

## Appendix 1

Included are tables of overall means for all field data and analyses. Note that values for maxima and minima (and therefore range) are means of absolute values for that month, not means of daily highs/lows.

Table A1. Habitat means for Skipwith Common (SD).

September 2008 – 1.5 m measurement height

Variable	Grassland	Heathland	Deciduous woodland
Mean	13.42 (0.09)	13.44 (0.15)	13.16 (0.08)
Max	22.50 (0.32)	23.33 (2.07)	20.28 (0.45)
Min	3.98 (0.27)	3.92 (1.59)	5.62 (1.59)
Range	18.53 (0.33)	19.40 (3.64)	14.66 (0.68)
GDD+5	252.79 (2.55)	253.46 (3.93)	244.83 (2.53)

September 2008 – 0.3 m measurement height

Variable	Grassland	Heathland	Deciduous woodland
Mean	13.45 (0.25)	13.03 (0.44)	13.13 (0.11)
Max	25.03 (2.61)	24.88 (1.24)	20.36 (0.98)
Min	2.11 (0.91)	0.37 (1.04)	5.71 (0.35)
Range	22.92 (2.67)	24.50 (1.87)	14.64 (0.99)
GDD+5	254.17 (7.41)	243.78 (11.85)	243.92 (3.33)

September 2008 – 0.01 m measurement height

Variable	Grassland	Heathland	Deciduous woodland
Mean	13.57 (0.39)	12.96 (0.59)	13.13 (0.12)
Max	28.92 (3.52)	25.55 (4.04)	20.40 (1.96)
Min	–0.12 (1.16)	0.51 (1.45)	6.35 (0.66)
Range	29.04 (3.81)	25.03 (4.80)	14.05 (2.35)
GDD+5	254.17 (7.41)	243.78 (11.85)	243.92 (3.33)

January 2009 – 1.5 m measurement height

Variable	Grassland	Heathland	Deciduous woodland
Mean	3.20 (0.06)	3.13 (0.30)	3.23 (0.11)
Max	10.56 (0.09)	10.56 (0.23)	10.56 (0.08)
Min	–4.35 (0.13)	–4.97 (1.06)	–3.94 (0.14)
Range	14.91 (0.17)	15.53 (0.84)	14.50 (0.18)
GDD+5	16.28 (0.54)	15.94 (2.06)	15.47 (1.03)

January 2009 – 0.3 m measurement height

Variable	Grassland	Heathland	Deciduous woodland
Mean	2.90 (0.18)	2.62 (0.32)	2.99 (0.14)
Max	10.49 (0.10)	10.46 (0.22)	10.40 (0.12)
Min	-5.39 (0.23)	-7.86 (0.89)	-3.97 (0.25)
Range	15.88 (0.27)	18.31 (0.94)	14.37 (0.34)
GDD+5	14.97 (1.37)	14.53 (2.08)	13.55 (1.14)

January 2009 – 0.01 m measurement height

Variable	Grassland	Heathland	Deciduous woodland
Mean	2.35 (0.22)	2.06 (0.19)	2.69 (0.16)
Max	10.11 (0.25)	9.94 (0.38)	9.67 (0.32)
Min	-6.99 (1.56)	-7.90 (0.59)	-3.57 (0.50)
Range	17.10 (1.72)	17.84 (0.87)	13.24 (0.73)
GDD+5	12.28 (2.49)	10.16 (1.73)	9.99 (1.42)

Table A2. ANOVA tables for Skipwith Common habitat analysis.

January 2009

 $T_{\text{mean}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	8.027	4.014	120.614	<0.0005
Block within habitat type	6	0.674	0.112	3.377	0.030
Habitat type	2	1.319	0.659	6.002	0.036
Height $\times$ habitat type	4	0.731	0.183	5.491	0.008
Height $\times$ block within habitat type	12	0.399	0.033	0.993	0.467
Error	58	1.942	0.033		
Total	84				

 $T_{\text{min}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	45.449	22.725	42.595	<0.0005
Block within habitat type	6	5.182	0.864	1.617	0.219
Habitat type	2	108.429	54.215	63.603	<0.0005
Height $\times$ habitat type	4	42.653	10.663	19.970	<0.0005
Height $\times$ block within habitat type	12	6.426	0.535	1.057	0.412
Error	58	29.376	0.506		
Total	84				

 $T_{\text{max}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	5.226	2.633	74.144	<0.0005
Block within habitat type	6	0.346	0.058	1.639	0.210
Habitat type	2	0.297	0.148	2.584	0.151
Height $\times$ habitat type	4	0.357	0.089	2.529	0.087
Height $\times$ block within habitat type	12	0.413	0.034	0.684	0.760
Error	58	2.920	0.050		
Total	84				

 $T_{\text{range}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	24.891	12.445	20.647	<0.0005
Block within habitat type	6	7.101	1.184	1.962	0.144
Habitat type	2	117.112	58.556	50.279	<0.0005
Height $\times$ habitat type	4	49.093	12.273	20.354	<0.0005
Height $\times$ block within habitat type	12	7.246	0.604	1.025	0.439
Error	58	34.156	0.589		
Total	84				

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	296.841	148.420	80.472	<0.0005
Block within habitat type	6	54.349	9.058	4.929	0.007
Habitat type	2	23.965	11.983	1.356	0.326
Height × habitat type	4	7.716	1.929	1.049	0.418
Height × block within habitat type	12	21.864	1.822	0.848	0.602
Error	58	124.552	2.147		
Total	84				

September 2008

 $T_{\text{mean}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	0.439	0.220	1.714	0.221
Block within habitat type	6	4.590	0.765	5.936	0.004
Habitat type	2	2.961	1.481	1.956	0.222
Height × habitat type	4	1.115	0.279	2.172	0.133
Height × block within habitat type	12	1.558	0.130	2.811	0.002
Error	106	4.897	0.046		
Total	132				

 $T_{\text{min}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	117.317	58.658	55.024	<0.0005
Block within habitat type	6	2.101	0.350	0.328	0.910
Habitat type	2	466.665	233.332	653.718	<0.0005
Height × habitat type	4	116.074	29.019	27.212	<0.0005
Height × block within habitat type	12	12.824	1.069	1.131	0.343
Error	106	100.138	0.945		
Total	132				

 $T_{\text{max}}$ 

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	184.868	92.434	13.538	0.001
Block within habitat type	6	119.133	19.856	2.896	0.055
Habitat type	2	647.006	323.503	16.443	0.004
Height × habitat type	4	140.762	35.191	5.148	0.012
Height × block within habitat type	12	82.699	6.892	1.784	0.060
Error	106	409.440	3.863		
Total	132				

T<sub>range</sub>

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	574.345	287.173	38.077	<0.0005
Block within habitat type	6	105.268	17.545	2.324	0.099
Habitat type	2	2188.835	1094.417	62.822	<0.0005
Height × habitat type	4	474.371	118.593	15.719	<0.0005
Height × block within habitat type	12	90.738	7.562	1.141	0.336
Error	106	702.578	6.628		
Total	132				

GDD+5

Source of variation	DF	Sum of squares	Mean square	F-ratio	p-value
Height	2	222.492	111.246	1.185	0.339
Block within habitat type	6	3577.136	596.189	6.316	0.003
Habitat type	2	3007.361	1503.680	2.549	0.158
Height × habitat type	4	929.597	232.399	2.471	0.100
Height × block within habitat type	12	1140.569	95.047	2.402	0.009
Error	106	4194.864	39.574		
Total	132				

Table A3. Topographical analyses. Values represent the slope ( $\beta$ ) of the relationship between temperature and the corresponding explanatory variable in the GLM, with SE the standard error.  $S \times \text{TrA}$  is the interaction term between slope and transformed aspect. Underlined values indicate where the best model under multi-model inference includes non-significant terms. Non-standardised models.

(A) for Wales.

September 2007 – 0.01 m measurement height. n = 47 loggers (with waypoint 47 removed).

Variable	Elevation		Slope		Transformed aspect		$S \times \text{TrA}$		$R^2_{\text{adjusted}}$
	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	
$T_{\text{mean}}$	-0.0108	0.003	0.0512	0.0299	<u>-0.0035</u>	<u>0.0021</u>	dropped		0.3089
$T_{\text{max}}$	<u>-0.0178</u>	<u>0.0163</u>	dropped		dropped		dropped		0.0040
$T_{\text{min}}$	-0.0136	0.0076	dropped		dropped		dropped		0.0446
$T_{\text{range}}$	<u>-0.0042</u>	<u>0.0207</u>	dropped		dropped		dropped		-0.0213
Gdd+5	-0.3213	0.0890	<u>1.4782</u>	<u>0.8897</u>	<u>-0.1033</u>	<u>0.0619</u>	dropped		0.3040

January 2007 – 0.01 m measurement height. n = 43 loggers (with waypoint 16 removed).

Variable	Elevation		Slope		Transformed aspect		$S \times \text{TrA}$		$R^2_{\text{adjusted}}$
	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	
$T_{\text{mean}}$	-0.0043	0.0022	dropped		-0.0022	0.0012	dropped		0.1199
$T_{\text{max}}$	<u>-0.0093</u>	<u>0.0069</u>	dropped		dropped		dropped		0.0217
$T_{\text{min}}$	dropped		dropped		<u>-0.0029</u>	<u>0.0052</u>	dropped		-0.0167
$T_{\text{range}}$	dropped		<u>0.0676</u>	<u>0.1075</u>	dropped		dropped		-0.0146
Gdd+5	<u>-0.0503</u>	<u>0.0301</u>	dropped		dropped		dropped		0.0411

(B) for Peak District

September 2007 – 0.01 m measurement height. n = 24 loggers (with waypoint 77 removed).

Variable	Elevation		Slope		Transformed aspect		$S \times \text{TrA}$		$R^2_{\text{adjusted}}$
	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	
$T_{\text{mean}}$	-0.0101	0.0034	-0.1064	0.0409	-0.0074	0.0025	dropped		0.4076
$T_{\text{max}}$	dropped		-0.5489	0.2905	-0.0338	0.0189	dropped		0.1490
$T_{\text{min}}$	-0.0166	0.0071	dropped		dropped		dropped		0.1565
$T_{\text{range}}$	dropped		<u>-0.5275</u>	<u>0.3528</u>	dropped		dropped		0.0490
Gdd+5	-0.3287	0.1025	-2.7723	1.2790	-0.1948	0.0754	dropped		0.3498

January 2007 – 0.01 m measurement height. n = 32 loggers (with waypoint 71 removed).

Variable	Elevation		Slope		Transformed aspect		$S \times \text{TrA}$		$R^2_{\text{adjusted}}$
	$\beta$	SE	$\beta$	p	$\beta$	p	$\beta$	p	
$T_{\text{mean}}$	-0.0049	0.0015	dropped		dropped		dropped		0.2245
$T_{\text{max}}$	dropped		0.2099	0.0785	<u>0.0073</u>	<u>0.0065</u>	-0.0021	0.0008	0.2115
$T_{\text{min}}$	<u>-0.0059</u>	<u>0.0068</u>	dropped		dropped		dropped		-0.0079
$T_{\text{range}}$	dropped		0.5006	0.1935	0.0291	0.0160	-0.0054	0.0020	0.1359
Gdd+5	-0.0382	0.0214	dropped		dropped		dropped		0.0661

Standardised models

(A) for Wales

September 2007 – 0.01 m measurement height. n = 47 loggers (with waypoint 47 removed).

Variable	Elevation		Slope		Transformed aspect		S × TrA		R <sup>2</sup> <sub>adjusted</sub>
	β	p	β	p	β	p	β	p	
T <sub>mean</sub>	-0.4433	0.1223	0.2113	0.1234	<u>-0.358</u>	<u>0.2131</u>	dropped		0.3089
T <sub>max</sub>	<u>-0.7262</u>	<u>0.6676</u>	dropped		dropped		dropped		0.0040
T <sub>min</sub>	-0.5547	0.3126	dropped		dropped		dropped		0.0446
T <sub>range</sub>	<u>-0.1716</u>	<u>0.8452</u>	dropped		dropped		dropped		-0.0213
Gdd+5	-13.132	3.639	<u>6.1</u>	<u>3.672</u>	<u>-10.588</u>	<u>6.341</u>	dropped		0.304

January 2007 – 0.01 m measurement height. n = 43 loggers (with waypoint 16 removed).

Variable	Elevation		Slope		Transformed aspect		S × TrA		R <sup>2</sup> <sub>adjusted</sub>
	β	SE	β	SE	β	SE	β	SE	
T <sub>mean</sub>	-0.1349	0.0696	dropped		-0.1228	0.0696	dropped		0.1199
T <sub>max</sub>	<u>-0.293</u>	<u>0.2107</u>	dropped		dropped		dropped		0.0217
T <sub>min</sub>	dropped		dropped		<u>-0.1657</u>	<u>0.2983</u>	dropped		-0.0167
T <sub>range</sub>	dropped		<u>0.2739</u>	<u>0.4352</u>	dropped		dropped		-0.0145
Gdd+5	<u>-1.5863</u>	<u>0.9478</u>	dropped		dropped		dropped		0.0607

(B) for Peak District

September 2007 – 0.01 m measurement height. n = 24 loggers (with waypoint 77 removed).

Variable	Elevation		Slope		Transformed aspect		S × TrA		R <sup>2</sup> <sub>adjusted</sub>
	β	SE	β	SE	β	SE	β	SE	
T <sub>mean</sub>	-0.4617	0.1536	-0.5156	0.1981	-0.4275	0.1461	dropped		0.4076
T <sub>max</sub>	dropped		-2.660	1.408	-1.956	1.097	dropped		0.149
T <sub>min</sub>	-0.7593	0.3251	dropped		dropped		dropped		0.1565
T <sub>range</sub>	dropped		<u>-2.557</u>	<u>1.71</u>	dropped		dropped		0.0490
Gdd+5	-15.016	4.680	-13.436	6.198	-11.276	4.367	<u>dropped</u>	ns	0.3498

January 2007 – 0.01 m measurement height. n = 32 loggers (with waypoint 71 removed).

Variable	Elevation		Slope		Transformed aspect		S × TrA		R <sup>2</sup> <sub>adjusted</sub>
	β	SE	β	SE	β	SE	β	SE	
T <sub>mean</sub>	-0.2515	0.0796	dropped		dropped		dropped		0.2245
T <sub>max</sub>	dropped		-0.1173 †	0.2261 †	-0.37	0.1907	-0.6096	0.2447	0.2115
T <sub>min</sub>	<u>-0.3053</u>	<u>0.3510</u>	dropped		dropped		dropped		-0.0079
T <sub>range</sub>	dropped		-0.5640 †	0.5570 †	-0.4256 †	0.4698 †	-1.5885	0.6028	0.1359
Gdd+5	-2.218	1.067	dropped		-2.080	1.067	dropped		0.1458

† Indicates variable was retained due to significance of S × TrA term.