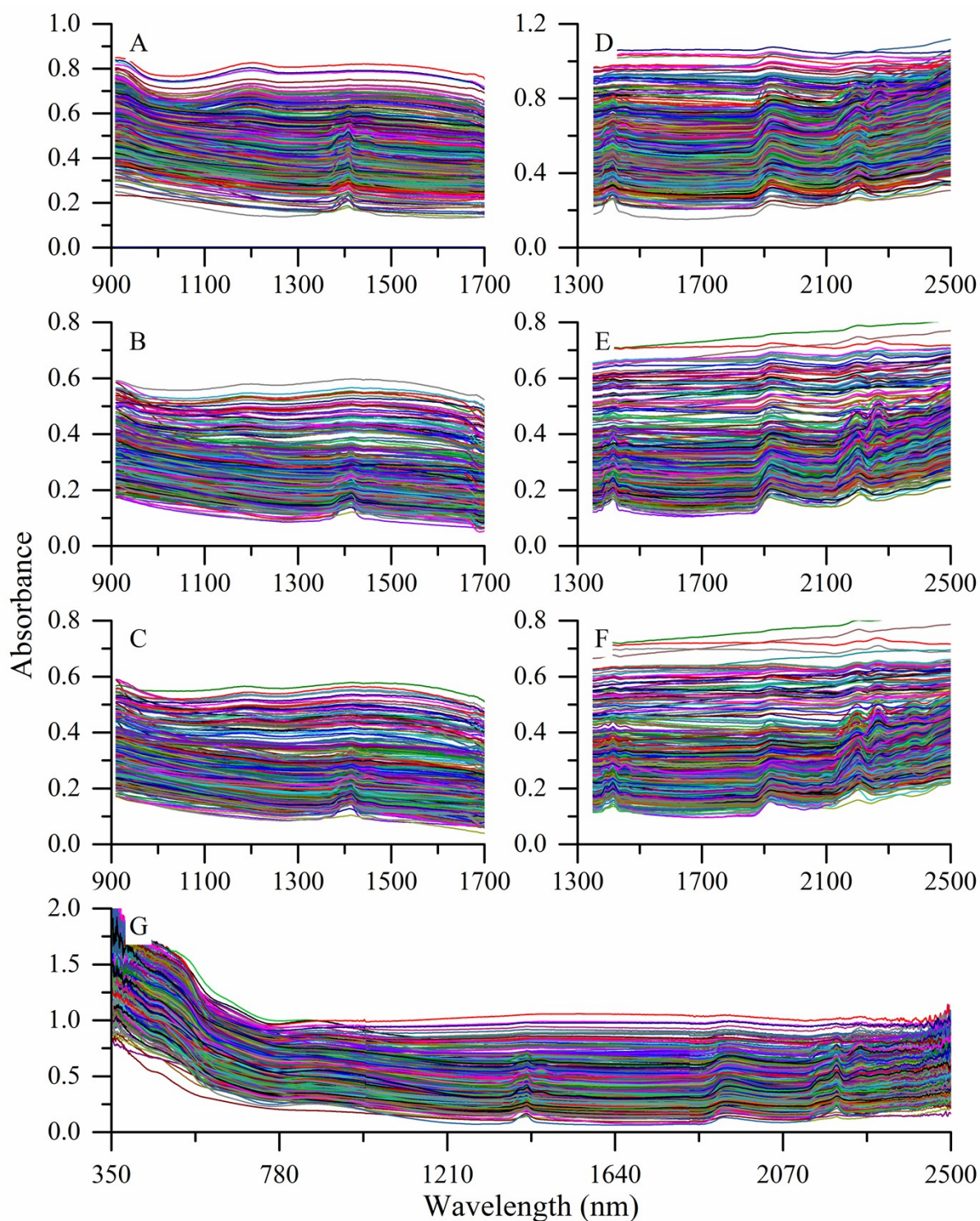


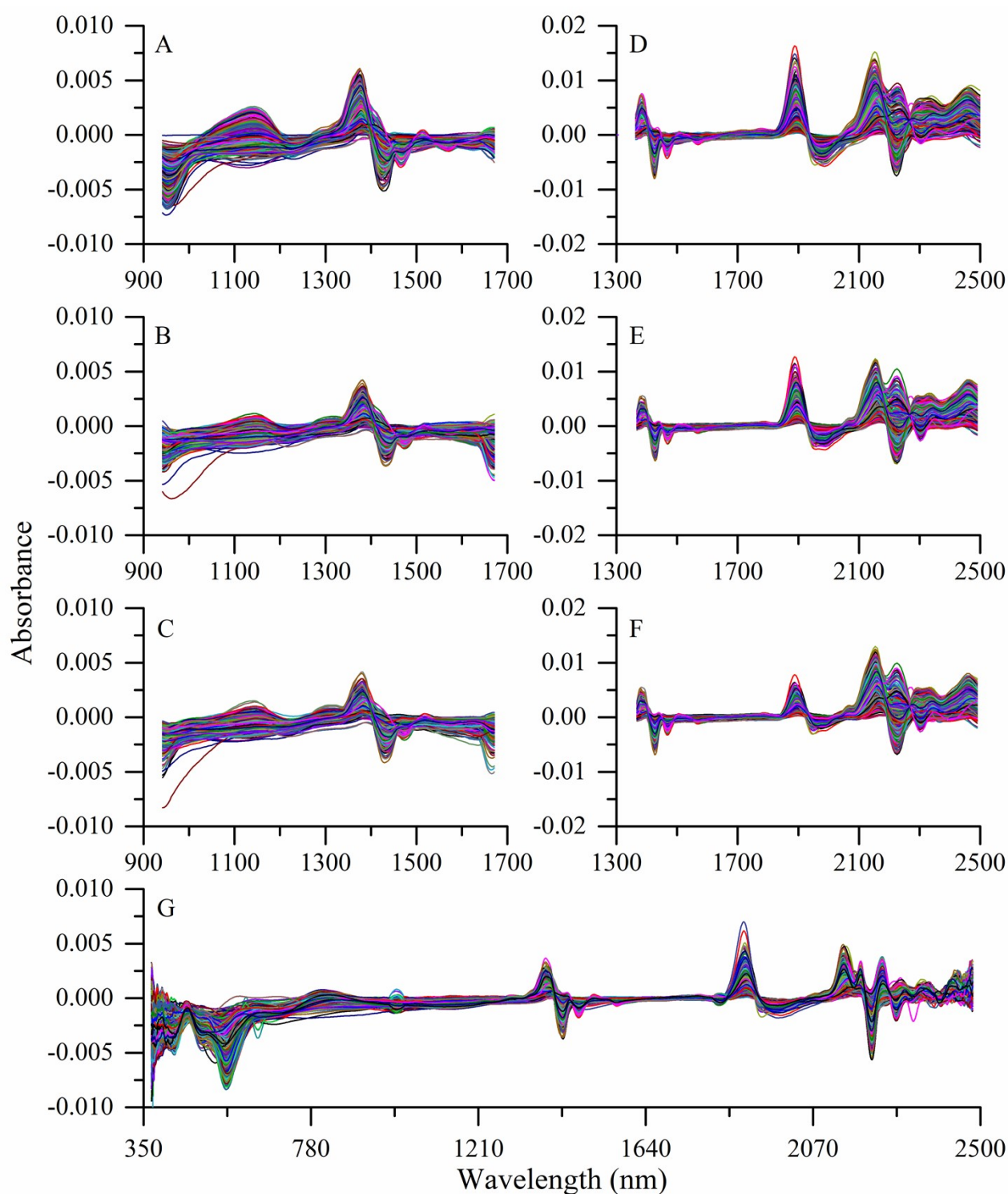
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# Supplementary material



2

**Figure S1.** Absorbance spectra of the sample set acquired using NanoNIR and soil sample preparation modes I (A), II (B), and III (C); NeoSpectra and soil sample preparation modes I (D), II (E) and III (F); and Vis-NIR spectrophotometer (G). Mode I = air-dried and 2 mm sieved soil samples; Mode II = air-dried and ground soil samples; Mode III = oven-dried and ground soil samples.



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8 **Figure S2.** First-derivative spectra of the sample set acquire using NanoNIR and soil sample  
 9 preparation modes I (A), II (B), and III (C); NeoSpectra and soil sample preparation modes I (D), II  
 10 (E) and III (F); and Vis-NIR spectrophotometer (G). Mode I = air-dried and 2 mm sieved soil samples;  
 11 Mode II = air-dried and ground soil samples; Mode III = oven-dried and ground soil samples.

**Table S1.** Results of randomization test for accuracy comparison between models built using different spectrophotometers

Spectra acquisition protocol <sup>a</sup>		RMSEP (g kg <sup>-1</sup> )		P-Value
Model-A	Model-B	Model-A	Model-B	
NeoSpectra – Mode I	NanoNIR – Mode I	6.3	8.2	< 0,001
NeoSpectra – Mode II	NanoNIR – Mode II	6.0	7.6	< 0,001
NeoSpectra – Mode III	NanoNIR – Mode III	6.0	7.6	< 0,001
NeoSpectra – Mode I	Vis-NIR <sup>b</sup>	6.3	6.8	0,028
NeoSpectra – Mode II	Vis-NIR	6.0	6.8	0,004
NeoSpectra – Mode III	Vis-NIR	6.0	6.8	0.009
NanoNIR – Mode I	Vis-NIR	8.2	6.8	< 0,001
NanoNIR – Mode II	Vis-NIR	7.6	6.8	0,006
NanoNIR – Mode III	Vis-NIR	7.6	6.8	0,006

<sup>a</sup>Mode I, air-dried and 2 mm sieved soil samples; Mode II, air-dried and ground soil samples; Mode III, oven-dried and ground soil samples. <sup>b</sup>Spectral data acquired using Vis-NIR spectrophotometer were measured using oven-dried (45 °C) and 2 mm sieved soil samples.

17 **Table S2.** Results of randomization test for accuracy comparison between models built using  
 18 different soil sample preparation modes<sup>a</sup>

Spectra acquisition protocol		RMSEP (g kg <sup>-1</sup> )		P-Value
Model-A	Model-B	Model-A	Model-B	
NeoSpectra				
Mode I	Mode II	6.3	6.0	0.196
Mode I	Mode III	6.3	6.0	0.214
Mode II	Mode III	6.0	6.0	0.903
NanoNIR				
Mode I	Mode II	8.2	7.6	0.001
Mode I	Mode III	8.2	7.6	0.001
Mode II	Mode III	7.6	7.6	0.826

19 <sup>a</sup>Mode I = air-dried and 2 mm sieved soil samples; Mode II = air-dried and ground soil samples; Mode  
 20 III = oven-dried and ground soil samples.

**Table S3.** Results for accuracy comparison between GLOBAL-PLSR and LOCAL-PLSR using the randomization test

	RMSEP (g kg <sup>-1</sup> )		P-Value
	GLOBAL-PLSR	LOCAL-PLSR	
NeoSpectra			
Mode I	6.3	5.9	0.079
Mode II	6.0	5.3	< 0.001
Mode III	6.0	5.2	0.001
NanoNIR			
Mode I	8.2	7.5	< 0.001
Mode II	7.6	7.1	0.013
Mode III	7.6	7.0	< 0,001

<sup>a</sup>Mode I = air-dried and 2 mm sieved soil samples; Mode II = air-dried and ground soil samples; Mode III = oven-dried and ground soil samples.

**Table S4.** Performance of LOCAL-PLSR in large-scale SOC determination using the NeoSpectra and oven-dried and ground soil samples according to the Mahalanobis distance used as the limit to select the nearest neighbors to be included in the local calibration set

Mahalanobis distance <sup>a</sup>	RMSEP (g kg <sup>-1</sup> )	• Number of analyzed samples <sup>b</sup>
1.0	2.8	3
1.1	4.2	8
1.2	4.8	22
1.3	4.4	46
1.4	4.8	62
1.5	4.8	83
1.6	5.1	110
...	...	...
3.3	5.2	160

<sup>a</sup>Mahalanobis distance is the limit to select the nearest neighbors to be included in the local calibration set. <sup>b</sup>Number of samples in the validation set whose SOC content was determined by LOCAL-PLSR using a given Mahalanobis limit distance.