

## **Supporting Information**

### **An FTIR study of biochar ageing in soils**

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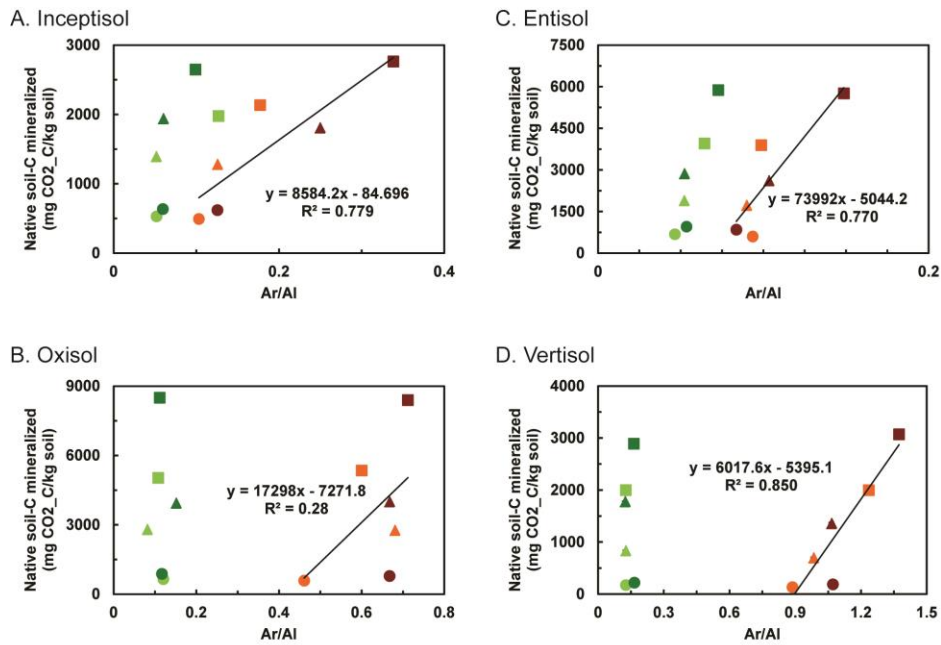
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**Table S1** Band assignments of FTIR spectra of the two biochars (i.e. B450 and B550) and biochar amended soils

Inceptisol			Oxisol			Entisol			Vertisol			Original biochar		Assignment
B0-D0	B450-D0	B550-D0	B0-D0	B450-D0	B550-D0	B0-D0	B450-D0	B550-D0	B0-D0	B450-D0	B550-D0	B450	B550	
3697	3696	3697	3695	3696	3695	3696	3694	3696		3694	3696			v (OH) kaolinite
3649	3649	3649										3630	3639	v (OH) kaolinite v (OH) – clay minerals?
3620	3620	3623	3621	3620	3621	3620	3620	3617	3623	3620	3623			v (OH) smectite v (OH) kaolinite and gibbsite
			3527	3526	3527									v (OH) gibbsite
			3445	3447	3445									v (OH) gibbsite
	3356	3342	3377	3390	3393	3396	3396	3396	3379	3396	3379	3330	3384	v (OH) sorbed water, clay and oxids v (OH) gibbsite
			3379	3378										v (OH) sorbed water, v(NH)
3062		3062	3051		3052				3056	3073	3056	3050	3050	v (CH)-aromatic
	2971			2968					2969	2968	2969	2965		v (CH) asymm C-H stretch - aliphatic
2923	2934	2924	2938	2928	2938	2934	2934	2934	2918	2931	2918	2920	2920	v (CH) asymm C-H stretch - aliphatic
	2871			2871						2872		2867		v (CH) symm C-H stretch - aliphatic
2850	2849	2850	2850	2849	2850	2842	2849	2849	2847		2847	2840		v (CH) symm C-H stretch - aliphatic
							2515	2520						
							1795	1795						
1693	1698	1694	1691	1696	1691				1691	1692	1691	1692	1690	v (C=O) - carboxylate
				1610						1662	1659			
1600	1602	1600	1597		1598	1585	1588	1585	1597		1597	1604	1593	v (C=C) - aromatic
1438		1438	1442	1438	1442	1452	1454	1452	1441	1443	1442	1437	1443	v (C-O) – v3 assymmetric stretch for calcite
1370	1375	1371	1374	1375	1374				1373	1378	1373	1370		
	1318			1318			1318		1316	1318	1317	1315		v (C-O) – v3 assymmetric stretch for whellite
	1273	1273		1273	1273	1273	1273	1273		1270	1276	1275	1277	
			1252	1253	1252				1248	1250	1249			
1229	1236	1229												
1163	1163	1164		1165						1171	1174			
1107	1108	1107	1102	1106	1102					1111	1117			
1033	1035	1034	1031	1035	1031	1032	1032	1032	1022	1027	1022			
1011	1012	1011	1008	1015	1008									
914	916	914	912	916	912		916	916		913				
		880	875		875	876	876	876	874	876	875	883	876	Out of plane bend –v2 - calcite
												865		
									818		818	820		
798	797	798	801		801		803	803			803			
	780			783			780	780		783		781		Out of plane bend –v2 - whewellite
755	757	755	753	754	753			749	755	760	755	760		
						715	715	715						
696	695	696	688	690	688			690	690	690	690			

**Table S2** Ratio of the total CH stretching intensity of aromatic and aliphatic bands (Ar/Al) in the FTIR spectra of the light fractions (density < 1.8 g cm<sup>-3</sup>) of the control (B0) and biochar amended soils (B450 and B550) at day zero (D0), and after 6 (6M) and 12 months (12M) of incubation at 20 (20C), 40 (40C) and 60°C (60C) in the laboratory.

Sample/treatment	Inceptisol	Oxisol	Entisol	Vertisol
B0_D0	0.033	0.015	0.032	0.020
B0_6M_20C	0.029	0.022	0.031	0.014
B0_6M_40C	0.033	0.022	0.029	0.020
B0_6M_60C	0.037	0.014	0.024	0.018
B0_12M_20C	0.032	0.019	0.027	0.009
B0_12M_40C	0.034	0.035	0.031	0.014
B0_12M_60C	0.030	0.016	0.037	0.004
B450_D0	0.058	0.163	0.050	0.155
B450_6M_20C	0.052	0.120	0.046	0.127
B450_6M_40C	0.051	0.081	0.052	0.126
B450_6M_60C	0.127	0.108	0.064	0.127
B450_12M_20C	0.060	0.117	0.054	0.166
B450_12M_40C	0.060	0.151	0.052	0.123
B450_12M_60C	0.099	0.111	0.073	0.164
B550_D0	0.103	0.705	0.076	0.599
B550_6M_20C	0.103	0.461	0.094	0.887
B550_6M_40C	0.125	0.680	0.090	0.983
B550_6M_60C	0.177	0.600	0.099	1.236
B550_12M_20C	0.126	0.668	0.084	1.072
B550_12M_40C	0.250	0.667	0.103	1.065
B550_12M_60C	0.338	0.712	0.149	1.373



**Figure S1.** The cumulative amount of native soil-C mineralized (mg CO<sub>2</sub>-C kg<sup>-1</sup> soil) from soil-biochar mixtures after 6 and 12 months of incubation at 20, 40 and 60 °C plotted against the Ar/AI ratio of the light fraction for the four soils. Green color symbols are for the biochar produced at 450°C (B450) and brown color symbols are for the biochar produced at 550°C (B550). Circles, triangles and squares are for the samples incubated at 20 °C, 40 °C and 60 °C, respectively, and the lighter and darker shade of the color (green or brown) represent the samples incubated for 6 and 12 months, respectively.