

Table S4: Overview of TA, DIC, $\delta^{13}\text{C}_{\text{DIC}}$, major elements (Ca, Mg, DSi), pCO_2 , CH_4 and N_2O concentrations, CO_2 and CH_4 fluxes and K600 for the different sampling sites during the wet season sampling campaign of 2012.

River	Station ID	TA [mmol L ⁻¹]	DIC [mmol L ⁻¹]	$\delta^{13}\text{C}_{\text{DIC}}$ [‰]	Ca	Mg [μM]	DSi	pCO_2 [ppm]	CH_4 [nmol L ⁻¹]	N_2O	CO_2 flux [mg C m ⁻² d ⁻¹]	CH_4 flux	K600 [cm h ⁻¹]
Zambezi mainstem													
Zambezi River	ZBZ.1	0.140	0.198	-13.8	28.3	25.5	139.9	1056	457	6.9	1534		5.2
Zambezi River	ZBZ.2	0.128	0.209	-12.9	31.7	16.6	113.5	2444	149	6.4	1592		1.7
Zambezi River	ZBZ.3	0.836	0.881	-11.6	253.0	130.3	173.8	1968	342	6.2	3286		4.6
Zambezi River	ZBZ.4												
Zambezi River	ZBZ.5	0.573	0.706	-8.5	172.3	83.9	208.6	7650	1020	4.1	12511		3.8
Zambezi River	ZBZ.6	0.608	0.677	-6.9	189.9	84.6	240.0	1890	447	6.2	553		0.8
Zambezi River	ZBZ.7	0.656	0.854	-7.0	202.5	92.2	252.0	6307	2336	5.0	3094		1.1
Zambezi River	ZBZ.8	0.676	0.764	-6.2	198.4	95.5	259.9	2500	224	5.8	1434		1.5
Zambezi River	ZBZ.9	0.666	0.683	-5.0	189.8	93.8	258.6	642	7	6.3	281		2.9
Zambezi River	ZBZ.10												
Zambezi River	ZBZ.11	0.849	0.929	-7.0	233.8	112.7	187.2	2008	240	8.5	2823		3.9
Zambezi River	ZBZ.12	1.171	1.202	-6.6	315.9	192.8	215.2	1228	144	6.9	1289		3.5
Zambezi River	ZBZ.13	1.096	1.105	-5.8	311.4	164.1	212.7	888	354	5.9	256		1.3
Zambezi River	ZBZ.14	1.15	1.191	-4.35	311.1	175.1	234.6	1802	370	8.0	1502		2.3
Zambezi River	ZBZ.15	1.16	1.172	-3.90	313.1	168.8	229.4	814	243	8.1	198		1.1
Zambezi River	ZBZ.16	1.16	1.157	-3.69	310.4	169.0	232.9	559	136	7.9	281		4.5
Zambezi River	ZBZ.17	1.19	1.214	-3.54	319.9	171.5	231.3	1204	2394	7.7	540		1.5
Zambezi River	ZBZ.18	1.95	2.249	-3.28	394.0	267.4	185.2	8181	1350	5.3	13384		3.8
Zambezi River	ZBZ.19	1.37	1.403	-3.17	339.3	195.0	223.3	1789	687	7.6	11150		
Zambezi River	ZBZ.20	1.41	1.444	-3.12	343.3	201.2	217.7	1612	313	7.9	3343		6.1
Tributaries													
Kafue River	KAF.1	0.93	1.027	-8.10	281.5	211.9	158.6	3945	263	6.1			
Kafue River	KAF.2	0.84	0.910	-8.29	332.4	206.9	166.3	2806	224	6.7	8688		7.9
Kafue River	KAF.3	1.15	1.179	-6.34	509.0	337.1	191.8	1830	367	5.8	2218		3.4
Kafue River	KAF.4	1.35	1.430	-4.62	481.6	322.0	207.4	3972	327	5.0	3062		1.9
Kafue River	KAF.5	1.49	1.531	-6.31	505.0	293.7	223.1	1858	252	6.0	440		0.7
Kafue River	KAF.6	1.57	1.572	-5.46	568.9	328.7	233.3	904	30	6.4	767		3.5
Kafue River	KAF.7	1.61	1.645	-5.19	569.6	349.5	231.5	1620	735	6.1	339		0.6
Kafue River	KAF.8	1.90	2.081	-5.80	591.6	367.9	321.1	9985	992	3.9	2876		0.7
Kafue River	KAF.9	2.00	2.214	-6.17	634.3	369.0	325.3	9769	651	6.1	2845		0.7
Kafue River	KAF.10	1.98	1.987	-5.39	610.8	374.3	313.2	1357	207	7.0	884		2.1
Kabompo River	KAB.1	0.235	0.295	-11.5	53.1	31.2	187.2		246	7.0			

Kabompo River	KAB.2											
Luangwa River	LUA.1											
Luangwa River	LUA.2	1.15	1.168	-8.37	261.7	139.2	321.2	1305	286	7.9		
Luangwa River	LUA.3	1.03	1.047	-8.42	238.1	108.1	284.7	1227	277	7.8	863	2.4
Luangwa River	LUA.4	0.771	0.810	-10.4	156.1	85.7	265.7	1469	166	6.5	867	1.8
Luangwa River	LUA.5	0.90	0.917	-8.10	222.5	100.3	289.7	1201	127	7.9		
Lunsewma River	LUNSE.1	0.72	0.796	-8.13	151.4	127.0	226.6	2952	422	7.6	3193	2.7
Lunsewma River	LUNSE.2	0.84	0.874	-7.00	189.9	140.7	240.3	1523	373	8.3	3140	6.2
Lunga River	LUN.1	1.72	1.821	-10.28	433.9	379.3	221.1	2621	541	6.5	5098	4.9
Lunga River	LUN.2	1.89	2.045	-8.64	618.0	303.2	223.3	4465	414	5.3	2037	1.1
Lunga River	LUN.3	1.88	1.937	-9.12	571.1	324.2	244.6	2460	307	6.1	3483	3.7
Mazoe River	MAZ.											
Shire River	SH.	2.19	2.576	-3.37	416.2	294.5	172.3	12698	849	3.4	20536	3.6
Reservoirs												
Kariba	KAR.1	0.871	0.865	-3.5	242.7	119.2	198.7		202	6.4	-248	1.3
Kariba	KAR.2	0.855	0.451	-3.6	197.6	80.7	182.2	356	212	6.1	-68	1.9
Kariba	KAR.3	0.835	0.825	-3.2	239.7	116.2	194.8	370	34	6.5	-70	2.7
Cabora Bassa	C.B.1	1.12	1.095	-2.67	315.4	168.7	210.2	168	78	8.0	-377	3.2
Cabora Bassa	C.B.2	1.13	1.146	-4.15	315.1	162.4	217.4	342	29	8.4		
Cabora Bassa	C.B.3											
Itezhi Tezhi	ITT.1	1.40	1.429	-5.79	491.0	278.3	235.5	1813	37	6.7	644	1.0
Itezhi Tezhi	ITT.2	1.50	1.498	-4.93	538.7	307.8	233.3	842	61	6.7	420	2.3
Itezhi Tezhi	ITT.3	1.62	1.610	-4.40	562.4	357.4	226.1	735	89	6.8	266	1.9