

Contents of this file

Text S1

Figures S1

Tables S1 to S2

Introduction

This supporting material details data collected from the RPO system and isotope analyses. This data is presented in figure plots of RPO thermograms and data tables. An explanation of calculations made to estimate the isotopic compositions of RPO fractions lost during sample analysis are also described below. These calculations are based on mass balance equations and are necessary to utilize the ramped pyrox Python package for data analysis.

Text S1. Derivation of Isotopic Values for Missing Fractions

Due to the loss of the $\delta^{13}\text{C}$ split for fraction 2 in KC-28, KC-30, and KC-08 and fraction 5 in KC-02, $\delta^{13}\text{C}$ values for the missing fractions were back-calculated through a mass balance equation utilizing the available $\delta^{13}\text{C}$ fraction values, fractional contribution by mass, and the observed bulk $\delta^{13}\text{C}$ for each sample. Because the observed bulk $\delta^{13}\text{C}$ is not always consistent with the RPO mass-balance calculated $\delta^{13}\text{C}$ value due to kinetic fraction processes during RPO combustion, an additional offset correction was applied to the calculated $\delta^{13}\text{C}$ of the missing fraction. For KC-30 and KC-28 the offset was determined by the difference between the observed and RPO bulk $\delta^{13}\text{C}$ in KC-30B and KC-28B, respectively. Because there is no direct core comparison for KC-02 and KC-08, an average difference between the observed and RPO bulk $\delta^{13}\text{C}$ for all samples within the Gulf of Martaban (-1.13‰) was used as the offset. Because the Fm split was also not available for the fifth fraction of KC-02, the acidified KC-02 sediment sample was analyzed at NOSAMS (following methods described in section 3.3) to characterize its bulk Fm. The Fm of the missing fraction was then calculated through a mass balance equation using the observed bulk, available Fm fraction values, and mass fractional contributions. No additional correction was necessary for the back-calculation of Fm as the bulk Fm derived from RPO fractions is consistent with independently analyzed Fm values (Hemingway et al., 2017a).

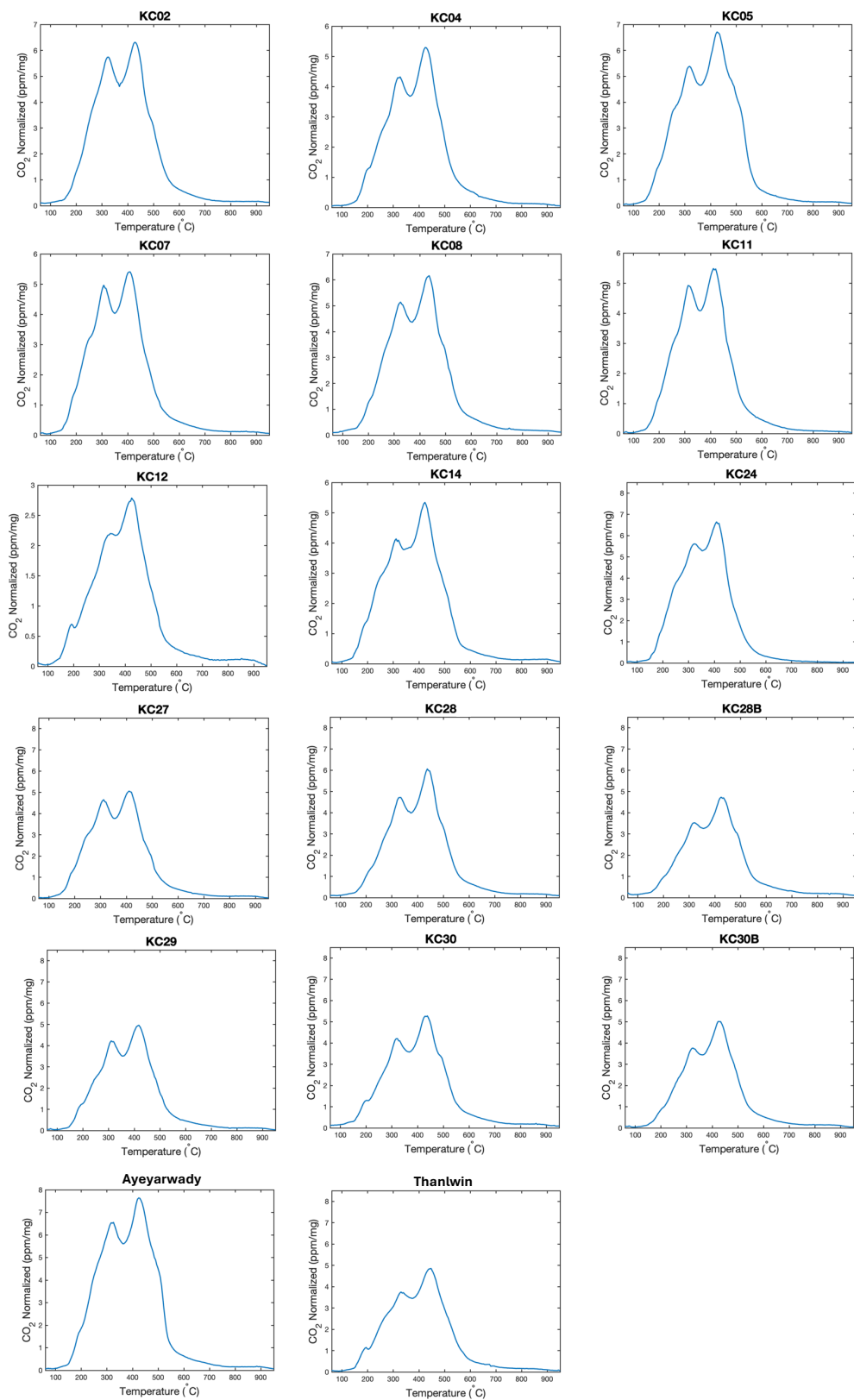


Figure S1. RPO thermograms of offshore and A-T river samples.

Sample ID	Longitude (°E)	Latitude (°N)	Sample Wt. (mg)	TOC (%)	Fm	$\delta^{13}\text{C}$ (‰)	SA ($\text{m}^2 \text{g}^{-1}$)
KC02	96.21	14.96	73.47	0.47	0.795	-22.99	24.94
KC24	94.92	14.93	74.01	0.49	0.771	-21.69	21.22
KC27	96.04	15.4	73.18	0.40	0.781	-23.15	22.96
KC04	96.88	15.5	71.40	0.40	0.774	-23.27	26.68
KC12	95.45	15.5	72.31	0.24	0.675	-24.19	10.26
KC07	97.37	15.07	72.65	0.42	0.758	-23.12	26.79
KC11	95.57	15.2	71.16	0.42	0.765	-22.80	25.81
KC29	96.76	15.84	74.83	0.38	0.752	-23.65	21.75
KC14	94.60	15.60	72.39	0.40	0.775	-23.77	17.42
KC05	97.37	16.17	75.54	0.56	0.799	-24.49	22.05
KC30B	96.26	16.03	72.68	0.37	0.721	-23.64	NA
KC30	96.26	16.03	74.18	0.40	0.760	-23.84	23.77
KC08	96.31	15.03	76.46	0.45	0.790	-23.30	25.11
KC28B	96.46	15.66	75.36	0.37	0.734	-23.59	24.04
KC28	96.46	15.66	72.74	0.42	0.769	-23.62	23.41
Ayeyarwady	96.17	16.84	71.412	0.60	0.790	-25.32	NA
Thanlwin	97.64	16.45	74.643	0.40	0.798	-24.80	NA

Table S1. Bulk organic carbon parameters including total organic carbon (TOC), fraction modern (Fm), $\delta^{13}\text{C}$, and surface area (SA) for sediment samples from the offshore delta and river end-members. Sample weight applies to bulk TOC and $\delta^{13}\text{C}$ analyses. Where data is not available "NA" is indicated.

Sample ID	Fraction No.	<i>E</i> (kJ mol ⁻¹)	<i>E</i> Std. Dev. (kJ mol ⁻¹)	Fm	δ ¹³ C (‰)
KC02	1	115.93	11.81	0.937	-24.48
	2	115.93	7.68	0.939	-23.87
	3	147.82	7.54	0.896	-20.30
	4	164.94	7.85	0.758	-23.13
	5	190.11	19.22	0.615	-23.24
KC24	1	113.78	7.02	0.910	-23.49
	2	131.71	8.99	0.877	-21.76
	3	154.35	9.40	0.789	-19.80
	4	168.79	6.43	0.657	-22.77
	5	194.72	23.31	0.504	-25.56
KC27	1	116.13	8.02	0.967	-24.82
	2	132.95	7.63	0.935	-24.01
	3	153.38	10.05	0.798	-21.69
	4	168.99	6.66	0.675	-23.64
	5	199.83	28.49	0.533	-23.39
KC04	1	118.34	8.50	0.970	-24.82
	2	136.06	7.57	0.925	-24.13
	3	156.86	10.39	0.794	-22.13
	4	173.50	6.93	0.693	-23.49
	5	207.23	29.07	0.544	-23.55
KC12	1	118.72	9.74	0.904	-26.06
	2	139.03	7.76	0.854	-24.23
	3	157.48	9.21	0.686	-23.71
	4	171.95	6.89	0.611	-24.94
	5	206.32	31.11	0.429	-23.05
KC07	1	116.12	7.61	0.942	-24.94
	2	132.32	7.59	0.911	-23.16
	3	151.96	9.84	0.794	-22.65
	4	168.26	6.91	0.664	-23.88
	5	202.42	29.50	0.489	-21.98
KC11	1	117.88	7.82	0.957	-23.94
	2	134.26	7.69	0.888	-23.95
	3	154.17	9.93	0.790	-21.02
	4	169.20	6.37	0.663	-23.30
	5	198.28	26.97	0.533	-24.19
KC29	1	115.42	7.74	0.962	-25.19
	2	133.31	7.91	0.928	-25.06
	3	153.99	10.07	0.786	-22.06
	4	170.66	7.10	0.677	-23.20
	5	205.60	29.82	0.476	-25.11
KC14	1	116.42	8.20	0.932	-25.90
	2	133.46	7.65	0.911	-24.11
	3	156.02	10.57	0.776	-22.48
	4	173.66	7.45	0.707	-23.71
	5	206.12	30.21	0.583	-24.76
KC05	1	114.84	7.76	0.926	-27.04
	2	133.13	8.41	0.914	-24.98
	3	156.76	10.62	0.817	-22.76
	4	174.34	7.67	0.756	-24.78
	5	201.10	26.43	0.647	-25.81

KC30B	1	118.56	8.48	0.916	-22.51
	2	136.28	7.85	0.890	-22.61
	3	157.70	10.23	0.748	-25.27
	4	173.83	7.00	0.675	-21.49
	5	206.40	28.85	0.497	-24.44
KC30	1	112.94	8.57	0.953	-22.07
	2	134.62	8.48	0.933	-21.46
	3	157.90	10.67	0.788	-24.35
	4	175.16	7.39	0.698	-25.82
	5	208.33	29.16	0.527	-23.96
KC08	1	108.01	11.78	0.927	-25.53
	2	133.87	9.21	0.945	-22.97
	3	149.11	7.58	0.888	-20.30
	4	163.55	7.63	0.764	-23.72
	5	190.41	25.76	0.650	-24.20
KC28B	1	113.52	8.47	0.928	-25.35
	2	133.29	8.29	0.918	-24.51
	3	156.66	10.71	0.775	-22.09
	4	174.45	7.29	0.679	-23.35
	5	211.44	31.52	0.500	-25.23
KC28	1	114.06	8.48	0.906	-25.27
	2	135.13	8.79	0.931	-23.23
	3	159.25	11.02	0.799	-22.65
	4	176.37	7.08	0.697	-24.24
	5	209.07	29.31	0.561	-25.02
Ayeyarwady	1	116.02	7.98	0.927	-27.97
	2	133.51	7.98	0.916	-26.80
	3	155.94	10.57	0.791	-24.07
	4	173.63	7.28	0.728	-24.71
	5	201.22	27.87	0.646	-25.46
Thanlwin	1	116.06	8.53	0.959	-26.77
	2	136.22	8.50	0.939	-26.03
	3	159.87	10.61	0.823	-23.70
	4	177.78	7.52	0.743	-25.69
	5	210.88	28.19	0.566	-23.70

Table S2. Average and standard deviation of activation energy (E) and carbon isotope compositions (Fm and $\delta^{13}\text{C}$) for offshore and river samples and the associated RPO fractions. Isotope values have been mass and blank corrected following Hanke et al. (2023) for Fm and Hemingway et al. (2017a) for $\delta^{13}\text{C}$. $\delta^{13}\text{C}$ also been corrected for kinetic fractionation following (Hemingway et al., 2017a).