Supplement for

Regional synthesis and mapping of soil organic carbon and nitrogen stocks at the Canadian Beaufort coast

Wagner et al.

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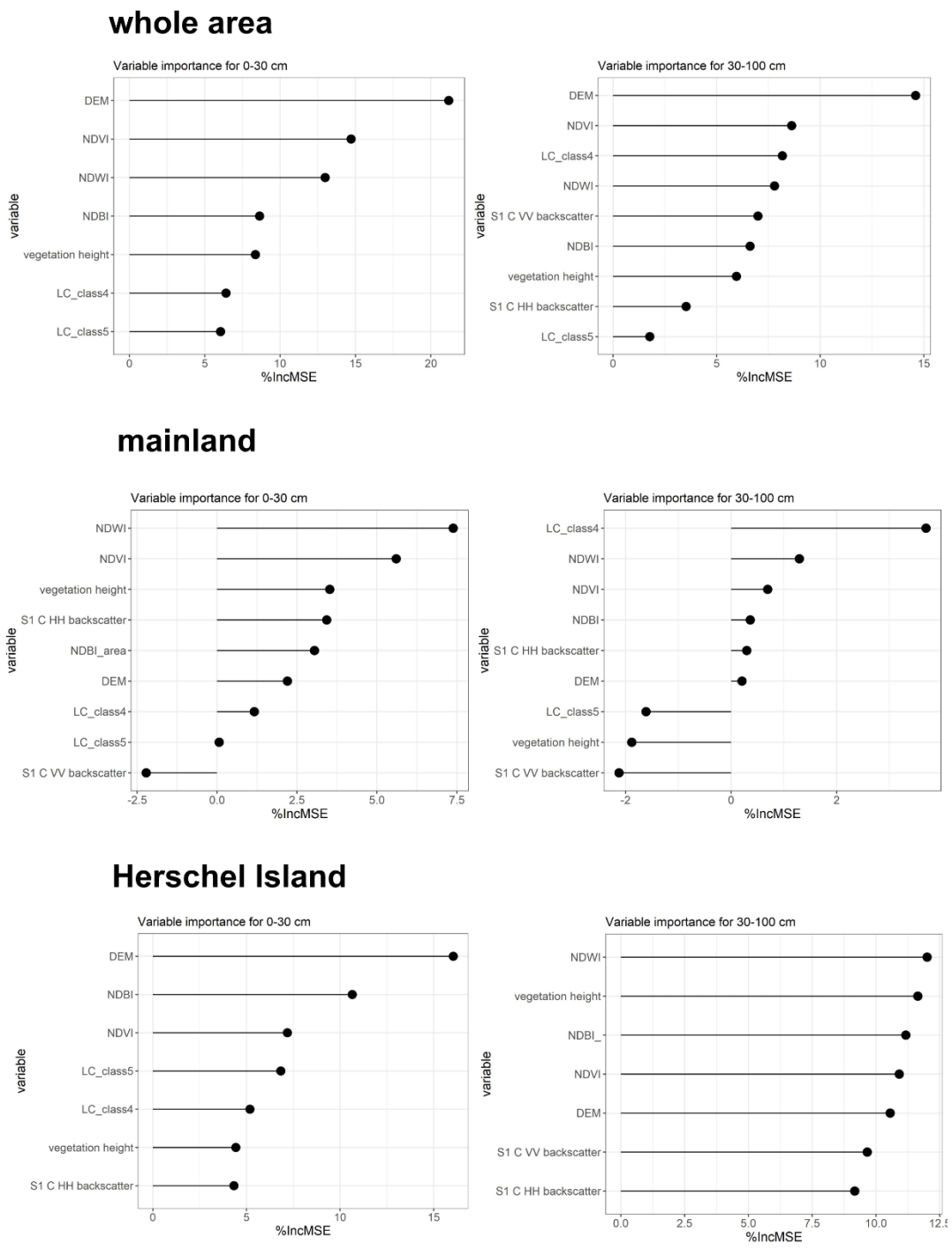

Figure S1: Variable importance plots for the different models for the SOC stocks.

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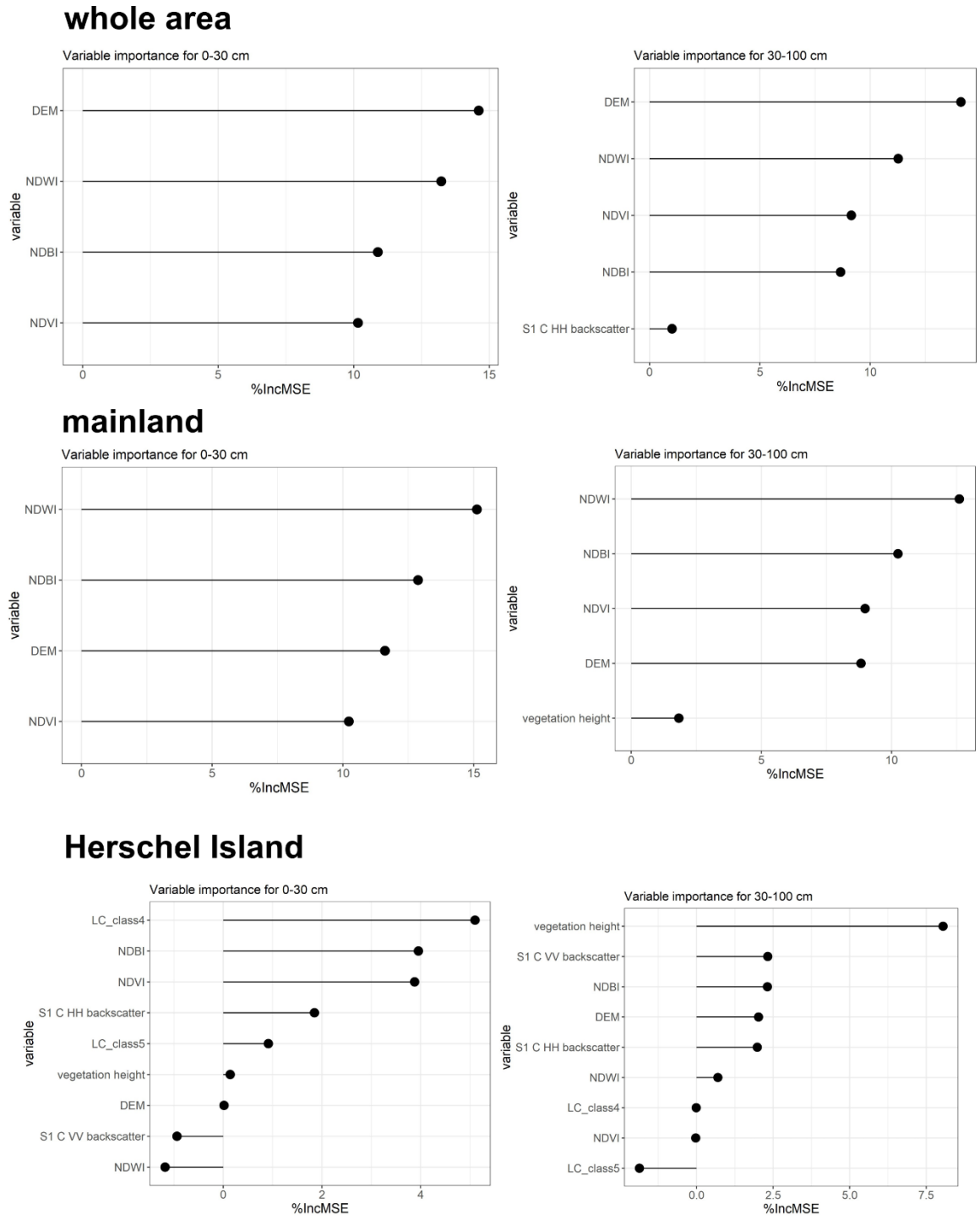


Figure S2: Variable importance plots for the different models for the N stocks.

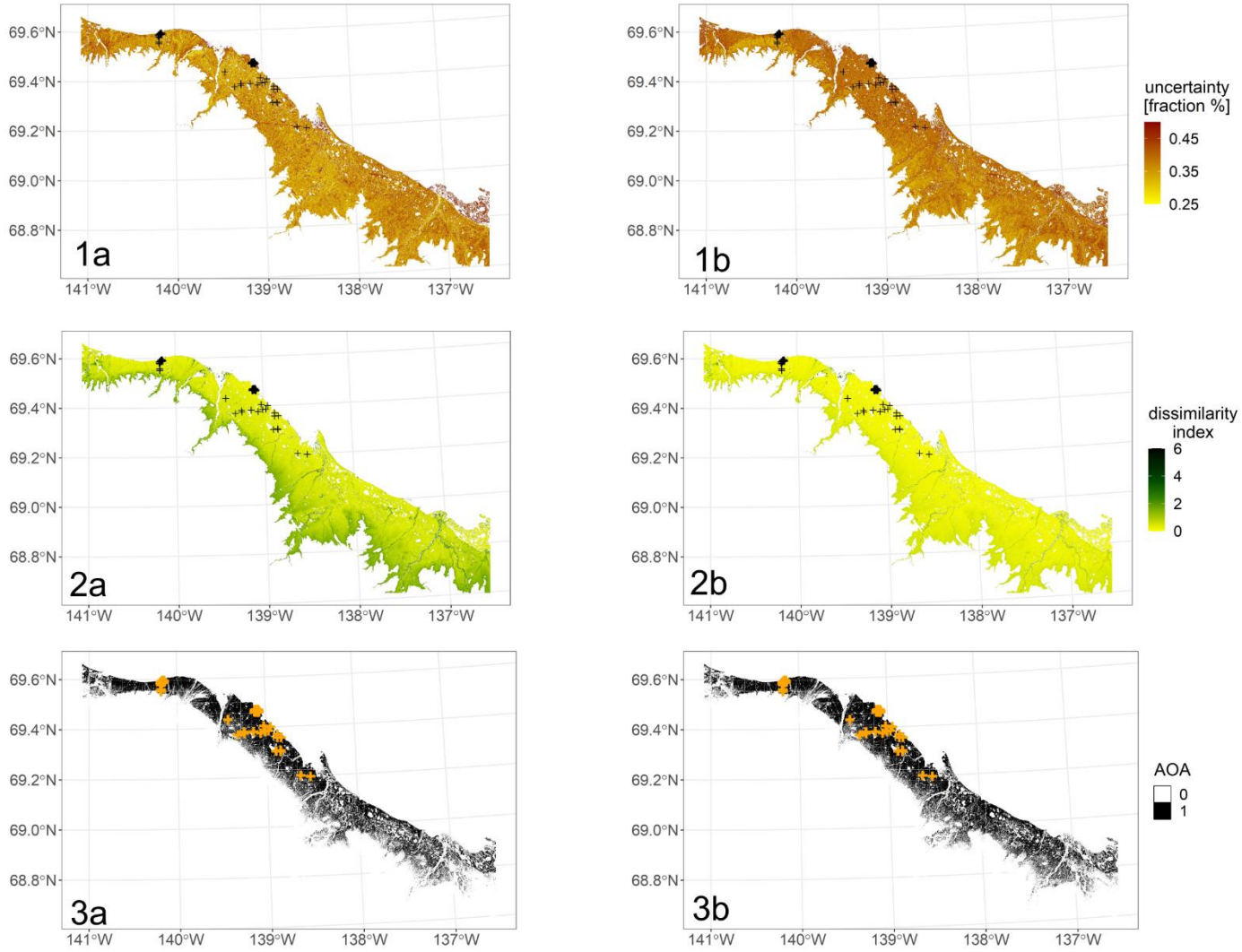
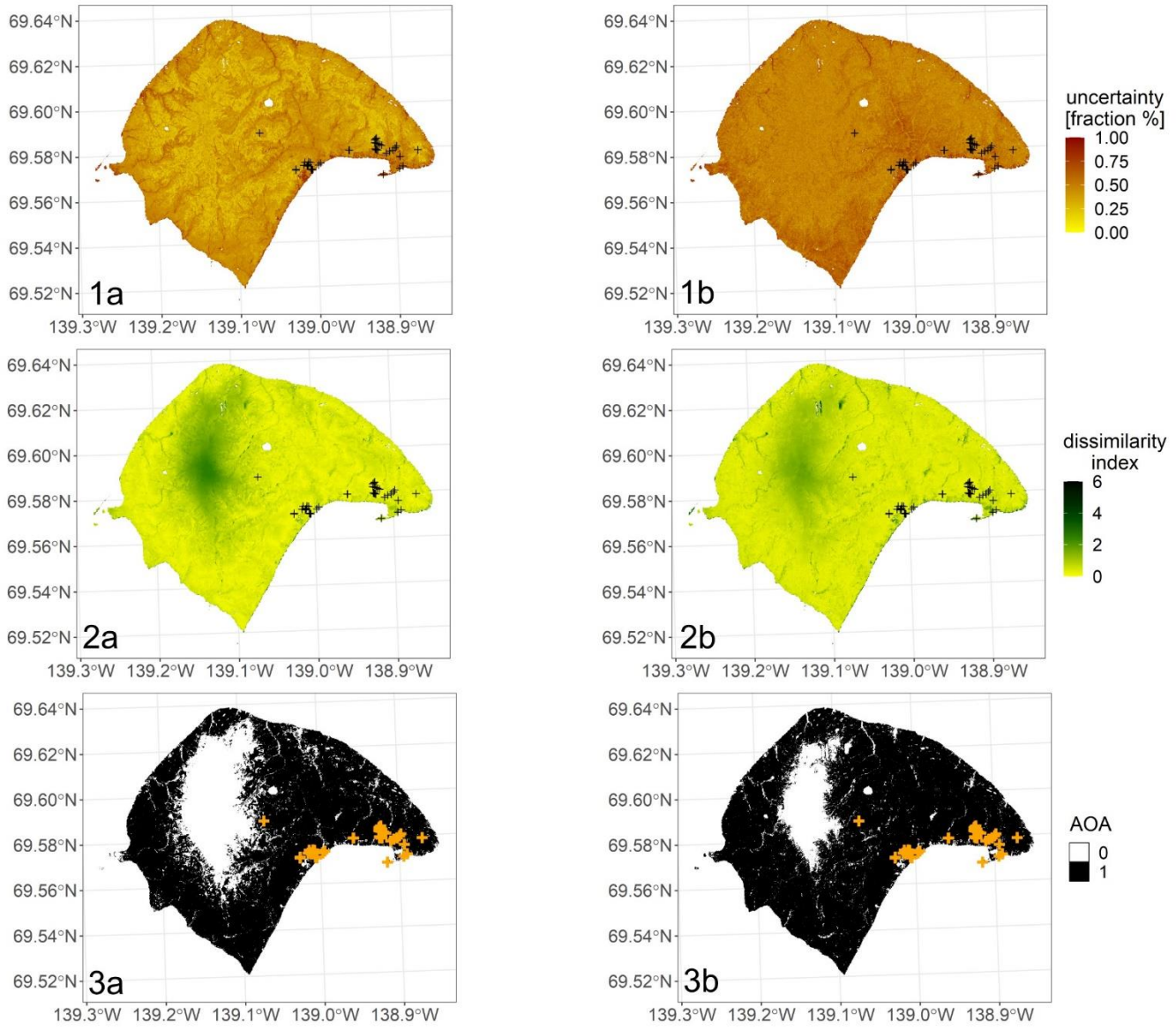


Figure S3: Comparison of uncertainty, dissimilarity index and AOA for the mainland for SOC stocks at depth 0-30 (1a, 2a, 3a) and at depth 30-100 (1b, 2b, 3b).



20 **Figure S4: Comparison of uncertainty, dissimilarity index and AOA for Herschel Island for SOC stocks at depth 0-30 (1a, 2a, 3a) and at depth 30-100 (1b, 2b, 3b).**

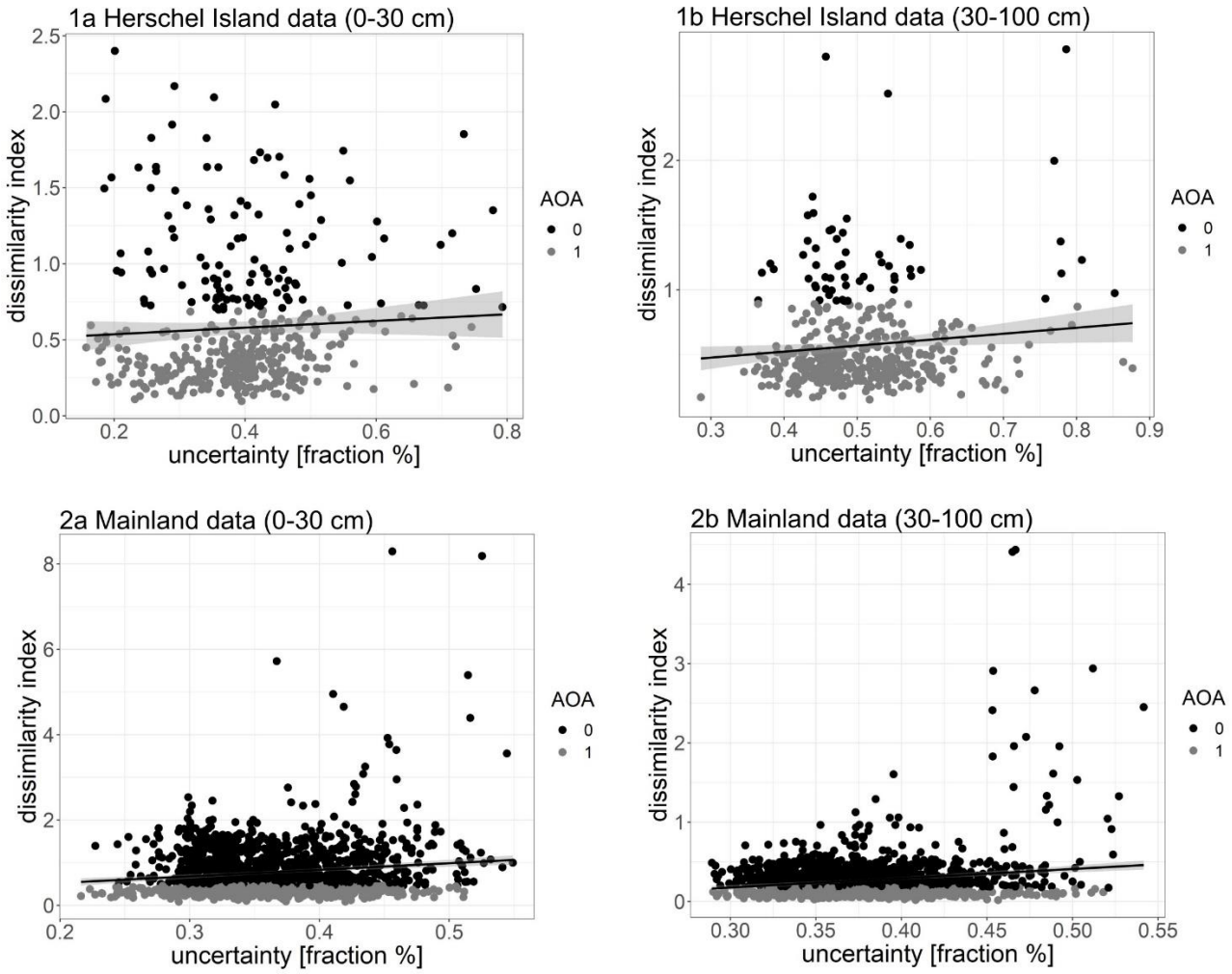


Figure S5: Uncertainty versus dissimilarity index for Herschel Island (1a and 1b) and the mainland (2a and 2b). The values are sampled from the raster files at random locations throughout the study area.

Table S1: Dissimilarity Index (DI) thresholds chosen by the area of applicability (AOA) method.

model	AOA Thresholds
whole area	
SOC stock 0-30 cm	0.40
SOC stocks 30-100 cm	0.51
N stocks 0-30 cm	0.35
N stocks 30-100 cm	0.34
mainland	
SOC stock 0-30 cm	0.46
SOC stocks 30-100 cm	0.17
N stocks 0-30 cm	0.40
N stocks 30-100 cm	0.44
Herschel Island	
SOC stock 0-30 cm	0.70
SOC stocks 30-100 cm	0.91
N stocks 0-30 cm	0.36
N stocks 30-100 cm	0.59

Table S2a: Comparison of average soil organic carbon (SOC) stocks for each model prediction depicting the whole area and additionally the AOA of each respective prediction and predictive model.

Prediction	SOC stocks 0-30 cm [kg/ m^2]							SOC stocks 30-100 cm [kg/ m^2]						
	mean	StDev	median	min	max	PCT90	range	mean	StDev	median	min	max	PCT90	range
whole area	14.9	3.0	14.4	7.8	37.2	19.1	29.4	29.8	4.3	29.5	11.3	59.4	35.2	48.1
whole area only AOA	16.2	3.6	15.2	7.8	37.2	21.3	29.4	30.6	5.1	30.1	11.3	59.4	37.4	48.1
mainland	19.9	2.8	19.7	12.8	38.3	22.9	25.4	37.3	3.3	37.3	23.4	60.7	41.5	37.4
mainland area only AOA	20.9	2.8	20.5	12.8	38.3	23.7	25.4	37.7	3.6	37.6	23.4	60.7	42.3	37.4
Herschel Island	12.2	1.7	12.4	7.0	22.5	14.2	15.6	24.0	4.7	23.4	9.1	47.6	31.0	38.6
Herschel Island only AOA	12.2	1.8	12.4	7.0	22.5	14.3	15.6	23.8	4.7	23.1	9.1	47.6	30.8	38.6
Herschel Island from mainland prediction	20.5	1.8	20.4	13.9	34.2	22.9	20.4	38.1	4.0	38.6	24.6	53.6	42.9	29.0
Herschel Island from whole area	14.3	1.9	14.3	7.9	30.6	16.2	22.7	27.6	4.5	27.2	11.3	51.3	33.6	40.0
mainland from whole area	14.9	3.0	14.4	7.8	37.2	19.1	29.4	29.9	4.3	29.5	14.1	59.4	35.2	45.3

Table S2b: Comparison of average soil nitrogen (N) stocks for each model prediction depicting the whole area and additionally the AOA of each respective prediction and predictive model.

Prediction	N stocks 0-30 cm [kg/ m^2]							N stocks 30-100 cm [kg/ m^2]						
	mean	StDev	median	min	max	PCT90	range	mean	StDev	median	min	max	PCT90	range
whole area	0.90	0.23	0.86	0.47	2.43	1.12	1.97	0.91	0.21	0.87	0.48	2.49	1.10	2.00
whole area only AOA	0.97	0.27	0.90	0.47	2.43	1.28	1.97	0.98	0.26	0.91	0.48	2.49	1.24	2.00
mainland	1.08	0.26	1.04	0.62	0.62	1.30	1.95	1.09	0.25	1.05	0.65	2.61	1.31	1.95
mainland area only AOA	1.21	0.36	1.12	0.62	2.57	1.79	1.95	1.20	0.33	1.12	0.65	2.61	1.51	1.95
Herschel Island	0.83	0.11	0.85	0.46	1.20	0.95	0.74	1.83	0.32	1.83	0.92	3.57	2.24	2.65
Herschel Island only AOA	0.83	0.11	0.86	0.46	1.20	0.96	0.74	1.81	0.33	1.80	0.92	3.57	2.23	2.65
Herschel Island from mainland prediction	1.02	0.18	1.02	0.65	2.50	1.22	1.85	1.05	0.18	1.04	0.67	2.48	1.28	1.81
Herschel Island from whole area	0.88	0.13	0.89	0.47	2.37	0.99	1.91	0.88	0.11	0.88	0.49	2.36	0.97	1.87
mainland from whole area	0.90	0.23	0.86	0.47	2.43	1.12	1.97	0.91	0.21	0.87	0.48	2.49	1.11	2.00

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Table S3: SOC and N stocks for 0-100 cm depth for the different models (sum of the predictions for 0-30 cm and 30-100 cm).

	SOC stocks 0-100 cm		N stocks 0-100 cm	
Prediction	[kg/ m^2]		[kg/ m^2]	
models	mean	StDev	mean	StDev
whole area	44.7	6.5	1.81	0.44
mainland	57.2	4.50	2.17	0.50
Herschel Island	36.2	5.70	2.66	0.39
sum of mainland and Herschel Island	56.7	5.6	2.19	0.51