

Supplementary

Assessment of air thermal conditions in the lowland part of south-western Poland for agriculture development purposes

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Table S1. Differences in the mean and standard deviation of temperature between the decades 2005-2014 and 1951-1960.

Month / season	Region	Station					Region	Station				
		Kalisz	Legnica	Opole	Wieluń	Wrocław		Kalisz	Legnica	Opole	Wieluń	Wrocław
	$\bar{x}$, in °C						sd, in °C					
Jan	0.8	0.8	0.6	1.0	0.6	0.9	1.5	1.6	1.6	1.2	1.3	1.5
Feb	2.1	2.2	2.2	1.9	1.8	2.2	-1.6	-1.5	-2.0	-1.4	-1.5	-1.7
Mar	1.8	1.9	1.6	1.7	1.7	1.7	0.3	0.6	0.4	0.0	0.3	0.3
Apr	2.7	2.9	2.4	2.6	2.7	2.6	-1.0	-0.8	-0.9	-1.1	-0.9	-0.9
May	1.4	1.6	1.1	1.3	1.3	1.4	-0.3	-0.2	-0.3	-0.3	-0.4	-0.4
Jun	0.6	0.5	0.5	0.6	0.4	0.7	-0.1	0.0	-0.1	-0.2	-0.1	-0.2
Jul	1.7	1.9	1.6	1.6	1.7	1.8	0.1	0.1	0.2	0.0	0.1	0.2
Aug	1.1	1.2	1.0	0.9	1.0	1.2	-0.5	-0.7	-0.4	-0.3	-0.6	-0.4
Sep	1.2	1.5	1.1	0.9	1.1	1.2	0.2	0.3	0.2	0.2	0.3	0.1
Oct	0.8	1.0	0.6	0.7	0.6	0.8	0.4	0.6	0.1	0.4	0.6	0.3
Nov	1.5	1.7	1.3	1.7	1.5	1.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3
Dec	-0.3	-0.1	-0.3	-0.4	-0.5	-0.2	1.2	1.4	1.2	1.1	1.3	1.3
Winter	0.8	1.1	1.0	1.0	0.8	1.1	0.5	0.4	0.5	0.5	0.4	0.6
Spring	1.9	2.1	1.7	1.9	1.9	1.9	0.1	0.2	0.1	0.1	0.1	0.1
Summer	1.1	1.2	1.1	1.0	1.1	1.2	-0.2	-0.3	-0.3	-0.2	-0.3	-0.3
Autumn	1.2	1.4	1.0	1.1	1.1	1.1	0.1	0.1	0.1	0.1	0.1	0.1
Year	1.3	1.4	1.1	1.2	1.2	1.3	-0.1	-0.1	0.0	-0.1	-0.1	0.0

Table S2. Correlation coefficients for relationship between the number of days with the air temperature characterizing the thermal periods of agriculture – winter plant dormancy ($T_a < 0\text{ }^{\circ}\text{C}$, a) and farming periods ($T_a > 3\text{ }^{\circ}\text{C}$, b) and the years 1951–2014; and the linear trend (in days / 10 years).

Month / season	Region		Station									
			Kalisz		Legnica		Opole		Wieluń		Wrocław	
	a	b	a	b	a	b	a	b	a	b	a	b
Jan	n.s. / -0.2	0.31 ² / 1.0	n.s. / -0.8	0.38 ¹ / 1.1	n.s. / -0.6	0.23 ³ / 0.8	n.s. / -0.6	0.36 ¹ / 1.1	n.s. / -0.6	0.37 ¹ / 1.0	n.s. / -0.6	0.27 ² / 0.8
Feb	n.s. / -0.7	n.s. / 0.6	n.s. / -0.7	0.27 ² / 0.9	n.s. / -0.6	n.s. / 0.6	n.s. / -0.6	0.22 ³ / 0.7	n.s. / -0.5	n.s. / 0.6	n.s. / -0.7	n.s. / 0.7
Mar	-0.23 ³ / -0.8	0.28 ² / 1.2	-0.26 ² / -0.9	0.32 ¹ / 1.4	-0.26 ² / -0.9	0.24 ³ / 1.0	-0.28 ² / -0.9	0.24 ³ / 0.9	n.s. / -0.7	0.28 ² / 1.2	-0.26 ² / -0.9	0.24 ³ / 1.0
Apr	n.s. / 0.0	0.25 ² / 0.4	n.s. / 0.0	0.29 ² / 0.5	n.s. / 0.0	n.s. / 0.3	n.s. / 0.0	0.22 ³ / 0.4	n.s. / 0.0	0.27 ² / 0.5	n.s. / 0.0	0.25 ² / 0.3
May	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	0.29 ² / 0.1	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	0.23 ³ / 0.1	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0
Jun	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0
Jul	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0
Aug	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0
Sep	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0
Oct	n.s. / 0.0	n.s. / -0.1	n.s. / 0.0	n.s. / -0.2	n.s. / 0.0	n.s. / -0.2	n.s. / 0.0	n.s. / -0.2	n.s. / 0.0	n.s. / -0.2	n.s. / 0.0	n.s. / -0.1
Nov	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.7	n.s. / 0.0	n.s. / 0.2	n.s. / -0.2	n.s. / 0.4	n.s. / 0.0	n.s. / 0.4	n.s. / 0.0	n.s. / 0.2
Dec	n.s. / 0.0	n.s. / 0.4	n.s. / -0.1	0.24 ² / 0.7	n.s. / 0.0	n.s. / 0.3	n.s. / 0.0	n.s. / 0.4	n.s. / 0.0	n.s. / 0.4	n.s. / 0.0	n.s. / 0.4
Winter	n.s. / -1.4	0.29 ² / 2.0	n.s. / -1.6	0.39 ¹ / 2.5	n.s. / -1.3	0.23 ¹ / 1.7	n.s. / -1.2	0.34 ¹ / 2.3	n.s. / -0.9	0.32 ¹ / 1.9	n.s. / -1.3	0.28 ² / 1.9
Spring	-0.22 ³ / -0.8	0.31 ² / 1.6	-0.24 ² / -0.9	0.37 ¹ / 1.9	-0.25 ² / -0.9	0.27 ² / 1.3	-0.26 ² / -0.9	0.28 ² / 1.4	-0.22 ³ / -0.9	0.33 ¹ / 1.7	-0.25 ² / -0.9	0.29 ² / 1.4
Summer	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0	n.s. / 0.0
Autumn	n.s. / 0.0	n.s. / 0.2	n.s. / 0.0	n.s. / 0.5	n.s. / -0.1	n.s. / 0.0	n.s. / -0.2	n.s. / 0.0	n.s. / 0.0	n.s. / 0.1	n.s. / -0.1	n.s. / 0.0
Year	-0.23 ³ / -2.3	0.38 ¹ / 3.9	-0.25 ² / -2.6	0.49 ¹ / 5.1	-0.25 ² / -2.3	0.30 ² / 3.1	-0.25 ² / -2.3	0.38 ¹ / 3.8	n.s. / -1.8	0.38 ¹ / 3.7	-0.25 ² / -2.3	0.34 ¹ / 3.4

Notes: ¹ at $P < 0.01$, ² at $P < 0.05$, ³ at $P < 0.1$, n.s. - non-significant.

Table S3. Correlation coefficients for relationship between the number of days with the air temperature characterizing the thermal periods of agriculture: vegetation ($T_a > 5\text{ }^{\circ}\text{C}$), active plant growth ($T_a > 10\text{ }^{\circ}\text{C}$) and plant maturation ($T_a > 15\text{ }^{\circ}\text{C}$) and the years 1951-2014; and the linear trend (in days / 10 years).

Month / season	Region			Station														
				Kalisz			Legnica			Opole			Wieluń			Wrocław		
	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
Jan	0.43 ¹ /0.8	n.s./0.0	n.s./0.0	0.46 ¹ /0.8	n.s./0.0	n.s./0.0	0.30 ² /0.7	0.26 ² /0.6	n.s./0.0	0.42 ¹ /0.8	0.23 ³ /0.1	n.s./0.0	0.44 ¹ /0.7	n.s./0.0	n.s./0.0	0.41 ¹ /0.8	0.27 ² /0.1	n.s./0.0
Feb	0.29 ² /0.6	0.25 ² /0.1	n.s./0.0	0.28 ² /0.6	n.s./0.0	n.s./0.0	0.23 ³ /0.6	0.22 ³ /0.9	n.s./0.0	0.24 ³ /0.6	0.22 ³ /0.1	n.s./0.0	n.s./0.4	n.s./0.0	n.s./0.0	0.30 ² /0.7	n.s./0.0	n.s./0.0
Mar	0.32 ¹ /1.1	n.s./0.1	n.s./0.0	0.35 ¹ /1.2	n.s./0.2	n.s./0.0	0.27 ² /1.0	n.s./0.0	n.s./0.0	0.31 ² /1.1	n.s./0.1	n.s./0.0	0.31 ² /1.1	n.s./0.1	n.s./0.0	0.31 ² /1.1	n.s./0.1	n.s./0.0
Apr	0.43 ¹ /1.0	0.41 ¹ /1.1	n.s./0.1	0.48 ¹ /1.2	0.45 ¹ /1.2	n.s./0.3	0.43 ¹ /1.0	0.38 ¹ /1.0	n.s./0.1	0.41 ¹ /1.0	0.41 ¹ /1.1	n.s./0.0	0.42 ¹ /1.1	0.40 ¹ /1.1	n.s./0.1	0.45 ¹ /1.0	0.41 ¹ /1.1	n.s./0.1
May	0.28 ² /0.1	0.33 ¹ /0.7	0.36 ¹ /1.0	0.31 ² /0.2	0.32 ¹ /0.7	0.32 ¹ /0.9	0.26 ² /0.1	0.33 ¹ /0.6	0.33 ¹ /0.9	0.32 ² /0.1	0.36 ¹ /0.7	0.33 ¹ /0.9	0.31 ² /0.2	0.34 ¹ /0.7	0.33 ¹ /0.9	0.30 ² /0.1	0.40 ¹ /0.8	0.39 ¹ /1.1
Jun	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	0.21 ³ /0.1	n.s./0.2	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.0	n.s./0.3
Jul	n.s./0.0	n.s./0.0	0.28 ² /0.7	n.s./0.0	n.s./0.0	0.30 ² /0.8	n.s./0.0	n.s./0.0	0.24 ³ /0.6	n.s./0.0	n.s./0.0	0.32 ¹ /0.8	n.s./0.0	0.25 ² /0.1	0.28 ² /0.8	n.s./0.0	n.s./0.0	0.30 ² /0.8
Aug	n.s./0.0	n.s./0.0	0.37 ¹ /0.9	n.s./0.0	n.s./0.0	0.40 ¹ /1.1	n.s./0.0	n.s./0.0	0.37 ¹ /0.8	n.s./0.0	n.s./0.0	0.32 ¹ /0.8	n.s./0.0	n.s./0.0	0.38 ¹ /1.0	n.s./0.0	n.s./0.0	0.41 ¹ /1.0
Sep	n.s./0.0	0.26 ² /0.5	n.s./0.4	n.s./0.0	0.32 ¹ /0.7	n.s./0.6	n.s./0.0	0.24 ³ /0.4	n.s./0.3	n.s./0.0	0.22 ³ /0.4	n.s./0.4	n.s./0.0	0.22 ³ /0.5	n.s./0.6	n.s./0.0	0.29 ² /0.6	n.s./0.5
Oct	n.s./-0.2	0.23 ³ /0.8	0.28 ² /0.4	n.s./0.0	0.28 ² /0.9	n.s./0.3	n.s./0.0	n.s./0.6	n.s./0.2	n.s./0.0	n.s./0.7	n.s./0.3	n.s./0.0	n.s./0.6	0.22 ³ /0.3	n.s./0.0	0.25 ² /0.8	n.s./0.2
Nov	0.21 ³ /0.6	n.s./0.2	n.s./0.0	0.28 ² /0.8	n.s./0.2	n.s./0.0	n.s./0.4	n.s./0.1	n.s./0.0	n.s./0.8	0.27 ² /0.4	0.25 ² /0.1	n.s./0.7	0.26 ² /0.3	n.s./0.0	n.s./0.5	n.s./0.2	n.s./0.0
Dec	n.s./0.3	n.s./0.0	n.s./0.0	n.s./0.3	n.s./0.0	n.s./0.0	n.s./0.2	n.s./0.0	n.s./0.0	n.s./0.3	n.s./0.0	n.s./0.0	n.s./0.2	n.s./0.0	n.s./0.0	n.s./0.3	n.s./0.0	n.s./0.0
Winter	0.34 ¹ /2.5	n.s./0.1	n.s./0.0	0.36 ¹ /2.4	n.s./0.0	n.s./0.0	0.28 ² /2.3	0.30 ² /0.3	n.s./0.0	0.33 ¹ /2.4	0.23 ³ /0.1	n.s./0.0	0.28 ¹ /1.7	0.24 ³ /0.1	n.s./0.0	0.35 ¹ /2.6	0.29 ² /0.2	n.s./0.0
Spring	0.45 ¹ /2.2	0.51 ¹ /2.0	0.35 ¹ /1.1	0.51 ¹ /2.4	0.53 ¹ /2.1	0.36 ¹ /1.2	0.42 ¹ /2.0	0.46 ¹ /1.7	0.34 ¹ /1.1	0.45 ¹ /2.2	0.52 ¹ /2.0	0.31 ² /1.0	0.46 ¹ /2.2	0.50 ¹ /1.9	0.32 ¹ /1.0	0.46 ¹ /2.2	0.53 ¹ /2.0	0.38 ¹ /1.2
Summer	n.s./0.0	n.s./0.0	0.34 ¹ /1.7	n.s./0.0	n.s./0.0	0.33 ¹ /1.7	n.s./0.0	n.s./0.0	0.29 ² /1.3	n.s./0.0	0.22 ³ /0.1	0.35 ¹ /1.7	n.s./0.0	n.s./0.0	0.33 ¹ /1.8	n.s./0.0	n.s./0.0	0.39 ¹ /2.0
Autumn	n.s./0.4	0.36 ¹ /1.4	0.26 ² /0.7	n.s./0.7	0.44 ¹ /1.7	0.26 ² /0.8	n.s./0.4	0.30 ² /1.2	n.s./0.4	n.s./0.6	0.36 ² /1.5	n.s./0.7	n.s./0.6	0.33 ² /1.3	0.26 ² /0.8	n.s./0.5	0.38 ¹ /1.6	n.s./0.6
Year	0.54 ¹ /4.4	0.57 ¹ /3.6	0.45 ¹ /3.6	0.59 ¹ /4.9	0.60 ¹ /3.9	0.48 ¹ /3.8	0.47 ¹ /3.9	0.51 ¹ /3.3	0.38 ¹ /2.8	0.53 ¹ /4.5	0.56 ¹ /3.3	0.44 ¹ /3.4	0.52 ¹ /4.1	0.53 ¹ /3.4	0.45 ¹ /3.6	0.55 ¹ /4.6	0.58 ¹ /3.8	0.48 ¹ /3.8

Notes: ¹ at $P < 0.01$, ² at $P < 0.05$, ³ at $P < 0.1$, n.s. - non-significant.



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