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Supplement of

Riverine carbon export in the arid to semiarid Wuding River catchment on the Chinese Loess Plateau

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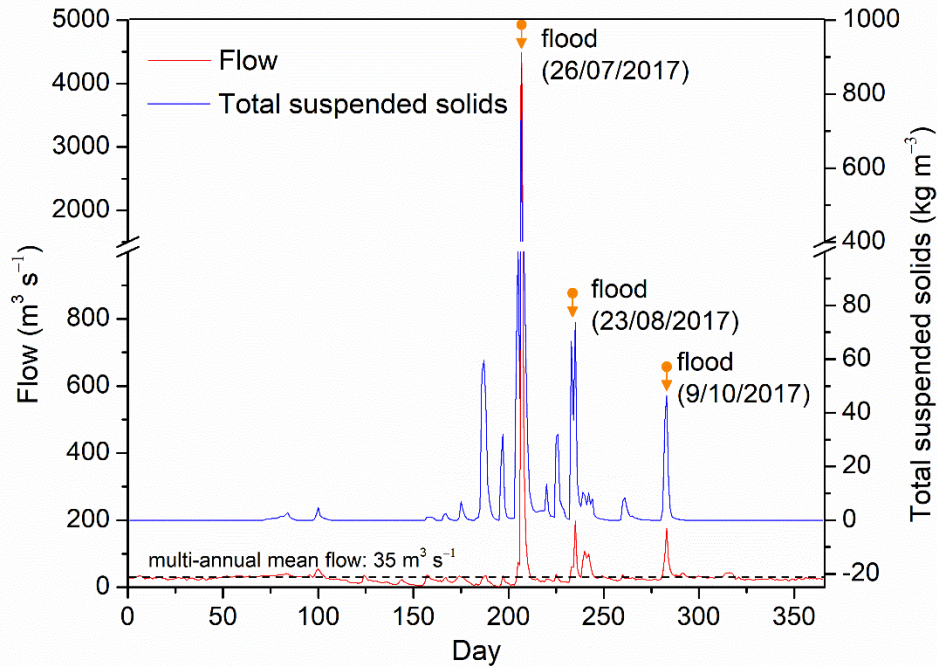


Figure S1. Spontaneous flow discharge and total suspended solids in the Wuding River at Baijiachuan gauge in 2017. The duration started from 1 January until 31 December 2017. The extreme flood on 25-26 July with the maximum daily rainfall of 203 mm and a spontaneous discharge of $4490 \text{ m}^3 \text{ s}^{-1}$ is a 200-year event (source: <http://www.sxmb.gov.cn/s.php/yulin>). Our conservative estimate suggests that the three floods (shown in the figure) in the wet season transported approximately 46% of the annual carbon flux.

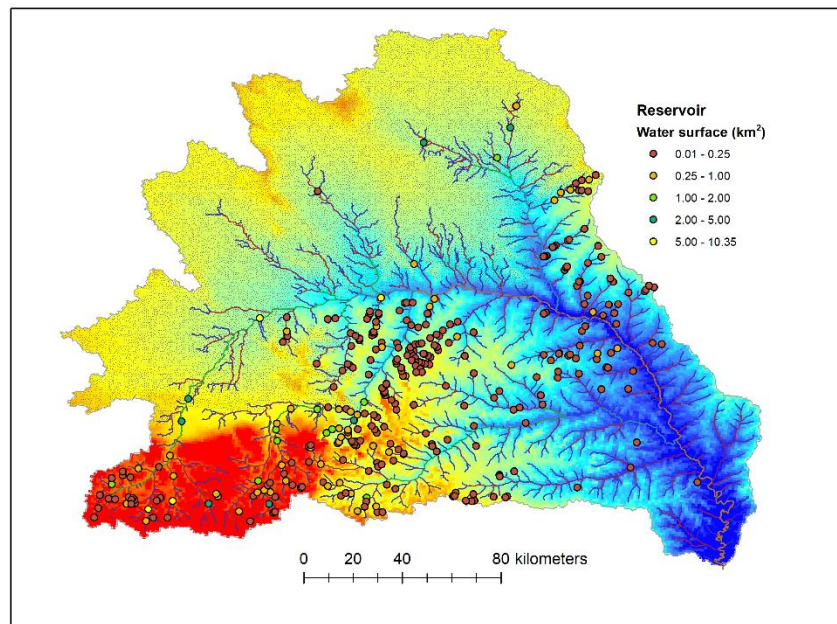


Figure S2. Spatial location of the 337 check dam-formed reservoirs within the Wuding River catchment.

Table S1. POC% in suspended sediments (dry weight) in spring, summer, and autumn within the Wuding River catchment in 2015 (n.d. denotes no data).

Site	E (°)	N (°)	POC% (spring/summer/autumn)	Site	E (°)	N (°)	POC% (spring/summer/autumn)
Site 1	109.6704	38.7150	0.52 / 0.44 / 0.57	Site 31	109.202911	37.731611	1.72 / 0.38 / 0.45
Site 2	109.6519333	38.5394833	0.59 / n.d. / 0.51	Site 32	109.913062	37.723534	1.14 / 0.51 / 0.65
Site 3	109.572779	38.59416	0.37 / 0.29 / 0.48	Site 33	109.642591	38.531045	n.d. / 0.44 / 0.88
Site 4	109.586677	38.616434	0.78 / 0.42 / 0.65	Site 34	109.761716	37.651897	n.d. / 0.41 / 0.44
Site 5	109.280033	37.91626	0.84 / 0.57 / 0.82	Site 35	109.574101	38.50211	0.71 / 0.39 / 0.84
Site 6	109.204611	37.756443	1.05 / 0.75 / 0.58	Site 36	109.620762	38.488028	0.31 / 0.37 / 0.45
Site 7	109.204482	37.755505	0.88 / 0.38 / 0.55	Site 37	109.015674	38.036713	0.49 / 0.42 / 0.28
Site 8	109.12282	37.691243	0.74 / 0.53 / 0.42	Site 38	109.019899	38.023019	0.81 / 0.36 / 0.87
Site 9	109.963279	37.657502	1.35 / 0.72 / 0.64	Site 39	109.044785	37.963968	0.95 / 0.43 / 0.74
Site 10	109.934874	37.688188	0.89 / 0.47 / 0.65	Site 40	109.170892	38.096652	0.64 / 0.31 / 0.53
Site 11	109.929881	37.707845	1.14 / 0.49 / 0.78	Site 41	109.848753	37.604823	0.96 / 0.38 / 0.81
Site 12	109.8936667	37.762965	1.37 / 0.51 / 0.77	Site 42	109.535868	37.555864	0.79 / 0.37 / 0.92
Site 13	109.843565	38.105545	n.d. / 0.58 / 0.41	Site 43	109.788402	37.627569	0.87 / 0.46 / 0.98
Site 14	109.6684	38.7134	0.88 / 0.49 / 0.46	Site 44	109.677892	38.4444	0.65 / 0.39 / 1.02
Site 15	109.586627	38.585814	0.93 / 0.50 / 0.70	Site 45	109.770647	38.128133	0.92 / 0.36 / 0.78
Site 16	109.033164	37.962789	0.56 / 0.46 / 0.79	Site 46	109.82468	38.000788	1.25 / 0.39 / 0.58
Site 17	109.033164	37.962789	1.28 / 0.59 / 0.76	Site 47	109.068546	38.020439	n.d. / 0.41 / 0.64
Site 18	109.208739	37.719403	0.41 / n.d. / 0.68	Site 48	109.201555	37.803375	0.63 / 0.29 / 0.68
Site 19	109.212468	37.714357	0.49 / 0.65 / 0.85	Site 49	109.152867	37.739736	1.35 / 0.38 / 0.63
Site 20	109.872779	37.745172	0.84 / 0.55 / 0.91	Site 50	109.12282	37.691243	0.98 / 0.49 / 0.59
Site 21	109.902658	37.737476	0.93 / 0.52 / 0.74	Site 51	110.001214	37.625839	1.17 / n.d. / 0.67
Site 22	109.896515	37.747859	0.76 / 0.31 / 0.56	Site 52	109.963279	37.657502	0.89 / 0.36 / 1.42
Site 23	109.811722	38.083644	n.d. / 0.33 / 0.54	Site 53	109.758937	38.02164	0.62 / 0.36 / 0.55
Site 24	109.843565	38.105545	n.d. / 0.37 / 0.48	Site 54	109.617308	38.034026	0.88 / 0.44 / 0.82
Site 25	109.6423	38.5111	0.56 / 0.43 / 0.42	Site 55	109.991145	37.951565	1.36 / 0.55 / 0.98
Site 26	109.657208	38.493477	0.94 / 0.44 / 0.50	Site 56	110.136182	37.80883	1.34 / 0.46 / 0.84
Site 27	109.633408	38.507959	0.78 / 0.37 / 1.14	Site 57	110.307521	37.446976	1.60 / 0.41 / 1.18
Site 28	109.50634	38.513226	0.88 / 0.39 / 0.64	Site 58	110.364369	37.374946	1.66 / 0.48 / 0.58
Site 29	109.617308	38.034026	0.79 / 0.58 / 0.61	Site 59	110.405976	37.294277	1.08 / 0.45 / 0.51
Site 30	109.186599	37.769123	0.70 / 0.47 / 1.04	Site 60	110.46104	37.27201	n.d. / 0.35 / n.d.

Table S2. Monthly carbon sampling results at the Wuding River catchment outlet Baijiachuan gauge in 2017. Note: the daily average discharge in 2015 on the same days as in 2017 is also presented here (n.d. denotes no data).

Date (mm/dd)	Flow discharge (m ³ /s)		DOC	DIC	POC
	Year 2015	Year 2017	mg/L	mg/L	%
01/20	25	24.5	2.66	36	0.47
02/20	34.3	32.5	2.9	31.2	0.62
03/20	40.1	36.6	3.55	41.4	0.69
04/20	26.4	24.6	3.54	42	0.64
05/20	11.5	8.23	3.68	42.6	0.68
06/20	5.25	16.0	3.66	37.8	1.16
07/22	50.2	6.85	3.51	46.2	0.64
07/26	11.6	1760.0	5.22	n.d.	0.15
08/23	17.6	198.0	5.07	46.8	0.46
09/20	25.8	26.6	3.47	33.6	0.72
10/20	23.9	34.5	2.9	39	0.49
11/20	49.4	22.2	2.79	34.2	0.53
12/20	19.6	23.2	2.73	36.6	0.69

Table S3. Sediment POC% (dry weight) behind the four investigated check dams within the Wuding River catchment.

Site S1		Site S2		Site S3		Site S4	
E: 109.5921° N: 38.56712°		E: 109.0996° N: 37.61303°		E: 109.8397° N: 37.58147°		E: 109.1789° N: 37.87671°	
0 cm	0.255	12.5 cm	0.306	0 cm	0.443	12.5 cm	0.438
20 cm	0.505	37.5 cm	0.139	20 cm	0.503	37.5 cm	0.366
40 cm	0.225	62.5 cm	0.187	40 cm	0.495	62.5 cm	0.483
60 cm	0.155	87.5 cm	0.151	60 cm	0.113	87.5 cm	0.506
80 cm	0.385	112.5 cm	0.13	80 cm	0.112	112.5 cm	0.277
100 cm	0.12	137.5 cm	0.226	100 cm	0.109	137.5 cm	0.367
120 cm	0.175	162.5 cm	0.117	120 cm	0.12	162.5 cm	0.307
140 cm	0.175	187.5 cm	0.152	140 cm	0.08	187.5 cm	0.339
160 cm	0.155	212.5 cm	0.151	160 cm	0.105	212.5 cm	0.231
180 cm	0.13	237.5 cm	0.15	180 cm	0.2	237.5 cm	0.178
200 cm	0.163	262.5 cm	0.134	200 cm	0.11	262.5 cm	0.142
220 cm	0.197	287.5 cm	0.128	220 cm	0.1	287.5 cm	0.177
240 cm	0.183	312.5 cm	0.119	240 cm	0.14	312.5 cm	0.266
260 cm	0.21	337.5 cm	0.159	260 cm	0.125	337.5 cm	0.208
280 cm	0.164	362.5 cm	0.181	280 cm	0.13	362.5 cm	0.26
300 cm	0.156	387.5 cm	0.121	300 cm	0.14	387.5 cm	0.225
320 cm	0.18	412.5 cm	0.087	320 cm	0.14	412.5 cm	0.234
340 cm	0.188	437.5 cm	0.115	340 cm	0.1	437.5 cm	0.255
360 cm	0.165	462.5 cm	0.113	360 cm	0.125	462.5 cm	0.209
380 cm	0.213	487.5 cm	0.221	380 cm	0.11	487.5 cm	0.213
400 cm	0.167	512.5 cm	0.103	400 cm	0.115	512.5 cm	0.281
		537.5 cm	0.139			537.5 cm	0.245
		562.5 cm	0.195			562.5 cm	0.259
		587.5 cm	0.124			587.5 cm	0.122

Table S4. Water surface area of the Wuding River drainage network (expressed as mean±standard deviation; SD).

Stream order (SO)	Sandy subcatchment			Loess subcatchment			Wuding catchment			%total
	Spring (km ²)	Summer (km ²)	Autumn (km ²)	Spring (km ²)	Summer (km ²)	Autumn (km ²)	Spring (km ²)	Summer (km ²)	Autumn (km ²)	
1	2.33±1.38	2.33±1.36	2.5±0.96	6.63±4.33	5.05±4.61	5.63±4.41	8.93±5.67	7.38±5.83	8.12±5.26	20%
2	1.7±0.77	1.33±0.98	2.48±2.05	2.65±0.87	1.73±0.82	3.04±1.52	4.2±1.53	2.83±1.59	5.06±3.14	10%
3	1.45±1.1	1.37±0.96	2.15±1.98	1.14±0.14	1.84±1.56	1.28±0.5	2.8±2.11	3.26±2.38	3.81±3.88	8%
4	1.45±0.82	1.39±0.95	1.38±0.29	2.51±0.07	2.19±1.32	1.6±0.92	3.7±1.65	3.5±2.13	3.04±1.12	9%
5	0.55±0.09	0.78±0.03	0.79±0.07	3.11±3.36	3.2±4.42	3.13±4.06	3.77±4.12	4.01±5.18	4±4.88	10%
6	5.03	5.01	4.79	13.9±4.94	10.69±7.84	12.41±4.99	18.88±8.66	15.24±11.47	16.82±8.42	43%
Total	12.9			27.2			40.1			
%total	32%			68%			100%			