

## Supplementary information

**Table S1.** Sampling sites in the middle (M) and lower (B) basin of the Usumacinta River.

Latitude UTM	Longitude UTM	Altitude (m a.s.l)	River	Code	Strahler order	Distance to the mouth (km)
1782640	704727	158	Ixcán (+)	M1	4	721
1781050	718609	150	Chajul (+)	M2	3	688
1800790	727433	137	Lacantún (+)	M3	5	660
1803793	726631	134	Tzendales (+)	M4	3	657
1804437	727316	133	Lacantún-Tzendales (+)	M5	5	655
1823051	761812	107	Chixoy	M6	4	599
1823953	762775	107	La Pasión (+)	M7	4	599
1823414	760335	107	Chixoy-La Pasión	M8	5	596
1861389	724442	95	Usumacinta (FC)	M9	6	525
1926693	660039	25	Usumacinta (BC)	M10	6	385
1964679	667707	5	San Pedro (+)	B1	4	290
1963988	666942	6	Usumacinta (BA)	B2	6	290
1964602	665786	5	Usumacinta-San Pedro	B3	6	288
2023798	583080	2	San Pedro San Pablo (-)	B4	-	66
2028076	548738	1	Usumacinta (TB)	B5	6	42
2031951	535729	1	Grijalva (TB) (+)	B6	6	27
2035408	537013	0	Grijalva-Usumacinta	B7	7	24
2056374	557978	0	San Pedro San Pablo (-)	B8	-	7

(+) tributaries, (-) distributary.

The distance to the mouth of the river was measured following the river channel.

FC: Frontera Corozal; BC: Boca del Cerro; BA: Balancán; TB: Tres Brazos.

**Table S2.** Summary of the physicochemical variables of the Usumacinta River in the rainy season. Average values are in the first line (grey) and standard deviation in the second line.

River	Code	Q	T	DO	pH	K <sub>25</sub>	Turb	ORP	Chl-a	TSS
Ixcán	M1	274	20.8	8.6	8.1	319	102	328	1.1	108
			<0.1	<0.1	<0.1	<0.1	2	2	0.1	15
Chajul	M2	141	21.3	8.4	8	241	100	333	0.3	113
			<0.1	<0.1	0.1	<0.1	1	6	<0.1	0.0
Lacantún	M3	948	22.2	8.5	8.1	374	100	346	0.4	119
			<0.1	<0.1	<0.1	<0.1	4	16	<0.1	14
Tzendales	M4	173	23.4	8.1	7.9	539	8	355	0.1	16
			<0.1	<0.1	<0.1	<0.1	<1	1	<0.1	<1
Lacantún-Tzendales	M5	1121	22.4	8.4	8.1	383	100	360	0.3	100
			<0.1	<0.1	<0.1	5	5	2	<0.1	24
Chixoy	M6	2625	24.2	6.4	7.7	288	70	346	1.8	96
			<0.1	0.1	<0.1	3	4	3	<0.1	3
La Pasión	M7	1065	25.9	1.6	7.3	319	5	374	1.3	9
			<0.1	0.1	0.1	1	1	27	<0.1	<1
Chixoy-La Pasión	M8	3690	25.1	4	7.4	304	36	403	1.2	58
			0.2	0.6	0.1	11	11	27	0.1	15
Usumacinta (FC)	M9	5715	24.3	5.8	7.7	316	55	357	0.8	76
			<0.1	0.1	<0.1	5	1	9	<0.1	6
Usumacinta (BC)	M10	5970	24.9	6.6	7.8	359	52	428	0.7	71
			<0.1	<0.1	<0.1	<0.1	2	4	<0.1	2
San Pedro	B1	369	27.0	4.6	7.6	737	5	411	4.1	8
			<0.1	<0.1	<0.1	5	<1	2	0.3	1
Usumacinta (BA)	B2	5610	25.2	6.5	7.7	355	46	408	1.4	62
			<0.1	<0.1	<0.1	<0.1	2	3	0.1	8
Usumacinta-San Pedro	B3	5133	25.5	6.3	7.7	399	41	410	1.5	61
			0.2	0.2	<0.1	44	6	4	0.2	9
San Pedro-San Pablo	B4	302	26.6	4.7	7.7	362	46	405	3.5	60
			<0.1	<0.1	<0.1	<0.1	3	1	0.1	4
Usumacinta (TB)	B5	2709	26.7	4.6	7.7	361	45	409	3.4	63
			<0.1	0.1	<0.1	<0.1	11	2	0.1	7
Grijalva (TB)	B6	2618	27.9	1.4	7.3	337	54	381	3.3	82
			<0.1	0.1	0.1	1	17	9	0.1	22
Usumacinta-Grijalva (TB)	B7	5380	27.4	2.8	7.5	357	54	392	4.1	80
			0.4	1.1	0.1	12	19	10	0.1	14
San Pedro-San Pablo	B8	368	27.5	1.9	7.4	394	51	390	3.7	69
			0.1	0.2	<0.1	14	23	4	0.2	20

Q: water discharge (m<sup>3</sup> s<sup>-1</sup>); T: temperature (°C); DO: dissolved oxygen concentration (mg L<sup>-1</sup>); K<sub>25</sub>: electrical conductivity standardized at 25 °C (µS cm<sup>-1</sup>); ORP: oxidoreduction potential (mV); Turb: turbidity (NTU); Chl-a: chlorophyll-a concentration (µg L<sup>-1</sup>); TSS: total suspended solids (mg L<sup>-1</sup>); FC: Frontera Corozal; BC: Boca del Cerro; BA: Balancán; TB: Tres Brazos.

**Table S3.** Summary of the physicochemical variables of the Usumacinta River in the dry season. Average values are in the first line (grey) and standard deviation in the second line.

River	Code	Q	T	DO	pH	K <sub>25</sub>	Turb	ORP	Chl-a	TSS
Ixcán	M1	62	25.9	10.8	8.2	546	44	302	0.3	4
			<0.1	<0.1	<0.1	<0.1	<1	2	<0.1	<1
Chajul	M2	32	28.3	10.6	8.3	346	43	280	0.9	10
			<0.1	<0.1	<0.1	<0.1	1	1	<0.1	<1
Lacantún	M3	224	26.9	9	8.0	593	44	274	0.4	6
			0.1	0.1	<0.1	1	4	2	<0.1	<1
Tzendales	M4	15	27.2	9.6	7.7	920	44	266	0.3	3
			0	0	0	1	1	1	<0.1	1
Lacantún-Tzendales	M5	239	27.5	9.4	8.0	619	44	302	0.5	5
			0.1	<0.1	<0.1	6.3	4	13	<0.1	<1
Chixoy	M6	408	27.5	8.5	8.1	502	65	346	0.9	4
			0.1	<0.1	<0.1	1	3	17	0.4	4
La Pasión	M7	145	29.8	8.1	7.8	913	34	351	0.5	7
			<0.1	0.1	<0.1	0.5	2	5	0.2	<1
Chixoy-La Pasión	M8	553	28.4	8.4	7.9	664	54	365	3.6	33
			<0.1	<0.1	<0.1	6.0	5	4.0	0.1	<1
Usumacinta (FC)	M9	917	27.4	8	8.0	661	49	339	3.7	25
			0	0	0	0	2	15	0.3	3
Usumacinta (BC)	M10	998	28.7	7.7	7.8	767	40	326	2.4	19
			0	0	0	2	2	3	0.1	1
San Pedro	B1	72	28.3	7.7	7.9	1279	51	317	1.4	27
			0	0	0	1	<1	0	0.1	2
Usumacinta (BA)	B2	839	28.4	8.3	8.0	775	42	340	4.3	20
			0.1	0.1	0	0	2	17	0.1	4
Usumacinta-San Pedro	B3	1080	28.5	8.4	8.0	811	41	353	4.4	19
			0.1	0.1	0	19.9	3	25	0.2	2
San Pedro-San Pablo	B4	41	29.1	8.6	8.2	777	44	352	6.7	21
			0	0	0	0	1	2	0.1	<1
Usumacinta (TB)	B5	677	28.9	6.3	7.9	1,326	34	314	6.0	9
			0.5	3	0.2	17612	1	17	0.3	1
Grijalva (TB)	B6	517	28.3	5.8	7.8	23071	36	286	5.0	10
			0.9	1.5	0.1	15815	3	26	0.3	2
Usumacinta-Grijalva (TB)	B7	1048	28.1	5.8	7.8	28418	33	304	3.6	7
			1.0	1.6	0.1	16826	2	13	0.4	5
San Pedro-San Pablo	B8	146	28.0	6.7	7.9	37114	66	302	13.4	11
			0.9	1.2	0.1	17794	43	10	1.3	2

Q: water discharge (m<sup>3</sup> s<sup>-1</sup>); T: temperature (°C); DO: dissolved oxygen concentration (mg L<sup>-1</sup>); K<sub>25</sub>: electrical conductivity standardized at 25 °C (µS cm<sup>-1</sup>); ORP: oxidoreduction potential (mV); Turb: turbidity (NTU); Chl-a: chlorophyll-a concentration (µg L<sup>-1</sup>); TSS: total suspended solids (mg L<sup>-1</sup>); FC: Frontera Corozal; BC: Boca del Cerro; BA: Balancán; TB: Tres Brazos.

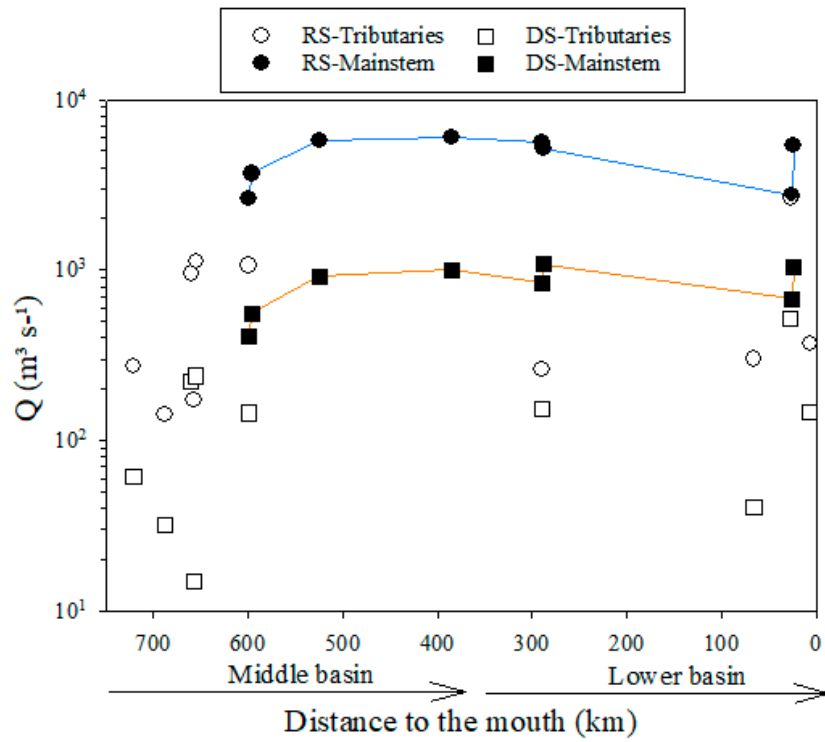
**Table S4.** Average values of C ratios (DOC/POC, POC/Chl-a, DIC/DOC) and percentages (DOC/TOC, POC/TSS) in the Usumacinta River during the rainy (RS) and the dry season (DS).

Code	DOC/POC		DOC/TOC (%)		POC/TSS (%)		POC/Chl-a		DIC/DOC	
	RS	DS	RS	DS	RS	DS	RS	DS	RS	DS
<b>M1</b>	0.6	2.5	38.8	71.6	1.6	8.7	1,617.3	1,056.6	21.5	30.6
<b>M2</b>	0.7	7.0	39.8	87.4	1.8	2.1	7,305.4	242.1	17.1	10.9
<b>M3</b>	0.4	3.6	29.0	78.1	3.2	8.0	9,144.5	941.6	22.2	24.3
<b>M4</b>	1.1	3.4	52.2	77.1	8.0	9.4	10,362.8	1,022.4	33.9	35.1
<b>M5</b>	0.9	3.6	46.1	78.1	2.3	5.3	7,381.8	569.2	15.8	32.7
<b>M6</b>	2.1	1.9	68.7	65.2	1.3	2.4	712.6	1,029.0	8.6	13.1
<b>M7</b>	10.6	4.1	91.4	80.5	4.9	5.1	341.5	746.0	6.6	32.1
<b>M8</b>	3.6	2.1	78.4	67.8	1.8	2.4	884.6	218.3	7.7	21.8
<b>M9</b>	2.6	2.1	72.1	67.2	1.4	3.5	1,372.8	238.1	10.2	15.8
<b>M10</b>	3.1	2.4	75.7	70.3	1.4	3.3	1,309.2	250.8	10.4	26.0
<b>B1</b>	11.1	4.3	91.7	81.3	8.0	2.8	158.2	550.9	4.2	11.5
<b>B2</b>	2.8	1.7	72.8	63.2	1.8	4.7	803.9	216.8	10.0	24.1
<b>B3</b>	3.9	2.2	78.9	68.8	1.3	4.4	556.0	190.5	9.6	21.4
<b>B4</b>	2.7	1.6	72.8	62.1	2.3	5.5	400.2	177.9	8.3	18.4
<b>B5</b>	2.0	2.1	67.0	67.3	2.6	8.8	479.0	131.6	9.1	21.3
<b>B6</b>	2.2	3.4	68.4	77.0	2.9	6.3	729.7	119.9	5.5	15.7
<b>B7</b>	1.8	3.1	64.8	75.6	3.2	7.1	623.1	144.8	6.2	19.3
<b>B8</b>	3.1	2.0	75.5	66.3	3.2	13.4	599.2	108.0	4.4	11.1
<b>Average</b>	3.1	2.9	65.8	72.5	2.9	5.7	2,487.9	441.9	11.7	21.4
<b>S.D.</b>	3.0	1.3	17.7	7.1	2.0	3.0	3,410.4	358.2	7.7	7.7
<b>Minimum</b>	0.4	1.6	29.0	62.1	1.3	2.1	158.2	108.0	4.2	10.9
<b>Maximum</b>	11.1	7.0	91.7	87.4	8.0	13.4	10,362.8	1,056.6	33.9	35.1

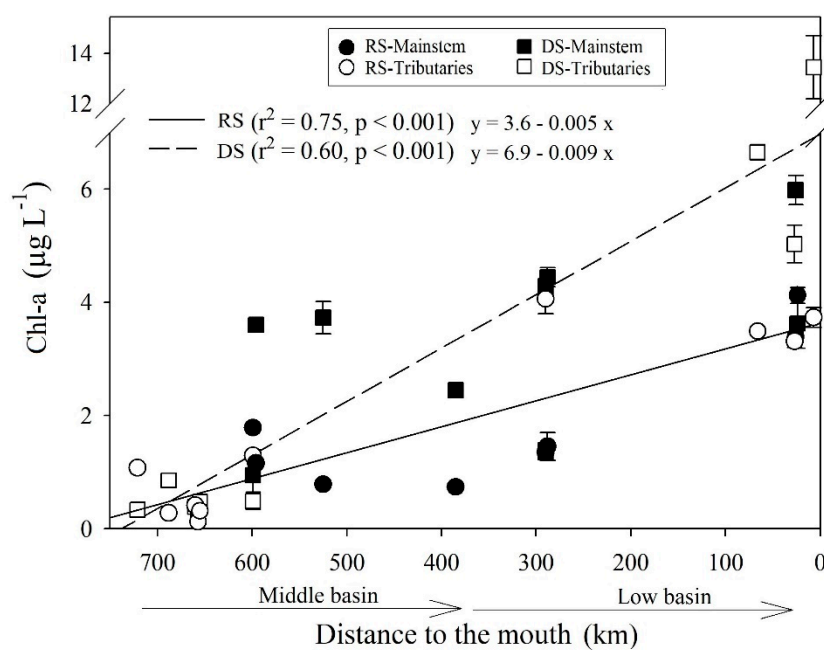
**Table S5.** C fluxes in the Usumacinta River during the rainy and dry seasons. Average values are in the first line (grey) and standard deviation in the second line.

Code	DOC (t d <sup>-1</sup> )		POC (t d <sup>-1</sup> )		TOC (t d <sup>-1</sup> )		DIC (t d <sup>-1</sup> )	
	RS	DS	RS	DS	RS	DS	RS	DS
M1	26.1	4.7	41.2	1.9	67.3	6.5	560.4	142.6
	0.3	0.1	8.9	0.3	8.6	0.4	5.4	6.7
M2	16.3	4.0	24.7	0.6	41.0	4.5	279.2	43.1
	4.2	1.4	7.7	0.0	3.5	1.3	1.3	0.4
M3	126.4	25.1	309.3	7.0	435.7	32.1	2,804.7	611.5
	49.5	1.9	59.5	1.6	64.2	1.4	81.1	4.1
M4	20.8	1.3	19.0	0.4	39.8	1.7	703.8	45.6
	1.0	0.2	0.8	0.0	1.0	0.2	2.6	3.7
M5	192.0	19.8	224.4	5.6	416.4	25.4	3,041.2	647.3
	5.5	2.3	70.5	0.5	62.1	1.2	563.8	11.6
M6	617.0	64.1	288.3	34.2	898.4	98.3	5,301.6	840.7
	33.6	7.6	58.1	5.9	76.9	5.8	350.1	114.6
M7	431.0	18.8	40.6	4.6	471.6	23.4	2,864.8	604.3
	20.1	2.6	5.0	0.7	10.5	1.6	227.0	3.6
M8	1184.8	79.2	326.3	37.5	1511.1	116.7	9128.6	1726.0
	155.6	11.2	28.6	8.2	132.5	7.5	301.1	72.1
M9	1373.2	144.3	530.7	70.3	1904.0	214.6	13992.6	2278.6
	127.3	40.3	73.5	6.8	83.9	39.8	458.9	132.6
M10	1549.0	124.8	497.7	52.8	2046.8	177.7	16073.4	3240.4
	68.9	27.9	27.8	2.8	98.8	18.6	143.0	112.7
B1	226.7	20.4	20.5	4.7	247.2	25.1	954.2	233.6
	10.3	2.5	1.2	0.1	9.2	2.4	13.9	3.1
B2	1461.8	115.9	526.4	67.4	2007.4	183.3	14617.0	2798.2
	75.4	5.9	203.6	8.9	169.8	16.3	460.4	3.3
B3	1412.1	174.3	358.0	79.0	1790.8	253.3	13565.5	3728.7
	261.9	38.1	74.9	7.5	274.7	27.9	60.7	66.0
B4	97.3	6.8	36.4	4.2	133.7	11.0	803.4	125.5
	1.6	0.4	0.4	0.9	2.0	0.5	0.0	5.3
B5	771.8	94.6	380.0	46.0	1,151.8	140.6	6,988.9	2,018.0
	61.5	17.3	125.7	10.7	95.1	7.9	60.6	197.3
B6	1183.5	90.2	546.3	26.9	1729.7	117.1	6567.6	1416.4
	79.6	13.0	98.8	2.9	97.4	13.2	241.2	2.7
B7	2198.8	146.9	1192.9	47.5	3391.8	194.4	13557.9	2830.2
	323.6	20.3	466.6	8.3	788.8	17.4	86.9	204.6
B8	219.7	36.0	71.2	18.3	290.9	54.3	970.4	398.5
	27.7	6.5	14.5	2.1	15.9	2.3	4.1	19.6
Average	737.4	65.1	304.2	28.3	1043.6	93.3	6265.3	1318.3
S.D.	689.7	57.5	298.3	26.9	967.5	83.7	5745.6	1220.6
Minimum	16.3	1.3	19.0	0.4	39.8	1.7	279.2	43.1
Maximum	2198.8	174.3	1192.9	79.0	3391.8	253.3	16073.4	3728.7

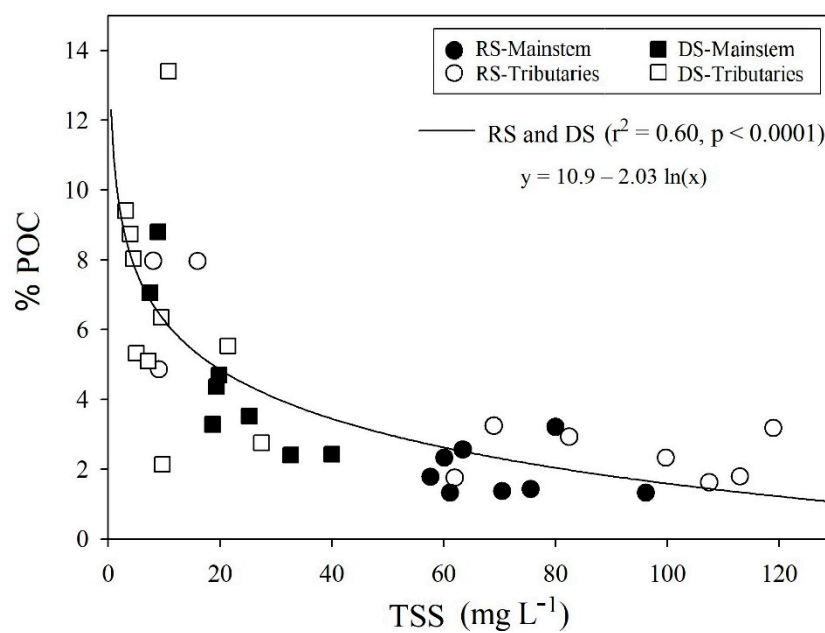
**Figure S1.** Discharge variation along the Usumacinta River during the rainy and dry seasons. The blue and orange lines represent the main channel in the RS and DS, respectively. The mainstem differs in both seasons from the tributaries.



**Figure S2.** Chlorophyll-a concentrations ( $\pm$  S.D.) along the Usumacinta River during the rainy (RS) and dry (DS) seasons. The mainstem differs in both seasons from the tributaries.

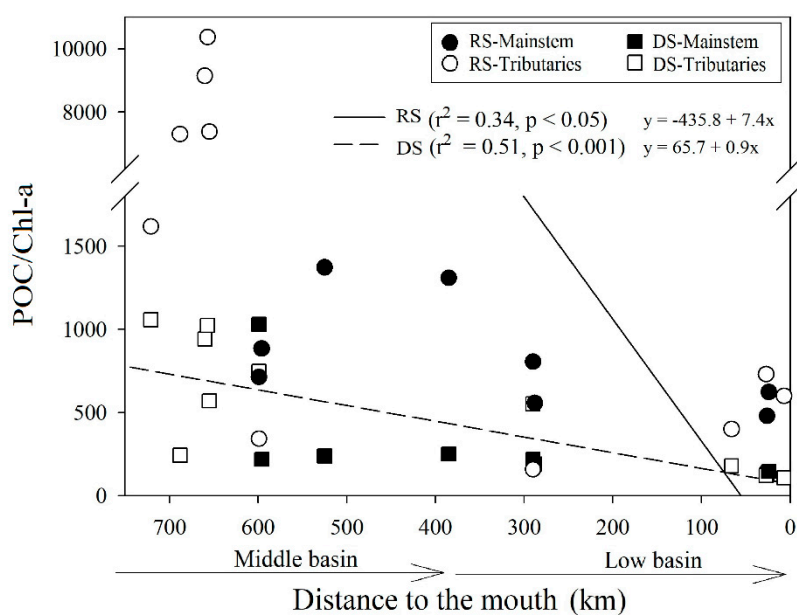


**Figure S3.** Adjustment of the percentage of POC (%) contained in the TSS concerning the TSS concentration of the Usumacinta River in the rainy (RS) and dry (DS) seasons. The mainstem differs in both seasons from the tributaries.

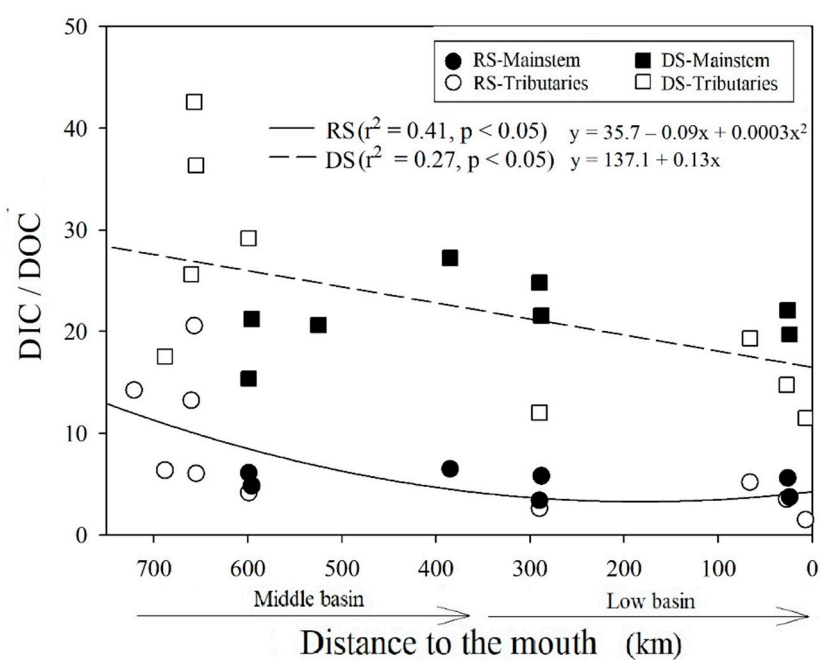




**Figure S4.** Longitudinal variation of the POC/Chl-a ratio with respect to distance from the mouth of the Usumacinta River during the rainy (RS) and dry (DS) seasons. The mainstem differs in both seasons from the tributaries.



**Figure S5.** Longitudinal variation of the DIC/DOC ratio with respect to distance from the mouth of the Usumacinta River during the rainy (RS) and dry (DS) seasons. The mainstem differs in both seasons from the tributaries.



**Figure S6.** PIC adjustment regarding total suspended sediments concentration of the Usumacinta River in the rainy (RS) and dry (DS) seasons. The mainstem differs in both seasons from the tributaries.

