

Supplement of Biogeosciences, 12, 4831–4840, 2015
<http://www.biogeosciences.net/12/4831/2015/>
doi:10.5194/bg-12-4831-2015-supplement
© Author(s) 2015. CC Attribution 3.0 License.



Supplement of

Ground cover rice production systems increase soil carbon and nitrogen stocks at regional scale

M. Liu et al.

Correspondence to: S. Lin (linshan@cau.edu.cn)

The copyright of individual parts of the supplement might differ from the CC-BY 3.0 licence.

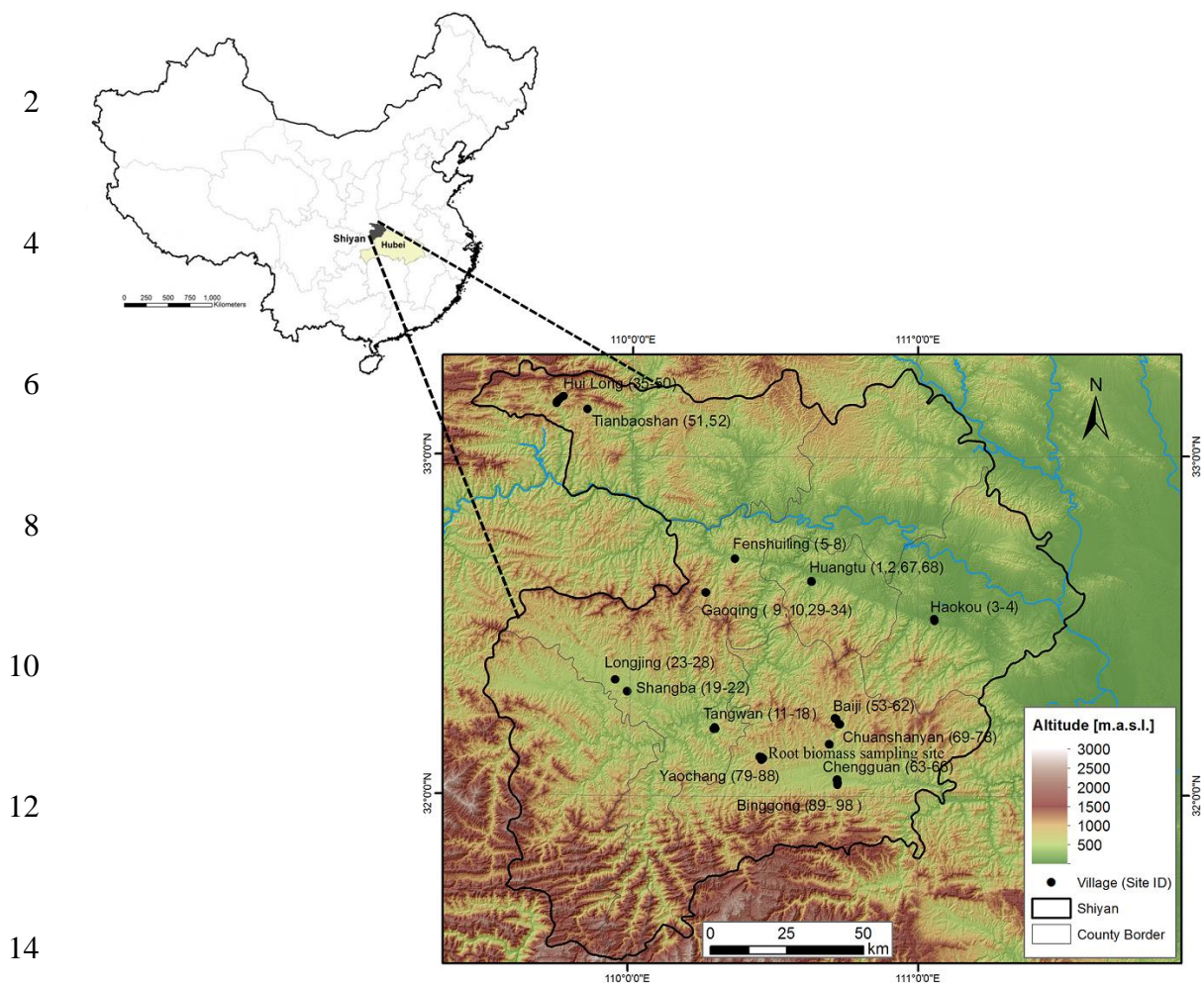


Figure S1 Map of Shiyan, Hubei province in Central China, showing the location of the ground cover rice production system (GCRPS) areas with paired traditional Paddy cultivation system. The number ranges indicate sampling sites both for GCRPS and Paddy systems (see also Table S1).

Table S1

Geographical information and soil types of all 49 paired sampling fields of ground cover rice production system (GCRPS) and Paddy cultivation systems.

Pair number	County	Township	Village	Householder		Latitude N	Longitude E	Latitude N	Longitude E	Altitude (m)		Soil type
				GCRPS	Paddy	GCRPS	GCRPS	Paddy	Paddy	GCRPS	Paddy	
1	Shiyan	Zhangwan	Huangtu	Zhang Dehua	Zhang Huibing	32°38,063'	110°37,716'	32°38,043'	110°37,767'	216	224	Dystric Cambisols
2	Shiyan	Zhangwan	Huangtu	Qin Shengfu	Qin Shengyan	32°37,958'	110°37,793'	32°37,938'	110°37,755'	248	256	
3	Danjingkou	Liuliping	Haokou	Li Yugen	Ming Pinghe	32°31,404'	111°03,387'	32°31,045'	111°03,491'	169	186	Dystric Cambisols
4	Yun	Baoxia	Fenshuiling	Dong Huanquan	Yan Keren	32°41,959'	110°21,707'	32°41,978'	110°21,675'	350	352	Haplic Luvisols
5	Yun	Baoxia	Fenshuiling	Liang Xinjun	Lei Renbao	32°41,974'	110°21,697'	32°41,948'	110°21,682'	350	352	
6	Yun	Baoxia	Gaoqiao	He Xianchun	He Xiangen	32°35,972'	110°15,668'	32°35,946'	110°15,704'	650	649	Dystric Regosols
7	Zhushan	Wenfeng	Tangwan	Su Hengshan	Wen Shilin	32°11,926'	110°17,834'	32°11,896'	110°17,802'	438	449	Haplic Luvisols
8	Zhushan	Wenfeng	Tangwan	Su Hengshan	Su Henglin	32°12,009'	110°17,783'	32°12,014'	110°17,778'	436	436	
9	Zhushan	Wenfeng	Tangwan	Su Hengtai	Su Henglin	32°12,047'	110°17,748'	32°12,131'	110°17,662'	419	447	
10	Zhushan	Wenfeng	Tangwan	Yang Yingyi	Gan Shibing	32°11,882'	110°17,495'	32°11,870'	110°17,492'	427	452	Calcaric Regosols
11	Zhushan	Baofeng	Shangba	Zhang Xianshe	Zhang Shizhong	32°18,406'	109°59,418'	32°18,438'	109°59,361'	426	424	
12	Zhushan	Baofeng	Shangba	Wang Daming	Liu Zhenhua	32°18,408'	109°59,422'	32°18,396'	109°59,387'	426	425	
13	Zhushan	Baofeng	Longjing	Li Daolin	Zhu Shijun	32°20,460'	109°56,865'	32°20,457'	109°56,922'	502	508	Haplic Luvisols
14	Zhushan	Baofeng	Longjing	Zhang Zugen	Li Daolin	32°20,456'	109°56,866'	32°20,496'	109°56,835'	500	503	
15	Zhushan	Baofeng	Longjing	Du Xiangmei	Li Daolin	32°20,484'	109°56,874'	32°20,485'	109°56,840'	505	504	
16	Yun	Baoxia	Gaoqiao	Wang Yongcheng	Zhan Shiyong	32°35,963'	110°15,636'	32°35,968'	110°15,633'	652	652	Dystric Regosols
17	Yun	Baoxia	Gaoqiao	Yu Benqing	Xie Huali	32°35,970'	110°15,672'	32°35,954'	110°15,702'	650	649	
18	Yun	Baoxia	Gaoqiao	Yu Benxing	Zhan Shili	32°35,958'	110°15,671'	32°35,948'	110°15,687'	650	649	
19	Yunxi	Guanfang	Huilong	Zhu Rongyu	Zhu Xingwu	33°09,264'	109°44,013'	33°09,273'	109°44,017'	539	539	Haplic Luvisols
20	Yunxi	Guanfang	Huilong	Kai Cailiang	Zhu Ronglan	33°09,210'	109°44,009'	33°09,201'	109°44,004'	529	527	

21	Yunxi	Guanfang	Huilong	Zhu Rongyu	Kang Caixian	33 °09,530'	109 °44,181'	33 °09,519'	109 °44,181'	567	570	
22	Yunxi	Guanfang	Huilong	Ming Lizheng	Zhu Xinghou	33 °09,592'	109 °44,241'	33 °09,467'	109 °44,121'	558	567	
23	Yunxi	Guanfang	Huilong	Zhong Xiumei	Liu Xiangcheng	33 °10,422'	109 °45,475'	33 °10,417'	109 °45,466'	656	656	
24	Yunxi	Guanfang	Huilong	Xie Changquan	Liu Xiangcheng	33 °10,425'	109 °45,444'	33 °10,420'	109 °45,467'	656	656	
25	Yunxi	Guanfang	Huilong	Zhu Donggen	Zhu Qinghe	33 °10,426'	109 °45,410'	33 °10,422'	109 °45,399'	661	649	
26	Yunxi	Guanfang	Huilong	Peng Jinao	Zhu Xingzhi	33 °09,946'	109 °44,605'	33 °09,341'	109 °44,075'	584	546	
27	Yunxi	Dianzi	Tianbaoshan	Xie Yonggui	Zhang Hejun	33 °08,215'	109 °50,498'	33 °08,211'	109 °50,507'	585	585	Haplic Luvisols
28	Fang	Tucheng	Baiji	Kuang Jianwen	Wu Meiqing	32 °13,835'	110 °42,727'	32 °13,73'	110 °42,990'	600	590	
29	Fang	Tucheng	Baiji	Yang Wanying	Yu Xingli	32 °13,840'	110 °42,727'	32 °13,758'	110 °42,919'	600	595	
30	Fang	Tucheng	Baiji	Li Ruwu	Sun Xueyu	32 °13,849'	110 °42,729'	32 °13,748'	110 °42,822'	599	598	Dystric Regosols
31	Fang	Tucheng	Baiji	Liu Yunhua	Yu Lichun	32 °13,774'	110 °42,875'	32 °13,722'	110 °42,998'	595	589	
32	Fang	Tucheng	Baiji	Lu Ruhua	Li Daxi	32 °13,766'	110 °42,825'	32 °13,757'	110 °42,793'	596	599	
33	Fang	Yaohuai	Yaochang	Zou Hongquan	Zhu Danfen	32 °06,725'	110 °27,758'	32 °06,987'	110 °27,093'	621	597	
34	Fang	Yaohuai	Yaochang	Zhou Facai	Lu Dinghua	32 °06,729'	110 °27,762'	32 °06,940'	110 °27,166'	622	593	
35	Fang	Yaohuai	Yaochang	Zhang Chenghua	Wang Jie	32 °06,42.4'	110 °27,45.0'	32 °06,940'	110 °27,168'	618	593	Dystric Cambisols
36	Fang	Yaohuai	Yaochang	Xia Jincheng	Wu Jifang	32 °06,926'	110 °27,467'	32 °06,967'	110 °27,074'	617	598	
37	Fang	Yaohuai	Yaochang	Long Chuanxi	Lu Lixian	32 °06,896'	110 °27,557'	32 °06,930'	110 °27,173'	607	593	
38	Fang	Chengguan	Binggong	Li Wenyun	Ji Taifa	32 °02,342'	110 °43,333'	32 °02,396'	110 °43,340'	466	460	
39	Fang	Chengguan	Binggong	Che Haizhao	Zheng Huifu	32 °02,338'	110 °43,313'	32 °02,409'	110 °43,279'	466	458	
40	Fang	Chengguan	Binggong	Che Youju	Xu Qiang	32 °02,337'	110 °43,307'	32 °02,375'	110 °43,298'	467	462	Eutric Gleysols
41	Fang	Chengguan	Binggong	Du Deyong	Li Wenyun	32 °02,340'	110 °43,328'	32 °02,413'	110 °43,297'	466	459	
42	Fang	Chengguan	Binggong	Yu Xingzhong	Xu Lianmin	32 °02,376'	110 °43,329'	32 °02,380'	110 °43,347'	462	462	
43	Fang	Chengguan	Erlanggang	Wang Xia	Liu Ming	32 °02,986'	110 °43,185'	32 °02,987'	110 °43,202'	433	433	
44	Fang	Chengguan	Erlanggang	He Mingzu	Zhang Bin	32 °02,963'	110 °43,151'	32 °02,990'	110 °43,289'	435	430	Eutric Gleysols
45	Fang	Tucheng	Chuanshanyan	Xiao Longgui	Wang Qingshan	32 °12,767'	110 °43,708'	32 °12,827'	110 °43,680'	574	578	Dystric Regosols

46	Fang	Tucheng	Chuanshanyan	Chen Qinghua	Chen Qinglin	32 °12,760'	110 °43,720'	32 °12,800'	110 °43,567'	573	571
47	Fang	Tucheng	Chuanshanyan	Chen Qingping	Chen Qinghe	32 °12,74'	110 °43,778'	32 °12,789'	110 °43,560'	576	570
48	Fang	Tucheng	Chuanshanyan	Wang Guoyun	Zhang Qinghua	32 °12,790'	110 °43,782'	32 °12,765'	110 °43,558'	575	570
49	Fang	Tucheng	Chuanshanyan	Chen Qingming	Gong Juxian	32 °12,762'	110 °43,817'	32 °12,762'	110 °43,553'	580	570

Table S2

Standardized information obtained for sampled sites

Standardized farmer questionnaires

Code No. of sampling

Name of sampling person

Date of sampling

County name

Township

Village

Household

Coordinate

Altitude

Cultivation type

Rice cultivar

Inter plant distance and row space

Number of years under continuous cultivation

Grain yield from last year

Type and amount of organic fertilizer

Type and amount of inorganic fertilizer

Additional information

Table S3

P-values for the variance analysis on the percentage change of SOC/N stocks between GCRPS and Paddy systems for the 0-90 cm soil depth. The factors analysed were soil type with years (Yr) since conversion from traditional Paddy cultivation to GCRPS and soil type with elevation (Ele.), and the interaction between both factors.

	Soil organic carbon stock	N Stock
Soil type	0.1218	0.2253
Yr	0.1380	0.0711
Soil type*Yr	0.4227	0.3121
Soil type	0.1363	0.3534
Ele.	0.5480	0.8897
Soil type * Ele	0.8981	0.9007

*: Percentage change of SOC/N stocks = $(\text{GCRPS}_{\text{SOC/N stocks}} - \text{Paddy}_{\text{SOC/N stocks}}) / \text{Paddy}_{\text{SOC/N stocks}} \times 100\%$

Table S4

P-values for one factor (production system) analysis of variance on SOC and N concentrations and related stocks, mean soil texture (clay, silt and sand content), pH, mineral nitrogen (Nmin), soil bulk density, soil $\delta^{15}\text{N}$ and root biomass for GCRPS and Paddy systems at different soil depth intervals.

Soil depth (cm)	SOC concentration	SOC stock	N concentration	N stock	Clay	Silt	Sand	pH	Nmin	Bulk density	Soil $\delta^{15}\text{N}$	Root biomass
0 - 20	0.0244	0.0557	0.0978	0.2809	0.8165	0.6713	0.5946	0.9104	0.9797	0.7293	< 0.0001	0.0041 (0-10 cm)
20 - 40	0.001	0.0059	0.0053	0.0392	0.9231	0.8537	0.8512	0.5442	0.3634	<0.0001	< 0.0001	0.0004 (10-20 cm)
40 - 60	0.0176	0.0108	0.1307	0.12	0.9297	0.6738	0.7459	0.5800	0.0977	0.0759	0.0002	0.0062 (20-40 cm)
70 - 90	0.0459	0.0415	0.0829	0.0562	0.8002	0.6496	0.6117	0.2819	0.1152	0.4236	0.0289	