

Calibration Algorithms for Multiscale Geographically and Temporally Weighted Regression: Parameter Recovery, Uncertainty Calibration, and Computational Scaling

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S1 Supplementary Results for Experiment I and II

This section provides additional simulation results and performance evaluations for Experiments 1 and 2 described in the main manuscript. For Experiment 1, Table S1 reports the parameter recovery performance across the global, interior, and boundary regions; Table S2 evaluates the calibration of the local uncertainty approximations; and Table S3 summarises the in-sample goodness-of-fit alongside computational benchmarks across target sample sizes. For Experiment II (computational scaling), Table S4 details the complete replicate-level raw records, including elapsed runtimes, peak memory usage, selected spatio-temporal bandwidths, and in-sample fitted RMSE values.

Table S1: Parametric recovery of the coefficient surfaces. Panel A presents the RMSE (calculated with respect to the true surface), the standard deviation of the RMSE (SD), the Monte Carlo standard error of the mean (MCSE), and the 95% CI. Panel B reports the interior and boundary (outer ring) regions, omitting the SD (–). Lower RMSE values indicate better parametric recovery.

N	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
Panel A. Global recovery of the surfaces							
1 125	Intercept	TDS	Global	0.1515	0.0158	0.0016	0.1484–0.1546
1 125	Intercept	2SCALL	Global	0.2617	0.0187	0.0019	0.2581–0.2654
1 125	Intercept	Backfitting	Global	0.1511	0.0153	0.0015	0.1481–0.1541
1 125	X_1	TDS	Global	0.0368	0.0234	0.0023	0.0322–0.0414

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Table S1 – continued

<i>N</i>	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
1 125	X1	2SCALL	Global	0.0561	0.0170	0.0017	0.0528–0.0595
1 125	X1	Backfitting	Global	0.0387	0.0242	0.0024	0.0339–0.0434
1 125	X2	TDS	Global	0.0344	0.0227	0.0023	0.0299–0.0388
1 125	X2	2SCALL	Global	0.0568	0.0173	0.0017	0.0534–0.0602
1 125	X2	Backfitting	Global	0.0377	0.0243	0.0024	0.0329–0.0424
1 125	X3	TDS	Global	0.1397	0.0141	0.0014	0.1370–0.1425
1 125	X3	2SCALL	Global	0.1758	0.0193	0.0019	0.1720–0.1796
1 125	X3	Backfitting	Global	0.1404	0.0146	0.0015	0.1376–0.1433
1 125	X4	TDS	Global	0.1399	0.0153	0.0015	0.1369–0.1429
1 125	X4	2SCALL	Global	0.1632	0.0166	0.0017	0.1599–0.1664
1 125	X4	Backfitting	Global	0.1400	0.0155	0.0016	0.1369–0.1430
1 125	X5	TDS	Global	0.1046	0.0173	0.0017	0.1012–0.1080
1 125	X5	2SCALL	Global	0.1567	0.0166	0.0017	0.1535–0.1600
1 125	X5	Backfitting	Global	0.1046	0.0182	0.0018	0.1010–0.1081
1 125	X6	TDS	Global	0.1121	0.0160	0.0016	0.1090–0.1153
1 125	X6	2SCALL	Global	0.1409	0.0226	0.0023	0.1365–0.1453
1 125	X6	Backfitting	Global	0.1125	0.0159	0.0016	0.1094–0.1157
5 120	Intercept	TDS	Global	0.0869	0.0063	0.0006	0.0857–0.0882
5 120	Intercept	2SCALL	Global	0.1124	0.0069	0.0007	0.1110–0.1138
5 120	Intercept	Backfitting	Global	0.0869	0.0063	0.0006	0.0857–0.0881
5 120	X1	TDS	Global	0.0162	0.0103	0.0010	0.0142–0.0182
5 120	X1	2SCALL	Global	0.0261	0.0097	0.0010	0.0242–0.0280
5 120	X1	Backfitting	Global	0.0174	0.0113	0.0011	0.0151–0.0196
5 120	X2	TDS	Global	0.0172	0.0099	0.0010	0.0153–0.0192
5 120	X2	2SCALL	Global	0.0259	0.0073	0.0007	0.0244–0.0273
5 120	X2	Backfitting	Global	0.0176	0.0099	0.0010	0.0156–0.0195
5 120	X3	TDS	Global	0.0812	0.0061	0.0006	0.0801–0.0824
5 120	X3	2SCALL	Global	0.0900	0.0086	0.0009	0.0884–0.0917
5 120	X3	Backfitting	Global	0.0812	0.0061	0.0006	0.0800–0.0824
5 120	X4	TDS	Global	0.0847	0.0064	0.0006	0.0834–0.0860
5 120	X4	2SCALL	Global	0.0853	0.0078	0.0008	0.0838–0.0869
5 120	X4	Backfitting	Global	0.0847	0.0065	0.0006	0.0834–0.0860
5 120	X5	TDS	Global	0.0576	0.0072	0.0007	0.0562–0.0590
5 120	X5	2SCALL	Global	0.0799	0.0078	0.0008	0.0783–0.0814
5 120	X5	Backfitting	Global	0.0577	0.0072	0.0007	0.0562–0.0591
5 120	X6	TDS	Global	0.0652	0.0064	0.0006	0.0640–0.0665
5 120	X6	2SCALL	Global	0.0771	0.0075	0.0007	0.0756–0.0786
5 120	X6	Backfitting	Global	0.0651	0.0064	0.0006	0.0639–0.0664
6 125	Intercept	TDS	Global	0.0812	0.0064	0.0006	0.0800–0.0825
6 125	Intercept	2SCALL	Global	0.1039	0.0068	0.0007	0.1025–0.1052
6 125	Intercept	Backfitting	Global	0.0812	0.0064	0.0006	0.0800–0.0825
6 125	X1	TDS	Global	0.0154	0.0089	0.0009	0.0136–0.0171
6 125	X1	2SCALL	Global	0.0229	0.0072	0.0007	0.0215–0.0243
6 125	X1	Backfitting	Global	0.0170	0.0104	0.0010	0.0149–0.0190
6 125	X2	TDS	Global	0.0133	0.0075	0.0007	0.0118–0.0148
6 125	X2	2SCALL	Global	0.0213	0.0063	0.0006	0.0200–0.0225
6 125	X2	Backfitting	Global	0.0141	0.0080	0.0008	0.0125–0.0156
6 125	X3	TDS	Global	0.0763	0.0054	0.0005	0.0752–0.0774
6 125	X3	2SCALL	Global	0.0834	0.0084	0.0008	0.0818–0.0851
6 125	X3	Backfitting	Global	0.0763	0.0055	0.0005	0.0752–0.0774

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Table S1 – continued

N	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
6 125	X4	TDS	Global	0.0789	0.0053	0.0005	0.0779–0.0800
6 125	X4	2SCALL	Global	0.0798	0.0072	0.0007	0.0783–0.0812
6 125	X4	Backfitting	Global	0.0789	0.0053	0.0005	0.0779–0.0800
6 125	X5	TDS	Global	0.0535	0.0055	0.0005	0.0524–0.0545
6 125	X5	2SCALL	Global	0.0749	0.0069	0.0007	0.0736–0.0763
6 125	X5	Backfitting	Global	0.0535	0.0055	0.0005	0.0524–0.0545
6 125	X6	TDS	Global	0.0604	0.0058	0.0006	0.0593–0.0616
6 125	X6	2SCALL	Global	0.0719	0.0062	0.0006	0.0707–0.0731
6 125	X6	Backfitting	Global	0.0604	0.0058	0.0006	0.0593–0.0616
7 220	Intercept	TDS	Global	0.0770	0.0054	0.0005	0.0759–0.0780
7 220	Intercept	2SCALL	Global	0.0963	0.0072	0.0007	0.0949–0.0977
7 220	Intercept	Backfitting	Global	0.0770	0.0054	0.0005	0.0759–0.0780
7 220	X1	TDS	Global	0.0142	0.0086	0.0009	0.0125–0.0159
7 220	X1	2SCALL	Global	0.0204	0.0072	0.0007	0.0190–0.0219
7 220	X1	Backfitting	Global	0.0152	0.0092	0.0009	0.0134–0.0170
7 220	X2	TDS	Global	0.0137	0.0082	0.0008	0.0121–0.0153
7 220	X2	2SCALL	Global	0.0207	0.0073	0.0007	0.0193–0.0222
7 220	X2	Backfitting	Global	0.0145	0.0090	0.0009	0.0127–0.0163
7 220	X3	TDS	Global	0.0727	0.0053	0.0005	0.0716–0.0737
7 220	X3	2SCALL	Global	0.0781	0.0071	0.0007	0.0767–0.0795
7 220	X3	Backfitting	Global	0.0727	0.0053	0.0005	0.0716–0.0737
7 220	X4	TDS	Global	0.0744	0.0048	0.0005	0.0735–0.0754
7 220	X4	2SCALL	Global	0.0739	0.0076	0.0008	0.0724–0.0754
7 220	X4	Backfitting	Global	0.0744	0.0048	0.0005	0.0735–0.0753
7 220	X5	TDS	Global	0.0497	0.0054	0.0005	0.0486–0.0507
7 220	X5	2SCALL	Global	0.0698	0.0072	0.0007	0.0684–0.0712
7 220	X5	Backfitting	Global	0.0497	0.0053	0.0005	0.0486–0.0507
7 220	X6	TDS	Global	0.0592	0.0055	0.0006	0.0581–0.0603
7 220	X6	2SCALL	Global	0.0687	0.0065	0.0006	0.0674–0.0699
7 220	X6	Backfitting	Global	0.0593	0.0057	0.0006	0.0582–0.0604
Panel B. Recovery in the interior and boundary regions							
1 125	Intercept	TDS	Interior	0.1353	–	0.0018	0.1319–0.1387
1 125	Intercept	2SCALL	Interior	0.2850	–	0.0021	0.2810–0.2891
1 125	Intercept	Backfitting	Interior	0.1350	–	0.0017	0.1317–0.1384
1 125	Intercept	TDS	Boundary	0.1906	–	0.0027	0.1853–0.1958
1 125	Intercept	2SCALL	Boundary	0.1709	–	0.0032	0.1648–0.1771
1 125	Intercept	Backfitting	Boundary	0.1900	–	0.0026	0.1848–0.1951
1 125	X1	TDS	Interior	0.0350	–	0.0022	0.0306–0.0394
1 125	X1	2SCALL	Interior	0.0515	–	0.0016	0.0483–0.0547
1 125	X1	Backfitting	Interior	0.0370	–	0.0023	0.0324–0.0416
1 125	X1	TDS	Boundary	0.0415	–	0.0027	0.0363–0.0468
1 125	X1	2SCALL	Boundary	0.0678	–	0.0020	0.0638–0.0718
1 125	X1	Backfitting	Boundary	0.0430	–	0.0027	0.0377–0.0483
1 125	X2	TDS	Interior	0.0323	–	0.0021	0.0282–0.0364
1 125	X2	2SCALL	Interior	0.0517	–	0.0016	0.0486–0.0549
1 125	X2	Backfitting	Interior	0.0356	–	0.0022	0.0312–0.0400
1 125	X2	TDS	Boundary	0.0397	–	0.0028	0.0342–0.0452
1 125	X2	2SCALL	Boundary	0.0695	–	0.0022	0.0652–0.0738
1 125	X2	Backfitting	Boundary	0.0430	–	0.0030	0.0372–0.0488

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Table S1 – continued

N	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
1 125	X_3	TDS	Interior	0.1159	–	0.0016	0.1128–0.1190
1 125	X_3	2SCALL	Interior	0.1726	–	0.0020	0.1686–0.1766
1 125	X_3	Backfitting	Interior	0.1167	–	0.0017	0.1134–0.1200
1 125	X_3	TDS	Boundary	0.1933	–	0.0025	0.1884–0.1982
1 125	X_3	2SCALL	Boundary	0.1834	–	0.0030	0.1776–0.1892
1 125	X_3	Backfitting	Boundary	0.1937	–	0.0025	0.1887–0.1986
1 125	X_4	TDS	Interior	0.1060	–	0.0014	0.1033–0.1088
1 125	X_4	2SCALL	Interior	0.1550	–	0.0019	0.1514–0.1587
1 125	X_4	Backfitting	Interior	0.1062	–	0.0014	0.1034–0.1090
1 125	X_4	TDS	Boundary	0.2102	–	0.0029	0.2044–0.2160
1 125	X_4	2SCALL	Boundary	0.1836	–	0.0028	0.1782–0.1890
1 125	X_4	Backfitting	Boundary	0.2102	–	0.0030	0.2044–0.2160
1 125	X_5	TDS	Interior	0.0975	–	0.0018	0.0940–0.1011
1 125	X_5	2SCALL	Interior	0.1485	–	0.0018	0.1450–0.1521
1 125	X_5	Backfitting	Interior	0.0976	–	0.0019	0.0939–0.1013
1 125	X_5	TDS	Boundary	0.1221	–	0.0022	0.1177–0.1265
1 125	X_5	2SCALL	Boundary	0.1776	–	0.0026	0.1725–0.1826
1 125	X_5	Backfitting	Boundary	0.1220	–	0.0023	0.1174–0.1265
1 125	X_6	TDS	Interior	0.0983	–	0.0015	0.0953–0.1013
1 125	X_6	2SCALL	Interior	0.1447	–	0.0027	0.1395–0.1499
1 125	X_6	Backfitting	Interior	0.0986	–	0.0015	0.0957–0.1016
1 125	X_6	TDS	Boundary	0.1449	–	0.0027	0.1397–0.1501
1 125	X_6	2SCALL	Boundary	0.1250	–	0.0030	0.1191–0.1309
1 125	X_6	Backfitting	Boundary	0.1455	–	0.0027	0.1402–0.1507
5 120	Intercept	TDS	Interior	0.0781	–	0.0006	0.0769–0.0793
5 120	Intercept	2SCALL	Interior	0.1106	–	0.0007	0.1091–0.1120
5 120	Intercept	Backfitting	Interior	0.0781	–	0.0006	0.0769–0.0792
5 120	Intercept	TDS	Boundary	0.1342	–	0.0014	0.1315–0.1370
5 120	Intercept	2SCALL	Boundary	0.1238	–	0.0017	0.1204–0.1272
5 120	Intercept	Backfitting	Boundary	0.1342	–	0.0014	0.1314–0.1369
5 120	X_1	TDS	Interior	0.0157	–	0.0010	0.0138–0.0177
5 120	X_1	2SCALL	Interior	0.0249	–	0.0009	0.0231–0.0266
5 120	X_1	Backfitting	Interior	0.0169	–	0.0011	0.0148–0.0191
5 120	X_1	TDS	Boundary	0.0190	–	0.0013	0.0164–0.0215
5 120	X_1	2SCALL	Boundary	0.0336	–	0.0014	0.0308–0.0363
5 120	X_1	Backfitting	Boundary	0.0202	–	0.0014	0.0175–0.0229
5 120	X_2	TDS	Interior	0.0167	–	0.0010	0.0148–0.0186
5 120	X_2	2SCALL	Interior	0.0246	–	0.0007	0.0232–0.0260
5 120	X_2	Backfitting	Interior	0.0171	–	0.0010	0.0152–0.0190
5 120	X_2	TDS	Boundary	0.0204	–	0.0012	0.0180–0.0227
5 120	X_2	2SCALL	Boundary	0.0335	–	0.0010	0.0316–0.0354
5 120	X_2	Backfitting	Boundary	0.0208	–	0.0012	0.0185–0.0231
5 120	X_3	TDS	Interior	0.0720	–	0.0006	0.0708–0.0731
5 120	X_3	2SCALL	Interior	0.0878	–	0.0009	0.0860–0.0895
5 120	X_3	Backfitting	Interior	0.0719	–	0.0006	0.0708–0.0731
5 120	X_3	TDS	Boundary	0.1297	–	0.0013	0.1271–0.1322
5 120	X_3	2SCALL	Boundary	0.1042	–	0.0015	0.1012–0.1072

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Table S1 – continued

N	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
5 120	X3	Backfitting	Boundary	0.1296	–	0.0013	0.1271–0.1322
5 120	X4	TDS	Interior	0.0706	–	0.0006	0.0695–0.0717
5 120	X4	2SCALL	Interior	0.0810	–	0.0008	0.0794–0.0827
5 120	X4	Backfitting	Interior	0.0706	–	0.0006	0.0695–0.0717
5 120	X4	TDS	Boundary	0.1516	–	0.0015	0.1486–0.1546
5 120	X4	2SCALL	Boundary	0.1110	–	0.0014	0.1082–0.1137
5 120	X4	Backfitting	Boundary	0.1516	–	0.0015	0.1486–0.1547
5 120	X5	TDS	Interior	0.0551	–	0.0007	0.0536–0.0566
5 120	X5	2SCALL	Interior	0.0762	–	0.0008	0.0746–0.0777
5 120	X5	Backfitting	Interior	0.0552	–	0.0007	0.0537–0.0566
5 120	X5	TDS	Boundary	0.0724	–	0.0011	0.0702–0.0746
5 120	X5	2SCALL	Boundary	0.1020	–	0.0014	0.0993–0.1047
5 120	X5	Backfitting	Boundary	0.0725	–	0.0011	0.0703–0.0748
5 120	X6	TDS	Interior	0.0594	–	0.0007	0.0581–0.0607
5 120	X6	2SCALL	Interior	0.0763	–	0.0008	0.0746–0.0779
5 120	X6	Backfitting	Interior	0.0593	–	0.0007	0.0580–0.0606
5 120	X6	TDS	Boundary	0.0968	–	0.0013	0.0941–0.0994
5 120	X6	2SCALL	Boundary	0.0816	–	0.0013	0.0790–0.0842
5 120	X6	Backfitting	Boundary	0.0967	–	0.0014	0.0941–0.0994
6 125	Intercept	TDS	Interior	0.0733	–	0.0006	0.0721–0.0745
6 125	Intercept	2SCALL	Interior	0.1022	–	0.0007	0.1008–0.1036
6 125	Intercept	Backfitting	Interior	0.0733	–	0.0006	0.0721–0.0745
6 125	Intercept	TDS	Boundary	0.1277	–	0.0015	0.1248–0.1305
6 125	Intercept	2SCALL	Boundary	0.1158	–	0.0015	0.1129–0.1186
6 125	Intercept	Backfitting	Boundary	0.1276	–	0.0015	0.1248–0.1305
6 125	X1	TDS	Interior	0.0150	–	0.0009	0.0133–0.0167
6 125	X1	2SCALL	Interior	0.0220	–	0.0007	0.0206–0.0234
6 125	X1	Backfitting	Interior	0.0166	–	0.0010	0.0146–0.0185
6 125	X1	TDS	Boundary	0.0180	–	0.0011	0.0157–0.0202
6 125	X1	2SCALL	Boundary	0.0291	–	0.0010	0.0272–0.0310
6 125	X1	Backfitting	Boundary	0.0199	–	0.0013	0.0173–0.0225
6 125	X2	TDS	Interior	0.0130	–	0.0007	0.0116–0.0145
6 125	X2	2SCALL	Interior	0.0204	–	0.0006	0.0192–0.0216
6 125	X2	Backfitting	Interior	0.0138	–	0.0008	0.0122–0.0153
6 125	X2	TDS	Boundary	0.0151	–	0.0009	0.0134–0.0168
6 125	X2	2SCALL	Boundary	0.0272	–	0.0009	0.0255–0.0290
6 125	X2	Backfitting	Boundary	0.0160	–	0.0009	0.0142–0.0179
6 125	X3	TDS	Interior	0.0678	–	0.0005	0.0668–0.0688
6 125	X3	2SCALL	Interior	0.0814	–	0.0009	0.0797–0.0831
6 125	X3	Backfitting	Interior	0.0678	–	0.0005	0.0668–0.0688
6 125	X3	TDS	Boundary	0.1242	–	0.0015	0.1213–0.1272
6 125	X3	2SCALL	Boundary	0.0972	–	0.0014	0.0944–0.0999
6 125	X3	Backfitting	Boundary	0.1242	–	0.0015	0.1213–0.1272
6 125	X4	TDS	Interior	0.0670	–	0.0004	0.0661–0.0679
6 125	X4	2SCALL	Interior	0.0765	–	0.0008	0.0749–0.0780
6 125	X4	Backfitting	Interior	0.0670	–	0.0004	0.0661–0.0679
6 125	X4	TDS	Boundary	0.1415	–	0.0015	0.1386–0.1444

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Table S1 – continued

N	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
6 125	X_4	2SCALL	Boundary	0.1013	–	0.0013	0.0988–0.1039
6 125	X_4	Backfitting	Boundary	0.1415	–	0.0015	0.1387–0.1444
6 125	X_5	TDS	Interior	0.0512	–	0.0005	0.0501–0.0523
6 125	X_5	2SCALL	Interior	0.0717	–	0.0007	0.0703–0.0731
6 125	X_5	Backfitting	Interior	0.0512	–	0.0005	0.0501–0.0523
6 125	X_5	TDS	Boundary	0.0685	–	0.0010	0.0666–0.0705
6 125	X_5	2SCALL	Boundary	0.0963	–	0.0013	0.0938–0.0988
6 125	X_5	Backfitting	Boundary	0.0685	–	0.0010	0.0666–0.0705
6 125	X_6	TDS	Interior	0.0552	–	0.0006	0.0540–0.0563
6 125	X_6	2SCALL	Interior	0.0709	–	0.0006	0.0696–0.0722
6 125	X_6	Backfitting	Interior	0.0552	–	0.0006	0.0540–0.0563
6 125	X_6	TDS	Boundary	0.0917	–	0.0011	0.0896–0.0939
6 125	X_6	2SCALL	Boundary	0.0786	–	0.0013	0.0761–0.0811
6 125	X_6	Backfitting	Boundary	0.0917	–	0.0011	0.0896–0.0939
7 220	Intercept	TDS	Interior	0.0698	–	0.0005	0.0687–0.0708
7 220	Intercept	2SCALL	Interior	0.0945	–	0.0008	0.0930–0.0961
7 220	Intercept	Backfitting	Interior	0.0698	–	0.0005	0.0687–0.0708
7 220	Intercept	TDS	Boundary	0.1228	–	0.0013	0.1202–0.1253
7 220	Intercept	2SCALL	Boundary	0.1096	–	0.0014	0.1069–0.1123
7 220	Intercept	Backfitting	Boundary	0.1228	–	0.0013	0.1202–0.1253
7 220	X_1	TDS	Interior	0.0138	–	0.0008	0.0122–0.0154
7 220	X_1	2SCALL	Interior	0.0195	–	0.0007	0.0182–0.0208
7 220	X_1	Backfitting	Interior	0.0148	–	0.0009	0.0130–0.0165
7 220	X_1	TDS	Boundary	0.0172	–	0.0011	0.0150–0.0194
7 220	X_1	2SCALL	Boundary	0.0270	–	0.0011	0.0249–0.0291
7 220	X_1	Backfitting	Boundary	0.0182	–	0.0012	0.0159–0.0205
7 220	X_2	TDS	Interior	0.0134	–	0.0008	0.0118–0.0150
7 220	X_2	2SCALL	Interior	0.0199	–	0.0007	0.0185–0.0212
7 220	X_2	Backfitting	Interior	0.0142	–	0.0009	0.0125–0.0159
7 220	X_2	TDS	Boundary	0.0160	–	0.0010	0.0140–0.0180
7 220	X_2	2SCALL	Boundary	0.0270	–	0.0011	0.0249–0.0291
7 220	X_2	Backfitting	Boundary	0.0168	–	0.0011	0.0148–0.0189
7 220	X_3	TDS	Interior	0.0644	–	0.0005	0.0635–0.0654
7 220	X_3	2SCALL	Interior	0.0760	–	0.0007	0.0746–0.0775
7 220	X_3	Backfitting	Interior	0.0644	–	0.0005	0.0635–0.0654
7 220	X_3	TDS	Boundary	0.1229	–	0.0013	0.1202–0.1255
7 220	X_3	2SCALL	Boundary	0.0930	–	0.0014	0.0903–0.0958
7 220	X_3	Backfitting	Boundary	0.1228	–	0.0013	0.1202–0.1255
7 220	X_4	TDS	Interior	0.0634	–	0.0005	0.0625–0.0643
7 220	X_4	2SCALL	Interior	0.0705	–	0.0008	0.0690–0.0720
7 220	X_4	Backfitting	Interior	0.0634	–	0.0005	0.0625–0.0643
7 220	X_4	TDS	Boundary	0.1369	–	0.0012	0.1346–0.1392
7 220	X_4	2SCALL	Boundary	0.0980	–	0.0013	0.0955–0.1006
7 220	X_4	Backfitting	Boundary	0.1369	–	0.0012	0.1346–0.1392
7 220	X_5	TDS	Interior	0.0477	–	0.0005	0.0466–0.0487
7 220	X_5	2SCALL	Interior	0.0671	–	0.0007	0.0657–0.0685
7 220	X_5	Backfitting	Interior	0.0476	–	0.0005	0.0466–0.0487

Continued on next page

Table S1 – continued

N	Coef.	Method	Region	RMSE	SD	MCSE	95% CI
7 220	X_5	TDS	Boundary	0.0644	–	0.0010	0.0624–0.0663
7 220	X_5	2SCALL	Boundary	0.0898	–	0.0014	0.0871–0.0925
7 220	X_5	Backfitting	Boundary	0.0644	–	0.0010	0.0624–0.0663
7 220	X_6	TDS	Interior	0.0541	–	0.0006	0.0530–0.0552
7 220	X_6	2SCALL	Interior	0.0675	–	0.0007	0.0662–0.0689
7 220	X_6	Backfitting	Interior	0.0542	–	0.0006	0.0531–0.0553
7 220	X_6	TDS	Boundary	0.0922	–	0.0010	0.0901–0.0942
7 220	X_6	2SCALL	Boundary	0.0766	–	0.0013	0.0741–0.0791
7 220	X_6	Backfitting	Boundary	0.0923	–	0.0011	0.0902–0.0943

Table S2: Calibration of the local uncertainty approximation. The evaluated metrics are: empirical coverage (EC); absolute coverage error at the 0.95 nominal level (CE); average interval width (AW); Interval Score (IS); false signal rate (FSR); mean of the local standard error ($\overline{SE}_{\text{local}}$); and empirical Monte Carlo standard deviation (SD_{MC}). An SE Ratio ($SD_{\text{MC}}/\overline{SE}_{\text{local}}$) close to 1 indicates adequate agreement between the empirical variability and the estimated uncertainty.

N	Method	Coef.	EC	CE	AW	IS	FSR	$\overline{SE}_{\text{local}}$	SD_{MC}	SE Ratio
1 125	TDS	Intercept	0.917	0.050	0.546	0.751	0.0000	0.1394	0.1183	0.849
1 125	TDS	X_1	0.966	0.060	0.162	0.183	0.0000	0.0414	0.0431	1.040
1 125	TDS	X_2	0.970	0.057	0.159	0.175	0.0000	0.0406	0.0404	0.996
1 125	TDS	X_3	0.920	0.034	0.473	0.660	0.0166	0.1208	0.1079	0.893
1 125	TDS	X_4	0.925	0.031	0.478	0.669	0.0000	0.1220	0.1067	0.874
1 125	TDS	X_5	0.917	0.051	0.375	0.521	0.0015	0.0958	0.0880	0.919
1 125	TDS	X_6	0.914	0.047	0.391	0.557	0.0104	0.0998	0.0882	0.884
1 125	2SCALL	Intercept	0.583	0.367	0.315	3.797	0.0000	0.0804	0.0945	1.175
1 125	2SCALL	X_1	0.768	0.185	0.130	0.427	0.0000	0.0333	0.0562	1.691
1 125	2SCALL	X_2	0.764	0.189	0.130	0.430	0.0000	0.0333	0.0571	1.717
1 125	2SCALL	X_3	0.568	0.382	0.298	1.911	0.0359	0.0761	0.1012	1.329
1 125	2SCALL	X_4	0.501	0.449	0.257	1.952	0.0000	0.0655	0.0941	1.435
1 125	2SCALL	X_5	0.453	0.497	0.217	2.199	0.0101	0.0555	0.0899	1.620
1 125	2SCALL	X_6	0.632	0.318	0.227	1.660	0.0065	0.0580	0.0874	1.506
1 125	Backfitting	Intercept	0.918	0.049	0.548	0.749	0.0000	0.1398	0.1188	0.850
1 125	Backfitting	X_1	0.964	0.060	0.166	0.191	0.0000	0.0422	0.0452	1.070
1 125	Backfitting	X_2	0.966	0.057	0.167	0.184	0.0000	0.0426	0.0442	1.037
1 125	Backfitting	X_3	0.921	0.034	0.477	0.662	0.0168	0.1217	0.1094	0.899
1 125	Backfitting	X_4	0.925	0.031	0.478	0.669	0.0000	0.1220	0.1068	0.876
1 125	Backfitting	X_5	0.914	0.053	0.372	0.522	0.0014	0.0950	0.0879	0.925
1 125	Backfitting	X_6	0.911	0.050	0.389	0.561	0.0103	0.0992	0.0882	0.889
5 120	TDS	Intercept	0.956	0.014	0.345	0.407	0.0000	0.0879	0.0661	0.752
5 120	TDS	X_1	0.977	0.055	0.079	0.084	0.0000	0.0201	0.0188	0.938
5 120	TDS	X_2	0.979	0.052	0.081	0.086	0.0000	0.0207	0.0195	0.943
5 120	TDS	X_3	0.971	0.022	0.347	0.388	0.0134	0.0885	0.0693	0.783
5 120	TDS	X_4	0.964	0.018	0.347	0.404	0.0000	0.0885	0.0682	0.771
5 120	TDS	X_5	0.956	0.027	0.234	0.272	0.0003	0.0597	0.0470	0.787
5 120	TDS	X_6	0.941	0.022	0.248	0.311	0.0029	0.0632	0.0493	0.781
5 120	2SCALL	Intercept	0.740	0.210	0.244	0.923	0.0000	0.0623	0.0696	1.117
5 120	2SCALL	X_1	0.761	0.193	0.059	0.207	0.0000	0.0151	0.0267	1.770
5 120	2SCALL	X_2	0.765	0.187	0.059	0.192	0.0000	0.0151	0.0257	1.700
5 120	2SCALL	X_3	0.696	0.254	0.195	0.693	0.0170	0.0499	0.0581	1.165
5 120	2SCALL	X_4	0.673	0.277	0.179	0.671	0.0000	0.0456	0.0547	1.199
5 120	2SCALL	X_5	0.678	0.272	0.168	0.636	0.0032	0.0428	0.0520	1.215
5 120	2SCALL	X_6	0.738	0.212	0.154	0.710	0.0027	0.0392	0.0486	1.239
5 120	Backfitting	Intercept	0.956	0.014	0.344	0.407	0.0000	0.0879	0.0661	0.752
5 120	Backfitting	X_1	0.971	0.056	0.082	0.091	0.0000	0.0208	0.0204	0.981
5 120	Backfitting	X_2	0.977	0.052	0.082	0.087	0.0000	0.0210	0.0198	0.945
5 120	Backfitting	X_3	0.971	0.022	0.347	0.388	0.0134	0.0885	0.0693	0.783
5 120	Backfitting	X_4	0.964	0.018	0.347	0.404	0.0000	0.0885	0.0682	0.771
5 120	Backfitting	X_5	0.956	0.027	0.234	0.272	0.0003	0.0598	0.0470	0.787

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Table S2 – continued

N	Method	Coef.	EC	CE	AW	IS	FSR	$\overline{SE}_{\text{local}}$	SD_{MC}	SE Ratio
5 120	Backfitting	X_6	0.941	0.022	0.247	0.310	0.0027	0.0629	0.0490	0.779
6 125	TDS	Intercept	0.959	0.017	0.328	0.385	0.0000	0.0837	0.0621	0.742
6 125	TDS	X_1	0.983	0.050	0.072	0.077	0.0000	0.0184	0.0174	0.942
6 125	TDS	X_2	0.988	0.050	0.065	0.067	0.0000	0.0165	0.0151	0.918
6 125	TDS	X_3	0.972	0.022	0.330	0.369	0.0122	0.0842	0.0652	0.774
6 125	TDS	X_4	0.967	0.019	0.330	0.379	0.0000	0.0842	0.0643	0.764
6 125	TDS	X_5	0.961	0.022	0.219	0.248	0.0003	0.0558	0.0429	0.768
6 125	TDS	X_6	0.944	0.018	0.230	0.286	0.0016	0.0586	0.0447	0.764
6 125	2SCALL	Intercept	0.750	0.200	0.229	0.844	0.0000	0.0585	0.0641	1.095
6 125	2SCALL	X_1	0.766	0.189	0.053	0.172	0.0000	0.0136	0.0231	1.703
6 125	2SCALL	X_2	0.800	0.153	0.053	0.144	0.0000	0.0135	0.0213	1.574
6 125	2SCALL	X_3	0.700	0.250	0.182	0.642	0.0166	0.0464	0.0531	1.146
6 125	2SCALL	X_4	0.672	0.278	0.168	0.618	0.0000	0.0429	0.0504	1.175
6 125	2SCALL	X_5	0.682	0.268	0.160	0.580	0.0033	0.0408	0.0485	1.188
6 125	2SCALL	X_6	0.758	0.192	0.149	0.638	0.0026	0.0380	0.0447	1.178
6 125	Backfitting	Intercept	0.959	0.017	0.328	0.385	0.0000	0.0837	0.0621	0.742
6 125	Backfitting	X_1	0.982	0.048	0.078	0.084	0.0000	0.0199	0.0196	0.985
6 125	Backfitting	X_2	0.986	0.049	0.067	0.069	0.0000	0.0171	0.0160	0.940
6 125	Backfitting	X_3	0.972	0.022	0.330	0.369	0.0122	0.0842	0.0652	0.775
6 125	Backfitting	X_4	0.967	0.018	0.330	0.379	0.0000	0.0842	0.0643	0.764
6 125	Backfitting	X_5	0.961	0.022	0.219	0.248	0.0003	0.0558	0.0429	0.769
6 125	Backfitting	X_6	0.944	0.018	0.230	0.286	0.0016	0.0586	0.0447	0.764
7 220	TDS	Intercept	0.960	0.016	0.314	0.364	0.0000	0.0801	0.0593	0.739
7 220	TDS	X_1	0.981	0.051	0.068	0.074	0.0000	0.0175	0.0162	0.930
7 220	TDS	X_2	0.970	0.058	0.065	0.071	0.0000	0.0165	0.0157	0.952
7 220	TDS	X_3	0.972	0.023	0.315	0.352	0.0118	0.0804	0.0617	0.767
7 220	TDS	X_4	0.969	0.020	0.315	0.358	0.0000	0.0804	0.0606	0.753
7 220	TDS	X_5	0.965	0.023	0.208	0.231	0.0002	0.0531	0.0402	0.758
7 220	TDS	X_6	0.934	0.027	0.218	0.286	0.0021	0.0557	0.0437	0.785
7 220	2SCALL	Intercept	0.762	0.188	0.219	0.751	0.0000	0.0559	0.0609	1.089
7 220	2SCALL	X_1	0.793	0.163	0.049	0.145	0.0000	0.0126	0.0206	1.641
7 220	2SCALL	X_2	0.784	0.173	0.050	0.154	0.0000	0.0127	0.0210	1.655
7 220	2SCALL	X_3	0.716	0.234	0.174	0.584	0.0147	0.0444	0.0504	1.136
7 220	2SCALL	X_4	0.708	0.242	0.163	0.535	0.0000	0.0416	0.0478	1.149
7 220	2SCALL	X_5	0.694	0.256	0.151	0.534	0.0022	0.0385	0.0455	1.181
7 220	2SCALL	X_6	0.757	0.193	0.142	0.610	0.0028	0.0362	0.0434	1.199
7 220	Backfitting	Intercept	0.960	0.016	0.314	0.364	0.0000	0.0801	0.0593	0.740
7 220	Backfitting	X_1	0.980	0.050	0.071	0.077	0.0000	0.0182	0.0174	0.954
7 220	Backfitting	X_2	0.967	0.057	0.068	0.075	0.0000	0.0173	0.0168	0.974
7 220	Backfitting	X_3	0.972	0.022	0.315	0.352	0.0118	0.0804	0.0617	0.768
7 220	Backfitting	X_4	0.969	0.020	0.315	0.358	0.0000	0.0804	0.0606	0.753
7 220	Backfitting	X_5	0.965	0.023	0.208	0.231	0.0002	0.0530	0.0402	0.758
7 220	Backfitting	X_6	0.935	0.026	0.219	0.286	0.0022	0.0560	0.0440	0.787

Table S3: In-sample fit and computational performance. The fitted RMSE reflects the fit to the values observed within the sample itself, and does not correspond to out-of-sample predictive performance. The success metric denotes executions without numerical failures. Times are described by their median and interquartile range [Q1–Q3], extracted from the 100 executions.

Method	N_{target}	Observed N	Fitted RMSE, mean (SD)	Executions	Success	Median time [Q1–Q3] (s)
TDS	1 000	1 125	0.6358 (0.0214)	100/100	100%	132.6 (112.0–154.2)
2SCALL	1 000	1 125	0.7314 (0.0156)	100/100	100%	124.1 (116.9–128.6)
Backfitting	1 000	1 125	0.6345 (0.0225)	100/100	100%	570.0 (524.3–602.0)
TDS	5 000	5 120	0.6785 (0.0067)	100/100	100%	2805.4 (2479.7–3083.2)
2SCALL	5 000	5 120	0.6954 (0.0070)	100/100	100%	2132.1 (2006.5–2283.6)
Backfitting	5 000	5 120	0.6785 (0.0065)	100/100	100%	9885.1 (9231.2–11209.9)
TDS	6 000	6 125	0.6811 (0.0064)	100/100	100%	3084.7 (2496.8–3481.5)
2SCALL	6 000	6 125	0.6963 (0.0065)	100/100	100%	2949.3 (2567.5–3266.8)
Backfitting	6 000	6 125	0.6809 (0.0065)	100/100	100%	10314.3 (9478.4–11426.6)
TDS	7 000	7 220	0.6841 (0.0053)	100/100	100%	4618.2 (3980.7–5080.9)
2SCALL	7 000	7 220	0.6972 (0.0059)	100/100	100%	4168.0 (3770.1–4485.4)
Backfitting	7 000	7 220	0.6839 (0.0054)	100/100	100%	15931.1 (14179.4–17441.4)

Table S4: Raw simulation results for the computational scaling experiment. Elapsed time is measured in seconds, whilst peak memory reflects R’s managed memory in gigabytes. All recorded runs were completed successfully without numerical failures. The spatial (h_S) and temporal (h_T) bandwidths are reported in the order of the seven model coefficients (intercept, $X_1, \dots, X_6$). The fitted RMSE represents the in-sample adherence and does not measure true surface recovery nor out-of-sample predictive performance.

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
1	TDS	1 000	1 125	162.2	0.131	2.93; 15.00; 15.00; 2.93; 2.93; 4.79; 3.86	5.00; 5.00; 2.00; 3.00; 5.00; 2.00; 5.00	0.6478
1	2SCALL	1 000	1 125	139.4	0.135	5.39; 19.80; 19.80; 6.27; 8.43; 11.12; 8.12	5.00; 4.61; 5.00; 5.00; 5.00; 2.24; 5.00	0.7349
2	2SCALL	1 000	1 125	147.8	0.135	5.39; 19.80; 19.80; 6.80; 7.70; 7.53; 9.42	5.00; 5.00; 5.00; 5.00; 5.00; 3.00; 5.00	0.7405
2	TDS	1 000	1 125	192.0	0.145	2.93; 15.00; 6.64; 2.93; 2.93; 3.86; 3.86	3.00; 5.00; 3.00; 3.00; 4.00; 2.00; 5.00	0.6229
3	TDS	1 000	1 125	163.6	0.131	2.93; 12.21; 13.14; 2.93; 2.93; 4.79; 3.86	3.00; 5.00; 2.00; 3.00; 5.00; 2.00; 5.00	0.6382
3	2SCALL	1 000	1 125	140.6	0.135	5.39; 19.07; 19.80; 5.79; 6.06; 10.69; 8.28	5.00; 5.00; 3.00; 5.00; 5.00; 3.00; 5.00	0.7218
4	2SCALL	1 000	1 125	134.3	0.135	5.39; 18.04; 19.80; 5.83; 6.21; 8.90; 6.97	5.00; 2.86; 2.00; 5.00; 5.00; 2.00; 4.45	0.7219
4	TDS	1 000	1 125	148.1	0.144	2.93; 15.00; 15.00; 2.93; 2.93; 4.79; 3.86	3.00; 5.00; 1.00; 3.00; 4.00; 2.00; 5.00	0.6418
5	TDS	1 000	1 125	168.1	0.131	2.93; 11.29; 15.00; 2.93; 2.93; 4.79; 3.86	5.00; 5.00; 2.00; 4.00; 5.00; 2.00; 5.00	0.6606
5	2SCALL	1 000	1 125	131.8	0.135	5.39; 17.18; 19.80; 5.60; 10.50; 11.57; 8.26	5.00; 4.00; 5.00; 5.00; 5.00; 3.00; 5.00	0.7441
6	2SCALL	1 000	1 125	130.2	0.135	5.39; 19.80; 19.80; 6.13; 7.69; 8.51; 7.60	5.00; 5.00; 2.32; 5.00; 5.00; 3.00; 5.00	0.7542
6	TDS	1 000	1 125	156.8	0.144	2.93; 4.79; 10.36; 2.93; 2.93; 4.79; 3.86	3.00; 4.00; 1.00; 3.00; 5.00; 2.00; 5.00	0.6510
7	TDS	1 000	1 125	184.0	0.131	2.00; 15.00; 13.14; 2.93; 2.93; 4.79; 3.86	5.00; 2.00; 3.00; 3.00; 3.00; 1.00; 4.00	0.5802
7	2SCALL	1 000	1 125	137.3	0.135	5.39; 19.80; 19.80; 5.39; 6.20; 6.26; 6.98	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 4.71	0.6975

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Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
8	2SCALL	1000	1125	135.4	0.135	5.39; 19.80; 19.80; 6.22; 5.86; 6.48; 8.05	5.00; 5.00; 5.00; 5.00; 5.00; 3.00; 5.00	0.7383
8	TDS	1000	1125	162.3	0.145	2.93; 15.00; 15.00; 2.93; 2.93; 3.86; 4.79	4.00; 5.00; 2.00; 3.00; 5.00; 2.00; 5.00	0.6520
9	TDS	1000	1125	178.3	0.131	2.93; 15.00; 15.00; 2.93; 2.00; 4.79; 3.86	3.00; 4.00; 2.00; 3.00; 5.00; 2.00; 5.00	0.6315
9	2SCALL	1000	1125	130.9	0.135	5.39; 19.80; 19.80; 5.91; 7.46; 7.73; 7.66	5.00; 2.20; 5.00; 5.00; 5.00; 3.00; 3.00	0.7280
10	2SCALL	1000	1125	137.7	0.135	5.39; 19.56; 19.80; 5.67; 6.93; 9.09; 9.28	5.00; 5.00; 5.00; 5.00; 5.00; 3.00; 5.00	0.7140
10	TDS	1000	1125	182.2	0.145	2.00; 8.50; 15.00; 2.93; 2.93; 3.86; 3.86	3.00; 5.00; 2.00; 3.00; 4.00; 2.00; 5.00	0.5793
11	TDS	1000	1125	176.7	0.131	2.93; 10.36; 3.86; 2.93; 2.93; 3.86; 3.86	4.00; 3.00; 4.00; 3.00; 5.00; 2.00; 5.00	0.6255
11	2SCALL	1000	1125	140.1	0.135	5.39; 19.80; 19.80; 5.69; 6.30; 9.77; 7.11	5.00; 4.22; 5.00; 5.00; 5.00; 3.00; 5.00	0.7360
12	2SCALL	1000	1125	142.4	0.135	5.39; 19.80; 19.80; 5.97; 7.70; 6.99; 8.91	5.00; 5.00; 2.00; 5.00; 5.00; 3.00; 3.00	0.7173
12	TDS	1000	1125	155.1	0.144	2.93; 15.00; 14.07; 2.93; 2.93; 5.71; 2.93	4.00; 5.00; 2.00; 3.00; 5.00; 1.00; 5.00	0.6315
13	TDS	1000	1125	158.4	0.131	2.93; 15.00; 15.00; 2.93; 2.93; 3.86; 3.86	5.00; 1.00; 1.00; 3.00; 5.00; 3.00; 5.00	0.6599
13	2SCALL	1000	1125	135.8	0.135	5.39; 19.80; 19.80; 5.74; 6.53; 11.21; 8.32	5.00; 5.00; 3.00; 5.00; 5.00; 3.00; 5.00	0.7592
14	2SCALL	1000	1125	134.0	0.135	5.39; 19.80; 19.80; 5.78; 8.46; 6.84; 7.90	5.00; 5.00; 4.00; 5.00; 5.00; 3.00; 5.00	0.7254
14	TDS	1000	1125	150.8	0.145	2.93; 15.00; 13.14; 2.93; 3.86; 3.86; 3.86	4.00; 3.00; 2.00; 3.00; 3.00; 2.00; 3.00	0.6261
15	TDS	1000	1125	127.7	0.131	2.00; 10.36; 9.43; 2.93; 2.93; 3.86; 3.86	5.00; 2.00; 2.00; 3.00; 4.00; 2.00; 5.00	0.5998
15	2SCALL	1000	1125	80.6	0.135	5.39; 19.80; 19.61; 5.64; 6.79; 9.37; 8.46	5.00; 2.00; 4.25; 5.00; 5.00; 2.30; 4.44	0.7159
16	2SCALL	1000	1125	82.4	0.135	5.39; 19.80; 19.80; 5.52; 6.65; 9.51; 8.06	2.71; 5.00; 5.00; 5.00; 4.93; 2.00; 5.00	0.7295
16	TDS	1000	1125	107.9	0.144	2.93; 15.00; 15.00; 2.93; 2.93; 4.79; 3.86	3.00; 1.00; 2.00; 2.00; 3.00; 1.00; 5.00	0.6097

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
17	TDS	1 000	1 125	170.3	0.131	2.93; 15.00; 15.00; 2.93; 2.93; 4.79; 3.86	4.00; 5.00; 2.00; 3.00; 5.00; 2.00; 5.00	0.6600
17	2SCALL	1 000	1 125	148.8	0.135	5.39; 19.80; 19.80; 5.39; 6.36; 19.80; 9.76	5.00; 5.00; 5.00; 5.00; 5.00; 3.00; 5.00	0.7482
18	2SCALL	1 000	1 125	126.9	0.135	5.39; 19.80; 19.80; 5.58; 7.55; 10.36; 8.60	5.00; 5.00; 4.37; 5.00; 5.00; 2.00; 5.00	0.7387
18	TDS	1 000	1 125	164.7	0.144	2.93; 15.00; 15.00; 2.93; 2.93; 4.79; 3.86	3.00; 5.00; 2.00; 4.00; 5.00; 2.00; 5.00	0.6486
19	TDS	1 000	1 125	191.0	0.131	2.93; 15.00; 15.00; 2.93; 2.93; 4.79; 4.79	5.00; 5.00; 3.00; 3.00; 5.00; 2.00; 4.00	0.6743
19	2SCALL	1 000	1 125	128.1	0.135	5.39; 19.80; 19.80; 5.75; 6.45; 9.73; 8.51	3.00; 5.00; 5.00; 5.00; 5.00; 2.52; 5.00	0.7440
20	2SCALL	1 000	1 125	144.4	0.135	5.39; 19.80; 19.80; 6.35; 5.95; 11.07; 9.56	5.00; 5.00; 5.00; 5.00; 4.00; 2.39; 5.00	0.7435
20	TDS	1 000	1 125	174.5	0.145	2.00; 15.00; 15.00; 2.93; 2.93; 4.79; 3.86	5.00; 5.00; 2.00; 4.00; 5.00; 2.00; 5.00	0.6462
21	TDS	1 000	1 125	179.7	0.131	2.00; 15.00; 6.64; 2.93; 2.93; 4.79; 3.86	5.00; 1.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6059
21	2SCALL	1 000	1 125	129.6	0.135	5.39; 17.99; 10.48; 5.58; 6.25; 9.51; 7.30	5.00; 3.00; 3.00; 5.00; 5.00; 2.03; 5.00	0.7286
22	2SCALL	1 000	1 125	142.7	0.135	5.39; 17.68; 19.80; 6.09; 9.82; 8.37; 7.54	5.00; 5.00; 3.00; 5.00; 3.00; 2.00; 5.00	0.7326
22	TDS	1 000	1 125	164.4	0.145	2.93; 15.00; 15.00; 3.86; 2.93; 4.79; 4.79	5.00; 4.00; 1.00; 4.00; 4.00; 2.00; 5.00	0.6646
23	TDS	1 000	1 125	113.3	0.145	2.93; 15.00; 15.00; 2.93; 2.93; 3.86; 3.86	3.00; 5.00; 2.00; 3.00; 4.00; 2.00; 5.00	0.6451
23	2SCALL	1 000	1 125	77.8	0.159	5.39; 19.80; 19.80; 6.13; 6.94; 7.66; 10.47	5.00; 2.33; 5.00; 5.00; 5.00; 2.00; 5.00	0.7434
24	2SCALL	1 000	1 125	87.0	0.159	5.39; 19.80; 19.80; 6.66; 9.34; 8.42; 9.23	5.00; 5.00; 2.53; 5.00; 5.00; 3.00; 3.00	0.7513
24	TDS	1 000	1 125	99.8	0.146	2.00; 12.21; 15.00; 2.93; 2.93; 3.86; 3.86	5.00; 5.00; 1.00; 4.00; 5.00; 2.00; 5.00	0.6183
25	TDS	1 000	1 125	141.3	0.145	2.00; 15.00; 15.00; 2.93; 2.93; 4.79; 2.93	4.00; 5.00; 2.00; 3.00; 4.00; 2.00; 5.00	0.5974
25	2SCALL	1 000	1 125	71.1	0.159	5.39; 19.80; 19.80; 5.73; 9.93; 10.23; 8.14	4.00; 4.41; 3.00; 5.00; 5.00; 3.00; 5.00	0.7313

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
26	2SCALL	1 000	1 125	89.3	0.159	5.39; 19.80; 19.80; 5.52; 7.03; 9.84; 9.77	5.00; 5.00; 5.00; 5.00; 5.00; 3.00; 4.00	0.7341
26	TDS	1 000	1 125	85.7	0.146	2.93; 14.07; 11.29; 2.93; 2.93; 4.79; 3.86	4.00; 5.00; 1.00; 3.00; 5.00; 2.00; 5.00	0.6408
27	TDS	1 000	1 125	86.4	0.145	2.93; 15.00; 15.00; 2.93; 2.93; 3.86; 2.93	2.00; 3.00; 3.00; 3.00; 5.00; 2.00; 5.00	0.6225
27	2SCALL	1 000	1 125	71.9	0.159	5.39; 19.80; 13.62; 5.86; 5.99; 6.90; 6.61	4.00; 4.00; 4.00; 3.13; 5.00; 2.68; 5.00	0.7186
28	2SCALL	1 000	1 125	86.6	0.159	5.39; 19.80; 19.80; 5.46; 7.04; 10.38; 7.72	5.00; 5.00; 5.00; 5.00; 3.02; 2.00; 5.00	0.7572
28	TDS	1 000	1 125	83.3	0.146	2.93; 13.14; 15.00; 3.86; 2.93; 4.79; 3.86	5.00; 2.00; 2.00; 2.00; 3.00; 2.00; 5.00	0.6661
29	TDS	1 000	1 125	96.6	0.145	2.93; 5.71; 15.00; 2.93; 2.93; 4.79; 3.86	4.00; 5.00; 2.00; 3.00; 5.00; 2.00; 5.00	0.6454
29	2SCALL	1 000	1 125	74.4	0.159	5.39; 19.80; 19.80; 5.82; 8.39; 9.33; 7.83	5.00; 4.82; 4.00; 5.00; 5.00; 3.00; 5.00	0.7291
30	2SCALL	1 000	1 125	86.6	0.159	5.39; 19.80; 19.80; 5.78; 6.78; 10.78; 7.34	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.7374
30	TDS	1 000	1 125	69.9	0.146	2.93; 15.00; 15.00; 2.93; 2.93; 3.86; 3.86	3.00; 5.00; 4.00; 3.00; 4.00; 2.00; 2.00	0.6392
1	TDS	5 000	5 120	2 558.9	0.955	4.14; 32.00; 32.00; 6.29; 4.14; 8.43; 6.29	3.00; 5.00; 2.00; 2.00; 3.00; 1.00; 5.00	0.6671
1	2SCALL	5 000	5 120	1 987.6	0.947	6.23; 36.70; 39.71; 8.18; 8.44; 9.85; 9.15	5.00; 4.69; 3.00; 5.00; 5.00; 2.00; 5.00	0.6850
2	2SCALL	5 000	5 120	1 793.3	1.139	6.10; 43.84; 43.84; 8.48; 8.30; 8.28; 10.13	5.00; 4.48; 4.00; 5.00; 5.00; 2.00; 4.00	0.6969
2	TDS	5 000	5 120	3 325.5	0.887	4.14; 10.57; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 4.00; 1.00; 3.00; 3.00; 1.00; 5.00	0.6701
3	TDS	5 000	5 120	3 287.0	0.955	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 3.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6658
3	2SCALL	5 000	5 120	1 940.4	1.130	6.02; 43.84; 43.84; 8.07; 8.30; 9.42; 9.99	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6882
4	2SCALL	5 000	5 120	2 096.0	1.139	6.18; 43.84; 43.84; 8.47; 9.57; 9.92; 9.68	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6855

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
4	TDS	5 000	5 120	2 862.8	0.888	4.14; 27.71; 32.00; 4.14; 4.14; 8.43; 4.14	3.00; 5.00; 2.00; 3.00; 5.00; 1.00; 5.00	0.6580
5	TDS	5 000	5 120	3 108.5	0.955	4.14; 32.00; 25.57; 4.14; 4.14; 8.43; 6.29	4.00; 5.00; 2.00; 3.00; 5.00; 1.00; 5.00	0.6727
5	2SCALL	5 000	5 120	2 502.1	1.130	6.23; 43.84; 43.84; 8.33; 8.67; 9.10; 11.09	5.00; 5.00; 2.86; 5.00; 4.07; 2.00; 5.00	0.6950
6	2SCALL	5 000	5 120	2 009.9	1.140	6.22; 43.84; 43.84; 7.75; 8.51; 9.19; 9.61	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6849
6	TDS	5 000	5 120	3 412.1	1.060	4.14; 32.00; 10.57; 6.29; 4.14; 8.43; 6.29	3.00; 5.00; 3.00; 2.00; 4.00; 1.00; 5.00	0.6663
7	TDS	5 000	5 120	3 194.0	0.955	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	2.00; 5.00; 1.00; 2.00; 5.00; 1.00; 5.00	0.6579
7	2SCALL	5 000	5 120	2 267.9	1.130	6.18; 43.84; 43.84; 8.75; 8.51; 9.97; 10.20	4.45; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6937
8	2SCALL	5 000	5 120	2 174.4	1.139	6.16; 43.84; 43.84; 8.38; 8.19; 9.63; 10.94	5.00; 5.00; 4.00; 5.00; 5.00; 2.00; 3.00	0.6858
8	TDS	5 000	5 120	2 241.3	0.888	4.14; 29.86; 32.00; 4.14; 4.14; 8.43; 6.29	4.00; 5.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6674
9	TDS	5 000	5 120	2 973.5	0.955	4.14; 14.86; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6632
9	2SCALL	5 000	5 120	1 969.3	0.948	5.94; 43.84; 43.84; 8.26; 8.09; 9.73; 9.94	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6847
10	2SCALL	5 000	5 120	2 133.1	1.139	5.71; 43.84; 43.84; 7.92; 8.34; 9.36; 10.65	5.00; 5.00; 5.00; 4.00; 5.00; 2.00; 4.60	0.6830
10	TDS	5 000	5 120	3 065.6	0.888	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 4.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6547
11	TDS	5 000	5 120	3 003.5	0.955	4.14; 17.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 3.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6622
11	2SCALL	5 000	5 120	2 005.0	1.131	6.16; 43.84; 43.84; 7.50; 8.17; 8.61; 10.24	5.00; 4.00; 5.00; 4.31; 5.00; 2.00; 5.00	0.6874
12	2SCALL	5 000	5 120	2 414.8	1.139	6.17; 43.84; 43.84; 7.78; 8.64; 9.38; 10.13	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.7033
12	TDS	5 000	5 120	3 274.8	0.888	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 4.00; 2.00; 2.00; 3.00; 1.00; 5.00	0.6710
13	TDS	5 000	5 120	4 602.6	0.955	4.14; 32.00; 32.00; 6.29; 4.14; 8.43; 6.29	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6792

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
13	2SCALL	5 000	5 120	1 750.9	0.948	6.31; 43.84; 30.09; 7.75; 8.50; 10.14; 10.25	5.00; 5.00; 4.00; 5.00; 5.00; 2.04; 5.00	0.6970
14	2SCALL	5 000	5 120	2 597.6	1.139	6.12; 43.84; 43.84; 8.40; 7.77; 9.69; 11.12	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.7019
14	TDS	5 000	5 120	2 674.1	0.888	4.14; 10.57; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6762
15	TDS	5 000	5 120	3 312.9	0.955	4.14; 32.00; 32.00; 6.29; 4.14; 8.43; 6.29	3.00; 4.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6908
15	2SCALL	5 000	5 120	2 079.5	0.948	6.01; 43.15; 43.84; 8.50; 8.38; 9.37; 11.08	5.00; 3.03; 4.53; 5.00; 5.00; 2.00; 4.84	0.7093
16	2SCALL	5 000	5 120	2 097.2	1.139	6.47; 43.84; 43.84; 8.45; 9.12; 9.29; 8.45	5.00; 5.00; 2.00; 5.00; 5.00; 2.00; 5.00	0.7063
16	TDS	5 000	5 120	3 278.6	0.888	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	4.00; 5.00; 1.00; 3.00; 4.00; 1.00; 5.00	0.6837
17	TDS	5 000	5 120	3 185.2	0.955	4.14; 32.00; 32.00; 6.29; 4.14; 8.43; 6.29	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6686
17	2SCALL	5 000	5 120	2 007.7	0.948	6.23; 43.84; 41.03; 7.92; 8.61; 9.32; 10.90	5.00; 2.90; 5.00; 4.49; 5.00; 1.94; 5.00	0.6796
18	2SCALL	5 000	5 120	2 587.3	1.139	6.13; 43.84; 43.84; 8.50; 8.11; 8.10; 10.37	5.00; 3.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6906
18	TDS	5 000	5 120	3 187.5	0.890	4.14; 32.00; 32.00; 6.29; 4.14; 8.43; 6.29	3.00; 5.00; 2.00; 2.00; 5.00; 1.00; 5.00	0.6803
19	TDS	5 000	5 120	3 318.4	0.955	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6785
19	2SCALL	5 000	5 120	2 113.8	0.948	5.90; 43.84; 43.84; 8.53; 9.72; 9.66; 9.59	5.00; 5.00; 4.58; 5.00; 5.00; 2.00; 5.00	0.7011
20	2SCALL	5 000	5 120	2 585.1	1.139	6.45; 36.31; 43.84; 7.31; 8.72; 9.50; 9.59	5.00; 2.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6958
20	TDS	5 000	5 120	3 078.5	0.887	4.14; 23.43; 32.00; 4.14; 4.14; 8.43; 4.14	4.00; 1.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6612
21	TDS	5 000	5 120	3 197.1	0.955	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 4.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6749
21	2SCALL	5 000	5 120	2 246.5	0.949	5.97; 43.84; 43.84; 8.11; 9.39; 8.39; 9.63	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6957
22	2SCALL	5 000	5 120	2 030.3	1.139	6.04; 43.84; 38.08; 8.09; 8.84; 9.19; 10.16	4.94; 5.00; 2.00; 5.00; 4.81; 2.00; 4.60	0.7023

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
22	TDS	5 000	5 120	3 391.5	0.887	4.14; 32.00; 21.29; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 1.00; 3.00; 4.00; 1.00; 5.00	0.6793
23	TDS	5 000	5 120	2 054.0	0.949	4.14; 21.29; 32.00; 4.14; 4.14; 8.43; 6.29	4.00; 5.00; 1.00; 2.00; 5.00; 1.00; 5.00	0.6815
23	2SCALL	5 000	5 120	1 397.4	0.969	6.37; 43.84; 43.84; 7.94; 8.76; 10.00; 9.20	5.00; 4.02; 5.00; 5.00; 5.00; 2.00; 5.00	0.7073
24	2SCALL	5 000	5 120	1 468.9	0.969	6.20; 43.84; 43.84; 8.30; 8.79; 9.42; 10.65	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6931
24	TDS	5 000	5 120	1 511.1	0.949	4.14; 32.00; 32.00; 6.29; 4.14; 6.29; 4.14	3.00; 5.00; 2.00; 2.00; 5.00; 2.00; 5.00	0.6712
25	TDS	5 000	5 120	1 850.4	0.949	4.14; 32.00; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 1.00; 3.00; 5.00; 1.00; 2.00	0.6614
25	2SCALL	5 000	5 120	1 341.8	0.968	6.15; 33.73; 43.84; 8.25; 8.87; 9.18; 9.75	5.00; 5.00; 2.00; 5.00; 5.00; 2.00; 4.00	0.6879
26	2SCALL	5 000	5 120	1 545.9	0.969	6.14; 41.28; 38.59; 8.06; 8.82; 10.39; 10.87	5.00; 5.00; 4.70; 5.00; 5.00; 2.00; 5.00	0.6959
26	TDS	5 000	5 120	1 587.3	0.949	4.14; 27.71; 25.57; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 1.00; 3.00; 4.00; 1.00; 5.00	0.6699
27	TDS	5 000	5 120	2 308.2	0.881	4.14; 32.00; 32.00; 6.29; 4.14; 8.43; 4.14	3.00; 5.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6834
27	2SCALL	5 000	5 120	1 374.0	0.968	6.35; 43.84; 43.84; 7.97; 8.54; 9.05; 10.28	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 3.20	0.7054
28	2SCALL	5 000	5 120	1 536.9	0.969	6.04; 43.84; 43.84; 8.27; 8.90; 9.67; 10.99	5.00; 4.00; 5.00; 5.00; 4.00; 2.00; 5.00	0.6956
28	TDS	5 000	5 120	1 705.0	0.949	4.14; 32.00; 10.57; 4.14; 4.14; 8.43; 6.29	3.00; 3.00; 2.00; 3.00; 4.00; 1.00; 5.00	0.6683
29	TDS	5 000	5 120	1 740.4	0.949	4.14; 19.14; 32.00; 4.14; 4.14; 8.43; 6.29	3.00; 5.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6705
29	2SCALL	5 000	5 120	1 296.9	0.968	6.28; 34.55; 43.84; 8.22; 9.28; 9.39; 10.39	4.14; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.7008
30	2SCALL	5 000	5 120	1 374.1	0.969	6.20; 43.84; 43.84; 7.75; 8.36; 9.52; 10.30	5.00; 5.00; 5.00; 4.00; 4.00; 2.00; 5.00	0.6955
30	TDS	5 000	5 120	1 536.2	0.949	4.14; 29.86; 32.00; 4.14; 4.14; 8.43; 6.29	4.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6702

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
1	TDS	10 000	10 125	13 373.2	3.429	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6784
1	2SCALL	10 000	10 125	5 598.7	3.420	7.60; 62.23; 62.23; 9.61; 10.57; 10.99; 13.20	5.00; 5.00; 5.00; 2.17; 5.00; 2.00; 5.00	0.6949
2	2SCALL	10 000	10 125	6 081.0	4.105	7.48; 62.23; 62.23; 10.11; 10.45; 11.29; 11.97	5.00; 5.00; 3.00; 5.00; 5.00; 2.00; 4.00	0.7047
2	TDS	10 000	10 125	6 806.6	3.169	5.07; 45.00; 45.00; 8.14; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6966
3	TDS	10 000	10 125	6 478.2	3.429	5.07; 17.36; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6847
3	2SCALL	10 000	10 125	5 354.2	3.419	7.49; 27.12; 62.23; 9.81; 10.93; 11.78; 11.60	5.00; 5.00; 4.71; 5.00; 4.83; 2.00; 5.00	0.7010
4	2SCALL	10 000	10 125	10 249.6	4.106	7.54; 62.23; 62.23; 9.79; 10.18; 10.80; 11.88	5.00; 5.00; 2.00; 5.00; 2.30; 2.00; 5.00	0.6953
4	TDS	10 000	10 125	6 692.6	3.167	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6816
5	TDS	10 000	10 125	6 660.9	3.429	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6870
5	2SCALL	10 000	10 125	5 836.5	3.420	7.53; 62.23; 62.23; 9.54; 10.80; 10.91; 12.92	5.00; 4.00; 5.00; 5.00; 4.19; 2.00; 5.00	0.7052
6	2SCALL	10 000	10 125	5 733.2	4.105	7.76; 62.23; 52.42; 9.99; 11.03; 11.46; 10.79	5.00; 5.00; 5.00; 5.00; 5.00; 1.58; 4.00	0.6994
6	TDS	10 000	10 125	6 700.6	3.166	5.07; 35.79; 45.00; 8.14; 5.07; 11.21; 8.14	3.00; 5.00; 2.00; 2.00; 3.00; 1.00; 4.00	0.6924
7	TDS	10 000	10 125	6 849.5	3.429	5.07; 45.00; 23.50; 5.07; 5.07; 11.21; 8.14	3.00; 1.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6788
7	2SCALL	10 000	10 125	6 033.4	3.422	7.63; 62.23; 62.23; 9.45; 10.41; 11.25; 12.63	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6950
8	2SCALL	10 000	10 125	5 958.8	4.105	7.81; 62.23; 62.23; 9.78; 10.63; 11.04; 12.70	5.00; 2.00; 5.00; 5.00; 5.00; 1.90; 5.00	0.7042
8	TDS	10 000	10 125	6 153.0	3.169	5.07; 32.71; 45.00; 8.14; 5.07; 11.21; 8.14	3.00; 5.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6997
9	TDS	10 000	10 125	6 718.6	3.429	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6779

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
9	2SCALL	10 000	10 125	5 574.1	3.421	7.71; 62.23; 62.23; 9.71; 10.03; 12.46; 12.14	5.00; 5.00; 4.41; 4.00; 4.06; 2.00; 5.00	0.6943
10	2SCALL	10 000	10 125	8 636.3	4.106	7.35; 62.23; 62.23; 10.09; 10.43; 10.85; 11.01	5.00; 4.00; 5.00; 5.00; 4.62; 2.00; 5.00	0.6963
10	TDS	10 000	10 125	8 347.2	3.167	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 2.00; 2.00; 4.00; 1.00; 5.00	0.6808
11	TDS	10 000	10 125	6 519.1	3.429	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 1.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6800
11	2SCALL	10 000	10 125	6 088.2	3.422	7.85; 62.23; 54.40; 9.08; 10.71; 10.62; 12.33	5.00; 2.00; 4.00; 5.00; 5.00; 2.00; 5.00	0.7004
12	2SCALL	10 000	10 125	5 690.6	4.104	7.81; 43.56; 62.23; 9.83; 11.37; 10.56; 12.92	5.00; 3.00; 5.00; 5.00; 5.00; 2.00; 5.00	0.6979
12	TDS	10 000	10 125	6 321.6	3.165	5.07; 29.64; 45.00; 5.07; 5.07; 8.14; 8.14	3.00; 3.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6750
13	TDS	10 000	10 125	12 696.4	3.429	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6676
13	2SCALL	10 000	10 125	5 795.6	3.421	7.50; 62.23; 62.23; 9.11; 10.12; 10.68; 12.94	5.00; 5.00; 5.00; 5.00; 5.00; 1.58; 5.00	0.6828
14	2SCALL	10 000	10 125	10 280.5	4.104	7.51; 62.23; 62.23; 9.73; 11.48; 11.11; 11.75	4.97; 5.00; 5.00; 5.00; 5.00; 2.00; 4.89	0.7017
14	TDS	10 000	10 125	7 941.1	3.169	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 5.07	3.00; 3.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6795
15	TDS	10 000	10 125	13 255.0	3.429	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6854
15	2SCALL	10 000	10 125	5 319.1	3.420	7.63; 62.23; 62.23; 9.57; 10.77; 10.88; 13.36	5.00; 5.00; 3.17; 4.96; 4.00; 1.58; 5.00	0.7006
16	2SCALL	10 000	10 125	6 058.3	3.433	7.48; 62.23; 62.23; 9.81; 10.74; 10.63; 11.96	5.00; 5.00; 5.00; 5.00; 5.00; 2.00; 3.67	0.6909
16	TDS	10 000	10 125	4 746.3	3.418	5.07; 45.00; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 3.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6726
17	TDS	10 000	10 125	5 546.2	3.418	5.07; 41.93; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 1.00; 2.00; 2.00; 3.00; 1.00; 5.00	0.6724
17	2SCALL	10 000	10 125	5 254.0	3.431	7.53; 62.23; 62.23; 9.45; 10.45; 10.87; 11.65	5.00; 3.37; 4.00; 5.00; 4.76; 2.00; 5.00	0.6907
18	2SCALL	10 000	10 125	5 674.6	3.433	7.44; 62.23; 43.10; 9.88; 10.86; 11.12; 11.90	5.00; 4.00; 5.00; 5.00; 5.00; 1.58; 5.00	0.6931

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
18	TDS	10 000	10 125	4 918.9	3.418	5.07; 23.50; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6794
19	TDS	10 000	10 125	5 813.7	3.418	5.07; 45.00; 35.79; 8.14; 5.07; 11.21; 8.14	3.00; 5.00; 1.00; 2.00; 4.00; 1.00; 5.00	0.6912
19	2SCALL	10 000	10 125	5 040.7	3.432	7.32; 62.23; 56.37; 9.76; 10.54; 10.86; 12.23	5.00; 5.00; 2.00; 4.00; 4.22; 2.00; 5.00	0.6990
20	2SCALL	10 000	10 125	5 617.5	3.433	7.81; 62.23; 62.23; 9.77; 11.04; 11.00; 13.13	5.00; 5.00; 4.37; 5.00; 4.85; 2.00; 5.00	0.7005
20	TDS	10 000	10 125	5 189.4	3.418	5.07; 17.36; 45.00; 5.07; 5.07; 11.21; 8.14	3.00; 3.00; 1.00; 2.00; 4.00; 1.00; 4.00	0.6811
1	TDS	20 000	20 480	22 378.5	13.636	6.43; 64.00; 64.00; 6.43; 6.43; 10.86; 10.86	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6904
1	2SCALL	20 000	20 480	19 759.9	13.645	9.44; 89.10; 89.10; 12.54; 12.48; 13.72; 15.38	5.00; 5.00; 5.00; 5.00; 5.00; 1.58; 5.00	0.7017
2	2SCALL	20 000	20 480	19 482.1	16.348	9.32; 83.49; 89.10; 12.05; 13.16; 14.56; 14.65	5.00; 2.00; 5.00; 5.00; 5.00; 1.58; 5.00	0.7037
2	TDS	20 000	20 480	22 715.0	15.122	6.43; 64.00; 64.00; 6.43; 6.43; 15.29; 10.86	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6961
3	TDS	20 000	20 480	22 964.2	13.636	6.43; 59.57; 64.00; 6.43; 6.43; 10.86; 10.86	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6955
3	2SCALL	20 000	20 480	22 362.8	13.645	9.88; 89.10; 89.10; 12.31; 13.49; 13.34; 15.09	5.00; 2.12; 4.00; 5.00; 5.00; 1.94; 5.00	0.7067
4	2SCALL	20 000	20 480	19 102.9	16.347	9.12; 84.79; 89.10; 12.07; 12.77; 13.67; 15.50	4.07; 3.00; 3.00; 5.00; 5.00; 1.88; 5.00	0.6953
4	TDS	20 000	20 480	26 348.3	15.122	6.43; 59.57; 59.57; 6.43; 6.43; 10.86; 10.86	2.00; 2.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6830
5	TDS	20 000	20 480	24 241.8	13.631	6.43; 64.00; 64.00; 6.43; 6.43; 10.86; 10.86	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6866
5	2SCALL	20 000	20 480	18 601.5	13.640	9.41; 89.10; 26.56; 11.47; 12.76; 13.62; 14.67	5.00; 4.10; 2.00; 5.00; 4.54; 1.74; 5.00	0.6958
6	2SCALL	20 000	20 480	22 011.3	16.718	9.80; 89.10; 39.67; 11.88; 12.84; 14.60; 14.92	5.00; 5.00; 2.00; 5.00; 5.00; 1.94; 4.00	0.7021
6	TDS	20 000	20 480	25 777.7	12.860	6.43; 46.29; 59.57; 6.43; 6.43; 15.29; 10.86	3.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6956

Continued on next page

Table S4 – continued

Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)	Temporal BW (h_T)	RMSE
7	TDS	20 000	20 480	23 883.1	13.631	6.43; 64.00; 64.00; 6.43; 6.43; 15.29; 6.43	3.00; 4.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6916
7	2SCALL	20 000	20 480	19 835.3	13.642	9.19; 89.10; 89.10; 11.83; 13.51; 13.67; 13.52	5.00; 5.00; 3.00; 4.00; 5.00; 1.94; 4.63	0.7019
8	2SCALL	20 000	20 480	22 757.0	16.718	9.54; 89.10; 89.10; 11.65; 13.58; 12.70; 14.67	5.00; 4.00; 5.00; 5.00; 5.00; 1.58; 4.23	0.7014
8	TDS	20 000	20 480	25 847.4	12.860	6.43; 59.57; 19.71; 6.43; 6.43; 10.86; 6.43	3.00; 3.00; 2.00; 2.00; 3.00; 1.00; 5.00	0.6880
9	TDS	20 000	20 480	24 229.7	13.631	6.43; 64.00; 64.00; 6.43; 6.43; 10.86; 10.86	3.00; 3.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6948
9	2SCALL	20 000	20 480	22 238.2	13.641	9.69; 89.10; 89.10; 12.74; 12.36; 13.32; 16.06	5.00; 4.00; 5.00; 5.00; 5.00; 1.58; 5.00	0.7058
10	2SCALL	20 000	20 480	19 266.3	13.643	8.83; 89.10; 89.10; 12.05; 12.87; 13.94; 14.39	5.00; 4.00; 5.00; 5.00; 5.00; 1.58; 5.00	0.6984
10	TDS	20 000	20 480	26 998.9	13.630	6.43; 28.57; 64.00; 6.43; 6.43; 10.86; 10.86	2.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6852
1	TDS	40 000	40 500	66 819.7	52.942	8.29; 90.00; 90.00; 8.29; 8.29; 14.57; 8.29	2.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6929
1	2SCALL	40 000	40 500	82 220.1	52.940	11.72; 125.86; 125.86; 14.38; 16.40; 17.38; 17.11	5.00; 5.00; 5.00; 5.00; 5.00; 1.85; 5.00	0.7018
2	2SCALL	40 000	40 500	94 212.7	63.517	11.79; 125.86; 125.86; 14.36; 15.35; 17.74; 19.73	5.00; 5.00; 2.00; 5.00; 4.00; 1.79; 5.00	0.7034
2	TDS	40 000	40 500	69 657.6	58.793	8.29; 83.71; 90.00; 8.29; 8.29; 14.57; 8.29	2.00; 5.00; 1.00; 2.00; 2.00; 1.00; 5.00	0.6930
3	TDS	40 000	40 500	72 398.7	52.940	8.29; 33.43; 64.86; 8.29; 8.29; 14.57; 8.29	2.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6941
3	2SCALL	40 000	40 500	85 110.7	63.509	11.35; 125.86; 125.86; 14.68; 16.88; 17.15; 16.17	4.00; 5.00; 2.00; 5.00; 5.00; 1.83; 5.00	0.7024
4	2SCALL	40 000	40 500	92 398.7	65.015	11.69; 125.86; 125.86; 14.84; 15.14; 17.55; 16.36	5.00; 5.00; 5.00; 5.00; 5.00; 1.84; 4.00	0.7024
4	TDS	40 000	40 500	67 728.2	49.953	8.29; 90.00; 90.00; 8.29; 8.29; 14.57; 8.29	2.00; 5.00; 1.00; 2.00; 3.00; 1.00; 5.00	0.6950
5	TDS	40 000	40 500	64 691.9	58.797	8.29; 90.00; 90.00; 8.29; 8.29; 14.57; 14.57	2.00; 5.00; 1.00; 2.00; 3.00; 1.00; 3.00	0.6967

Continued on next page

Table S4 – continued																
Replicate	Method	N_{target}	N_{obs}	Time (s)	Mem. (GB)	Spatial BW (h_S)					Temporal BW (h_T)					RMSE
5	2SCALL	40 000	40 500	84 533.9	65.019	11.47;	125.86;	125.86;	14.69;	16.52;	4.18;	5.00;	5.00;	5.00;	5.00;	0.7027
						16.39;	16.45				1.78;	4.03				