

# Phytosociological Research Center

www.globalbioclimatics.org

## Worldwide Bioclimatic Classification System

S.Rivas-Martinez(+) & S.Rivas-Saenz

(Adapted to Synoptical Table 14/02/2020)

BOLGRAD (UKRAINE)

Altitude: 81 m.

Latitude: 45°40'N Longitude: 28°37'E

Temperature observation period.: 1984-1994 (11)

Rainfall observation period....: 1984-1994 (11)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	Epi
Jan.	-3.34	-0.56	-6.11	10.00	-23.89	37.8	0.00
Feb.	-0.28	2.22	-2.78	17.22	-21.11	34.3	0.00
Mar.	3.89	8.33	-0.56	21.11	-13.89	37.6	12.19
Apr.	10.56	16.11	5.00	26.11	-6.11	38.9	47.75
May.	16.12	21.67	10.56	30.00	1.11	52.3	93.07
Jun.	20.56	26.11	15.00	35.00	6.11	57.9	127.58
Jul.	22.22	28.33	16.11	36.11	10.00	47.8	142.91
Aug.	21.67	27.78	15.56	35.00	6.11	29.5	127.96
Sep.	17.22	23.33	11.11	32.22	2.78	39.4	81.56
Oct.	12.22	17.22	7.22	26.11	-3.89	29.0	47.77
Nov.	6.95	10.00	3.89	23.89	-8.89	31.5	19.66
Dec.	0.55	3.33	-2.22	16.11	-20.00	40.9	0.74
Year	10.69	15.32	6.07	25.74	-5.97	477	701.20

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	40
Compensated thermicity index.....(Itc):	124
Simple continentality index.....(Ic):	25.6
Diurnality index.....(Id):	12.2
Annual ombrothermic index.....(Io):	3.07
Monthly estival ombrothermic index.....(Ios1):	1.36
Bimonthly estival ombrothermic index.....(Ios2):	1.76
Threemonthly estival ombrothermic index.....(Ios3):	2.10
Fourmonthly estival ombrothermic index.....(Ios4):	2.33
Annual ombro-evaporation index.....(Ioe):	0.68
Annual positive temperature.....(Tp):	1320
Annual negative temperature.....(Tn):	36
Estival temperature.....(Ts):	645
Positive precipitation.....(Pp):	405

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	3	6	1	0	2

Latitudinal Belt...: High Eutemperate

Continentality.....: Continental - High Subcontinental

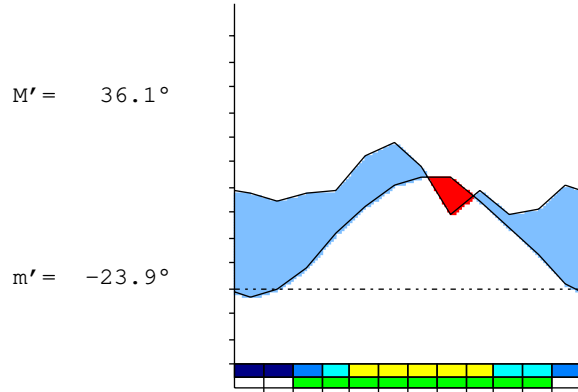
Bioclimate(Variant): MEDITERRANEAN PLUVISEASONAL-CONTINENTAL (STEPPIC)

Bioclimatic Belt...: LOW SUPRAMEDITERRANEAN UPPER DRY

BOLGRAD (UKRAINE)

81 m

P= 477      45° 40'N      28° 37'E      11/11 y.  
 T= 10.7 °    Ic= 25.6      Tp= 1320      Tn= 36  
 m= -6.1 °    M= -0.6 °      Itc= 124      Io= 3.1



MEDITERRANEAN PLUVISEASONAL-CONTINENTAL (STEPPIC)  
 LOW SUPRAMEDITERRANEAN UPPER DRY

WATER INDEX CARD      BOLGRAD (UKRAINE)  
 Altitude: 81 m.      Latitude: 45° 40'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	-3.3	0	38	38	90	0	0	0	0	*
Feb.	-0.3	0	34	10	100	0	0	24	12	*
Mar.	3.9	12	38	0	100	12	0	25	19	2.0
Apr.	10.6	48	39	-9	91	48	0	0	9	-0.1
May.	16.1	93	52	-41	50	93	0	0	5	-0.4
Jun.	20.6	128	58	-50	0	108	19	0	2	-0.5
Jul.	22.2	143	48	0	0	48	95	0	1	-0.6
Aug.	21.7	128	30	0	0	30	98	0	1	-0.7
Sep.	17.2	82	39	0	0	39	42	0	0	-0.5
Oct.	12.2	48	29	0	0	29	19	0	0	-0.3
Nov.	6.9	20	32	12	12	20	0	0	0	0.6
Dec.	0.6	1	41	40	52	1	0	0	0	*
Year	10.7	701	477	*	*	427	274	50	50	*

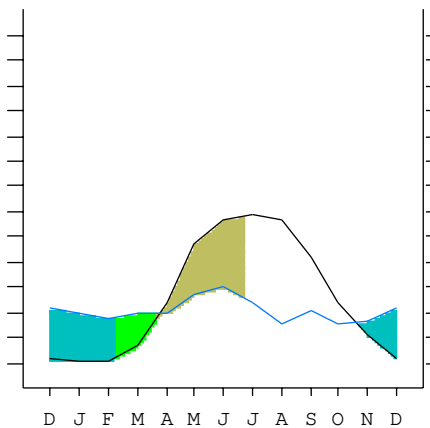
R = Reserve    VR = Variation of the reserve    RE = Real evapotranspiration  
 DR = Drainage    HC = Humidity coefficient    DF = Deficit    SP = Superavit

BOLGRAD (UKRAINE)

45°40'N    28°37'E      81 m 11/11 y.

T= 10.7    Ic= 25.6      MEDITERRANEAN PLUVISEASONAL-CONTINENTAL (STEPPIC)  
 m= -6.1    Tp= 1320      LOW SUPRAMEDITERRANEAN  
 M= -0.6    Tn= 36      UPPER DRY  
 M' = 36.1    Itc= 124  
 m' = -23.9    Io= 3.1  
 P= 477      mm ———  
 PE= 701     mm ———

Imbibing	19 Oct.
Saturation	9 Feb.
Reserve Use	23 Mar.
Deficit	22 Jun.



BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continentality Index [C2b]  
 + Type .....: C. Continental  
 + Subtype .....: 2. Subcontinental  
 + Variant .....: b. High  
 Thermic types [B1.B5]  
 + Latitudinal zone ....: B. Temperate  
 + Latitudinal belt ....: 1. High Eutemperate  
 + Thermic type .....: B. Temperate  
 + Thermic subtype .....: 5. Subtemperate  
 Bioclimatic types [B7a.4b.5a]  
 + Macrobioclimate .....: B. MEDITERRANEAN  
 + Bioclimate .....: 7. PLUVISEASONAL-CONTINENTAL  
 + Bioclimatic variant .: STEPPIC  
 + Thermic type.....: 4. SUPRAMEDITERRANEAN  
 + Thermic subtype.....: b. LOW  
 + Ombrothermic type ...: 5. DRY  
 + Ombrothermic subtype : a. UPPER  
 Bioclimatic Classification .....Mepc(Stp).Sme.Dry.Suc

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 256  
 Coldest semester of the year.....(Psw): 221  
 Warmest four months period of the year.....(Pcm1): 175  
 Following warmest four months period.....(Pcm2): 139  
 Positive precipitation dryest 3 months.....(Ppd): 98  
 Positive precipitation dryest 2 months.....(Ppd2): 61  
 Positive precipitation dryest 1 month.....(Ppd1): 29  
 Positive precipitation warmest 3 months.....(Pps): 135  
 Positive precipitation warmest 2 months.....(Pps2): 77  
 Positive precipitation warmest 1 month.....(Pps1): 48  
 Positive precipitation coldest 3 months.....(Ppw): 41  
 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	113	128	135	99

Seasonal rainfall rhythms: S > P > W > F

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 22.2  
 Average coldest month [T].....(Tmin): -3.3  
 Maximum temp. warmest month [M].....(Tmax): 28.3  
 Minimum temp. coldest month [m].....(Tmin): -6.1  
 Absolute Max.temp. warmest month [M'].....(Tamax): 36.1  
 Absolute Min.temp. coldest month [m'].....(Tamin): -23.9  
 First warmest contrasted month [M].....(Tcmax): 28.3 (7)  
 First coldest contrasted month [m].....(Tcmin): 16.1 (7)  
 Estival temperature.....(Ts): 645  
 Positive temperature dryest 3 months.....(Tpd): 511  
 Positive temperature dryest 2 months.....(Tpd2): 192  
 Positive temperature dryest 1 month.....(Tpd1): 122  
 Positive temperature warmest 3 months.....(Tps): 645  
 Positive temperature warmest 2 months.....(Tps2): 439  
 Positive temperature warmest 1 month.....(Tps1): 222  
 Positive temperature coldest 3 months.....(Tpw): 6  
 Positive temperature coldest 2 months.....(Tpw2): 0  
 Positive temperature coldest 1 month.....(Tpw1): 0

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

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	o	o	
Ultragelid...[M'<=0] (Pf)												
Hypergelid...[M <=0] (Pf)	o											
Gelid.....[T <=0] (Pf)	o	o										
Subgelid.....[m <=0] (Pf)	o	o	o									o
Pregelid.....[m'<=0] (Pf)	o	o	o	o						o	o	o
Agelid.....[m'> 0] (Pf)					o	o	o	o	o			
HiperAgelid..[all>0] (Pf)					o	o	o	o	o			

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 1.47  
 Mediterranean index of July.[PE/P].....(Im1): 2.99  
 Mediterranean index of July & August.....(Im2): 3.50  
 Mediterranean index of June, July & August....(Im3): 2.95

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	409	*	*	376	389	523	579	478	295	394	290	315
Tp	6	*	*	39	106	161	206	222	217	172	122	70
Io (Iom)	74.4	*	*	9.67	3.68	3.24	2.82	2.15	1.36	2.29	2.37	4.53
Seasons	Winter			Spring			Summer			Autumn		
Pp(x10)/Tp	*/*			1288 / 306			1352 / 644			999 / 364		
Io (Iot)	*			4.213			2.098			2.745		
Semesters	December-May						June-November					
Pp(x10)/Tp	*/*						2351 / 1008					
Io (Iosm)	*						2.331					

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

Aridity Value Index (AVI)

[10xPP/TP=IO]: 4048/1320=3.07 There is No Yearly Aridity

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	409	*	*	376	389	523	579	478	295	394	290	315
Tp [T*10]	6	*	*	39	106	161	206	222	217	172	122	70
Iom [Pp/Tp]	\$\$	!!	!!	967	368	324	282	215	136	229	237	453
Avm [200-Iom]	***	***	***	***	***	***	***	***	64	***	***	***
Seasons	Winter			Spring			Summer			Autumn		
Pp / Tp	* / *			1288 / 306			1352 / 644			999 / 364		
Iot [Pp/Tp]	**			421			210			275		
Avs E[Avm<200]	***			***			***			***		
Weak lower semiarid [1]												

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....	(Sp): 25.56
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4] .....	40.35
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14] .....	38.62
+ Oceanic (20<CI<40)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....	1.58
+ Subcontinental (1.1<CI<1.7)	
Rainfall Index of Lang (1925) [R=P/T] .....	44.59
+ Semiarid (60>R>40)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....	23.04
+ Subhumid (30>Ia>20)	
I of Emberger (1930) [Q=100*P/(Tmmax <sup>2</sup> -Tmmin <sup>2</sup> )] .....	62.32
+ Subhumid (90>Q>50)	
I of Dantin & Revenga (1940) [DR=100*T/P] .....	2.24
+ Semiarid (3>DR>2)	
Aridity Index of UNEP [I=P/PE] .....	0.68
+ Humid (I>0.65)	
Potencial Erosion I of Fournier (1960) [K=Pi <sup>2</sup> /P].....	7.03
+ Very low (K<60)	

BOLGRAD (UKRAINE)

Latitude: 45°40'N Longitude: 28°37'E Altitude: 81 m

BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)  
 + Climate ..... B. Cold and temperate cold  
 + Region ..... 10. Psicroxeroterico (Submediterranean)  
 + Thermic type: 5. Meso-microthermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.31	0.26	0.24	0.19	0.22	0.22	0.17	0.10	0.16	0.13	0.17	0.30
T-E ratio	0.00	0.00	1.75	4.75	7.25	9.25	10.00	9.75	7.75	5.50	3.13	0.25
Precipitation-effectiveness: 24.80						Temperature-efficiency .....: 59.38						
Moisture Index [MI=100*(P-PE)/PE] .....												
+ C1.Subhumid dry (-33.3<MI<0)												
Index of dryness [DI=100*d/PE] .....												
+ Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE] .....												
+ No surplus (0<HI<10)												
Potential Evapotranspiration PE .....												
+ First mesothermic (570<PE<712)												

