A simulation study to examine the information content in phylogenomic datasets under the multispecies coalescent model

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Supplementary material

Figure S1: The posterior 95% CIs and CI coverage for parameters under the MSC model for species tree U of figure 1. Model parameters for unbalanced tree: $\tau_R = 5\theta$, $\tau_S = 4\theta$, $\tau_T = 3\theta$, $\tau_U = 2.5\theta$. See legend for figure 2.

Figure S2: Posterior 95% HPD CIs and CI coverage for the 21 parameters in MSci model B of figure 8.

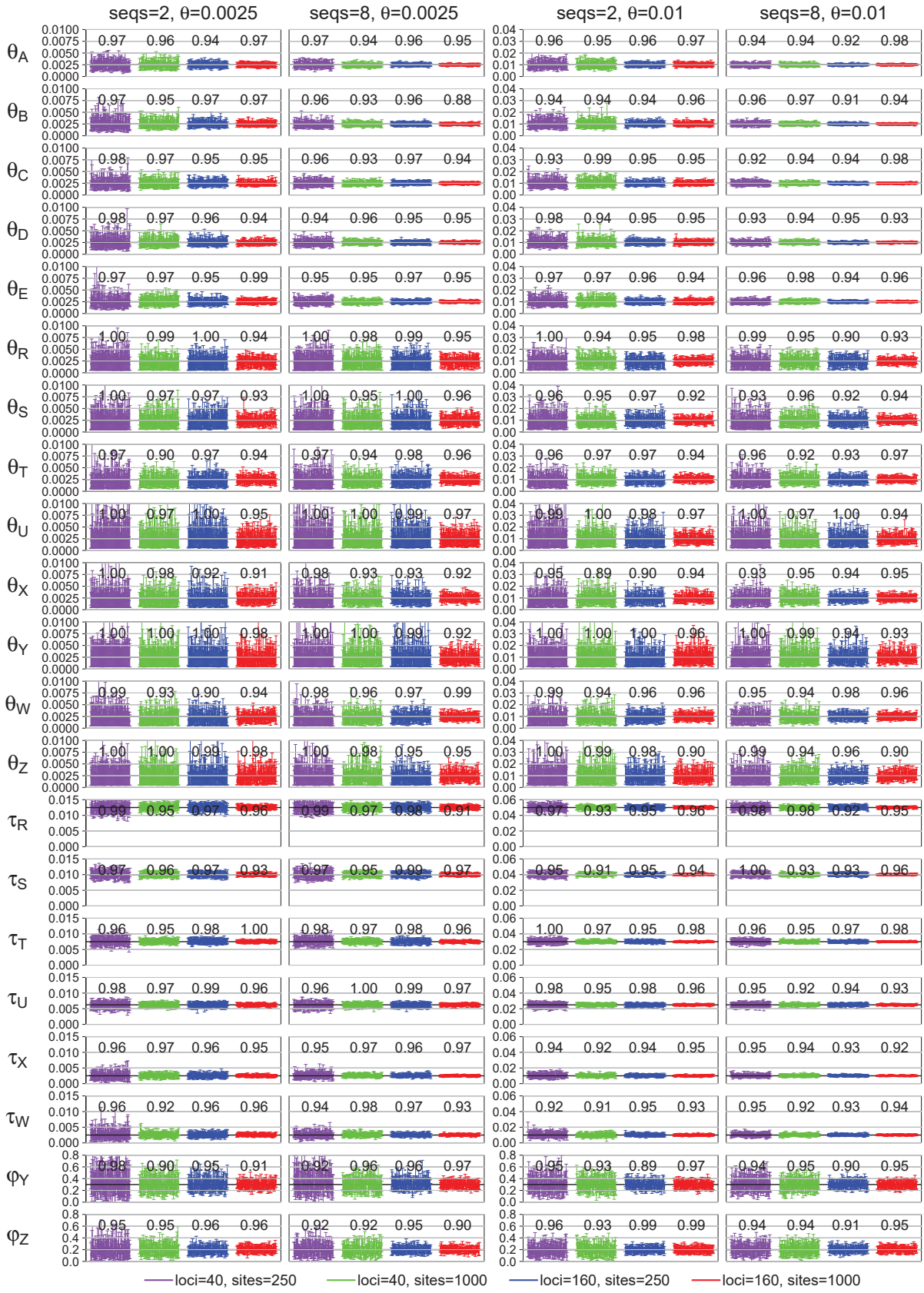

Figure S3: Posterior 95% HPD CIs and CI coverage for the 21 parameters in MSci model U of figure 8.

Table S1: Average CI width for the 13 parameters in the MSC models of figure 1 ($\times 10^{-3}$)

		θ_A	θ_B	θ_C	θ_D	θ_E	θ_R	θ_S	θ_T	θ_U	τ_R	τ_S	τ_T	τ_U
Tree B														
	$L = 40, N = 250$	2.19	2.28	2.25	2.23	2.26	3.23	4.33	5.21	7.86	2.69	2.87	3.05	3.88
$S = 2$	$L = 40, N = 1000$	1.82	1.77	1.72	1.73	1.75	2.43	3.27	3.46	6.60	1.45	1.65	1.71	2.38
$\theta = 0.0025$	$L = 160, N = 250$	1.19	1.21	1.20	1.19	1.20	2.47	3.35	3.86	7.75	1.57	1.74	1.87	2.68
	$L = 160, N = 1000$	0.90	0.91	0.89	0.89	0.90	1.39	1.99	1.96	4.75	0.76	0.91	0.91	1.53
	$L = 40, N = 250$	1.31	1.31	1.33	1.34	1.33	3.32	4.50	4.78	7.70	2.66	2.82	2.85	3.67
$S = 8$	$L = 40, N = 1000$	0.88	0.88	0.89	0.88	0.88	2.47	3.19	3.15	6.97	1.43	1.61	1.60	2.38
$\theta = 0.0025$	$L = 160, N = 250$	0.68	0.68	0.68	0.69	0.69	2.42	3.41	3.42	7.22	1.53	1.70	1.71	2.51
	$L = 160, N = 1000$	0.44	0.44	0.45	0.45	0.45	1.38	1.94	1.90	5.04	0.74	0.89	0.87	1.55
	$L = 40, N = 250$	7.04	6.97	6.96	7.02	7.05	10.06	14.46	14.51	28.18	6.04	7.02	7.11	10.05
$S = 2$	$L = 40, N = 1000$	6.44	6.27	6.32	6.25	6.33	7.28	9.86	9.52	20.01	3.28	3.93	3.89	6.07
$\theta = 0.01$	$L = 160, N = 250$	3.58	3.55	3.59	3.62	3.61	5.83	8.39	8.61	20.20	3.17	3.86	3.93	6.45
	$L = 160, N = 1000$	3.22	3.19	3.23	3.19	3.19	3.90	5.15	5.26	12.29	1.67	1.99	2.01	3.61
	$L = 40, N = 250$	3.50	3.52	3.51	3.56	3.50	10.06	13.34	13.76	26.41	5.93	6.70	6.71	9.65
$S = 8$	$L = 40, N = 1000$	2.75	2.74	2.72	2.73	2.74	7.27	9.45	9.65	18.46	3.19	3.82	3.77	5.72
$\theta = 0.01$	$L = 160, N = 250$	1.77	1.77	1.78	1.80	1.79	5.74	8.28	8.20	19.25	3.09	3.75	3.69	6.20
	$L = 160, N = 1000$	1.38	1.37	1.38	1.37	1.38	3.88	5.03	5.06	11.80	1.64	1.94	1.92	3.46
Tree U														
	$L = 40, N = 250$	2.30	2.24	2.22	2.29	2.20	4.09	4.45	3.38	6.30	3.34	2.75	2.23	2.67
$S = 2$	$L = 40, N = 1000$	1.72	1.75	1.77	1.67	1.75	3.06	3.30	2.53	4.99	1.94	1.62	1.23	1.63
$\theta = 0.0025$	$L = 160, N = 250$	1.18	1.18	1.18	1.19	1.19	3.19	3.28	2.38	5.26	2.09	1.67	1.25	1.72
	$L = 160, N = 1000$	0.89	0.89	0.89	0.90	0.90	1.99	1.93	1.47	3.03	1.12	0.87	0.66	0.93
	$L = 40, N = 250$	1.33	1.32	1.31	1.34	1.34	4.02	4.53	3.41	5.76	3.29	2.68	2.11	2.41
$S = 8$	$L = 40, N = 1000$	0.87	0.86	0.88	0.89	0.89	3.05	3.24	2.50	4.46	1.93	1.56	1.18	1.48
$\theta = 0.0025$	$L = 160, N = 250$	0.68	0.68	0.68	0.69	0.70	3.13	3.28	2.29	4.65	2.04	1.63	1.18	1.52
	$L = 160, N = 1000$	0.44	0.44	0.44	0.45	0.45	1.96	1.93	1.46	2.80	1.09	0.85	0.64	0.86
	$L = 40, N = 250$	7.04	7.08	6.98	6.76	6.72	12.32	13.50	10.51	20.47	8.03	6.71	5.14	6.65
$S = 2$	$L = 40, N = 1000$	6.34	6.49	6.27	6.27	6.42	8.94	9.46	8.01	13.84	4.53	3.78	2.95	3.84
$\theta = 0.01$	$L = 160, N = 250$	3.62	3.59	3.59	3.56	3.60	8.45	8.29	6.20	12.91	4.71	3.76	2.78	3.93
	$L = 160, N = 1000$	3.25	3.21	3.18	3.18	3.23	4.78	5.14	4.21	7.67	2.28	1.94	1.51	2.06
	$L = 40, N = 250$	3.52	3.52	3.57	3.56	3.54	12.73	14.34	10.66	18.47	7.97	6.62	4.96	6.13
$S = 8$	$L = 40, N = 1000$	2.71	2.75	2.73	2.75	2.72	9.13	9.60	8.06	13.60	4.45	3.71	2.86	3.68
$\theta = 0.01$	$L = 160, N = 250$	1.78	1.78	1.79	1.79	1.80	8.15	8.35	6.15	11.98	4.56	3.63	2.66	3.60
	$L = 160, N = 1000$	1.36	1.38	1.38	1.38	1.38	4.77	5.00	4.20	7.13	2.24	1.87	1.46	1.91

Table S2: Root mean square error (RMSE) for the 13 parameters in the MSC models of figure 1 ($\times 10^{-3}$)

		θ_A	θ_B	θ_C	θ_D	θ_E	θ_R	θ_S	θ_T	θ_U	τ_R	τ_S	τ_T	τ_U
Tree B														
	$L = 40, N = 250$	0.49	0.44	0.47	0.54	0.62	0.70	0.66	0.93	1.11	0.56	0.60	0.63	0.78
$S = 2$	$L = 40, N = 1000$	0.49	0.40	0.41	0.43	0.38	0.63	0.80	0.73	1.12	0.38	0.42	0.40	0.56
$\theta = 0.0025$	$L = 160, N = 250$	0.28	0.31	0.27	0.34	0.32	0.56	0.74	0.95	1.30	0.34	0.35	0.48	0.47
	$L = 160, N = 1000$	0.23	0.22	0.23	0.19	0.23	0.36	0.44	0.47	0.93	0.18	0.23	0.24	0.33
	$L = 40, N = 250$	0.40	0.32	0.32	0.31	0.32	0.66	0.82	0.78	0.98	0.67	0.70	0.66	0.83
$S = 8$	$L = 40, N = 1000$	0.19	0.25	0.22	0.26	0.24	0.59	0.67	0.66	1.09	0.36	0.39	0.38	0.46
$\theta = 0.0025$	$L = 160, N = 250$	0.19	0.17	0.17	0.15	0.20	0.60	0.77	0.69	1.20	0.37	0.45	0.42	0.51
	$L = 160, N = 1000$	0.10	0.11	0.11	0.11	0.11	0.38	0.49	0.46	1.10	0.19	0.24	0.22	0.32
	$L = 40, N = 250$	1.52	1.60	1.45	1.77	1.91	2.61	3.57	3.49	5.15	1.47	1.71	1.56	2.04
$S = 2$	$L = 40, N = 1000$	1.61	1.44	1.61	1.56	1.81	1.92	2.13	2.24	3.94	0.88	1.00	0.97	1.21
$\theta = 0.01$	$L = 160, N = 250$	0.88	0.83	0.75	0.88	1.03	1.79	2.41	1.88	3.84	0.83	1.04	0.90	1.21
	$L = 160, N = 1000$	0.85	0.66	0.81	0.69	0.79	0.99	1.35	1.22	2.45	0.43	0.43	0.44	0.73
	$L = 40, N = 250$	0.86	0.85	0.94	0.80	0.88	2.56	2.98	2.83	3.94	1.63	1.67	1.57	1.75
$S = 8$	$L = 40, N = 1000$	0.71	0.72	0.76	0.67	0.67	1.61	2.29	2.33	4.03	0.78	0.95	1.09	1.29
$\theta = 0.01$	$L = 160, N = 250$	0.42	0.44	0.49	0.47	0.52	1.53	1.96	2.25	3.32	0.91	1.00	0.98	1.00
	$L = 160, N = 1000$	0.35	0.39	0.38	0.38	0.34	0.99	1.10	1.18	2.77	0.45	0.50	0.45	0.80
Tree U														
	$L = 40, N = 250$	0.63	0.50	0.53	0.67	0.59	0.62	0.66	0.66	0.95	0.69	0.61	0.51	0.52
$S = 2$	$L = 40, N = 1000$	0.44	0.46	0.48	0.46	0.43	0.67	0.64	0.67	1.03	0.47	0.36	0.28	0.34
$\theta = 0.0025$	$L = 160, N = 250$	0.30	0.28	0.26	0.29	0.31	0.64	0.64	0.45	0.99	0.39	0.34	0.32	0.38
	$L = 160, N = 1000$	0.26	0.23	0.24	0.24	0.23	0.55	0.47	0.35	0.74	0.29	0.22	0.16	0.25
	$L = 40, N = 250$	0.39	0.32	0.29	0.33	0.31	0.65	0.91	0.75	0.92	0.71	0.62	0.52	0.49
$S = 8$	$L = 40, N = 1000$	0.22	0.23	0.22	0.25	0.21	0.76	0.89	0.53	0.88	0.44	0.39	0.27	0.34
$\theta = 0.0025$	$L = 160, N = 250$	0.21	0.16	0.17	0.17	0.16	0.65	0.66	0.52	1.21	0.44	0.36	0.27	0.32
	$L = 160, N = 1000$	0.12	0.11	0.11	0.11	0.11	0.59	0.51	0.35	0.59	0.31	0.24	0.16	0.20
	$L = 40, N = 250$	1.96	1.78	1.76	1.67	1.60	2.67	3.22	2.28	4.09	1.98	1.73	1.18	1.43
$S = 2$	$L = 40, N = 1000$	1.62	1.78	1.74	1.61	1.43	2.33	2.10	1.90	3.67	1.05	0.84	0.73	0.92
$\theta = 0.01$	$L = 160, N = 250$	0.91	0.98	0.96	0.87	0.79	2.24	1.91	1.47	2.65	1.21	0.79	0.67	0.92
	$L = 160, N = 1000$	0.81	0.83	0.82	0.84	0.64	1.17	1.19	1.12	1.81	0.58	0.42	0.41	0.56
	$L = 40, N = 250$	0.88	0.72	0.88	0.83	0.94	2.55	3.28	2.33	3.08	1.93	1.65	1.31	1.37
$S = 8$	$L = 40, N = 1000$	0.72	0.70	0.74	0.64	0.70	2.57	2.37	2.14	2.97	1.26	0.91	0.70	0.86
$\theta = 0.01$	$L = 160, N = 250$	0.37	0.45	0.46	0.50	0.45	2.34	2.21	1.42	3.09	1.32	1.04	0.70	0.81
	$L = 160, N = 1000$	0.35	0.31	0.34	0.32	0.37	1.29	1.38	1.07	1.81	0.59	0.47	0.37	0.50

Table S3: Average 95% HPD CI width for the 21 parameters in the MSci models of figure 8 ($\times 10^{-3}$ for θs and τs)

		θ_A	θ_B	θ_C	θ_D	θ_E	θ_R	θ_S	θ_T	θ_U	θ_X	θ_Y	θ_W	θ_Z	τ_R	τ_S	τ_T	τ_U	τ_X	τ_W	φ_Y	φ_Z
Tree B																						
$S=2$	$L=40, N=250$	2.21	2.82	2.70	2.85	2.85	3.60	4.67	4.85	8.88	4.42	5.36	4.77	5.35	2.92	3.42	2.98	4.93	2.75	3.94	0.343	0.365
$\theta=0.0025$	$L=40, N=1000$	1.74	2.06	2.00	2.09	2.04	2.65	3.57	3.43	7.37	3.24	4.60	3.59	4.69	1.57	1.92	1.73	2.76	1.51	1.88	0.265	0.236
	$L=160, N=250$	1.19	1.44	1.36	1.46	1.43	2.75	3.62	3.76	8.37	3.15	4.91	3.31	4.60	1.73	2.10	1.89	3.32	1.39	1.86	0.178	0.180
	$L=160, N=1000$	0.90	1.00	1.00	1.01	1.02	1.53	2.26	2.16	5.86	1.99	3.63	2.28	3.33	0.83	1.09	0.97	1.84	0.79	0.96	0.138	0.121
$S=8$	$L=40, N=250$	1.33	1.51	1.43	1.49	1.50	3.40	4.58	4.75	8.34	3.52	4.93	3.89	4.29	2.78	3.22	2.90	4.46	1.93	2.59	0.303	0.302
$\theta=0.0025$	$L=40, N=1000$	0.88	0.94	0.94	0.94	0.95	2.54	3.60	3.35	7.09	2.65	4.18	2.72	3.59	1.51	1.84	1.66	2.63	1.09	1.40	0.253	0.218
	$L=160, N=250$	0.68	0.76	0.74	0.77	0.76	2.66	3.66	3.52	7.54	2.27	4.07	2.48	3.35	1.68	2.01	1.78	2.99	0.95	1.20	0.157	0.151
	$L=160, N=1000$	0.44	0.47	0.47	0.48	0.48	1.47	2.24	2.04	4.74	1.46	2.75	1.58	2.30	0.80	1.04	0.91	1.62	0.56	0.69	0.130	0.112
$S=2$	$L=40, N=250$	6.85	8.14	8.22	8.18	8.32	10.88	14.96	15.07	31.33	13.23	19.07	15.30	17.15	6.51	8.06	7.37	11.77	6.11	7.76	0.272	0.240
$\theta=0.01$	$L=40, N=1000$	6.31	7.10	7.23	7.15	7.01	7.93	10.91	10.30	20.44	10.55	18.32	11.88	17.56	3.55	4.66	4.07	6.57	3.86	4.78	0.262	0.227
	$L=160, N=250$	3.59	4.03	4.04	4.10	4.09	6.32	9.84	9.18	21.79	8.31	15.16	9.38	13.47	3.45	4.70	4.10	7.23	3.21	3.85	0.140	0.124
	$L=160, N=1000$	3.20	3.57	3.57	3.58	3.54	4.18	5.78	5.36	13.49	5.98	12.83	6.88	11.13	1.81	2.34	2.06	4.01	1.98	2.40	0.134	0.116
$S=8$	$L=40, N=250$	3.51	3.70	3.69	3.80	3.75	10.56	14.16	14.61	27.90	10.70	16.77	10.60	15.18	6.26	7.57	6.95	10.52	4.57	5.60	0.254	0.217
$\theta=0.01$	$L=40, N=1000$	2.74	2.85	2.82	2.83	2.81	7.65	10.45	9.71	17.91	8.64	14.23	9.56	14.03	3.43	4.38	3.82	5.98	3.01	3.62	0.243	0.213
	$L=160, N=250$	1.78	1.88	1.86	1.90	1.89	6.23	9.47	8.75	20.55	5.84	11.39	6.37	9.99	3.35	4.37	3.86	6.84	2.26	2.75	0.131	0.113
	$L=160, N=1000$	1.38	1.43	1.42	1.43	1.42	4.08	5.56	5.17	12.41	4.52	8.68	5.02	7.91	1.75	2.23	1.94	3.74	1.47	1.79	0.125	0.109
Tree U																						
$S=2$	$L=40, N=250$	2.25	2.94	2.64	3.08	2.84	4.48	4.65	4.08	6.17	4.80	5.45	4.43	4.92	3.97	2.85	3.11	2.63	2.97	3.74	0.493	0.316
$\theta=0.0025$	$L=40, N=1000$	1.74	2.08	1.94	2.06	2.04	3.11	3.73	2.78	4.54	3.61	4.94	3.42	4.78	2.14	1.74	1.53	1.60	1.50	1.81	0.305	0.232
	$L=160, N=250$	1.19	1.47	1.38	1.52	1.38	3.47	3.67	2.82	5.22	3.52	4.91	3.16	4.61	2.40	1.80	1.68	1.75	1.50	1.69	0.254	0.154
	$L=160, N=1000$	0.88	1.02	1.01	1.00	1.02	2.22	2.14	1.72	3.24	2.29	3.88	2.19	3.53	1.28	0.96	0.83	0.98	0.79	0.95	0.156	0.120
$S=8$	$L=40, N=250$	1.34	1.48	1.46	1.52	1.53	4.30	4.53	4.05	6.09	3.98	5.48	3.63	4.61	3.71	2.76	2.87	2.49	2.12	2.30	0.425	0.261
$\theta=0.0025$	$L=40, N=1000$	0.86	0.93	0.92	0.94	0.93	3.31	3.48	2.69	4.62	2.99	4.46	2.84	3.93	2.11	1.66	1.41	1.50	1.15	1.39	0.278	0.215
	$L=160, N=250$	0.68	0.75	0.75	0.76	0.76	3.30	3.53	2.79	4.87	2.75	4.71	2.47	3.29	2.25	1.73	1.57	1.60	1.06	1.13	0.219	0.136
	$L=160, N=1000$	0.44	0.47	0.46	0.47	0.47	2.12	2.11	1.62	3.07	1.58	2.86	1.58	2.39	1.20	0.92	0.76	0.90	0.57	0.68	0.140	0.112
$S=2$	$L=40, N=250$	6.96	8.20	7.79	8.29	8.18	13.29	14.80	11.97	22.22	15.05	20.29	13.65	19.10	8.81	7.06	6.68	6.97	6.37	7.68	0.316	0.229
$\theta=0.01$	$L=40, N=1000$	6.25	7.15	7.22	7.18	7.17	9.77	9.82	9.27	14.46	12.17	18.63	11.48	17.31	4.99	3.97	3.74	3.97	3.81	4.90	0.275	0.219
	$L=160, N=250$	3.59	4.13	4.00	4.09	4.08	9.08	9.22	7.23	14.06	9.19	15.25	9.00	13.68	5.22	4.05	3.51	4.13	3.21	3.86	0.159	0.120
	$L=160, N=1000$	3.21	3.54	3.54	3.56	3.57	5.23	5.25	4.91	8.13	6.80	13.43	6.44	10.81	2.53	2.03	1.89	2.15	1.96	2.42	0.140	0.115
$S=8$	$L=40, N=250$	3.46	3.78	3.73	3.77	3.76	12.28	13.95	11.76	18.71	11.51	18.06	11.04	15.17	8.28	6.83	5.97	6.16	4.66	5.40	0.281	0.218
$\theta=0.01$	$L=40, N=1000$	2.74	2.85	2.82	2.88	2.88	9.66	10.08	8.80	13.11	9.69	16.76	9.21	13.20	4.89	3.88	3.39	3.63	3.01	3.56	0.253	0.210
	$L=160, N=250$	1.77	1.90	1.86	1.89	1.88	8.73	8.65	6.83	12.69	6.44	12.60	6.45	9.58	4.96	3.88	3.19	3.75	2.30	2.70	0.143	0.113
	$L=160, N=1000$	1.37	1.42	1.42	1.43	1.43	5.09	5.26	4.59	7.57	5.06	9.76	4.92	7.85	2.46	1.98	1.72	1.98	1.49	1.76	0.129	0.110

Table S4: Root mean square error (RMSE) for the 21 parameters in the MSci models of figure 8 ($\times 10^{-3}$ for θs and τs)

		θ_A	θ_B	θ_C	θ_D	θ_E	θ_R	θ_S	θ_T	θ_U	θ_X	θ_Y	θ_W	θ_Z	τ_R	τ_S	τ_T	τ_U	τ_X	τ_W	φ_Y	φ_Z
Tree B																						
$S = 2$	$L = 40, N = 250$	0.58	0.70	0.74	0.65	0.66	0.73	0.76	0.75	1.10	0.78	0.65	0.70	0.58	0.71	0.74	0.58	0.90	0.75	1.12	0.075	0.076
$\theta = 0.0025$	$L = 40, N = 1000$	0.41	0.55	0.51	0.56	0.52	0.57	0.69	0.76	1.53	0.66	0.80	0.73	0.79	0.35	0.44	0.41	0.59	0.42	0.50	0.074	0.050
	$L = 160, N = 250$	0.31	0.39	0.35	0.32	0.39	0.65	0.74	0.79	1.18	0.72	0.84	0.66	0.81	0.40	0.48	0.39	0.52	0.38	0.52	0.046	0.043
	$L = 160, N = 1000$	0.23	0.29	0.24	0.25	0.27	0.35	0.51	0.57	1.13	0.51	0.74	0.60	0.82	0.18	0.26	0.25	0.35	0.19	0.26	0.036	0.032
$S = 8$	$L = 40, N = 250$	0.32	0.40	0.36	0.31	0.38	0.67	0.62	0.70	0.98	0.73	0.83	0.83	0.64	0.63	0.66	0.54	0.85	0.49	0.67	0.082	0.064
$\theta = 0.0025$	$L = 40, N = 1000$	0.23	0.25	0.23	0.24	0.25	0.61	0.89	0.58	1.26	0.67	0.74	0.73	0.74	0.33	0.43	0.36	0.50	0.30	0.38	0.060	0.055
	$L = 160, N = 250$	0.17	0.20	0.17	0.18	0.18	0.62	0.60	0.68	1.01	0.55	0.79	0.64	0.69	0.42	0.44	0.37	0.58	0.26	0.33	0.042	0.044
	$L = 160, N = 1000$	0.10	0.13	0.12	0.13	0.14	0.35	0.54	0.46	0.83	0.43	0.58	0.45	0.60	0.19	0.24	0.21	0.29	0.14	0.21	0.035	0.030
$S = 2$	$L = 40, N = 250$	1.61	2.13	2.23	2.02	2.34	2.50	3.22	2.47	6.00	3.06	2.65	3.14	2.48	1.71	2.03	1.68	2.22	1.62	1.99	0.068	0.063
$\theta = 0.01$	$L = 40, N = 1000$	1.79	1.70	1.68	1.81	1.75	1.97	2.88	2.43	3.49	2.80	3.78	2.49	3.88	0.87	1.08	0.96	1.35	1.24	1.56	0.065	0.061
	$L = 160, N = 250$	0.78	1.07	0.91	0.97	1.11	1.50	2.39	2.02	3.98	2.01	3.07	2.15	2.78	0.83	1.19	0.96	1.24	0.82	1.03	0.036	0.032
	$L = 160, N = 1000$	0.94	0.94	0.91	1.01	0.82	1.03	1.55	1.32	3.11	1.46	3.28	1.81	3.31	0.40	0.62	0.53	0.94	0.55	0.61	0.033	0.031
$S = 8$	$L = 40, N = 250$	0.81	0.89	0.89	0.99	0.86	2.79	3.10	3.71	3.95	2.34	3.33	3.15	3.37	1.54	1.98	1.74	2.00	1.20	1.59	0.065	0.049
$\theta = 0.01$	$L = 40, N = 1000$	0.67	0.83	0.67	0.65	0.81	1.82	2.41	2.24	3.05	2.04	2.43	2.30	3.06	0.92	1.13	1.00	1.31	0.89	1.06	0.061	0.060
	$L = 160, N = 250$	0.47	0.44	0.44	0.52	0.53	1.58	2.41	2.10	3.27	1.43	2.71	1.76	2.52	0.86	1.18	0.93	1.34	0.61	0.66	0.033	0.027
	$L = 160, N = 1000$	0.32	0.38	0.41	0.34	0.38	1.08	1.37	1.50	2.52	1.13	1.87	1.41	1.87	0.49	0.57	0.59	0.83	0.37	0.49	0.034	0.028
Tree U																						
$S = 2$	$L = 40, N = 250$	0.53	0.67	0.65	0.65	0.70	0.72	0.61	0.76	0.83	0.86	0.51	0.71	0.47	0.86	0.66	0.66	0.57	0.76	1.13	0.115	0.072
$\theta = 0.0025$	$L = 40, N = 1000$	0.48	0.53	0.44	0.52	0.46	0.68	0.74	0.64	0.83	0.81	0.71	0.73	0.77	0.57	0.40	0.38	0.33	0.39	0.53	0.081	0.059
	$L = 160, N = 250$	0.30	0.36	0.37	0.40	0.38	0.65	0.71	0.57	0.97	0.85	0.79	0.74	1.30	0.51	0.39	0.36	0.33	0.37	0.40	0.063	0.039
	$L = 160, N = 1000$	0.19	0.26	0.28	0.28	0.22	0.50	0.57	0.43	0.67	0.59	0.94	0.49	0.78	0.30	0.26	0.20	0.21	0.20	0.24	0.043	0.032
$S = 8$	$L = 40, N = 250$	0.35	0.38	0.36	0.38	0.37	0.55	0.67	0.69	1.00	0.70	0.96	0.65	0.75	0.74	0.66	0.63	0.54	0.60	0.60	0.116	0.068
$\theta = 0.0025$	$L = 40, N = 1000$	0.23	0.24	0.26	0.23	0.24	0.74	0.77	0.62	1.03	0.80	0.86	0.69	0.90	0.42	0.39	0.35	0.36	0.26	0.37	0.067	0.062
	$L = 160, N = 250$	0.16	0.18	0.19	0.18	0.17	0.69	0.74	0.58	0.85	0.70	1.03	0.54	0.74	0.44	0.36	0.40	0.31	0.30	0.28	0.057	0.032
	$L = 160, N = 1000$	0.11	0.14	0.12	0.12	0.12	0.53	0.49	0.37	0.62	0.42	0.61	0.33	0.59	0.32	0.22	0.19	0.21	0.13	0.20	0.033	0.030
$S = 2$	$L = 40, N = 250$	1.77	2.17	2.11	2.06	1.93	2.58	2.92	2.62	4.39	3.05	3.00	2.67	2.98	2.09	1.66	1.48	1.46	1.60	2.29	0.090	0.056
$\theta = 0.01$	$L = 40, N = 1000$	1.49	2.09	1.83	1.97	1.75	2.52	2.40	2.12	3.02	3.23	2.81	2.87	3.61	1.24	1.17	0.88	0.93	1.17	1.38	0.068	0.059
	$L = 160, N = 250$	0.85	1.09	1.11	1.08	0.94	2.19	2.17	1.80	3.23	2.50	2.84	2.07	3.05	1.23	1.01	0.97	1.03	0.90	1.02	0.045	0.027
	$L = 160, N = 1000$	0.75	0.89	0.84	0.98	0.92	1.32	1.47	1.27	1.88	1.77	2.67	1.46	2.74	0.67	0.59	0.44	0.53	0.53	0.57	0.034	0.026
$S = 8$	$L = 40, N = 250$	0.85	0.98	1.08	0.96	0.96	2.83	3.04	2.61	3.64	2.91	3.54	2.56	2.93	1.96	1.31	1.41	1.39	1.14	1.39	0.074	0.058
$\theta = 0.01$	$L = 40, N = 1000$	0.75	0.67	0.70	0.78	0.69	2.39	2.60	2.27	3.24	2.32	2.97	2.35	2.86	1.18	0.99	0.94	1.00	0.84	0.97	0.057	0.052
	$L = 160, N = 250$	0.44	0.52	0.49	0.46	0.47	2.46	2.10	1.56	2.64	1.75	3.16	1.45	2.27	1.38	1.04	0.74	0.91	0.64	0.76	0.040	0.034
	$L = 160, N = 1000$	0.35	0.38	0.33	0.39	0.36	1.30	1.28	1.02	2.20	1.31	2.62	1.14	2.09	0.63	0.52	0.42	0.54	0.41	0.43	0.031	0.028