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Supplement of

Optical properties of coated black carbon aggregates: numerical simulations, radiative forcing estimates, and size-resolved parameterization scheme

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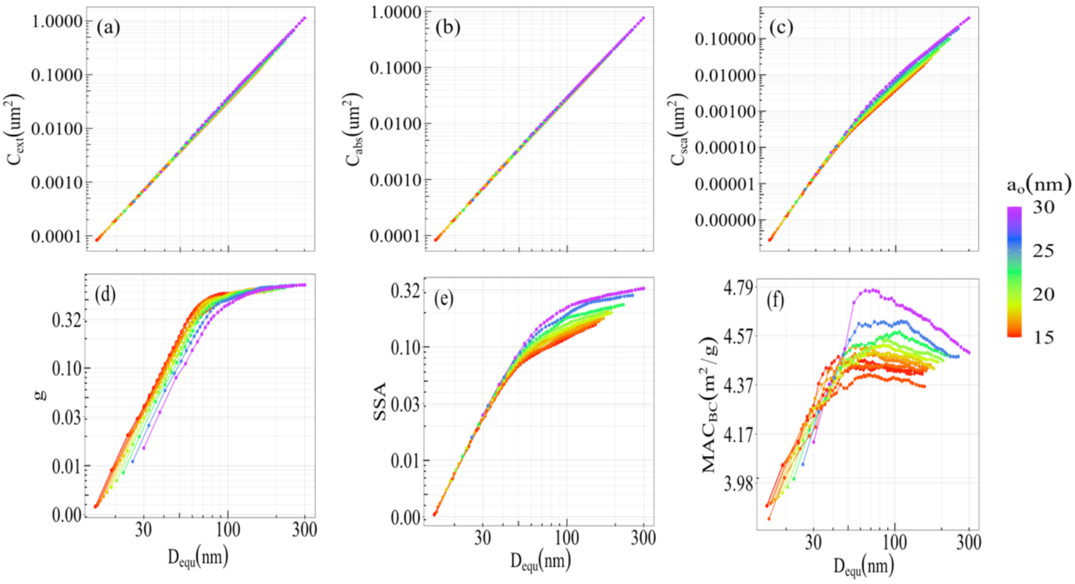

Figure S1. Optical properties of pure BCFAs for various radii of primary particles (a_o) as a function of the volume equivalent radius (R_{equ}): (a) extinction cross-section C_{ext}, (b) absorption cross-section C_{abs}, (c) scattering cross-section C_{sca}, (d) asymmetry parameter g, (e) single scattering albedo *SSA,* and (f) black carbon mass absorption cross-section MAC_{BC} at $\lambda = 660$nm.

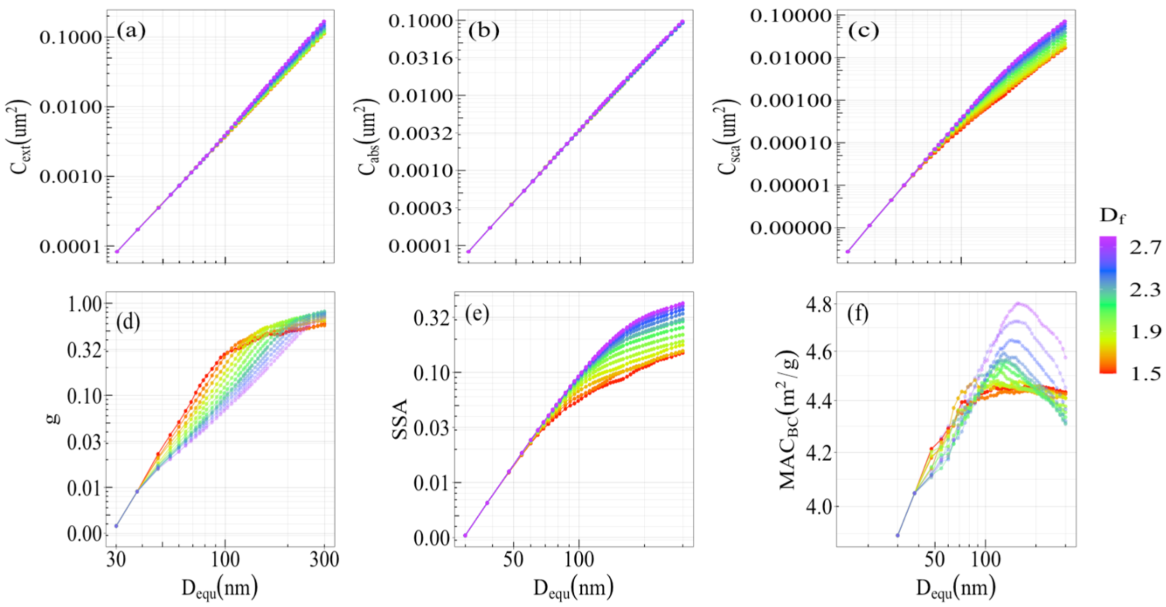

Figure S2. Optical properties of pure BCFAs as a function of volume equivalent radius (R_{equ}) for various fractal dimension (D_f): (a) extinction cross-section C_{ext}, (b) absorption cross-section C_{abs}, (c) scattering cross-section C_{sca}, (d) asymmetry parameter g, (e) single scattering albedo *SSA,* and (f) black carbon mass absorption cross-section MAC_{BC} at $\lambda = 660$nm.

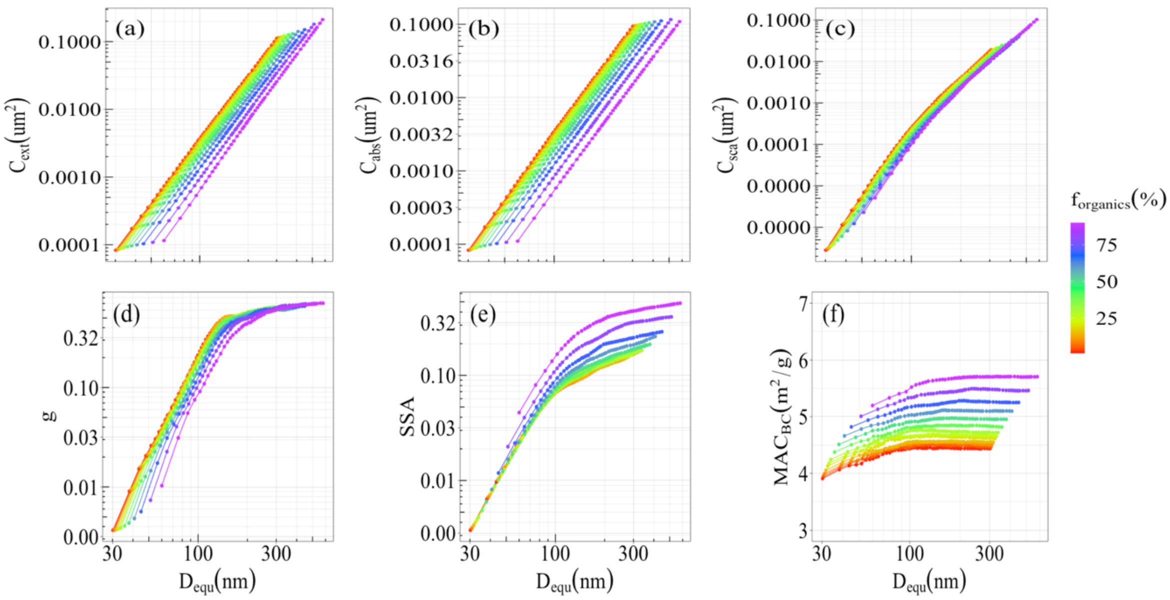

Figure S3. Optical properties of BCFAs (D_f = 1.7) as a function of volume equivalent radius (R_{equ}) for various fraction of organics ($f_{organics}$): (a) extinction cross-section C_{ext}, (b) absorption cross-section C_{abs}, (c) scattering cross-section C_{sca}, (d) asymmetry parameter g, (e) single scattering albedo *SSA,* and (f) black carbon mass absorption cross-section MAC_{BC} at λ = 660nm.

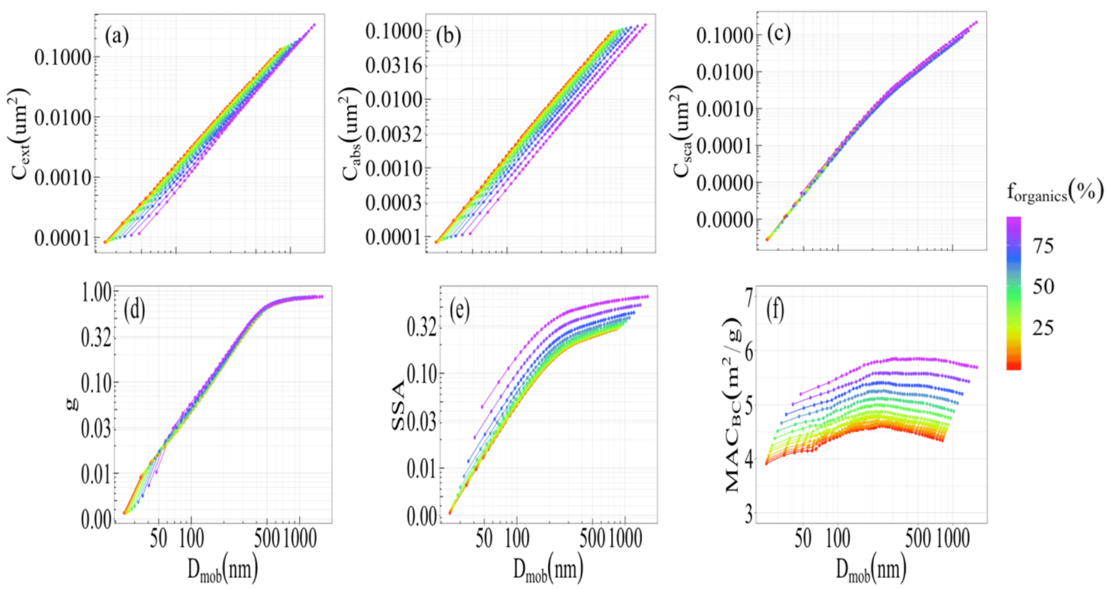

Figure S4. Optical properties of BCFAs (D_f = 2.2) as a function of D_{mob} for various fraction of organics ($f_{organics}$): (a) extinction cross-section C_{ext}, (b) absorption cross-section C_{abs}, (c) scattering cross-section C_{sca}, (d) asymmetry parameter g, (e) single scattering albedo *SSA,* and (f) black carbon mass absorption cross-section MAC_{BC} at λ = 660nm.

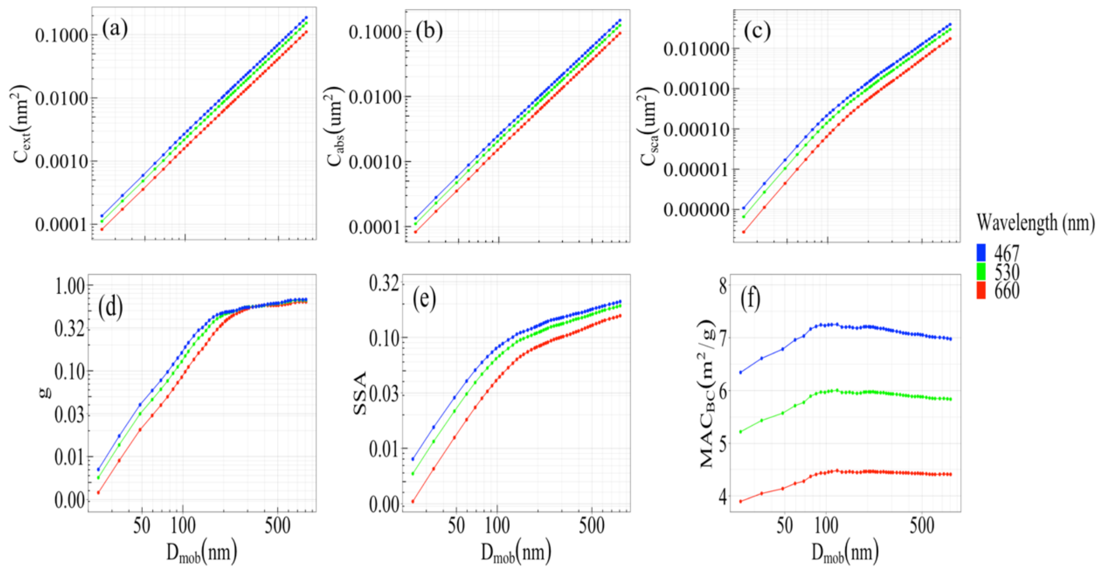

Figure S5. Optical properties of pure BCFAs (D_f = 1.7) as a function of D_{mob} for various wavelengths (λ): (a) extinction cross-section C_{ext}, (b) absorption cross-section C_{abs}, (c) scattering cross-section C_{sca}, (d) asymmetry parameter g, (e) single scattering albedo *SSA,* and (f) black carbon mass absorption cross-section MAC_{BC}.

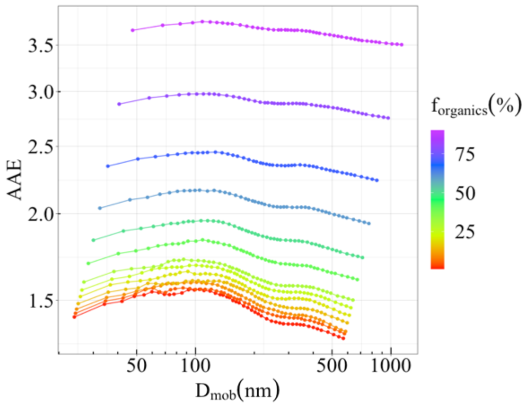

Figure S6. Ångström Absorption Exponent (AAE) of slightly compact BCFAs (D_f= 2.2) with changing fraction of organics ($f_{organics}$) and mobility diameter (D_{mob}).

Bulk optical properties of BCFAs

For application over the atmosphere, it is more meaningful to know the averaged optical properties over a certain particle size distribution, i.e. the bulk optical properties. Bulk optical properties of BC are useful since they can be used directly for simulations of radiative forcing. The bulk optical properties of BCFAs are calculated with an assumption that the mobility diameter D_{mob} of BCFAs follow a lognormal size distribution:

$$n(D_{mob}) = \frac{1}{\sqrt{\pi D_{mob}}\ln(\sigma)} exp\left[-\left[\frac{\ln(D_{mob}/2)-\ln(D_{mob_o}/2)}{\sqrt{2}\ln(\sigma)}\right]^2\right],$$

(1)

where D_{mob_o} is the geometric mean mobility diameter, and σ is the standard deviation in $\ln(D_{mob})$.

Table 4 shows the bulk optical properties of BCFAs for various compositions and morphologies at a wavelength of 530 nm. For each case, the bulk optical properties are calculated as integrals over the lognormal size distribution $n(D_{mob})$ with limits of D_{mob} varying from 0.030 to 0.60µm, and the corresponding MSTM calculated values. The calculations are done following the mathematical formulas summarised in Li et al (2016).

Table S1. Bulk optical properties of black carbon for different fraction of organics ($f_{organics}$) and fractal dimension (D_f) at a wavelength of 530nm.

	$f_{organics}$ (%)													
	0	1	5	10	15	20	25	30	40	50	60	70	80	90
D_f = 1.7														
C_{ext} ($\times10^{-2}\mu m^{-2}$)	2.94	2.96	3.02	3.03	3.04	3.12	3.12	3.14	3.18	3.14	3.08	2.92	2.74	2.35
C_{abs} ($\times10^{-2}\mu m^{-2}$)	2.54	2.55	2.58	2.60	2.62	2.65	2.66	2.67	2.66	2.60	2.48	2.25	1.86	1.35
C_{sca} ($\times10^{-2}\mu m^{-2}$)	0.40	0.41	0.44	0.43	0.42	0.47	0.47	0.47	0.52	0.54	0.61	0.67	0.88	1.00
SSA	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.15	0.16	0.17	0.20	0.23	0.32	0.43
g	0.60	0.58	0.57	0.60	0.59	0.59	0.61	0.57	0.62	0.60	0.60	0.62	0.64	0.63
D_f =2.2														
C_{ext} ($\times10^{-2}\mu m^{-2}$)	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03
C_{abs} ($\times10^{-2}\mu m^{-2}$)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.01
C_{sca} ($\times10^{-2}\mu m^{-2}$)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
SSA	0.25	0.26	0.26	0.26	0.26	0.27	0.27	0.27	0.29	0.31	0.33	0.37	0.45	0.57
G	0.70	0.69	0.70	0.70	0.71	0.71	0.72	0.72	0.73	0.73	0.75	0.76	0.77	0.75

Parametrization for bulk optical properties

An important application of the optical parametrization scheme would be calculation of the bulk optical properties of atmospheric BC aerosols. The bulk optical properties can be calculated between any limits of mobility diameter (D_{mob}), for the cases of fractal dimension (D_f), fraction of organics ($f_{organics}$), and wavelength (λ) provided in the parametrization scheme. Following Eq. (1), it must be assumed that the mobility diameter (D_{mob}) of the BCFAs follow a log normal distribution:

$$n(D_{mob}) = \frac{1}{\sqrt{2\pi D_{mob}}\ln(\sigma)} exp\left[-\left[\frac{\ln(D_{mob})-\ln(\overline{D_{mob}})}{\sqrt{2}\ln(\sigma)}\right]^2\right], \quad (2)$$

where $\overline{D_{mob}}$ is the arithmetic mean diameter, and σ is the standard deviation in $\ln(D_{mob})$.

The bulk extinction cross-section is given by:

$$\langle C_{ext}\rangle = \int_{D_{mob}^{min}}^{D_{mob}^{max}} C_{ext}(D_{mob}, D_f, f_{organics}, \lambda)\ n(D_{mob})\ d(D_{mob}), \quad (3)$$

using the parametrization scheme for extinction cross-section,

$$\langle C_{ext}\rangle = \int_{D_{mob}^{min}}^{D_{mob}^{max}} (e^{c_0} + e^{c_1}D_{mob})\ n(D_{mob})\ d(D_{mob}). \quad (4)$$

The values of the coefficients C_0 and C_1 must be chosen from their tabulated values for various cases of fractal dimension (D_f), fraction of organics ($f_{organics}$), and wavelength (λ) provided in the section of supplementary below.
Similarly, using the parametrization schemes provided, the corresponding bulk optical properties can be calculated as:

$$\langle C_{abs}\rangle = \int_{D_{mob}^{min}}^{D_{mob}^{max}} (e^{g_0} + e^{g_1}D_{mob})\ n(D_{mob})\ d(D_{mob}), \quad (5)$$

$$\langle C_{sca}\rangle = \int_{D_{mob}^{min}}^{D_{mob}^{max}} (e^{H_0} + e^{H_1}D_{mob} + e^{H_2}lnD_{mob})\ n(D_{mob})\ d(D_{mob}), \quad (6)$$

$$\langle SSA\rangle = \int_{D_{mob}^{min}}^{D_{mob}^{max}} (e^{k_0} + e^{k_1}D_{mob} + e^{k_2}lnD_{mob})\ n(D_{mob})\ d(D_{mob}), \quad (7)$$

$$\langle g\rangle = \int_{D_{mob}^{min}}^{D_{mob}^{max}} (e^{s_0} + e^{s_1}D_{mob} + e^{s_2}D_{mob}^2 + e^{s_3}D_{mob}^3)\ n(D_{mob})\ d(D_{mob}). \quad (8)$$

The relative errors between the bulk optical properties from the MSTM calculations and the parametrization scheme are comparable to that in the case of single sized BCFAs shown in the section 3.7.1.

Parametrization scheme for optical properties of BCFAs

$$lnC_{ext} = c_0 + c_1 lnD_{mob}$$

$$lnC_{abs} = g_0 + g_1 lnD_{mob}$$

$$lnC_{sca} = H_0 + H_1 lnD_{mob} + H_2 \ln(lnD_{mob})$$

$$lnSSA = k_0 + k_1 lnD_{mob} + k_2 \ln(lnD_{mob})$$

$$lng = \sum_{n=0}^{3} s_n lnD_{mob}^{n}$$

Table S2. Parameterization scheme for coated and non-coated black carbon fractal aggregates (BCFA).

λ	D_f	$f_{organics}$	c0	c1	g0	g1	H0	H1	H2	s0	s1	s2	s3	k0	k1	k2
660	1.5	0	-15.7525	2.0244	-15.4847	1.9605	-24.2159	1.9921	3.5801	-46.0080	21.3332	-3.3873	0.1816	-8.8739	-0.1242	4.1179
660	1.5	5	-15.7550	2.0214	-15.5059	1.9597	-31.3601	0.2872	13.3115	0.6842	-2.4337	0.6085	-0.0406	-14.9613	-1.5899	12.4673
660	1.5	25	-15.8438	2.0177	-15.6260	1.9616	-24.6220	1.6677	4.8432	9.8861	-7.6666	1.5889	-0.1010	-8.5946	-0.3101	4.6065
660	1.5	50	-16.1005	2.0298	-15.8183	1.9591	-21.4000	2.3674	0.6833	-33.6550	14.4609	-2.1386	0.1072	-6.1086	0.1704	1.6966
660	1.5	70	-16.4923	2.0594	-16.1146	1.9624	-26.7081	1.2486	7.4745	-22.5955	8.5255	-1.0988	0.0475	-10.3414	-0.8352	7.6265
660	1.6	0	-15.7675	2.0278	-15.4998	1.9626	-30.8563	0.4502	12.5063	-51.4395	23.8510	-3.7532	0.1980	-14.7285	-1.4969	12.0341
660	1.6	5	-15.7611	2.0214	-15.5484	1.9657	-26.0321	1.3267	6.8446	-67.6214	31.3213	-4.9038	0.2572	-10.3641	-0.7155	6.9666
660	1.6	25	-15.8199	2.0167	-15.5835	1.9543	-29.1829	0.5997	11.0671	15.0126	-11.1566	2.3105	-0.1478	-13.2172	-1.3853	10.8791
660	1.6	50	-16.0327	2.0207	-15.7920	1.9548	-23.5291	1.7441	4.0211	-28.7900	10.8963	-1.3692	0.0558	-7.9102	-0.3621	4.5393
660	1.6	70	-16.3849	2.0426	-16.0953	1.9595	-23.9888	1.6021	4.7863	-52.7974	22.7540	-3.3130	0.1616	-7.2572	-0.3732	4.3668
660	1.7	0	-15.6665	2.0113	-15.4404	1.9526	-22.7664	2.0195	2.7341	-135.7843	65.3114	-10.5239	0.5659	-7.4564	-0.0716	3.2013
660	1.7	1	-15.7172	2.0183	-15.4884	1.9588	-25.8963	1.3457	6.7473	-122.5711	58.9261	-9.5008	0.5114	-10.3542	-0.7121	6.9776
660	1.7	5	-15.7239	2.0186	-15.4929	1.9569	-31.7647	-0.0265	14.6745	-50.8588	22.2507	-3.3079	0.1656	-15.2113	-1.8591	13.5868
660	1.7	10	-15.7602	2.0205	-15.5022	1.9557	-23.8127	1.8851	3.7649	-159.7634	77.9977	-12.7479	0.6950	-8.0993	-0.1458	3.8261
660	1.7	15	-15.7845	2.0191	-15.5576	1.9598	-23.2942	1.9081	3.3738	-133.6831	64.5100	-10.4305	0.5627	-7.8428	-0.1847	3.8075
660	1.7	20	-15.7825	2.0157	-15.5614	1.9552	-32.8077	-0.2625	16.0185	-36.1842	14.4067	-1.9131	0.0833	-16.1224	-2.0803	14.8498
660	1.7	25	-15.8531	2.0220	-15.6139	1.9591	-28.1449	0.8408	9.6764	-100.6791	47.1922	-7.4289	0.3908	-11.9529	-1.1075	9.2395
660	1.7	30	-15.8519	2.0163	-15.6197	1.9546	-23.9360	1.7146	4.3721	-129.5501	61.9130	-9.9117	0.5292	-8.5159	-0.3948	4.9260
660	1.7	40	-16.0243	2.0333	-15.7297	1.9594	-25.4089	1.5384	5.7834	-86.7096	40.5283	-6.3706	0.3349	-9.4150	-0.5013	5.8219
660	1.7	50	-16.0639	2.0259	-15.8239	1.9597	-25.9052	1.2578	6.9899	-80.3566	36.9175	-5.7005	0.2940	-9.5129	-0.7003	6.5787
660	1.7	60	-16.2345	2.0381	-15.9518	1.9608	-26.0324	1.2540	7.0923	-52.0232	23.3486	-3.5458	0.1804	-9.6134	-0.7470	6.8648
660	1.7	70	-16.3536	2.0390	-16.1041	1.9606	-32.1653	-0.0616	14.9674	-21.9360	8.4632	-1.1023	0.0475	-13.6578	-1.6823	12.3611
660	1.7	80	-16.7395	2.0821	-16.3304	1.9612	-38.0200	-0.9987	21.4747	3.1163	-3.3064	0.7257	-0.0464	-16.6107	-2.2156	15.9668
660	1.7	90	-16.9556	2.1004	-16.6020	1.9615	-23.2061	1.5596	4.7601	-47.3551	19.7729	-2.7880	0.1317	-5.4062	-0.3913	3.7885
660	1.8	0	-15.7101	2.0220	-15.4458	1.9541	-23.8616	1.7819	4.2225	-137.0045	64.2293	-10.0778	0.5276	-8.1299	-0.2353	4.1941

λ	D_f	$f_{organics}$	c0	c1	g0	g1	H0	H1	H2	s0	s1	s2	s3	k0	k1	k2
660	1.8	5	-15.7925	2.0314	-15.4917	1.9562	-27.5406	1.0574	8.7186	-115.6974	53.8541	-8.4068	0.4385	-11.5420	-0.9278	8.4485
660	1.8	25	-15.8439	2.0232	-15.5996	1.9570	-32.3807	-0.1483	15.4265	-119.8288	56.5257	-8.9570	0.4748	-15.0559	-1.8492	13.5171
660	1.8	50	-16.0872	2.0337	-15.7961	1.9554	-28.3066	0.7812	10.0090	-126.5501	58.8226	-9.1555	0.4755	-11.5542	-1.1150	9.1759
660	1.8	70	-16.4100	2.0521	-16.0932	1.9587	-30.4162	0.3195	12.7735	-55.0677	23.9062	-3.4960	0.1710	-12.5547	-1.4507	11.0171
660	1.9	0	-15.6963	2.0220	-15.4085	1.9471	-30.0008	0.3678	12.4687	-101.7978	45.3518	-6.7572	0.3355	-13.6819	-1.5148	11.6529
660	1.9	5	-15.7176	2.0224	-15.4146	1.9440	-33.1895	-0.3221	16.5742	-81.5721	35.1277	-5.0436	0.2400	-16.9354	-2.2243	15.8707
660	1.9	25	-15.8518	2.0280	-15.5323	1.9458	-26.7767	1.1206	8.1099	-90.0003	39.0629	-5.6576	0.2724	-10.8130	-0.8831	7.9656
660	1.9	50	-16.0837	2.0376	-15.7752	1.9522	-32.2508	-0.0935	15.2303	-108.9910	48.9904	-7.3835	0.3718	-14.2591	-1.7368	12.8407
660	1.9	70	-16.4636	2.0654	-16.0805	1.9572	-29.8972	0.4238	12.1912	-154.7034	71.3913	-11.0253	0.5684	-11.4088	-1.2381	9.7067
660	2	0	-15.7288	2.0320	-15.3580	1.9389	-34.4017	-0.5381	18.0565	-33.7398	9.7380	-0.6146	-0.0142	-17.6773	-2.3471	16.7518
660	2	5	-15.8193	2.0434	-15.4130	1.9436	-34.9233	-0.5664	18.4429	-35.2785	10.9254	-0.8826	0.0045	-17.9426	-2.3493	16.9198
660	2	25	-15.9172	2.0421	-15.5335	1.9454	-31.4270	0.1639	13.9926	-63.7470	24.9933	-3.1927	0.1307	-14.8040	-1.7246	13.0825
660	2	50	-16.1849	2.0577	-15.7717	1.9513	-29.1520	0.6545	11.0481	-118.3233	52.3182	-7.7371	0.3818	-11.9699	-1.1972	9.7992
660	2	70	-16.5079	2.0789	-16.0376	1.9505	-30.2661	0.4061	12.5343	-120.9526	53.6772	-7.9736	0.3955	-11.7531	-1.2834	10.1079
660	2.1	0	-15.8414	2.0562	-15.3373	1.9359	-39.6313	-1.5337	24.4085	17.0640	-15.9467	3.6574	-0.2483	-21.4966	-3.0761	21.4035
660	2.1	5	-15.8896	2.0600	-15.3784	1.9383	-39.6327	-1.5065	24.3083	11.7614	-13.1479	3.1683	-0.2200	-21.7129	-3.1112	21.6459
660	2.1	25	-15.9769	2.0580	-15.4672	1.9354	-36.6508	-0.8448	20.3844	-9.3617	-2.4771	1.3768	-0.1200	-19.2591	-2.5949	18.5602
660	2.1	50	-16.2544	2.0752	-15.7219	1.9439	-31.6634	0.2219	13.9815	-64.7328	25.0202	-3.1550	0.1280	-14.3508	-1.6346	12.6563
660	2.1	70	-16.6360	2.1070	-16.0171	1.9477	-31.2855	0.2983	13.5405	-106.9849	45.9556	-6.6040	0.3168	-12.6759	-1.4254	11.1524
660	2.2	0	-15.9386	2.0773	-15.2911	1.9283	-42.5466	-2.0281	27.7710	45.7660	-30.3926	6.0367	-0.3769	-24.0551	-3.5336	24.4260
660	2.2	1	-15.9574	2.0798	-15.3008	1.9291	-43.5919	-2.2444	29.0821	46.5315	-30.6360	6.0537	-0.3766	-24.6930	-3.6613	25.2133
660	2.2	5	-15.9792	2.0807	-15.3260	1.9305	-43.1870	-2.1503	28.5326	43.4108	-29.0778	5.7948	-0.3623	-24.2837	-3.5754	24.6981
660	2.2	10	-16.0323	2.0866	-15.3729	1.9352	-42.6450	-2.0007	27.7195	43.7349	-29.2047	5.8138	-0.3634	-23.5799	-3.4108	23.7542
660	2.2	15	-16.0398	2.0835	-15.3891	1.9333	-41.6971	-1.8030	26.5155	41.3224	-27.9852	5.6071	-0.3516	-23.3603	-3.3780	23.5251
660	2.2	20	-16.0705	2.0834	-15.4080	1.9306	-40.6870	-1.5654	25.1437	26.5665	-20.5268	4.3560	-0.2820	-22.4621	-3.1765	22.3546
660	2.2	25	-16.0916	2.0824	-15.4388	1.9309	-40.3342	-1.4985	24.7107	25.6997	-20.0174	4.2582	-0.2758	-22.1812	-3.1323	22.0528
660	2.2	30	-16.1225	2.0830	-15.4628	1.9297	-39.9442	-1.4068	24.1787	23.4640	-18.7616	4.0265	-0.2617	-21.7367	-3.0403	21.5044
660	2.2	40	-16.2270	2.0900	-15.5465	1.9312	-37.8484	-0.9401	21.4283	1.2015	-7.6087	2.1721	-0.1594	-19.6995	-2.6238	18.9906
660	2.2	50	-16.3486	2.0984	-15.6515	1.9338	-36.9895	-0.7576	20.3284	-21.4244	3.7398	0.2826	-0.0549	-18.3565	-2.3839	17.4674
660	2.2	60	-16.5134	2.1103	-15.7940	1.9373	-33.2557	-0.0074	15.7181	-46.7099	16.0099	-1.6927	0.0507	-15.1915	-1.8062	13.8063
660	2.2	70	-16.7301	2.1296	-15.9601	1.9397	-30.5047	0.5188	12.4297	-76.0719	30.2332	-3.9798	0.1728	-12.3894	-1.3418	10.7534
660	2.2	80	-17.0743	2.1681	-16.2179	1.9457	-28.2245	0.9254	9.8460	-116.4726	49.5177	-7.0368	0.3338	-9.3207	-0.9038	7.6881
660	2.2	90	-17.3836	2.2100	-16.4765	1.9450	-28.7464	0.7758	10.7484	-122.6619	52.5263	-7.5212	0.3596	-7.6649	-0.7847	6.5109
660	2.3	0	-15.9946	2.0882	-15.2844	1.9275	-42.1833	-1.8499	26.9852	51.2474	-32.8655	6.4029	-0.3947	-23.8961	-3.4245	23.9812
660	2.4	0	-16.1798	2.1247	-15.2973	1.9305	-44.2697	-2.1175	29.1167	62.1700	-37.9808	7.1711	-0.4318	-25.6072	-3.6861	25.8635
660	2.5	0	-16.3614	2.1617	-15.3158	1.9358	-46.7334	-2.4902	31.8049	63.2385	-37.9598	7.0546	-0.4185	-27.2020	-3.9418	27.6511
660	2.6	0	-16.5160	2.1947	-15.3132	1.9385	-48.2719	-2.6790	33.3545	58.8104	-35.1755	6.4784	-0.3799	-28.7290	-4.1957	29.3882
660	2.7	0	-16.7545	2.2411	-15.4121	1.9580	-49.8298	-2.8628	34.8902	57.1738	-33.8531	6.1607	-0.3566	-29.6921	-4.3461	30.4571
660	2.8	0	-16.7545	2.2411	-15.4121	1.9580	-49.8298	-2.8628	34.8902	57.1738	-33.8531	6.1607	-0.3566	-29.6921	-4.3461	30.4571
530	1.5	0	-15.4483	2.0275	-15.1533	1.9529	-22.3937	2.0759	2.6127	-38.6483	17.9350	-2.8595	0.1543	-7.2936	-0.0297	3.0690

λ	D_f	$f_{organics}$	c0	c1	g0	g1	H0	H1	H2	s0	s1	s2	s3	k0	k1	k2
530	1.5	5	-15.4354	2.0230	-15.1684	1.9518	-29.0070	0.4851	11.6650	-12.3844	4.3217	-0.5290	0.0223	-12.7832	-1.3611	10.6311
530	1.5	25	-15.4925	2.0170	-15.2770	1.9552	-21.9488	1.9199	2.8396	10.3025	-7.6207	1.5526	-0.0978	-6.2980	-0.0626	2.6354
530	1.5	50	-15.7149	2.0309	-15.4302	1.9540	-19.7990	2.4336	-0.0981	-35.8653	16.1143	-2.4826	0.1292	-4.8126	0.2522	0.8143
530	1.5	70	-15.9573	2.0492	-15.6296	1.9555	-22.5647	1.7752	3.7288	-40.5993	17.1966	-2.4689	0.1189	-7.0733	-0.3645	4.2926
530	1.6	0	-15.4582	2.0301	-15.1645	1.9541	-30.2522	0.2839	13.0506	-13.4329	5.3086	-0.7402	0.0353	-14.1640	-1.6051	12.2251
530	1.6	5	-15.4217	2.0195	-15.2076	1.9574	-23.3446	1.5936	4.7752	-49.7193	22.9073	-3.5832	0.1883	-8.0395	-0.4520	4.9281
530	1.6	15	-15.4624	2.0151	-15.2338	1.9474	-24.8580	1.2147	6.9134	-18.5029	6.1204	-0.6164	0.0157	-9.4089	-0.8034	6.9306
530	1.6	50	-15.6189	2.0175	-15.4049	1.9499	-20.6727	2.0390	1.7690	-44.1478	19.1614	-2.8166	0.1389	-5.3902	-0.0480	2.1902
530	1.6	70	-15.8549	2.0337	-15.6103	1.9529	-23.6874	1.4126	5.5919	-41.5504	18.4041	-2.7716	0.1403	-6.9495	-0.4497	4.5236
530	1.7	0	-15.3457	2.0117	-15.1085	1.9449	-22.1744	1.8602	3.2575	-75.8437	36.5469	-5.9322	0.3222	-6.9526	-0.1792	3.4198
530	1.7	1	-15.4024	2.0197	-15.1596	1.9518	-24.1066	1.4635	5.6682	-58.3757	27.5215	-4.3801	0.2334	-8.8238	-0.5832	5.8255
530	1.7	5	-15.3735	2.0148	-15.1536	1.9483	-28.3354	0.3895	11.6814	-40.0908	17.5714	-2.6200	0.1315	-12.1463	-1.4425	10.6119
530	1.7	10	-15.4378	2.0218	-15.1620	1.9477	-23.1438	1.7445	4.1842	-76.1110	36.8942	-6.0263	0.3294	-7.5993	-0.2535	4.0447
530	1.7	15	-15.4566	2.0202	-15.2130	1.9520	-22.5137	1.8176	3.5627	-71.1980	34.3472	-5.5807	0.3031	-7.2562	-0.2467	3.8218
530	1.7	20	-15.4286	2.0140	-15.2137	1.9479	-29.5085	0.1516	13.1085	-26.2377	10.3361	-1.3589	0.0583	-13.0825	-1.6438	11.8172
530	1.7	25	-15.5002	2.0207	-15.2542	1.9504	-25.7225	1.0879	7.8131	-64.1386	29.9268	-4.7034	0.2472	-9.8893	-0.8603	7.3838
530	1.7	30	-15.5068	2.0173	-15.2676	1.9484	-22.6320	1.7391	3.8814	-67.8289	32.2766	-5.1718	0.2769	-7.4854	-0.3559	4.3434
530	1.7	40	-15.6444	2.0317	-15.3452	1.9509	-25.2849	1.2893	6.8754	-18.2671	7.6862	-1.1265	0.0563	-9.4102	-0.6937	6.5832
530	1.7	50	-15.6533	2.0231	-15.4243	1.9526	-24.0667	1.3764	5.8946	-30.6855	13.3950	-1.9923	0.0995	-8.0697	-0.5757	5.4641
530	1.7	60	-15.7950	2.0357	-15.5214	1.9543	-24.5993	1.3187	6.3996	-32.0283	14.5091	-2.2417	0.1164	-8.5442	-0.6647	6.0790
530	1.7	70	-15.8112	2.0278	-15.6123	1.9528	-30.4234	0.0299	14.0204	-13.5435	5.1912	-0.6883	0.0307	-12.3873	-1.5659	11.3281
530	1.7	80	-16.0606	2.0611	-15.7484	1.9540	-34.5742	-0.6042	18.5583	-14.2286	5.1097	-0.6168	0.0243	-14.3195	-1.8881	13.6114
530	1.7	90	-16.0906	2.0656	-15.8622	1.9540	-23.3292	1.3332	5.9157	-10.2931	3.6915	-0.4636	0.0198	-5.9208	-0.5010	4.4057
530	1.8	0	-15.3770	2.0207	-15.1030	1.9442	-22.3631	1.8124	3.5980	-116.1937	55.9503	-9.0290	0.4865	-6.5949	-0.1207	3.0855
530	1.8	5	-15.4707	2.0325	-15.1466	1.9464	-25.4391	1.2396	7.2465	-113.7617	54.9201	-8.8863	0.4800	-9.4615	-0.6792	6.5818
530	1.8	50	-15.6722	2.0302	-15.3889	1.9469	-26.8964	0.8227	9.4017	-81.3740	38.0949	-5.9855	0.3140	-10.2878	-1.0140	8.2289
530	1.8	70	-15.8629	2.0396	-15.6026	1.9506	-26.6440	0.8021	9.3698	-29.9995	12.5153	-1.7632	0.0829	-9.7750	-1.0421	8.1523
530	1.9	0	-15.3627	2.0203	-15.0710	1.9375	-25.2539	1.1174	7.6052	-138.0865	65.9737	-10.5439	0.5621	-9.4218	-0.7977	6.9900
530	1.9	5	-15.3602	2.0178	-15.0659	1.9333	-28.0789	0.4681	11.3749	-107.4108	50.0976	-7.8234	0.4075	-12.2964	-1.4550	10.8210
530	1.9	25	-15.4880	2.0251	-15.1747	1.9369	-22.8383	1.6702	4.3719	-109.5103	51.0049	-7.9524	0.4138	-7.2266	-0.3279	4.2123
530	1.9	50	-15.6402	2.0292	-15.3707	1.9434	-30.1632	0.0449	13.9158	-61.7963	27.5115	-4.1197	0.2063	-12.3549	-1.5363	11.2004
530	1.9	70	-15.9053	2.0507	-15.5866	1.9482	-29.1671	0.3470	12.3573	-59.0646	26.7554	-4.0790	0.2081	-10.9436	-1.2535	9.5521
530	2	0	-15.3493	2.0228	-14.9997	1.9253	-28.1476	0.4633	11.5022	-111.8723	51.4189	-7.9118	0.4065	-11.9231	-1.3635	10.3555
530	2	5	-15.4374	2.0345	-15.0530	1.9303	-29.2671	0.2896	12.7102	-97.4479	44.4187	-6.7869	0.3466	-12.6300	-1.4759	11.1370
530	2	25	-15.5146	2.0330	-15.1524	1.9322	-25.7346	1.0450	8.1582	-127.5849	59.1440	-9.1710	0.4746	-9.5137	-0.8343	7.2475
530	2	50	-15.7279	2.0467	-15.3507	1.9393	-26.3697	0.9306	8.8733	-132.3193	61.4817	-9.5533	0.4953	-9.2747	-0.8336	7.1611
530	2	70	-15.9225	2.0590	-15.5251	1.9379	-28.8131	0.4335	11.9367	-91.6314	41.5217	-6.3004	0.3191	-10.5808	-1.1770	9.1418
530	2.1	0	-15.4277	2.0413	-14.9538	1.9170	-31.3780	-0.1503	15.4513	-63.5038	26.1653	-3.5666	0.1598	-14.0733	-1.7711	12.9918
530	2.1	5	-15.4687	2.0446	-14.9928	1.9200	-31.5647	-0.1735	15.6231	-66.1172	27.5916	-3.8238	0.1751	-14.4141	-1.8410	13.4176
530	2.1	25	-15.5506	2.0450	-15.0785	1.9202	-28.9548	0.4140	12.1588	-89.2740	39.1348	-5.7337	0.2801	-12.2176	-1.3728	10.6288

λ	D_f	$f_{organics}$	c0	c1	g0	g1	H0	H1	H2	s0	s1	s2	s3	k0	k1	k2
530	2.1	50	-15.7581	2.0580	-15.2814	1.9284	-27.0473	0.8296	9.6674	-125.3823	57.0188	-8.6725	0.4403	-9.8592	-0.9329	7.8765
530	2.1	70	-16.0226	2.0821	-15.4889	1.9320	-28.8712	0.4955	11.8323	-117.5095	53.1077	-8.0261	0.4048	-10.4563	-1.1220	8.9375
530	2.2	0	-15.4744	2.0543	-14.8869	1.9057	-32.6405	-0.3626	16.9392	-24.6864	5.7529	-0.0381	-0.0411	-15.3279	-2.0051	14.5306
530	2.2	1	-15.4866	2.0559	-14.8813	1.9041	-34.3386	-0.7204	19.0909	-23.0105	5.1492	0.0225	-0.0423	-16.4775	-2.2411	15.9679
530	2.2	5	-15.4982	2.0558	-14.9006	1.9052	-34.1257	-0.6766	18.8197	-25.2534	6.2635	-0.1630	-0.0319	-16.1602	-2.1793	15.5842
530	2.2	10	-15.5622	2.0638	-14.9495	1.9106	-33.3220	-0.4539	17.6143	-31.3818	9.4207	-0.6972	-0.0022	-15.2506	-1.9580	14.3336
530	2.2	15	-15.5653	2.0607	-14.9693	1.9103	-31.9414	-0.1665	15.8674	-33.4950	10.3724	-0.8393	0.0049	-14.7735	-1.8725	13.7811
530	2.2	20	-15.5853	2.0599	-14.9847	1.9082	-31.4042	-0.0434	15.1449	-52.5260	20.0485	-2.4740	0.0967	-14.1882	-1.7458	13.0338
530	2.2	25	-15.6060	2.0596	-15.0166	1.9097	-30.8199	0.0778	14.4001	-53.4761	20.5159	-2.5496	0.1007	-13.7828	-1.6703	12.5548
530	2.2	30	-15.6303	2.0601	-15.0392	1.9093	-30.6155	0.1251	14.1210	-52.9759	20.3525	-2.5376	0.1009	-13.6031	-1.6370	12.3484
530	2.2	40	-15.7160	2.0667	-15.1111	1.9119	-29.0655	0.4714	12.0828	-72.8733	30.2813	-4.1828	0.1914	-12.0823	-1.3276	10.4756
530	2.2	50	-15.8023	2.0727	-15.1879	1.9135	-29.6343	0.3555	12.7851	-98.7155	43.2500	-6.3430	0.3108	-11.8632	-1.3104	10.3195
530	2.2	60	-15.9231	2.0823	-15.3025	1.9185	-27.3411	0.8217	9.9330	-112.0073	49.6061	-7.3490	0.3636	-9.9017	-0.9560	8.0637
530	2.2	70	-16.0740	2.0972	-15.4269	1.9226	-26.7874	0.9328	9.2630	-113.3254	50.2233	-7.4417	0.3681	-8.9568	-0.8233	7.1374
530	2.2	80	-16.2901	2.1253	-15.5877	1.9287	-26.9575	0.9087	9.4894	-107.3439	47.4461	-7.0096	0.3456	-8.1556	-0.7512	6.5267
530	2.2	90	-16.3319	2.1369	-15.6593	1.9231	-27.1610	0.7963	10.0927	-73.9224	31.8899	-4.6050	0.2220	-7.6132	-0.7757	6.4075
530	2.3	0	-15.5285	2.0646	-14.8693	1.9029	-32.6492	-0.2718	16.6524	-19.7277	3.4914	0.3010	-0.0578	-15.4153	-1.9543	14.4179
530	2.4	0	-15.6642	2.0932	-14.8418	1.8984	-34.9362	-0.6474	19.2588	6.1155	-9.7140	2.5202	-0.1808	-17.1146	-2.2573	16.4319
530	2.5	0	-15.7697	2.1177	-14.7974	1.8926	-37.8215	-1.1848	22.7353	29.8303	-21.7347	4.5243	-0.2910	-18.8315	-2.5812	18.5157
530	2.6	0	-15.8535	2.1392	-14.7374	1.8852	-40.0848	-1.5995	25.4485	49.5473	-31.6996	6.1786	-0.3816	-20.5944	-2.9240	20.6830
530	2.7	0	-16.0074	2.1717	-14.7684	1.8930	-42.8377	-2.1139	28.7616	69.7092	-41.8366	7.8571	-0.4735	-21.9356	-3.1892	22.3479
530	2.8	0	-16.0074	2.1717	-14.7684	1.8930	-42.8377	-2.1139	28.7616	69.7092	-41.8366	7.8571	-0.4735	-21.9356	-3.1892	22.3479
467	1.5	0	-15.2250	2.0243	-14.9285	1.9460	-21.3605	2.1205	2.0663	-35.1209	16.2828	-2.5973	0.1403	-6.4219	0.0321	2.4416
467	1.5	5	-15.2593	2.0374	-14.9620	1.9575	-20.6890	2.5173	0.4504	-2.4744	-1.8736	0.7619	-0.0666	-4.6311	0.6979	-0.7219
467	1.5	25	-15.1857	2.0120	-15.0053	1.9525	-23.9461	1.2193	6.5281	25.4720	-15.2767	2.8497	-0.1714	-7.9766	-0.6104	5.4794
467	1.5	50	-15.3527	2.0269	-15.0907	1.9490	-19.2520	2.3718	0.0752	-41.9971	19.6730	-3.1445	0.1693	-4.2522	0.2672	0.5329
467	1.5	70	-15.4996	2.0464	-15.1718	1.9464	-16.4574	2.8418	-2.9382	-58.8100	26.4711	-4.0238	0.2051	-2.5874	0.4590	-0.9002
467	1.6	0	-15.2353	2.0268	-14.9409	1.9474	-28.7077	0.4507	11.8045	-3.6309	0.3396	0.1020	-0.0122	-12.9050	-1.4491	11.0611
467	1.6	5	-15.1087	2.0092	-14.9205	1.9485	-23.1181	1.4085	5.4647	-74.3275	36.0744	-5.9106	0.3245	-8.1900	-0.6441	5.7107
467	1.6	25	-15.1530	2.0094	-14.9482	1.9418	-27.0336	0.4617	10.8670	-7.1065	0.0965	0.4647	-0.0496	-11.0903	-1.3638	9.8096
467	1.6	50	-15.2620	2.0145	-15.0787	1.9467	-23.7455	1.1604	6.7018	-38.6478	17.0336	-2.5500	0.1282	-7.8347	-0.7112	5.8602
467	1.6	70	-15.4007	2.0318	-15.1680	1.9461	-25.4695	0.8308	8.8622	-17.6725	7.4038	-1.0838	0.0541	-8.3194	-0.8399	6.6743
467	1.7	0	-15.1155	2.0073	-14.8876	1.9386	-22.1811	1.6816	4.0381	-31.3774	14.5618	-2.3199	0.1250	-7.1132	-0.3364	4.1005
467	1.7	1	-15.1170	2.0132	-14.8921	1.9455	-26.0870	0.7824	9.2430	-47.7187	23.0792	-3.7922	0.2096	-10.6256	-1.1477	8.7725
467	1.7	5	-15.1067	2.0121	-14.8977	1.9440	-30.8519	-0.4743	16.1665	7.4308	-7.4722	1.7897	-0.1275	-14.4195	-2.1684	14.3606
467	1.7	10	-15.1654	2.0187	-14.8977	1.9428	-19.8279	2.3611	0.4682	-87.7277	44.3931	-7.5678	0.4318	-4.8964	0.2865	0.7859
467	1.7	15	-15.1618	2.0143	-14.9404	1.9467	-23.6818	1.3451	6.0014	-53.7600	26.1864	-4.3148	0.2382	-8.2849	-0.6135	5.6836
467	1.7	20	-15.1850	2.0187	-14.9519	1.9452	-31.4590	-0.5230	16.6700	-16.5877	5.7736	-0.6280	0.0187	-14.6983	-2.1725	14.5528
467	1.7	25	-15.2028	2.0171	-14.9556	1.9427	-25.4709	0.9410	8.3817	-22.6606	9.0044	-1.1840	0.0500	-9.5186	-0.9018	7.3789
467	1.7	30	-15.1800	2.0103	-14.9541	1.9397	-23.6609	1.3071	6.1293	-84.1306	41.7810	-6.9752	0.3890	-8.4906	-0.7054	6.1423

λ	D_f	$f_{organics}$	c0	c1	g0	g1	H0	H1	H2	s0	s1	s2	s3	k0	k1	k2
467	1.7	40	-15.3097	2.0274	-15.0127	1.9423	-25.1544	1.1019	7.6760	31.1196	-17.1699	3.0401	-0.1762	-9.5844	-0.8668	7.3337
467	1.7	50	-15.2976	2.0204	-15.0740	1.9454	-22.9614	1.4066	5.4430	-46.2425	21.7884	-3.4835	0.1870	-7.2677	-0.5266	4.9292
467	1.7	60	-15.3859	2.0313	-15.1169	1.9447	-27.6765	0.4446	11.3400	-17.9367	7.7740	-1.1630	0.0586	-10.9685	-1.3040	9.6534
467	1.7	70	-15.3723	2.0284	-15.1650	1.9450	-34.1261	-1.0020	19.8687	10.2521	-6.5287	1.2364	-0.0745	-15.2400	-2.3052	15.4740
467	1.7	80	-15.5774	2.0685	-15.2111	1.9461	-37.1340	-1.3591	22.8655	10.2683	-6.7329	1.2976	-0.0790	-15.9493	-2.3255	16.0399
467	1.7	90	-15.3685	2.0509	-15.1912	1.9437	-23.1269	1.1428	6.8196	-5.2663	1.5274	-0.1471	0.0042	-6.3543	-0.6471	5.1619
467	1.8	0	-15.7285	2.0831	-15.2932	1.9592	-31.1127	-0.1752	15.4226	-130.1084	61.2659	-9.6866	0.5122	-11.8049	-1.4565	10.7326
467	1.8	5	-15.1723	2.0243	-14.8433	1.9339	-24.3049	1.3340	6.4867	-122.3392	61.1171	-10.2353	0.5724	-8.4259	-0.5207	5.5241
467	1.8	25	-15.2531	2.0294	-14.9630	1.9440	-31.7033	-0.4742	16.6739	-37.6599	17.5699	-2.7950	0.1499	-14.5915	-2.0714	14.1873
467	1.8	50	-15.3357	2.0308	-15.0297	1.9378	-27.1692	0.5606	10.6962	-58.7503	27.6982	-4.3992	0.2337	-10.5063	-1.1779	8.9745
467	1.8	70	-15.3919	2.0345	-15.1511	1.9418	-28.5653	0.1474	12.9522	2.0684	-3.2605	0.8269	-0.0588	-11.2729	-1.4948	10.5753
467	1.9	0	-15.1396	2.0166	-14.8460	1.9298	-23.2852	1.4146	5.6731	-177.0870	88.0780	-14.6465	0.8125	-7.7418	-0.5058	5.1251
467	1.9	5	-15.1009	2.0157	-14.7945	1.9253	-27.2283	0.4626	11.1008	-101.8639	48.3998	-7.7015	0.4089	-11.3532	-1.3673	10.0462
467	1.9	25	-15.1841	2.0197	-14.8990	1.9323	-23.6641	1.2782	6.3534	-120.0116	58.0425	-9.4039	0.5089	-7.7863	-0.5803	5.4254
467	1.9	50	-15.3412	2.0360	-15.0293	1.9368	-30.3293	-0.2013	15.0883	-38.5780	17.0127	-2.5392	0.1272	-12.5334	-1.6966	11.9042
467	1.9	70	-15.4933	2.0551	-15.1380	1.9394	-30.3382	-0.1092	14.8490	-61.8573	29.2308	-4.6502	0.2476	-11.8205	-1.5400	11.0665
467	2	0	-15.1130	2.0169	-14.7616	1.9148	-25.8479	0.7847	9.2983	-129.2946	61.6969	-9.8565	0.5259	-9.7768	-1.0037	7.9982
467	2	5	-15.1751	2.0318	-14.7893	1.9236	-27.7512	0.4176	11.6102	-124.5039	59.8334	-9.6403	0.5194	-11.3581	-1.3220	9.9511
467	2	25	-15.2150	2.0287	-14.8585	1.9243	-24.0297	1.2301	6.7896	-157.8741	76.3599	-12.3547	0.6673	-7.7562	-0.5524	5.3735
467	2	50	-15.3907	2.0468	-15.0066	1.9321	-26.4881	0.6991	9.9642	-161.8839	78.3793	-12.6905	0.6858	-9.1129	-0.9106	7.3901
467	2	70	-15.4694	2.0565	-15.0517	1.9249	-30.4092	-0.1312	15.0224	-101.0511	47.6277	-7.5203	0.3967	-11.6095	-1.5002	10.8573
467	2.1	0	-15.2008	2.0367	-14.7349	1.9094	-28.8421	0.1785	13.0826	-80.4684	35.5475	-5.2334	0.2558	-11.9144	-1.4465	10.7392
467	2.1	5	-15.1910	2.0391	-14.7273	1.9126	-28.8999	0.1716	13.1464	-88.4309	39.8327	-5.9982	0.3011	-12.3942	-1.5521	11.3555
467	2.1	25	-15.2680	2.0433	-14.7903	1.9126	-25.5820	0.9624	8.6347	-105.0686	48.0961	-7.3573	0.3752	-9.3550	-0.8579	7.3516
467	2.1	50	-15.4216	2.0583	-14.9261	1.9188	-25.2955	1.0100	8.3313	-144.4405	68.3194	-10.8100	0.5711	-8.3038	-0.7025	6.2947
467	2.1	70	-15.5940	2.0833	-15.0090	1.9172	-26.8970	0.6971	10.3489	-133.0941	62.4855	-9.8108	0.5142	-9.0259	-0.9162	7.5009
467	2.2	0	-15.2165	2.0444	-14.6641	1.8972	-29.7629	-0.0102	14.2948	-19.1750	2.5816	0.6214	-0.0879	-12.8919	-1.6601	12.0497
467	2.2	1	-15.1990	2.0474	-14.6285	1.8974	-31.8693	-0.4877	17.0880	-37.4604	12.7007	-1.2323	0.0245	-14.5741	-2.0293	14.2235
467	2.2	5	-15.2217	2.0503	-14.6575	1.9010	-32.1649	-0.5623	17.5039	-29.3700	8.4060	-0.4772	-0.0195	-14.2925	-1.9765	13.8932
467	2.2	10	-15.2632	2.0552	-14.6851	1.9035	-30.8288	-0.2051	15.5548	-39.6139	13.7847	-1.4087	0.0338	-13.1405	-1.6815	12.2617
467	2.2	15	-15.2330	2.0475	-14.6699	1.8981	-28.7418	0.2526	12.8496	-31.1358	9.1435	-0.5693	-0.0164	-12.4100	-1.5347	11.3644
467	2.2	20	-15.2836	2.0534	-14.7134	1.9019	-27.9901	0.4408	11.7992	-59.4431	23.8465	-3.1090	0.1295	-11.3847	-1.3029	10.0230
467	2.2	25	-15.2842	2.0510	-14.7214	1.9004	-27.7322	0.4875	11.4924	-72.1353	30.5181	-4.2737	0.1971	-11.2953	-1.2954	9.9503
467	2.2	30	-15.3153	2.0539	-14.7486	1.9018	-28.1864	0.3865	12.0852	-71.8006	30.5272	-4.3065	0.2008	-11.4609	-1.3426	10.2089
467	2.2	40	-15.3567	2.0574	-14.7739	1.9002	-26.3214	0.8071	9.6421	-91.1375	40.3701	-5.9726	0.2945	-9.8598	-1.0011	8.1894
467	2.2	50	-15.4536	2.0703	-14.8358	1.9036	-26.8054	0.7214	10.2167	-124.3192	57.2902	-8.8383	0.4557	-9.5292	-0.9475	7.8526
467	2.2	60	-15.5219	2.0782	-14.9051	1.9076	-25.7403	0.9312	8.9352	-130.0775	60.1462	-9.3065	0.4811	-8.5305	-0.7861	6.7820
467	2.2	70	-15.6158	2.0930	-14.9704	1.9112	-27.6593	0.5370	11.3666	-132.7757	61.6566	-9.5787	0.4971	-9.1078	-0.9501	7.6951
467	2.2	80	-15.7060	2.1141	-15.0054	1.9116	-27.5942	0.5635	11.3242	-101.5491	46.3602	-7.0800	0.3610	-8.3212	-0.8496	6.9822
467	2.2	90	-15.5041	2.1010	-14.9155	1.8988	-26.4610	0.6389	10.5841	-61.9217	27.1741	-3.9960	0.1964	-7.4641	-0.8129	6.4600

λ	D_f	$f_{organics}$	c0	c1	g0	g1	H0	H1	H2	s0	s1	s2	s3	k0	k1	k2
467	2.3	0	-15.2744	2.0552	-14.6573	1.8961	-29.1260	0.2391	13.1161	-11.3711	-1.2798	1.2579	-0.1228	-12.8534	-1.5781	11.7616
467	2.4	0	-15.3828	2.0789	-14.6223	1.8898	-31.8896	-0.3003	16.5330	20.8495	-18.1860	4.1848	-0.2904	-14.8163	-1.9761	14.2390
467	2.5	0	-15.4665	2.0997	-14.5745	1.8832	-34.9085	-0.9250	20.3731	52.4292	-34.6302	7.0106	-0.4510	-16.7000	-2.3711	16.6524
467	2.6	0	-15.5159	2.1151	-14.4968	1.8723	-37.2465	-1.4072	23.3510	74.5120	-46.0470	8.9528	-0.5601	-18.7793	-2.8188	19.3463
467	2.7	0	-15.6455	2.1437	-14.5196	1.8785	-40.5182	-2.0967	27.5370	96.3327	-57.1947	10.8299	-0.6646	-20.4577	-3.1879	21.5461
467	2.8	0	-15.6455	2.1437	-14.5196	1.8785	-40.5182	-2.0967	27.5370	96.3327	-57.1947	10.8299	-0.6646	-20.4577	-3.1879	21.5461