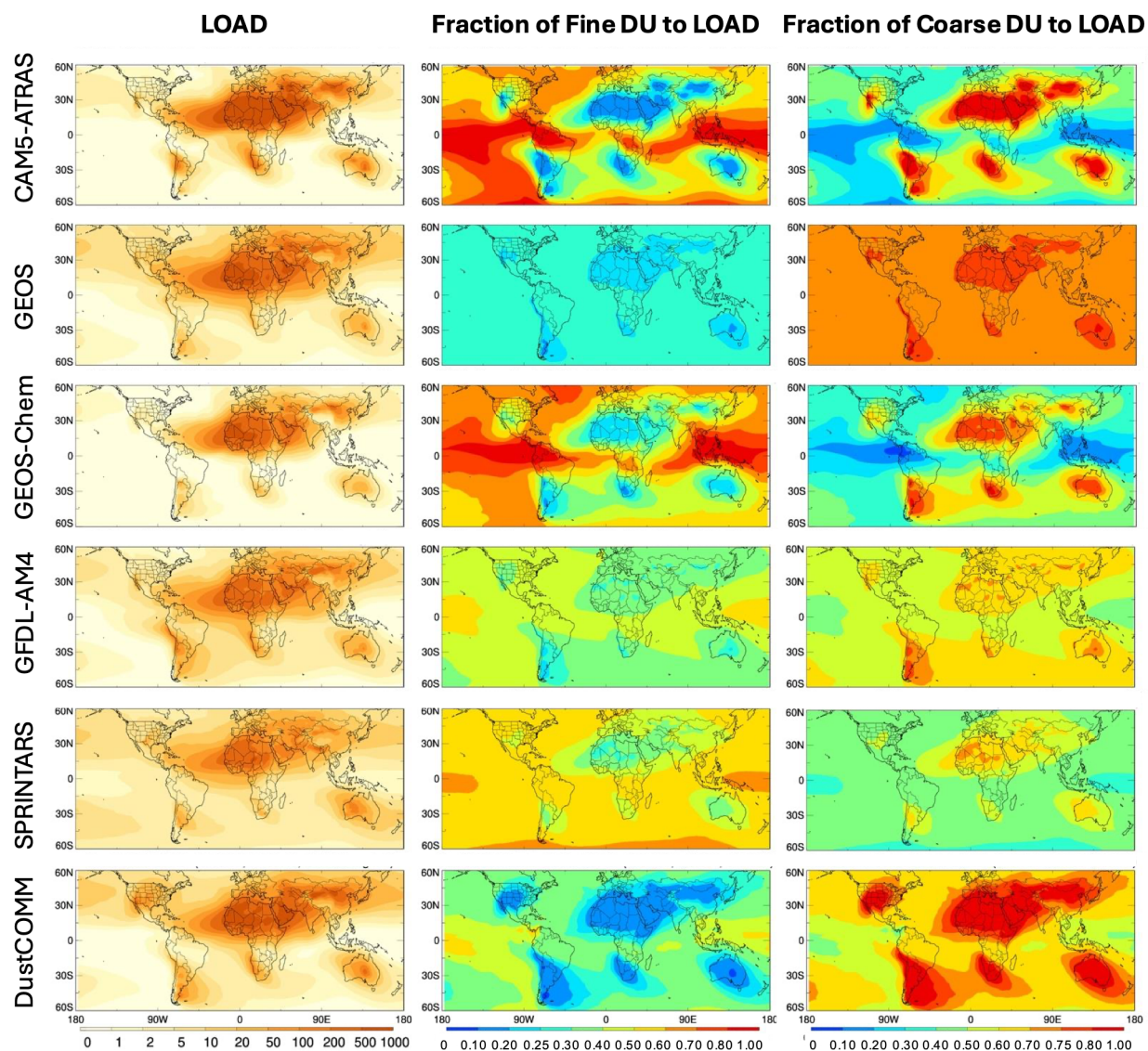


Figure S2. Horizontal distribution of (left) dust column loading, (middle) fraction of fine dust to the total loading, and (right) fraction of coarse dust to the total loading for the model simulations averaged for 2009-2012.

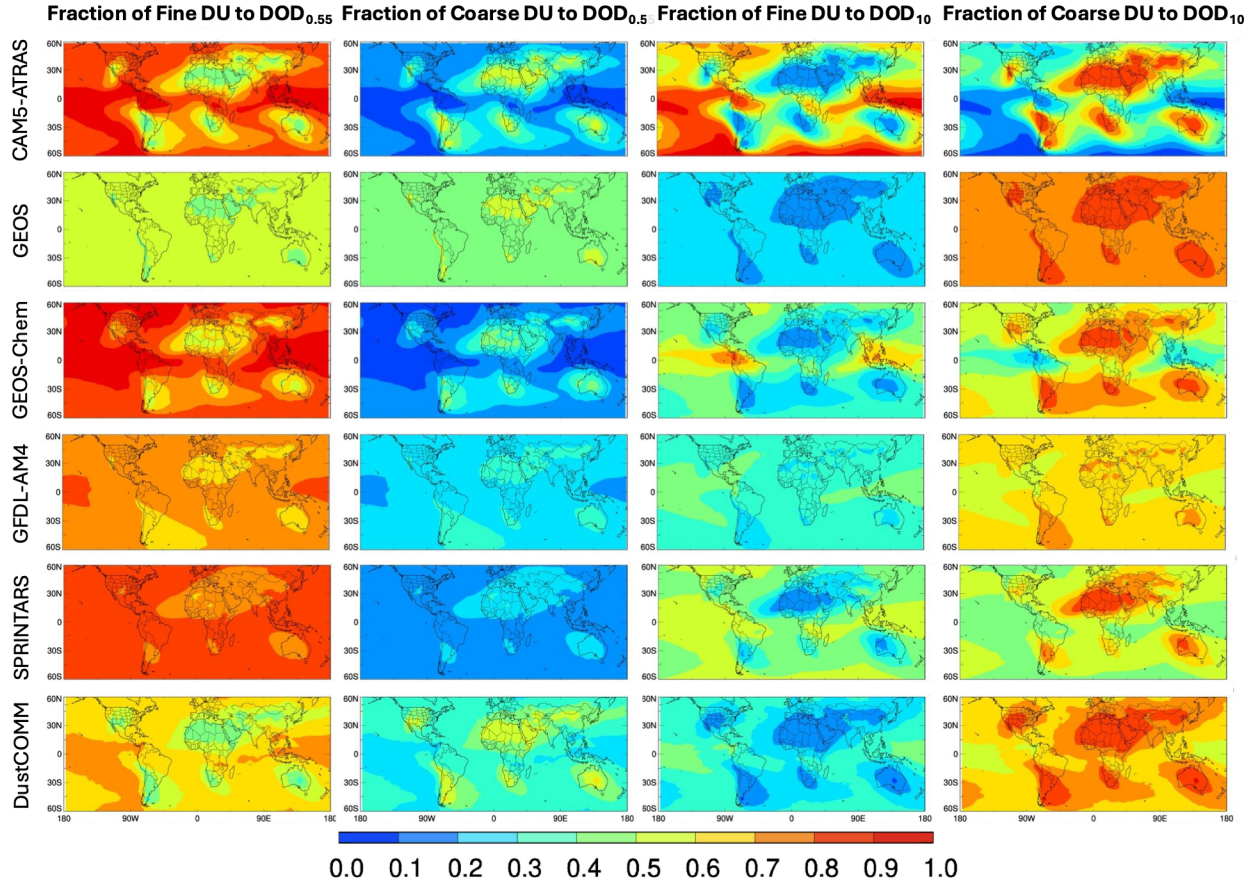


Figure S3. Fraction of (first column) fine dust to DOD_{0.55}, (second column) coarse dust to DOD_{0.55}, (third column) fine dust to DOD₁₀, (fourth column) coarse dust to DOD₁₀ averaged for 2009-2012.