



Figure S1: Distribution pattern of 6 different FDOM groups given in excitation wavelength in the South China Sea and Sulu Sea.

Table S1: All physical parameters, OVOCs, fluxes and FDOM data that are used in this study. Empty spaces show not measured data.

			Temperature				Water					Air						Flux					FDOM						
lat	lon	DOY	Salinity	Water	air	wind speed	Acetaldehyde	Propanal	Acetone	Butanal	Butanone	Acetaldehyde	Propanal	Acetone	Butanal	Butanone	Nitrat	Acetone	Acetaldehyde	Propanal	Butanal	Butanone	C1	C2	C3	C4	C5	C6	
				[°C]		[m s <sup>-1</sup> ]	[nmol L <sup>-1</sup> ]					[ppm]					[μmol L <sup>-1</sup> ]	[μmol m <sup>-2</sup> d <sup>-1</sup> ]					[nm]						
3.63	110.34	321.9167	32.6	29.1		6.8	8.85		67.76	1.64	2.14												0.073	0.007	0.005	0.009	0.019	0.004	
3.07	110.45	322.0417	32.4	29.1		8.2	3.00		21.32	0.93	1.21												0.076	0.006	0.004	0.008	0.015	0.002	
2.53	110.55	322.1667	32.6	29.7		8.4	5.97		33.92	1.50	2.14												0.098	0.006	0.004	0.010	0.015	0.003	
2.41	110.57	322.2917	32.6	30.1		1.8	5.18		39.76	1.64	1.74												0.102	0.007	0.006	0.012	0.011	0.003	
2.41	110.57	322.4167	32.6	30.1		4.0				0.29	2.03												0.051	0.011	0.007	0.011	0.016	0.008	
2.41	110.57	322.5417	32.6	29.6		4.2				0.27	1.02												0.051	0.006	0.003	0.007	0.010	0.010	
2.41	110.57	322.6667	32.6	29.6		6.0	7.71		21.70	1.03	0.93																		
2.41	110.57	322.7917	32.6	29.5		5.7	4.80		22.82	1.41	1.09						0.14						0.041	0.008	0.003	0.005	0.016	0.006	
2.41	110.57	322.9167	32.6	29.4		5.4	4.80		18.71	0.58	0.87						0.14						0.036	0.007	0.004	0.007	0.026	0.003	
2.10	110.64	323.0417	32.1	29.4		8.2	8.06		27.33	1.42	1.21																		
1.85	110.70	323.1667	31.3	29.4		2.6	6.62		39.31								0.15						0.393	0.010	0.003	0.022	0.013	0.005	
2.04	110.78	323.2917	31.6	30.1		8.8	2.96		19.99	0.92	0.73						0.13						0.212	0.008	0.004	0.013	0.009	0.002	
2.58	110.99	323.4167	32.1	29.6		10.9	4.62		25.95	0.75	0.88						0.22						0.066	0.044	0.022	0.028	0.012	0.049	
3.06	111.24	323.5417	31.6	29.4		6.9	5.87		34.75	0.79	0.83						0.20						0.039	0.041	0.019	0.026	0.014	0.016	
3.39	111.72	323.6667	32.0	29.3		6.3	4.07		19.17	0.48	0.51						0.16						0.022	0.019	0.010	0.017	0.020	0.004	
3.44	111.84	323.7917	32.1	29.2		3.3	7.26		23.55								0.18						0.016	0.033	0.016	0.026	0.017	0.004	
3.23	111.97	323.9167	30.6	28.8		4.4	3.92		12.58	0.45	0.41						0.18						0.073	0.023	0.012	0.018	0.022	0.006	
3.23	112.16	324.0417	31.1	29.2		8.7	3.21		14.23	0.29	0.33												0.109	0.016	0.008	0.015	0.014	0.004	

3.33	112.39	324.1667	31.2	29.8		8.2	11.51		43.99	0.35	0.46						0.22												
3.39	112.63	324.2917	31.1	29.8		7.7	2.61		21.39	0.33	0.48						0.19							0.135	0.040	0.019	0.030	0.010	0.005
3.48	112.77	324.4167	31.2	29.8		8.9	3.93		19.96	0.50	0.53						0.15							0.015	0.029	0.015	0.023	0.016	0.004
3.64	112.57	324.5417	31.7	29.7		8.9	4.06		13.09	0.31	0.28						0.17							0.017	0.027	0.015	0.022	0.013	0.003
3.85	112.47	324.6667	31.7	29.3		10.2	6.37		23.42	0.37	0.66						0.16							0.018	0.027	0.014	0.025	0.012	0.005
3.93	112.46	324.7917	31.9	29.3		6.4	14.45		4.98	0.69	4.31						0.17							0.164	0.050	0.062	0.155	0.100	0.026
4.15	112.65	324.9167	32.2	29.2		8.1	0.82		3.20	0.06	0.23						0.23							0.096	0.018	0.009	0.019	0.024	0.005
4.40	112.87	325.0417	32.3	29.2		5.5	0.35	0.08	2.47	0.33	0.23																		
4.64	113.08	325.1667	32.3	29.3		6.9											0.24							0.149	0.014	0.009	0.018	0.008	0.004
4.64	113.08	325.2917	32.3	29.5	29.2	4.3	4.51	0.81	33.97	0.77	1.26	0.47	0.03	0.82	0.03	0.06	0.20	2.12	-0.80	0.22	0.27	0.08	0.071	0.011	0.006	0.011	0.014	0.002	
4.97	113.41	325.4167	32.2	29.4		13.9	6.04	2.29	54.37	2.32	2.44						0.18						0.035	0.008	0.005	0.007	0.015	0.018	
5.33	113.88	325.5417	32.4	29.3		17.0	5.27	1.98	51.47	2.02	2.23												0.088	0.006	0.006	0.009	0.012	0.012	
5.64	114.36	325.6667	32.0	29.3	29.3	14.9	3.38	1.37	39.48	1.33	1.56	0.17	0.02	0.14	0.02	0.01	0.18	30.63	2.17	2.58	2.99	1.96	0.063	0.008	0.012	0.008	0.012	0.006	
6.01	114.77	325.7917	32.0	29.2	28.8	12.0		0.49	18.90	0.85	1.05	0.11	0.01	0.24	0.01	0.00	0.21	7.93		0.63	1.49	1.02	0.069	0.007	0.008	0.010	0.010	0.007	
6.01	114.78	325.9167	32.0	29.2		9.7	2.45	0.55	11.02	0.41	0.28						0.56						0.116	0.008	0.013	0.006	0.005	0.001	
6.01	114.78	326.0417	32.0	29.2	28.9	11.7	2.44	0.61	17.74	0.90	0.57	0.19	0.02	0.42	0.03	0.23	0.20	3.40	-0.22	0.71	1.20	-3.18	0.051	0.012	0.010	0.012	0.009	0.002	
6.01	114.78	326.1667	32.1	29.2		8.8																							
6.01	114.78	326.2917	32.1	29.3	28.3	6.8	2.95	0.52	18.98	0.44	0.54	0.50	0.03	0.58	0.02	0.01	0.19	0.50	-3.07	0.18	0.26	0.20	0.192	0.011	0.030	0.009	0.005	-0.003	
6.01	114.78	326.4167	32.1	29.2	28.7	9.6	2.01	0.62	17.41	0.68	0.58	0.55	0.05	0.89	0.05	0.11	0.17	-4.83	-6.41	0.12	0.42	-0.99	0.043	0.016	0.020	0.005	0.021	0.378	
6.01	114.78	326.5417	32.1	29.1	28.9	12.4	2.40	0.53	13.89	0.42	0.11	0.36	0.02	0.37	0.02	0.01	0.20	2.05	-3.99	0.48	0.54	-0.09	0.129	0.013	0.009	0.015	0.012	0.052	
6.01	114.78	326.6667	32.2	29.1		9.2	3.88	0.85	21.43	0.82	1.25												0.143	0.024	0.014	0.009	0.047	0.045	
6.01	114.78	326.7917	32.2	29.0		12.0											0.18												
5.90	115.28	326.9167	32.2	29.2		12.4	1.08	0.81	11.12	0.80	0.83						0.18						0.037	0.013	0.009	0.009	0.023	0.004	
5.98	115.74	327.0417	31.9	29.3	28.4	6.0		1.55	32.80	1.44	2.59		0.02	0.65	0.00		0.18	4.02		0.90			0.049	0.011	0.008	0.010	0.017	0.002	

6.07	115.91	327.1667	32.0	29.7	31.4	0.9	3.03	1.06	17.37	0.00		0.19	0.03	0.45	0.03	0.06	0.19	0.20	0.05	0.05			0.078	0.012	0.008	0.012	0.011	0.004	
5.85	115.49	327.2917	32.0	29.7	29.1	8.1	2.06	1.25	23.35	0.98	0.86	0.21	0.02	0.36	0.03	0.05	0.00	5.65	-0.81	1.04	0.86	0.00	0.367	0.034	0.003	0.014	0.036	0.005	
5.98	114.90	327.4167	32.2	29.1	28.0	7.0	7.43	1.80	42.34	1.63	2.23	1.78	0.16	2.35	0.16	0.35	0.00	-10.91	-13.82	0.07	0.31	-1.98	0.052	0.017	0.011	0.012	0.016	0.132	
6.29	115.04	327.5417	32.5	28.9		15.9	1.54	0.83	27.72	1.17	1.13						0.00												
6.62	115.37	327.6667	32.5	28.9	28.1	8.2	4.17	1.42	35.47	1.03	1.02	0.43	0.04	0.56	0.05	0.03	0.00	7.92	-1.79	0.96	0.67	0.30	0.020	0.012	0.007	0.011	0.016	0.011	
6.83	115.58	327.7917	32.4	28.8	27.6	16.2	4.81	0.77	21.34	0.88	0.84	0.67	0.04	0.62	0.03	0.02	0.00	1.56	-10.11	0.80	1.54	0.62	0.050	0.010	0.006	0.008	0.013	0.013	
7.20	115.93	327.9167	32.4	28.7	27.1	15.1	2.22	0.77	26.05	1.08	0.52		0.02	0.40	0.02	0.01	0.00	10.75		0.97	2.12	0.48	0.045	0.009	0.004	0.007	0.014	0.003	
7.33	116.06	328.0417	32.4	28.8	27.4	7.5	3.32	1.95	45.96	2.96	2.19	2.45	0.64	14.48	1.21	35.46	0.00	-158.1	-26.63	-4.53	-6.56	-344.8	0.057	0.009	0.004	0.007	0.012	0.003	
7.41	116.30	328.1667	32.4	28.8	27.3	12.2	6.68	3.06	50.67	3.35	2.05	2.35	0.49	7.27	0.24	0.74	0.00	-117.7	-40.53	-3.92	2.49	-10.67	0.067	0.011	0.007	0.008	0.005	0.004	
7.60	116.85	328.2917	32.2	28.4	26.3	12.0	6.35	3.29	63.59	2.84	2.26	1.37	0.26	3.44	0.14	0.17	0.00	-31.09	-20.51	0.28	2.64	-0.84	0.100	0.011	0.008	0.009	0.046	0.003	
7.97	117.22	328.4167	32.6	29.1		14.0																							
7.94	117.81	328.5417	32.7	29.0	28.0	12.7		2.33	35.44	2.34	3.22		0.54	8.86	0.21	0.23	0.00	-166.1		-5.95	1.41	-0.71	0.071	0.009	0.006	0.008	0.009	0.010	
7.90	118.05	328.6667	32.6	29.1	28.6	9.4		1.02	28.27	1.15	1.02		0.48	7.25	0.20	0.35	0.22	-97.38		-4.83	-0.49	-3.63	0.089	0.010	0.005	0.009	0.008	0.009	
7.93	118.53	328.7917	32.6	29.1	26.5	14.2	4.38	1.08	13.93				0.22	4.40	0.11	0.09	0.00	-97.59		-2.80			0.060	0.007	0.004	0.005	0.012	0.006	
7.76	119.03	328.9167	32.7	29.2		9.2	4.40	1.63	32.08	1.21	0.97						0.01						0.055	0.006	0.002	0.003	0.028	0.003	
7.11	118.99	329.0417	32.7	28.9		6.0											0.00												
7.06	118.99	329.1667	32.7	29.0	28.2	7.2	3.74	1.25	25.76	1.42	1.29	1.64	0.17	2.15	0.18	2.87	0.00	-15.08	-15.44	-0.52	0.05	-25.64	0.083	0.008	0.003	0.003	0.044	0.001	
6.89	118.75	329.2917	32.5	28.9	28.2	2.3	4.97	1.03	21.63	0.96	0.99		0.35	4.07	0.20	0.37	0.00	-10.51		-0.52	-0.13	-0.71	0.083	0.009	0.003	0.002	0.036	0.002	
6.52	118.21	329.4167	32.4	29.0	28.0	3.3	6.73	1.27	23.47	1.21	1.04		0.65	7.72	0.43	1.56	0.00	-33.09		-1.76	-0.70	-5.39	0.017	0.007	0.003	0.004	0.024	0.013	
6.29	118.27	329.5417	32.3	29.0	28.6	6.4		1.13	21.21	1.37	1.08	0.88	0.20	1.63	0.10	0.19		-9.35		-0.72	0.49	-1.03	0.175	0.013	0.006	0.008	0.014	0.080	
6.49	118.67	329.6667	32.6	28.9	28.9	13.7	6.41	1.25	21.61	0.71	0.56		0.15	2.05	0.08	0.09	0.00	-30.80		-0.43	0.26	-1.05	0.052	0.012	0.005	0.003	0.035	0.027	
6.56	118.80	329.7917	32.6	29.0	29.0	14.1	2.70	0.78	12.79	0.64	0.41		0.16	1.55	0.03	0.02	0.00	-26.76		-1.60	1.01	0.02	0.045	0.012	0.007	0.007	0.022	0.020	
6.53	119.37	329.9167	32.6	28.9	29.0	14.0		1.04	14.57	0.70	0.94	0.87	0.10	1.40	0.04	0.02	0.00	-21.60		0.00	1.00	0.69	0.059	0.011	0.004	0.006	0.017	0.004	
6.51	119.95	330.0417	32.6	29.4	28.8	10.2	4.03	1.83	25.70	1.03	1.14	8.50	0.15	2.76	0.04	0.05	0.00	-32.10	-139.4	0.42	1.10	0.32	0.054	0.008	0.002	0.004	0.016	0.002	

6.50	120.03	330.1667	32.6	29.3		2.7	3.39	1.03	20.28	0.55	0.34						0.00							0.048	0.007	0.002	0.005	0.024	0.002
6.51	120.03	330.2917	32.6	29.8	28.6	6.0	2.23	1.07	15.99	0.67	0.65	4.24	0.15	4.51	0.07	0.03	0.03	-37.35	-36.61	-0.37	0.12	0.06	0.087	0.007	0.003	0.003	0.018	0.003	
7.08	120.08	330.4167	32.8	29.7		10.2											0.00												
7.55	120.12	330.5417	32.8	29.4		6.8																							
7.55	120.12	330.6667	32.8	29.3		5.9											0.01												
8.05	120.16	330.7917	32.8	29.4		12.7											0.17												
8.47	120.20	330.9167	33.2	29.3		5.4											0.00												
8.47	120.20	331.0417	33.3	29.3		5.3																							
8.74	120.23	331.1667	33.2	29.4		10.3	2.77	0.95	9.72	0.53	0.28						0.00						0.062	0.005	0.002	0.004	0.004	0.001	
9.36	120.29	331.2917	33.1	29.5		11.0	4.57	1.05	10.17	0.56	0.41						0.00						0.120	0.007	0.004	0.004	0.008	0.002	
9.39	120.30	331.4167	33.1	29.2		5.5																							
9.63	120.55	331.5417	33.1	29.2	28.6	11.2	4.57	0.91	8.52	0.40	0.22	5.26	0.57	4.69	0.44	0.41	0.00	-82.42	-109.3	-7.49	-4.98	-6.15	0.110	0.008	0.006	0.006	0.013	0.024	
10.07	121.00	331.6667	33.0	29.2	28.7	12.2	3.80	0.98	10.00	0.44	0.26	0.86	0.19	3.85	0.18	0.06	0.00	-72.17	-14.38	-1.70	-1.68	-0.73	0.135	0.012	0.004	0.003	0.017	0.036	
10.50	121.44	331.7917	33.0	29.1	28.8	11.7	4.31	0.60	8.59	0.23	0.19		0.12	2.22	0.00		0.08	-37.92	7.27	-0.96			0.088	0.009	0.004	0.002	0.011	0.019	
11.00	121.78	331.9167	33.0	29.3		7.1	0.94		4.48	0.00							0.09						0.079	0.008	0.002	0.005	0.017	0.012	
11.52	121.65	332.0417	33.0	29.2		11.5	4.15		9.86	0.00							0.18						0.107	0.008	0.001	0.004	0.008	0.003	
11.86	121.20	332.1667	33.2	28.1		15.0	6.38		7.19	0.00							0.00						0.183	0.008	0.009	0.005	0.003	0.001	
12.31	120.89	332.2917	32.8	30.0		8.5											0.00						0.102	0.012	0.004	0.003	0.015	0.002	
12.82	120.52	332.4167	32.9	29.4		8.1			8.63	0.00							0.01						0.091	0.010	0.005	0.002	0.013	0.092	
13.37	120.19	332.5417	32.9	29.4		12.0	3.66			0.00							0.18						0.249	0.015	0.013	0.009	0.004	0.059	
13.90	119.92	332.6667	32.9	28.5	28.3	10.2	6.75		14.32	0.00		3.90	0.29	4.65	0.19	0.03	0.00	-70.64	-68.02				0.444	0.010	0.015	0.014	-0.009	0.058	
14.25	120.30	332.7917	32.9	28.1	28.0	12.1	5.83		26.82	0.00		1.80	1.42		0.06	0.02	0.00		-33.92				0.220	0.009	0.010	0.007	0.006	0.030	
14.45	120.67	332.9167	32.3	27.8	26.6	8.0	3.23		10.89	0.30	0.49		0.36	5.29	0.14	0.02	0.00	-64.76	3.15		-0.93	0.10	0.081	0.009	0.002	0.001	0.026	0.004	
14.59	120.97	333.0417	32.9	27.5		2.6	2.94		8.79	0.20	0.30						0.13						0.304	0.012	0.005	0.005	0.034	0.002	

