

Table S1. Optimized hyperparameters for ANN with 9 bands and 4 mean textural features as input predictors.

10-Fold Cross-Validation	Momentum Coefficient	Learning Rate	Number of Nodes of Hidden Layers
K = 1	0.8	0.25	4
K = 2	0.25	0.45	6
K = 3	0.15	0.1	3
K = 4	0.15	0.8	5
K = 5	1	0.3	5
K = 6	0.3	0.5	4
K = 7	0.8	0.75	7
K = 8	0.15	0.4	5
K = 9	1	0.4	7
K = 10	0.1	0.8	5

Table S2. Optimized hyperparameters for SVR with 9 bands and 4 mean textural features as input predictors.

10-Fold Cross-Validation	Box Constraint	Kernel Scale	Epsilon
K = 1	887	207.67	0.00089
K = 2	0.014794	1.3697	0.0030474
K = 3	123.43	105.51	0.00012043
K = 4	793.16	793.16	793.16
K = 5	850.69	124.48	0.0084059
K = 6	0.0017711	0.38765	0.000864
K = 7	2.7493	19.761	0.00041584
K = 8	909.86	857.45	0.040185
K = 9	786.75	999.24	0.0015198
k = 10	14.985	30.04	0.00012154

Table S3. Optimized hyperparameters for RF with 9 bands and 4 mean textural features as input predictors.

10-Fold Cross-Validation	Number of Trees
K = 1	50
K = 2	210
K = 3	110
K = 4	270
K = 5	190
K = 6	230
K = 7	270
K = 8	70
K = 9	110
k = 10	190

Table S4. Optimized hyperparameters for GPR with 9 bands and 4 mean textural features as input predictors.

10-Fold Cross-Validation	Sigma
K = 1	0.058593
K = 2	0.050157
K = 3	0.05404
K = 4	0.083962
K = 5	0.056016
K = 6	0.058613
K = 7	0.055279
K = 8	0.053623
K = 9	0.057162
k = 10	0.054067

The above methods were implemented using MATLAB.

Table S5. The R^2_{cv} and $RMSE_{cv}$ (%) values for each fold of the 10-fold cross-validation of the univariate regressions based on MSI bands.

10-Fold Cross- Validation	B2		B3		B4		B5		B6	
	R^2_{cv}	$RMSE_{cv}$ (%)	R^2_{cv}	$RMSE_{cv}$ (%)	R^2_{cv}	$RMSE_{cv}$ (%)	R^2_{cv}	$RMSE_{cv}$ (%)	R^2_{cv}	$RMSE_{cv}$ (%)
K = 1	0.42	10.566	0.57	9.050	0.61	8.648	0.50	9.791	0.48	10.111
K = 2	0.34	7.470	0.38	7.408	0.47	6.869	0.44	7.185	0.44	7.157
K = 3	0.55	9.130	0.70	7.582	0.79	6.550	0.70	7.187	0.82	6.339
K = 4	0.54	8.391	0.56	8.254	0.65	7.529	0.55	8.266	0.47	9.025
K = 5	0.00	8.807	0.10	7.841	0.33	6.590	0.15	7.899	0.22	7.564
K = 6	0.18	9.249	0.20	9.461	0.39	8.046	0.29	8.750	0.27	8.869
K = 7	0.36	8.612	0.53	7.330	0.62	6.702	0.55	7.171	0.55	7.207
K = 8	0.42	9.681	0.65	8.200	0.66	7.755	0.57	8.530	0.55	8.847
K = 9	0.33	7.744	0.64	5.704	0.69	5.359	0.67	5.518	0.60	6.191
k = 10	0.33	9.711	0.47	8.590	0.56	7.805	0.52	8.172	0.52	8.122

Table S6. The continuation of Table S5.

10-Fold Cross- Validation	B7		B8a		B11		B12	
	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)
K = 1	0.53	9.543	0.47	10.104	0.29	11.754	0.45	13.461
K = 2	0.38	7.811	0.42	7.451	0.33	7.747	0.03	9.182
K = 3	0.76	6.894	0.80	6.112	0.52	8.889	0.02	11.577
K = 4	0.58	8.304	0.59	8.409	0.44	9.810	0.00	12.001
K = 5	0.15	7.817	0.19	7.867	0.03	9.129	0.14	7.799
K = 6	0.28	8.868	0.29	8.860	0.20	9.161	0.02	10.303
K = 7	0.48	7.689	0.50	7.685	0.34	8.697	0.02	11.016
K = 8	0.60	8.449	0.55	8.723	0.28	10.636	0.00	12.258
K = 9	0.65	5.658	0.65	5.587	0.48	7.207	0.00	9.695
k = 10	0.55	7.914	0.51	8.236	0.31	9.851	0.00	11.731

Table S7. The R^2_{cv} and RMSE_{cv} (%) values for each fold of the 10-fold cross-validation of the univariate regressions based on CRIs.

10-Fold Cross- Validation	NDI5		NDI7		NDTI		NDRI		NDSVI	
	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)
K = 1	0.28	8.880	0.30	8.869	0.28	8.847	0.31	8.608	0.19	9.274
K = 2	0.63	6.514	0.63	6.511	0.55	7.237	0.67	6.201	0.49	7.660
K = 3	0.50	7.766	0.63	6.674	0.58	7.160	0.61	6.837	0.25	9.836
K = 4	0.46	10.526	0.51	10.148	0.48	10.553	0.56	9.369	0.34	11.380
K = 5	0.52	8.173	0.58	7.758	0.52	8.433	0.75	6.178	0.73	6.833
K = 6	0.65	7.544	0.70	6.981	0.62	7.812	0.70	6.744	0.62	8.011
K = 7	0.57	6.652	0.65	6.096	0.54	6.457	0.71	5.710	0.36	7.443
K = 8	0.51	6.264	0.64	5.360	0.63	5.345	0.77	3.994	0.66	5.232
K = 9	0.66	5.008	0.66	4.595	0.52	5.248	0.55	5.026	0.30	7.008
k = 10	0.33	8.906	0.37	8.628	0.34	8.752	0.42	7.966	0.31	8.391

Table S8. The continuation of Table S7.

10-Fold Cross- Validation	SGNDI		CRCI		MCRC		STI		DFI	
	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)
K = 1	0.11	9.957	0.37	8.033	0.02	10.888	0.28	9.000	0.29	8.653
K = 2	0.47	7.814	0.40	8.364	0.08	10.296	0.63	6.511	0.56	7.107
K = 3	0.34	9.023	0.37	8.793	0.00	12.216	0.63	6.690	0.59	7.113
K = 4	0.43	10.617	0.34	11.865	0.04	13.743	0.51	10.099	0.50	10.302
K = 5	0.73	7.153	0.12	10.960	0.56	10.676	0.59	7.740	0.56	8.172
K = 6	0.52	8.548	0.38	9.869	0.17	11.385	0.71	6.946	0.61	7.787
K = 7	0.63	6.045	0.33	7.715	0.17	8.551	0.65	6.119	0.56	6.329
K = 8	0.72	4.400	0.15	8.344	0.48	7.342	0.64	5.365	0.65	5.169
K = 9	0.27	6.497	0.62	4.920	0.00	8.184	0.66	4.637	0.53	5.182
k = 10	0.24	8.961	0.25	9.176	0.01	10.081	0.37	8.677	0.35	8.601

Table S9. The continuation of Table S8.

10-Fold Cross-Validation	3BI1		3BI2		3BI3	
	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)
K = 1	0.35	8.432	0.724	7.086	0.31	8.622
K = 2	0.67	6.182	0.56	6.025	0.68	6.151
K = 3	0.67	6.275	0.74	6.164	0.64	6.598
K = 4	0.60	8.966	0.54	7.882	0.58	9.262
K = 5	0.71	6.581	0.64	4.592	0.74	6.339
K = 6	0.71	6.623	0.44	7.424	0.70	6.736
K = 7	0.66	5.904	0.60	7.087	0.72	5.632
K = 8	0.70	4.628	0.70	7.091	0.77	4.065
K = 9	0.62	4.598	0.71	5.191	0.57	4.875
k = 10	0.44	7.792	0.65	6.551	0.42	8.017

Table S10. The R^2_{cv} and RMSE_{cv} (%) values for each fold of the 10-fold cross-validation of the univariate regressions based on textural features.

10-Fold Cross-Validation	B2_mean		B3_mean		B4_mean		B8_mean	
	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)
K = 1	0.33	9.957	0.40	9.242	0.52	8.300	0.49	8.585
K = 2	0.25	9.938	0.34	9.349	0.41	8.822	0.33	9.409
K = 3	0.06	11.434	0.25	10.320	0.33	9.908	0.30	10.097
K = 4	0.55	7.214	0.59	6.540	0.60	6.590	0.57	6.911
K = 5	0.33	8.512	0.39	7.955	0.53	6.951	0.51	7.008
K = 6	0.46	10.223	0.65	9.067	0.73	8.926	0.76	8.572
K = 7	0.05	10.864	0.19	9.806	0.30	9.089	0.30	9.016
K = 8	0.35	9.259	0.63	7.768	0.75	6.677	0.63	7.640
K = 9	0.30	8.323	0.37	7.702	0.44	7.300	0.41	7.565
k = 10	0.16	8.940	0.18	8.774	0.35	8.142	0.40	7.391

Table S11. The R^2_{cv} and RMSE_{cv} (%) values for each fold of the 10-fold cross-validation of the five ML approaches with 9 bands and 4 mean textural features as input predictors.

10-Fold Cross-Validation	PLSR		ANN		GPR		SVR		RF	
	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)	R^2_{cv}	RMSE _{cv} (%)
K = 1	0.78	5.396	0.62	7.236	0.74	5.942	0.60	6.722	0.69	6.307
K = 2	0.68	6.598	0.81	5.944	0.67	6.075	0.72	5.024	0.73	4.875
K = 3	0.62	6.641	0.67	9.079	0.76	5.825	0.69	6.223	0.54	6.933
K = 4	0.60	7.654	0.67	7.045	0.61	6.825	0.69	7.169	0.67	6.705
K = 5	0.45	7.268	0.68	6.374	0.54	6.756	0.69	7.094	0.59	6.406
K = 6	0.49	8.256	0.75	5.983	0.56	6.454	0.64	5.954	0.59	6.538
K = 7	0.50	7.255	0.59	9.602	0.82	5.864	0.72	7.297	0.45	7.349
K = 8	0.74	5.686	0.68	8.637	0.68	6.463	0.65	5.633	0.51	7.024
K = 9	0.71	6.292	0.66	6.540	0.56	6.381	0.69	5.953	0.71	5.497
k = 10	0.69	6.356	0.73	6.290	0.65	6.933	0.62	6.343	0.64	6.512