

# Phytosociological Research Center

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## Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 14/02/2020)

MARINGA (BRAZIL)

Altitude: 542 m.

Latitude: 23°25'S Longitude: 51°57'W

Temperature observation period.: 1961-1989 (29)

Rainfall observation period....: 1961-1989 (29)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	19.40	24.00	15.70	36.40	11.20	151.0	93.41
Feb.	19.40	24.10	15.80	37.80	13.90	136.0	81.33
Mar.	18.00	22.80	14.50	36.70	9.40	111.0	74.73
Apr.	17.40	22.20	13.50	34.00	5.00	96.0	64.61
May.	14.10	18.40	10.80	32.00	1.80	90.0	45.20
Jun.	12.30	16.50	9.60	30.20	1.00	76.0	33.81
Jul.	13.00	17.70	9.60	31.40	-1.00	49.0	38.70
Aug.	14.10	18.60	10.50	34.00	-0.20	38.0	47.11
Sep.	15.60	20.40	11.80	37.20	4.60	77.0	56.21
Oct.	17.00	21.80	12.90	37.40	9.20	124.0	71.25
Nov.	17.00	21.50	13.30	40.00	10.20	91.0	71.25
Dec.	19.00	23.60	15.10	37.40	13.20	155.0	91.04
Year	16.36	20.97	12.76	35.38	6.52	1194	768.64

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	425
Compensated thermicity index.....(Itc):	425
Simple continentality index.....(Ic):	7.1
Diurnality index.....(Id):	8.9
Annual ombrothermic index.....(Io):	6.08
Monthly dry ombrothermic index.....(Iod1):	2.70
Bimonthly dry ombrothermic index.....(Iod2):	3.21
Threemonthly dry ombrothermic index.....(Iod3):	4.14
Fourmonthly dry ombrothermic index.....(Iod4):	4.73
Annual ombro-evaporation index.....(Ioe):	1.55
Annual positive temperature.....(Tp):	1963
Annual negative temperature.....(Tn):	0
Dry station temperature.....(Td):	394
Positive precipitation.....(Pp):	1194

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	10	2	0	0	0

Latitudinal Belt...: Eutropical

Continentality.....: Hyperoceanic - Low Euhyperoceanic

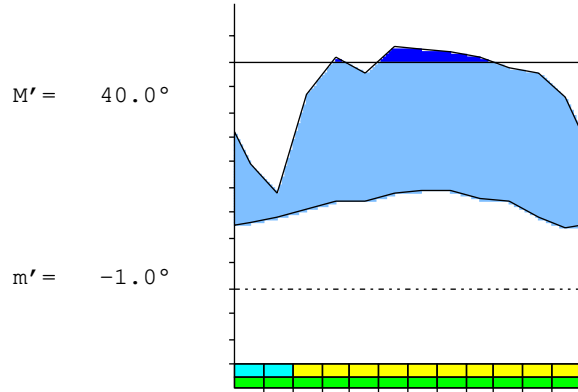
Bioclimate(Variant): TROPICAL PLUVIAL (HYGROPHYTIC)

Bioclimatic Belt...: LOW MESOTROPICAL LOW HUMID

MARINGA (BRAZIL)

542 m

P= 1194      23° 25'S      51° 57'W      29/29 y.  
 T= 16.4 °      Ic= 7.1      Tp= 1963      Tn= 0  
 m= 9.6 °      M= 16.5 °      Itc= 425      Io= 6.1



TROPICAL PLUVIAL (HYGROPHYTIC)  
 LOW MESOTROPICAL LOW HUMID

WATER INDEX CARD      MARINGA (BRAZIL)  
 Altitude: 542 m.      Latitude: 23° 25'S

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jul.	13.0	39	49	0	100	39	0	10	26	0.2
Aug.	14.1	47	38	-9	91	47	0	0	13	-0.1
Sep.	15.6	56	77	9	100	56	0	12	12	0.3
Oct.	17.0	71	124	0	100	71	0	53	33	0.7
Nov.	17.0	71	91	0	100	71	0	20	26	0.2
Dec.	19.0	91	155	0	100	91	0	64	45	0.7
Jan.	19.4	93	151	0	100	93	0	58	51	0.6
Feb.	19.4	81	136	0	100	81	0	55	53	0.6
Mar.	18.0	75	111	0	100	75	0	36	45	0.4
Apr.	17.4	65	96	0	100	65	0	31	38	0.4
May.	14.1	45	90	0	100	45	0	45	41	0.9
Jun.	12.3	34	76	0	100	34	0	42	42	1.2
Year	16.4	769	1194	*	*	769	0	425	425	*

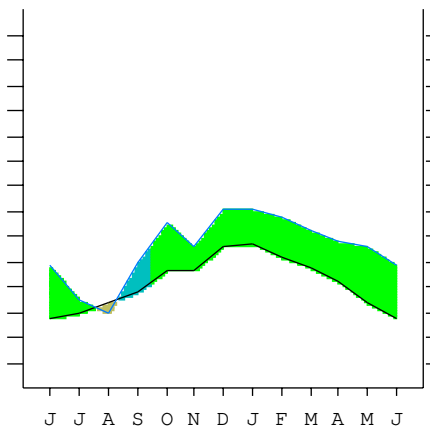
R = Reserve    VR = Variation of the reserve    RE = Real evapotranspiration  
 DR = Drainage    HC = Humidity coefficient    DF = Deficit    SP = Superavit

MARINGA (BRAZIL)

23°25'S    51°57'W    542 m 29/29 y.

T= 16.4      Ic= 7.1      TROPICAL PLUVIAL (HYGROPHYTIC)  
 m= 9.6      Tp= 1963      LOW MESOTROPICAL  
 M= 16.5      Tn= 0      LOW HUMID  
 M' = 40.0    Itc= 425  
 m' = -1.0    Io= 6.1  
 P= 1194      mm ———  
 PE= 769      mm ———

Imbibing	10 Aug.
Saturation	14 Sep.
Reserve Use	16 Jul.
Deficit	



MARINGA (BRAZIL)

Latitude: 23°25'S Longitude: 51°57'W Altitude: 542 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continentality Index [A2b]  
 + Type .....: A. Hyperoceanic  
 + Subtype .....: 2. Euhyperoceanic  
 + Variant .....: b. Low

Thermic types [A2.A3]  
 + Latitudinal zone ....: A. Warm  
 + Latitudinal belt ....: 2. Eutropical  
 + Thermic type .....: A. Warm  
 + Thermic subtype .....: 3. Subwarm

Bioclimatic types [A5.3b.7b]  
 + Macrobioclimate .....: A. TROPICAL  
 + Bioclimate .....: 5. PLUVIAL  
 + Bioclimatic variant .: HYGROPHYTIC  
 + Thermic type.....: 3. MESOTROPICAL  
 + Thermic subtype.....: b. LOW  
 + Ombrothermic type ...: 7. HUMID  
 + Ombrothermic subtype : b. LOW

Bioclimatic Classification .....Trpl(Hig).Mtr.Hum.Eho

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 740  
 Coldest semester of the year.....(Psw): 454  
 Warmest four months period of the year.....(Pcm1): 553  
 Following warmest four months period.....(Pcm2): 311  
 Positive precipitation dryest 3 months.....(Ppd): 163  
 Positive precipitation dryest 2 months.....(Ppd2): 87  
 Positive precipitation dryest 1 month.....(Ppd1): 38  
 Positive precipitation warmest 3 months.....(Pps): 442  
 Positive precipitation warmest 2 months.....(Pps2): 287  
 Positive precipitation warmest 1 month.....(Pps1): 151  
 Positive precipitation coldest 3 months.....(Ppw): 215  
 Positive precipitation coldest 2 months.....(Ppw2): 125  
 Positive precipitation coldest 1 month.....(Ppw1): 76

Seasons	Jun+Jul+Aug Ttr3-3	Sep+Oct+Nov Ttr4-4	Dec+Jan+Feb Ttr1-1	Mar+Apr+May Ttr2-2
Rainfall	163	292	442	297

Tropical rainfall rhythms: 1 > 2 > 4 > 3

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 19.4  
 Average coldest month [T].....(Tmin): 12.3  
 Maximum temp. warmest month [M].....(Tmmax): 24.1  
 Minimum temp. coldest month [m].....(Tmmin): 9.6  
 Absolute Max.temp. warmest month [M'].....(Tamax): 40.0  
 Absolute Min.temp. coldest month [m'].....(Tamin): -1.0  
 First warmest contrasted month [M].....(Tcmax): 21.8 (10)  
 First coldest contrasted month [m].....(Tcmin): 12.9 (10)  
 Dry station temperature.....(Td): 394  
 Positive temperature dryest 3 months.....(Tpd): 394  
 Positive temperature dryest 2 months.....(Tpd2): 271  
 Positive temperature dryest 1 month.....(Tpd1): 141  
 Positive temperature warmest 3 months.....(Tps): 578  
 Positive temperature warmest 2 months.....(Tps2): 388  
 Positive temperature warmest 1 month.....(Tps1): 194  
 Positive temperature coldest 3 months.....(Tpw): 394  
 Positive temperature coldest 2 months.....(Tpw2): 253  
 Positive temperature coldest 1 month.....(Tpw1): 123

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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)							o	o				
Agelid.....[m'> 0] (Pf)	o	o	o	o	o	o			o	o	o	o
HiperAgelid..[all>0] (Pf)	o	o	o	o	o	o			o	o	o	o

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 0.64  
 Mediterranean index of January.....(Im1): 0.62  
 Mediterranean index of January & February.....(Im2): 0.61  
 Mediterranean index of December to February...(Im3): 0.60

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	1550	1510	1360	1110	960	900	760	490	380	770	1240	910
Tp	190	194	194	180	174	141	123	130	141	156	170	170
Io (Iom)	8.16	7.78	7.01	6.17	5.52	6.38	6.18	3.77	2.70	4.94	7.29	5.35
Seasons	Dec+Jan+Feb			Mar+Apr+May			Jun+Jul+Aug			Sep+Oct+Nov		
Pp(x10)/Tp	4420 / 578			2970 / 495			1630 / 394			2920 / 496		
Io (Iot)	7.647			6.000			4.137			5.887		
Semesters	December-May						June-November					
Pp(x10)/Tp	7390 / 1073						4550 / 890					
Io (Iosm)	6.887						5.112					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 11940/1963=6.08 There is No Yearly Aridity

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	1550	1510	1360	1110	960	900	760	490	380	770	1240	910
Tp [T*10]	190	194	194	180	174	141	123	130	141	156	170	170
Iom [Pp/Tp]	816	778	701	617	552	638	618	377	270	494	729	535
Avm [200-Iom]	***	***	***	***	***	***	***	***	***	***	***	***
Seasons	Dec+Jan+Feb			Mar+Apr+May			Jun+Jul+Aug			Sep+Oct+Nov		
Pp / Tp	4420 / 578			2970 / 495			1630 / 394			2920 / 496		
Iot [Pp/Tp]	765			600			414			589		
Avs E [Avm<200]	***			***			***			***		

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....(Sp): 7.10  
 CI of Gorezinski (1920) [1.7\*Sp/sin(Lat)-20.4] .....: 9.97  
 CI of Conrad (1946) [1.7\*Sp/sin(Lat+10)-14] .....: 7.92  
 + Hyperoceanic (-20<CI<20)  
 CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....: 0.81  
 + Oceanic (0.6<CI<1.1)  
 Rainfall Index of Lang (1925) [R=P/T] .....: 72.99  
 + Temperate warm (100>R>60)  
 Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....: 45.30  
 + Humid (60>Ia>30)  
 I of Emberger (1930) [Q=100\*P/(Tmmax<sup>2</sup>-Tmmin<sup>2</sup>)] .....: 244.35  
 + Humid (Q>90)  
 I of Dantin & Revenga (1940) [DR=100\*T/P] .....: 1.37  
 + Humid (2>DR>0)  
 Aridity Index of UNEP [I=P/PE] .....: 1.55  
 + Humid (I>0.65)  
 Potential Erosion I of Fournier (1960) [K=Pi<sup>2</sup>/P].....: 20.12  
 + Very low (K<60)

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)  
 + Climate .....: A. Warm and temperate warm  
 + Region .....: 7. Mesoaxeric (Axeric temperate)  
 + Thermic type: 3. Macro-mesothermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.67	0.60	0.49	0.43	0.44	0.38	0.23	0.17	0.35	0.57	0.41	0.70
T-E ratio	8.73	8.73	8.10	7.83	6.35	5.54	5.85	6.35	7.02	7.65	7.65	8.55
Precipitation-effectiveness: 54.23						Temperature-efficiency .....: 88.34						
Moisture Index [MI=100*(P-PE)/PE] .....: 55.34 + B2.Humid medium-humid (40<MI<60)												
Index of dryness [DI=100*d/PE] .....: 0.00 + No deficit (0<DI<16.7)												
Index of humidity [HI=100*s/PE] .....: 55.33 + Strong surplus (20<HI)												
Potential Evapotranspiration PE .....: 768.64 + Second mesothermic (712<PE<855)												

