

Phytosociological Research Center

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Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 14/02/2020)

KARLSTAD (SWEDEN)

Altitude: 47 m.

Latitude: 59°22'N Longitude: 13°28'E

Temperature observation period.: 1950-1980 (31)

Rainfall observation period....: 1950-1905 (-44 r)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	-4.40	-1.20	-7.50	9.00	-29.40	47.0	0.00
Feb.	-4.20	-0.50	-7.80	11.20	-28.00	31.0	0.00
Mar.	-1.10	3.40	-5.50	17.00	-27.00	25.0	0.00
Apr.	4.70	9.30	0.00	22.60	-18.40	38.0	32.09
May.	10.40	15.70	5.00	27.40	-4.80	38.0	81.71
Jun.	14.90	19.70	10.00	32.40	0.80	49.0	120.08
Jul.	17.60	22.20	12.90	34.00	4.40	64.0	139.51
Aug.	16.30	20.80	11.80	31.80	2.50	81.0	113.58
Sep.	12.00	15.90	8.00	24.00	-4.20	70.0	69.15
Oct.	6.70	9.90	3.40	19.80	-10.20	61.0	32.57
Nov.	2.10	4.50	-0.40	12.00	-19.90	69.0	8.08
Dec.	-1.10	1.50	-3.60	11.20	-27.00	51.0	0.00
Year	6.16	10.10	2.19	21.03	-13.43	624	596.77

BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	-25
Compensated thermicity index.....(Itc):	5
Simple continentality index.....(Ic):	22.0
Diurnality index.....(Id):	10.7
Annual ombrothermic index.....(Io):	5.55
Monthly estival ombrothermic index.....(Ios1):	3.29
Bimonthly estival ombrothermic index.....(Ios2):	4.28
Threemonthly estival ombrothermic index.....(Ios3):	3.98
Fourmonthly estival ombrothermic index.....(Ios4):	3.92
Annual ombro-evaporation index.....(Ioe):	1.05
Annual positive temperature.....(Tp):	847
Annual negative temperature.....(Tn):	108
Estival temperature.....(Ts):	488
Positive precipitation.....(Pp):	470

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	5	3	0	0	4

Latitudinal Belt...: High Subtemperate

Continentalty.....: Continental - Low Subcontinental

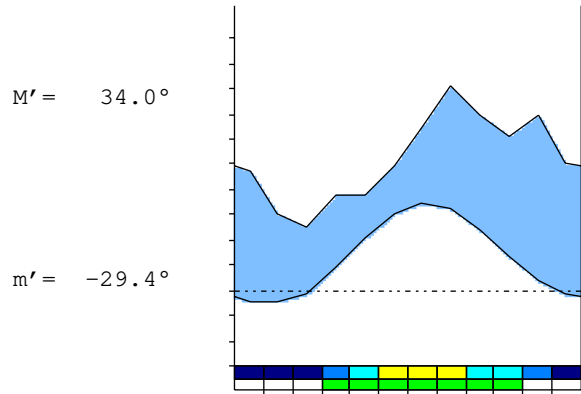
Bioclimate(Variant): TEMPERATE CONTINENTAL (HEMIBOREAL)

Bioclimatic Belt...: UPPER SUPRATEMPERATE (HEMIBOREAL) UPPER SUBHUMID

KARLSTAD (SWEDEN)

47 m

P= 624 59° 22'N 13° 28'E 31/-44 y.
 T= 6.2 ° Ic= 22.0 Tp= 847 Tn= 108
 m= -7.5 ° M= -1.2 ° Itc= 5 Io= 5.5



TEMPERATE CONTINENTAL (HEMIBOREAL)
 UPPER SUPRATEMPERATE (HEMIBOREAL) UPPER SUBHUMID

WATER INDEX CARD KARLSTAD (SWEDEN)
 Altitude: 47 m. Latitude: 59° 22'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	-4.4	0	47	0	100	0	0	47	34	*
Feb.	-4.2	0	31	0	100	0	0	31	32	*
Mar.	-1.1	0	25	0	100	0	0	25	29	*
Apr.	4.7	32	38	0	100	32	0	6	17	0.1
May.	10.4	82	38	-44	56	82	0	0	9	-0.5
Jun.	14.9	120	49	-56	0	105	15	0	4	-0.5
Jul.	17.6	140	64	0	0	64	76	0	2	-0.5
Aug.	16.3	114	81	0	0	81	33	0	1	-0.2
Sep.	12.0	69	70	1	1	69	0	0	1	0.0
Oct.	6.7	33	61	28	29	33	0	0	0	0.8
Nov.	2.1	8	69	61	90	8	0	0	0	7.5
Dec.	-1.1	0	51	10	100	0	0	41	21	*
Year	6.2	597	624	*	*	474	123	150	150	*

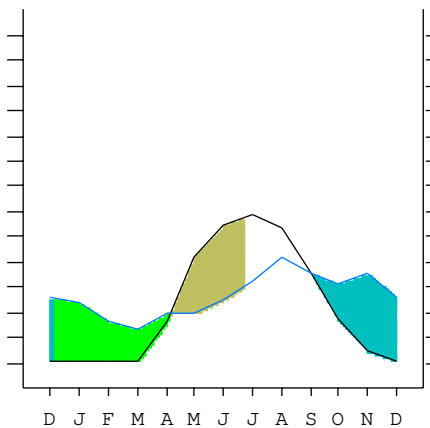
R = Reserve VR = Variation of the reserve RE = Real evapotranspiration
 DR = Drainage HC = Humidity coefficient DF = Deficit SP = Superavit

KARLSTAD (SWEDEN)

59°22'N 13°28'E 47 m 31/-44 y.

T= 6.2 Ic= 22.0 TEMPERATE CONTINENTAL (HEMIBOREAL)
 m= -7.5 Tp= 847 UPPER SUPRATEMPERATE (HEMIBOREAL)
 M= -1.2 Tn= 108 UPPER SUBHUMID
 M' = 34.0 Itc= 5
 m' = -29.4 Io= 5.5
 P= 624 mm ———
 PE= 597 mm ———

Imbibing	30 Aug.
Saturation	6 Dec.
Reserve Use	4 Apr.
Deficit	24 Jun.



KARLSTAD (SWEDEN)

Latitude: 59°22'N Longitude: 13°28'E Altitude: 47 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [C2a]
 + Type: C. Continental
 + Subtype: 2. Subcontinental
 + Variant: a. Low

Thermic types [B2.B5]
 + Latitudinal zone: B. Temperate
 + Latitudinal belt: 2. High Subtemperate
 + Thermic type: B. Temperate
 + Thermic subtype: 5. Subtemperate

Bioclimatic types [C2.4a.6a]
 + Macrobioclimate: C. TEMPERATE
 + Bioclimate: 2. CONTINENTAL
 + Bioclimatic variant .: HEMIBOREAL
 + Thermic type.....: 4. SUPRATEMPERATE (HEMIBOREAL)
 + Thermic subtype.....: a. UPPER
 + Ombrothermic type ...: 6. SUBHUMID
 + Ombrothermic subtype : a. UPPER

Bioclimatic ClassificationTeco(Hem).Ste.Shu.Suc

KARLSTAD (SWEDEN)

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 363
 Coldest semester of the year.....(Psw): 261
 Warmest four months period of the year.....(Pcm1): 264
 Following warmest four months period.....(Pcm2): 228
 Positive precipitation dryest 3 months.....(Ppd): 38
 Positive precipitation dryest 2 months.....(Ppd2): 0
 Positive precipitation dryest 1 month.....(Ppd1): 0
 Positive precipitation warmest 3 months.....(Pps): 194
 Positive precipitation warmest 2 months.....(Pps2): 145
 Positive precipitation warmest 1 month.....(Pps1): 64
 Positive precipitation coldest 3 months.....(Ppw): 0
 Positive precipitation coldest 2 months.....(Ppw2): 0
 Positive precipitation coldest 1 month.....(Ppw1): 0

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	129	101	194	200

Seasonal rainfall rhythms: F > S > W > P

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 17.6
 Average coldest month [T].....(Tmin): -4.4
 Maximum temp. warmest month [M].....(Tmax): 22.2
 Minimum temp. coldest month [m].....(Tmin): -7.8
 Absolute Max.temp. warmest month [M'].....(Tamax): 34.0
 Absolute Min.temp. coldest month [m'].....(Tamin): -29.4
 First warmest contrasted month [M].....(Tcmax): 15.7 (5)
 First coldest contrasted month [m].....(Tcmin): 5.0 (5)
 Estival temperature.....(Ts): 488
 Positive temperature dryest 3 months.....(Tpd): 47
 Positive temperature dryest 2 months.....(Tpd2): 0
 Positive temperature dryest 1 month.....(Tpd1): 0
 Positive temperature warmest 3 months.....(Tps): 488
 Positive temperature warmest 2 months.....(Tps2): 339
 Positive temperature warmest 1 month.....(Tps1): 176
 Positive temperature coldest 3 months.....(Tpw): 0
 Positive temperature coldest 2 months.....(Tpw2): 0
 Positive temperature coldest 1 month.....(Tpw1): 0

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SEASONAL PARAMETERS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Warmest semester... (Sms)					o	o	o	o	o	o		
Dryest semester... (Smd)	o	o	o	o	o	o						
Warmest 4 months... (Cm1)						o	o	o	o			
Dryest 4 months... (Cmd)		o	o	o	o							
Vegetation Activity (Pav)				o	o	o	o	o	o	o		
Ultragelid... [M' <=0] (Pf)												
Hypergelid... [M <=0] (Pf)	o	o										
Gelid... [T <=0] (Pf)	o	o	o									o
Subgelid... [m <=0] (Pf)	o	o	o	o							o	o
Pregelid... [m' <=0] (Pf)	o	o	o	o	o				o	o	o	o
Agelid... [m' > 0] (Pf)						o	o	o				
HiperAgelid... [all >0] (Pf)						o	o	o				

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OMBROTHERMIC PARAMETERS

Annual aridity index. [PE/P]..... (Iar): 0.96
 Mediterranean index of July. [PE/P]..... (Im1): 2.18
 Mediterranean index of July & August..... (Im2): 1.75
 Mediterranean index of June, July & August.... (Im3): 1.92

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp (x10)	*	*	*	*	380	380	490	640	810	700	610	690
Tp	*	*	*	*	47	104	149	176	163	120	67	21
Io (Iom)	*	*	*	*	8.09	3.65	3.29	3.64	4.97	5.83	9.10	32.9
Seasons	Winter			Spring			Summer			Autumn		
Pp (x10) / Tp	* / *			* / *			1940 / 488			2000 / 208		
Io (Iot)	*			*			3.975			9.615		
Semesters	December-May						June-November					
Pp (x10) / Tp	* / *						3940 / 696					
Io (Iosm)	*						5.661					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 4700/847=5.55 There is No Yearly Aridity

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	*	*	*	*	380	380	490	640	810	700	610	690
Tp [T*10]	*	*	*	*	47	104	149	176	163	120	67	21
Iom [Pp/Tp]	!!	!!	!!	!!	809	365	329	364	497	583	910	\$\$
Avm [200-Iom]	***	***	***	***	***	***	***	***	***	***	***	***
Seasons	Winter			Spring			Summer			Autumn		
Pp / Tp	* / *			* / *			1940 / 488			2000 / 208		
Iot [Pp/Tp]	**			**			398			962		
Avs E [Avm < 200]	***			***			***			***		

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin](Sp): 22.00
 CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4]: 23.07
 CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14]: 25.96
 + Oceanic (20<CI<40)
 CI of Currey (1974) [CI=Sp/(1+Lat/3)]: 1.06
 + Oceanic (0.6<CI<1.1)
 Rainfall Index of Lang (1925) [R=P/T]: 101.33
 + Temperate humid (160>R>100)
 Aridity Index of Martonne (1926) [Ia=P/(T+10)]: 38.62
 + Humid (60>Ia>30)
 I of Emberger (1930) [Q=100*P/(Tmmax²-Tmmin²)]: 144.44
 + Humid (Q>90)
 I of Dantin & Revenga (1940) [DR=100*T/P]: 0.99
 + Humid (2>DR>0)
 Aridity Index of UNEP [I=P/PE]: 1.05
 + Humid (I>0.65)
 Potential Erosion I of Fournier (1960) [K=Pi²/P].....: 10.51
 + Very low (K<60)

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)
 + Climate: B. Cold and temperate cold
 + Region: 11. Psicroaxeric (Axeric cold)
 + Thermic type: 5. Meso-microthermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.40	0.25	0.19	0.23	0.19	0.22	0.27	0.36	0.35	0.36	0.50	0.41
T-E ratio	0.00	0.00	0.00	2.11	4.68	6.70	7.92	7.33	5.40	3.01	0.94	0.00
Precipitation-effectiveness: 37.27						Temperature-efficiency: 38.11						
Moisture Index [MI=100*(P-PE)/PE]: 4.56 + C2.Subhumid humid (0<MI<20)												
Index of dryness [DI=100*d/PE]: 20.58 + Moderate deficit (16.7<DI<33.3)												
Index of humidity [HI=100*s/PE]: 25.15 + Strong surplus (20<HI)												
Potential Evapotranspiration PE: 596.77 + First mesothermic (570<PE<712)												

