

Phytosociological Research Center

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Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 30/08/2017)

MARBELLA (ESP MALAGA)

Altitude: 100 m.

Latitude: 36°32'N Longitude: 4°57'W

Temperature observation period.: 1974-1988 (15)

Rainfall observation period....: 1974-1987 (14)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	11.80	16.40	7.20	21.30	4.10	94.0	27.17
Feb.	12.10	17.20	7.00	21.80	4.40	81.5	28.09
Mar.	13.40	18.80	8.10	24.30	5.70	52.4	40.87
Apr.	14.70	19.90	9.50	26.00	6.50	54.5	51.52
May.	17.10	23.00	11.20	27.70	7.70	23.5	74.92
Jun.	21.20	27.20	15.20	34.30	12.00	8.4	111.00
Jul.	24.00	29.90	18.00	37.60	14.30	2.6	140.88
Aug.	24.60	30.80	18.50	37.30	15.00	10.6	137.83
Sep.	22.60	28.00	17.10	33.90	14.00	13.2	104.24
Oct.	18.70	23.50	13.90	29.10	9.80	72.2	69.92
Nov.	14.90	19.60	10.20	23.80	6.70	128.7	40.79
Dec.	12.50	17.10	7.90	21.50	4.80	102.3	29.08
Year	17.30	22.62	11.98	28.22	8.75	644	856.30

BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	409
Compensated thermicity index.....(Itc):	409
Simple continentality index.....(Ic):	12.8
Diurnality index.....(Id):	12.3
Annual ombrothermic index.....(Io):	3.10
Monthly estival ombrothermic index.....(Ios1):	0.11
Bimonthly estival ombrothermic index.....(Ios2):	0.27
Threemonthly estival ombrothermic index.....(Ios3):	0.31
Fourmonthly estival ombrothermic index.....(Ios4):	0.52
Annual ombro-evaporation index.....(Ioe):	0.25
Annual positive temperature.....(Tp):	2076
Annual negative temperature.....(Tn):	0
Estival temperature.....(Ts):	698
Positive precipitation.....(Pp):	644

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

Latitudinal Belt...: Low eutemperate

Continentalty.....: Oceanic - Low Semihyperoceanic

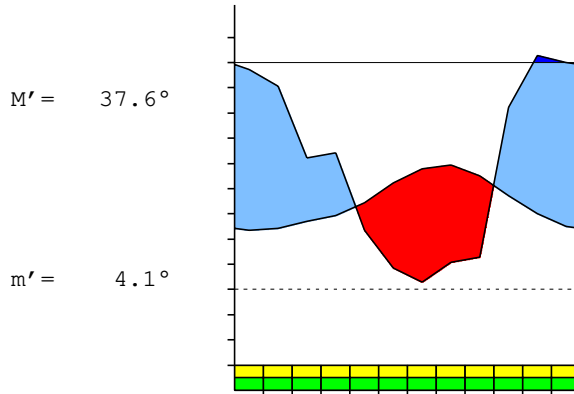
Bioclimate.....: MEDITERRANEAN PLUVISEASONAL-OCEANIC

Bioclimatic Belt...: LOW THERMOMEDITERRANEAN UPPER DRY

MARBELLA (ESP MALAGA)

100 m

P= 644 36° 32'N 4° 57'W 15/14 y.
 T= 17.3° Ic= 12.8 Tp= 2076 Tn= 0
 m= 7.2° M= 16.4° Itc= 409 Io= 3.1



MEDITERRANEAN PLUVISEASONAL-OCEANIC
 LOW THERMOMEDITERRANEAN UPPER DRY

WATER INDEX CARD MARBELLA (ESP MALAGA)
 Altitude: 100 m. Latitude: 36° 32'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	11.8	27	94	0	100	27	0	67	49	2.4
Feb.	12.1	28	82	0	100	28	0	53	51	1.9
Mar.	13.4	41	52	0	100	41	0	12	31	0.2
Apr.	14.7	52	55	0	100	52	0	3	17	0.0
May.	17.1	75	24	-51	49	75	0	0	9	-0.6
Jun.	21.2	111	8	-49	0	57	54	0	4	-0.9
Jul.	24.0	141	3	0	0	3	138	0	2	-0.9
Aug.	24.6	138	11	0	0	11	127	0	1	-0.9
Sep.	22.6	104	13	0	0	13	91	0	1	-0.8
Oct.	18.7	70	72	2	2	70	0	0	0	0.0
Nov.	14.9	41	129	88	90	41	0	0	0	2.1
Dec.	12.5	29	102	10	100	29	0	63	32	2.5
Year	17.3	856	644	*	*	446	411	198	198	*

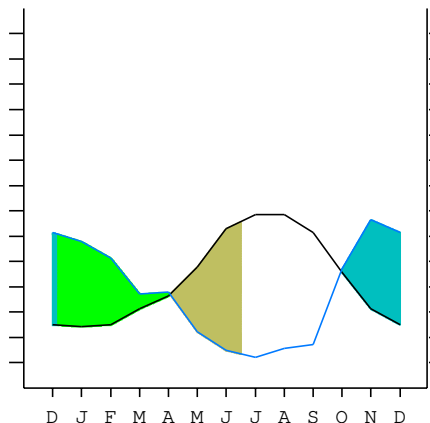
R = Reserve VR = Variation of the reserve RE = Real evapotranspiration
 DR = Drainage HC = Humidity coefficient DF = Deficit SP = Superavit

MARBELLA (ESP MALAGA)

36°32'N 4°57'W 100 m 15/14 y.

T= 17.3 Ic= 12.8 MEDITERRANEAN PLUVISEASONAL-OCEANIC
 m= 7.2 Tp= 2076 LOW THERMOMEDITERRANEAN
 M= 16.4 Tn= 0 UPPER DRY
 M' = 37.6 Itc= 409
 m' = 4.1 Io= 3.1
 P= 644 mm ———
 PE= 856 mm ———

Imbibing	30 Sep.
Saturation	5 Dec.
Reserve Use	2 Apr.
Deficit	15 Jun.



MARBELLA (ESP MALAGA)

Latitude: 36°32'N Longitude: 4°57'W Altitude: 100 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [B1b]
 + Type: B. Oceanic
 + Subtype: 1. Semihyperoceanic
 + Variant: b. Low

Thermic types [B1.A3]
 + Latitudinal zone: B. Temperate
 + Latitudinal belt: 1. Low eutemperate
 + Thermic type: A. Warm
 + Thermic subtype: 3. Subwarm

Bioclimatic types [B8.2b.5a]
 + Macrobioclimate: B. MEDITERRANEAN
 + Bioclimate: 8. PLUVISEASONAL-OCEANIC
 + Bioclimatic variant ..:
 + Thermic type.....: 2. THERMOMEDITERRANEAN
 + Thermic subtype.....: b. LOW
 + Ombrothermic type ...: 5. DRY
 + Ombrothermic subtype : a. UPPER

Bioclimatic Classification: Mehc.Tme.Dry

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 131
 Coldest semester of the year.....(Psw): 513
 Warmest four months period of the year.....(Pcm1): 35
 Following warmest four months period.....(Pcm2): 397
 Positive precipitation dryest 3 months.....(Ppd): 22
 Positive precipitation dryest 2 months.....(Ppd2): 11
 Positive precipitation dryest 1 month.....(Ppd1): 3
 Positive precipitation warmest 3 months.....(Pps): 26
 Positive precipitation warmest 2 months.....(Pps2): 13
 Positive precipitation warmest 1 month.....(Pps1): 11
 Positive precipitation coldest 3 months.....(Ppw): 278
 Positive precipitation coldest 2 months.....(Ppw2): 176
 Positive precipitation coldest 1 month.....(Ppw1): 94

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	277	130	21	214

Seasonal rainfall rhythms: W > F > P > S

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 24.6
 Average coldest month [T].....(Tmin): 11.8
 Maximum temp. warmest month [M].....(Tmmax): 30.8
 Minimum temp. coldest month [m].....(Tmmin): 7.0
 Absolute Max.temp. warmest month [M'].....(Tamax): 37.6
 Absolute Min.temp. coldest month [m'].....(Tamin): 4.1
 First warmest contrasted month [M].....(Tcmax): 30.8 (8)
 First coldest contrasted month [m].....(Tcmin): 18.5 (8)
 Estival temperature.....(Ts): 698
 Positive temperature dryest 3 months.....(Tpd): 698
 Positive temperature dryest 2 months.....(Tpd2): 452
 Positive temperature dryest 1 month.....(Tpd1): 240
 Positive temperature warmest 3 months.....(Tps): 712
 Positive temperature warmest 2 months.....(Tps2): 486
 Positive temperature warmest 1 month.....(Tps1): 246
 Positive temperature coldest 3 months.....(Tpw): 364
 Positive temperature coldest 2 months.....(Tpw2): 239
 Positive temperature coldest 1 month.....(Tpw1): 118

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

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 1.33
 Mediterranean index of July.[PE/P].....(Im1): 54.18
 Mediterranean index of July & August.....(Im2): 21.11
 Mediterranean index of June, July & August....(Im3): 18.04

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	1023	940	815	524	545	235	84	26	106	132	722	1287
Tp	125	118	121	134	147	171	212	240	246	226	187	149
Io (Iom)	8.18	7.97	6.74	3.91	3.71	1.37	0.40	0.11	0.43	0.58	3.86	8.64
Seasons	Winter			Spring			Summer			Autumn		
Pp(x10)/Tp	2778 / 364			1304 / 452			216 / 698			2141 / 562		
Io (Iot)	7.632			2.885			0.309			3.810		
Semesters	December-May						June-November					
Pp(x10)/Tp	4082 / 816						2357 / 1260					
Io (Iosm)	5.002						1.871					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 6439/2076=3.10 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	1023	940	815	524	545	235	84	26	106	132	722	1287
Tp [T*10]	125	118	121	134	147	171	212	240	246	226	187	149
Iom [Pp/Tp]	818	797	674	391	371	137	40	11	43	58	386	864
Avm [200-Iom]	***	***	***	***	***	63	160	189	157	142	***	***
Seasons	Winter			Spring			Summer			Autumn		
Pp / Tp	2778 / 364			1304 / 452			216 / 698			2141 / 562		
Iot [Pp/Tp]	763			288			31			381		
Avs E[Avm<200]	***			***			506			***		
Upper ultrahyperarid [1]							Upper hyperarid [2]					
Strong lower arid [1]							Weak lower arid [1]					
Weak lower semiarid [1]												

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin]	(Sp): 12.80
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4]	16.15
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14]	15.98
+ Hyperoceanic (-20<CI<20)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)]	0.97
+ Oceanic (0.6<CI<1.1)	
Rainfall Index of Lang (1925) [R=P/T]	37.22
+ Steppic (40>R>0)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)]	23.59
+ Subhumid (30>Ia>20)	
I of Emberger (1930) [Q=100*P/(Tmax ² -Tmin ²)]	71.57
+ Subhumid (90>Q>50)	
I of Dantin & Revenga (1940) [DR=100*T/P]	2.69
+ Semiarid (3>DR>2)	
Aridity Index of UNEP [I=P/PE]	0.75
+ Humid (I>0.65)	
Potential Erosion I of Fournier (1960) [K=Pi ² /P]	25.72
+ Very low (K<60)	

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)
 + Climate

- + Climate
- + Region
- + Thermic type: 3. Macro-mesothermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.49	0.42	0.24	0.25	0.09	0.03	0.01	0.03	0.04	0.30	0.63	0.53
T-E ratio	5.31	5.45	6.03	6.61	7.70	9.54	10.80	11.07	10.17	8.42	6.70	5.63
Precipitation-effectiveness: 30.51						Temperature-efficiency						93.42
Moisture Index [MI=100*(P-PE)/PE]												-24.80
+ C1.Subhumid dry (-33.3<MI<0)												
Index of dryness [DI=100*d/PE]												47.94
+ Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE]												23.13
+ Strong surplus (20<HI)												
Potential Evapotranspiration PE												856.30
+ Third mesothermic (855<PE<997)												

