

Using groundwater temperature time-series to reveal subsurface thermal and hydraulic processes

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Table S1. Summary of features identified at each borehole with process interpretation

ID	Logger depth (mbgl)	Water table depth (mbgl)	Seasonal groundwater temp.	Temp. range (°C)	Land cover	Geology (m)				Lag behind air temp. (days)	Short-lived events										Ocean tide signal	Seasonal groundwater levels	Groundwater level response to rain	Groundwater levels fluctuate as river levels	Groundwater level response to river levels	Shape†	Process‡
						MGR	TFD / ALV	GFSD	MMG		Cooling spikes	Warming spikes	Average spike magnitude (°C)	Average time for heat re-equilibration (days)	Thermal diffusivity (m²/d)	Length scale (Thermal)	Average time for levels re-equilibration (days)	Hydraulic diffusivity (m/d)	Length scale (m) (Hydraulic)								
1/OB1	14	5.41	✓	0.097	Grass	6.9	3.2	8.9											✓		✓	✓	R	Re			
2/PB1	6.6	6.0	✓	0.63	Grass	5.8	3.4	8.6	0.7	150									✓			✓	R	Re			
3/OB1	18	4.27		0.02	Grass	6.3	4.5	8.2	0.5										✓				F	U			
4/PB1 Shallow	7	2.56	✓	0.65	Paving slabs	2.7	4	7.2	1.1	127											✓		R	Re			
4/PB1 Deep	11	2.56		0	Paving slabs	2.7	4	7.2	1.1												✓		F	U			
4/PB2 Shallow	8	2.42		0.176	Paving slabs	0.8	7	2.9	2.8													✓	U	U			
4/PB2 Deep	10	2.42		0.012	Paving slabs	0.8	7	2.9	2.8													✓	F	U			
5/PB1 Shallow	7	4.15		0.14	Tarmac	3.6	0	6	1.9										✓				U	U			
5/PB1 Deep	10.5	4.15		0.09	Tarmac	3.6	0	6	1.9										✓				U	U			
6/PB1	6.7	3.41	✓	0.95	Concrete	0.9	2.1	4.7	2.3	122											✓		R	Re			
6/PB2	10	3.24	✓	0.58	Tarmac	0.9	1.3	5.9	2.9	151.5											✓		R	Re			
6/PB4	6.3	2.49	✓	2.31	Tarmac	0.5	1.3 (ALV)	5.5	2.7	87												✓		R	Re		
7/OB1L	5	3.44	✓	3.14	Paving slabs	1.4	0.7 (ALV)	4.7	0.7	78.5												✓		N	C		
9/OB1L	7	3.45	✓	1.9	Paving slabs	5.3	0	1.5	0.2	119.5	✓	✓	0.579	0.354	0.051	0.13	8.451	47.797	20.10		✓	✓		R	Re		
CS002A	7.9	4.03	✓	0.25	Grass	3	2	5.8	1.5	194	✓		1.301	0.5	0.046	0.15	4.372	80.268	18.73		✓	✓		R	Re		
CS037C	14.5	5.5		0	Grass	4.7	10.3	2												✓	✓		✓	F	U		
CS038A	6	3.42	✓	1.02	Tarmac	1.5	3.8	7.2	4.95	131.5														N	C		
CS067A	13.2	2.97		0.15	Block paving	1.6	8.2	5.2												✓				U	U		
CS074AL	6	3.33	✓	0.48	Grass	1.6	2.4	6		141.5											✓	✓		R	Re		
CS116AL	12.5	3.8		0.15	Tarmac	3.8	3.6	6.1												✓		✓	✓	F	U		
CS133CL	10.3	3.25		0.049	Grass	2.9	6.6	0	1											✓	✓			F	U		
CS178AL	8.8	4.28	✓	0.18	Grass	2.9	6.9	1.2		234										✓				N	C		
CS211	3.9	2.07	✓	3.75	Grass	0.7	0	3.8		47.5	✓	✓	0.20	0.13	0.03	0.06	15.24	177.59	52.02		✓	✓		R	Re		
CS217 Shallow	7.5	4.06	✓	0.32	Grass	3.8	5	8.2		212.5										✓		✓	✓	N	C		
CS217 Deep	11.5	4.06	✓	0.092	Grass	3.8	5	8.2		286.5										✓		✓	✓	N	C		
CS229	7	3.46	✓	0.28	Paving slabs	1.8	4.3	4.2		202.5	✓		0.10	0.42	0.05	0.15	2.20	28.82	7.96	✓	✓	✓		R	Re		
CS233 Shallow	7	4.79	✓	1.23	Tarmac	2.8	3.6	6.6		162										✓		✓	✓	N	C		
CS233 Deep	11	3.31	✓	0.21	Tarmac	2.8	3.6	6.6												✓		✓	✓	U	U		
CS238A	15.5	3.31	✓	1.02	Grass	5.5	4.5	6.5		180.5										✓		✓	✓	N	C		
CS241	11.5	2.7	✓	0.045	Grass	2.2	6.45	5.4		272.5										✓				N	C		
CS248	7.8	2.86	✓	0.43	Tarmac	2.5	4.3	2.5	0.7	191														N	C		
CS266	11.4	4.2	✓	0.07	Grass	4.9	5.45	2.6	1.55	267.5										✓		✓		N	C		
CS268	7	3.46	✓	0.86	Tarmac	0.6	2.9	4.7	0.8	145											✓	✓		R	Re		
CS272 Shallow	7	4.79	✓	0.35	Grass	1.5	6.5	6.2		181											✓	✓		R	Re		

CS272 Deep	11	4.79	✓	0.15	Grass	1.5	6.5	6.2												✓	✓			R	Rc	
CS274B	5.2	4.79	✓	4.47	Grass	0.6	0	5.4	0.5											✓	✓			N	U	
CS278	18	5.27		0	Grass	4	8.8	4.25												✓			✓	F	U	
CS283	7.7	3.11	✓	0.57	Block paving	1.4	4.1	2.5		175														N	C	
CS304AL	13.7	6.91		0	Grass	5.5	5.5	3.5	0.6															F	U	
CS307L	14.2	4.32		0.15	Paving slabs	2.6	10.4	4.5												✓				U	U	
CS308L	18.1	5.04		0	Grass	4.4	10.95	3.8	0.9											✓				F	U	
CS313L	11	3.37		0.15	Grass	1.5	6.22	11.2	1															F	U	
CS317L	12.7	3.41		0.09	Concrete	4.6	5.98	10	0.47	281.5										✓		✓	✓	N	C	
CS318	3	2.48	✓	4.92	Grass	1	0	5.25	1.3	51.5	✓		0.30	3.71	0.03	0.31	6.00	148.23	29.82	✓	✓	✓		✓	M	Rv
CS329	6.5	3.02	✓	1.33	Concrete	2.3	2.25	5.15	1	121	✓	✓	4.10	0.83	0.05	0.20	10.96	67.45	27.19		✓	✓			R	Rc
CS332L	6	3.91	✓	0.9	Tarmac	1.4	5.62	0	1	127										✓			✓	N	T	
CS335	4	2.75	✓	3.08	Block paving	2	0	6	2.3	90	✓	✓	1.10	0.17	0.04	0.08	2.88	109.00	17.73		✓	✓		✓	R	Rc
CS337	5.5	2.6	✓	4.29	Block paving	0.5	0.4 (ALV)	3.25	1	66.5												✓		✓	N	C

* MGR = Made Ground, TFD = Tidal Flat Deposits, ALV = Alluvium, MMG = Mercia Mudstone Group

† N = neutral, R = right-leaning, M = mixed, F = flat, U = undetermined

‡ C = conduction-only, Rc = Recharge, Rv = river, T = tidal, U = undetermined