

# Phytosociological Research Center

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## Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 30/08/2017)

RIO GRANDE (BRAZIL)

Altitude: 153 m.

Latitude: 29°41'S Longitude: 53°48'W

Temperature observation period.: 1957-1977 (21)

Rainfall observation period....: 1957-1977 (21)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	24.40	28.40	18.80	35.10	11.50	121.0	137.26
Feb.	24.00	28.20	18.60	35.10	11.70	87.0	114.02
Mar.	22.60	26.80	17.20	32.70	10.30	106.0	104.17
Apr.	19.30	26.90	13.60	30.30	6.00	67.0	68.29
May.	16.40	21.00	11.20	26.50	4.20	88.0	47.90
Jun.	13.70	18.00	9.00	26.50	1.70	108.0	30.99
Jul.	13.50	17.50	9.30	26.10	1.20	150.0	31.87
Aug.	14.00	17.90	9.50	26.00	2.30	154.0	36.54
Sep.	15.90	19.40	11.80	27.50	3.90	153.0	48.97
Oct.	18.40	22.10	13.60	29.00	6.70	113.0	73.25
Nov.	20.10	24.20	15.30	32.50	8.90	96.0	88.82
Dec.	22.90	26.90	17.40	33.90	10.20	75.0	122.06
Year	18.77	23.11	13.78	30.10	6.55	1318	904.13

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	456
Compensated thermicity index.....(Itc):	456
Simple continentality index.....(Ic):	10.9
Diurnality index.....(Id):	13.3
Annual ombrothermic index.....(Io):	5.85
Monthly estival ombrothermic index.....(Ios1):	3.28
Bimonthly estival ombrothermic index.....(Ios2):	4.30
Threemonthly estival ombrothermic index.....(Ios3):	3.97
Fourmonthly estival ombrothermic index.....(Ios4):	4.15
Annual ombro-evaporation index.....(Ioe):	0.72
Annual positive temperature.....(Tp):	2252
Annual negative temperature.....(Tn):	0
Estival temperature.....(Ts):	713
Positive precipitation.....(Pp):	1318

N. of	P>4T	P:2T-4T	PT-2T	P<T	T<0
Months	9	3	0	0	0

Latitudinal Belt...: Subtropical

Continentality.....: Hyperoceanic - Low Subhyperoceanic

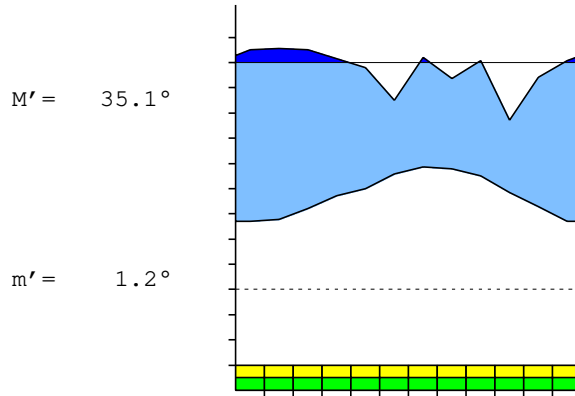
Bioclimate.....: TEMPERATE HYPEROCEANIC

Bioclimatic Belt...: INFRATEMPERATE UPPER SUBHUMID

RIO GRANDE (BRAZIL)

153 m

P= 1318      29° 41'S      53° 48'W      21/21 y.  
 T= 18.8°      Ic= 10.9      Tp= 2252      Tn= 0  
 m= 9.3°      M= 17.5°      Itc= 456      Io= 5.9



TEMPERATE HYPEROCEANIC  
 INFRATEMPERATE UPPER SUBHUMID

WATER INDEX CARD      RIO GRANDE (BRAZIL)  
 Altitude: 153 m.      Latitude: 29° 41'S

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jul.	13.5	32	150	0	100	32	0	118	66	3.7
Aug.	14.0	37	154	0	100	37	0	117	92	3.2
Sep.	15.9	49	153	0	100	49	0	104	98	2.1
Oct.	18.4	73	113	0	100	73	0	40	69	0.5
Nov.	20.1	89	96	0	100	89	0	7	38	0.0
Dec.	22.9	122	75	-47	53	122	0	0	19	-0.3
Jan.	24.4	137	121	-16	37	137	0	0	10	-0.1
Feb.	24.0	114	87	-27	10	114	0	0	5	-0.2
Mar.	22.6	104	106	2	12	104	0	0	2	0.0
Apr.	19.3	68	67	-1	10	68	0	0	1	0.0
May.	16.4	48	88	40	50	48	0	0	1	0.8
Jun.	13.7	31	108	50	100	31	0	27	14	2.4
Year	18.8	904	1318	*	*	904	0	414	414	*

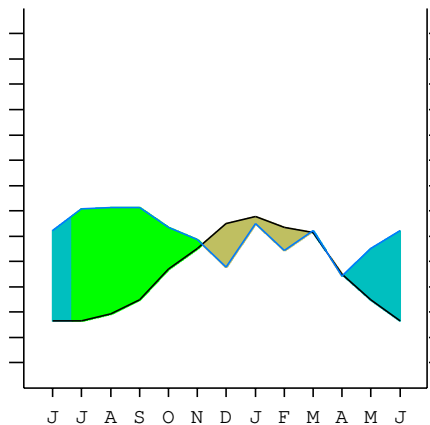
R = Reserve      VR = Variation of the reserve      RE = Real evapotranspiration  
 DR = Drainage      HC = Humidity coefficient      DF = Deficit      SP = Superavit

RIO GRANDE (BRAZIL)

29°41'S      53°48'W      153 m 21/21 y.

T= 18.8      Ic= 10.9      TEMPERATE HYPEROCEANIC  
 m= 9.3      Tp= 2252      INFRATEMPERATE  
 M= 17.5      Tn= 0      UPPER SUBHUMID  
 M' = 35.1      Itc= 456  
 m' = 1.2      Io= 5.9  
 P= 1318      mm      ———  
 PE= 904      mm      ———

Imbibing	1 Apr.
Saturation	20 Jun.
Reserve Use	18 Mar.
Deficit	



RIO GRANDE (BRAZIL)

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SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [A3b]  
 + Type .....: A. Hyperoceanic  
 + Subtype .....: 3. Subhyperoceanic  
 + Variant .....: b. Low  
 Thermic types [A3.A3]  
 + Latitudinal zone ....: A. Warm  
 + Latitudinal belt ....: 3. Subtropical  
 + Thermic type .....: A. Warm  
 + Thermic subtype .....: 3. Subwarm  
 Bioclimatic types [C4.1.6a]  
 + Macrobioclimate .....: C. TEMPERATE  
 + Bioclimate .....: 4. HYPEROCEANIC  
 + Bioclimatic variant ..:  
 + Thermic type.....: 1. INFRATEMPERATE  
 + Thermic subtype.....:  
 + Ombrothermic type ...: 6. SUBHUMID  
 + Ombrothermic subtype : a. UPPER  
 Bioclimatic Classification .....: Texe.Ite.Shu

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 552  
 Coldest semester of the year.....(Psw): 766  
 Warmest four months period of the year.....(Pcm1): 389  
 Following warmest four months period.....(Pcm2): 413  
 Positive precipitation dryest 3 months.....(Ppd): 260  
 Positive precipitation dryest 2 months.....(Ppd2): 155  
 Positive precipitation dryest 1 month.....(Ppd1): 67  
 Positive precipitation warmest 3 months.....(Pps): 283  
 Positive precipitation warmest 2 months.....(Pps2): 208  
 Positive precipitation warmest 1 month.....(Pps1): 121  
 Positive precipitation coldest 3 months.....(Ppw): 412  
 Positive precipitation coldest 2 months.....(Ppw2): 258  
 Positive precipitation coldest 1 month.....(Ppw1): 150

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	412	362	283	261

Seasonal rainfall rhythms: W > P > S > F

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 24.4  
 Average coldest month [T].....(Tmin): 13.5  
 Maximum temp. warmest month [M].....(Tmmax): 28.4  
 Minimum temp. coldest month [m].....(Tmmin): 9.0  
 Absolute Max.temp. warmest month [M'].....(Tamax): 35.1  
 Absolute Min.temp. coldest month [m'].....(Tamin): 1.2  
 First warmest contrasted month [M].....(Tcmax): 26.9 (4)  
 First coldest contrasted month [m].....(Tcmin): 13.6 (4)  
 Estival temperature.....(Ts): 713  
 Positive temperature dryest 3 months.....(Tpd): 659  
 Positive temperature dryest 2 months.....(Tpd2): 357  
 Positive temperature dryest 1 month.....(Tpd1): 193  
 Positive temperature warmest 3 months.....(Tps): 713  
 Positive temperature warmest 2 months.....(Tps2): 484  
 Positive temperature warmest 1 month.....(Tps1): 244  
 Positive temperature coldest 3 months.....(Tpw): 412  
 Positive temperature coldest 2 months.....(Tpw2): 272  
 Positive temperature coldest 1 month.....(Tpw1): 135

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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): 0.69  
 Mediterranean index of January.....(Im1): 1.13  
 Mediterranean index of January & February.....(Im2): 1.21  
 Mediterranean index of December to February...(Im3): 1.32

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	750	1210	870	1060	670	880	1080	1500	1540	1530	1130	960
Tp	229	244	240	226	193	164	137	135	140	159	184	201
Io (Iom)	3.28	4.96	3.63	4.69	3.47	5.37	7.88	11.1	11.0	9.62	6.14	4.78
Seasons	Summer			Autumn			Winter			Spring		
Pp(x10)/Tp	2830 / 713			2610 / 583			4120 / 412			3620 / 544		
Io (Iot)	3.969			4.477			10.00			6.654		
Semesters	December-May						June-November					
Pp(x10)/Tp	5440 / 1296						7740 / 956					
Io (Iosm)	4.198						8.096					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 13180/2252=5.85 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	750	1210	870	1060	670	880	1080	1500	1540	1530	1130	960
Tp [T*10]	229	244	240	226	193	164	137	135	140	159	184	201
Iom [Pp/Tp]	328	496	363	469	347	537	788	\$\$	\$\$	962	614	478
Avm [200-Iom]	***	***	***	***	***	***	***	***	***	***	***	***
Seasons	Summer			Autumn			Winter			Spring		
Pp / Tp	2830 / 713			2610 / 583			4120 / 412			3620 / 544		
Iot [Pp/Tp]	397			448			1000			665		
Avs E[Avm<200]	***			***			***			***		

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....	(Sp): 10.90
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4] .....	17.02
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14] .....	15.02
+ Hyperoceanic (-20<CI<20)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....	1.00
+ Oceanic (0.6<CI<1.1)	
Rainfall Index of Lang (1925) [R=P/T] .....	70.23
+ Temperate warm (100>R>60)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....	45.82
+ Humid (60>Ia>30)	
I of Emberger (1930) [Q=100*P/(Tmax <sup>2</sup> -Tmin <sup>2</sup> )] .....	181.65
+ Humid (Q>90)	
I of Dantin & Revenga (1940) [DR=100*T/P] .....	1.42
+ Humid (2>DR>0)	
Aridity Index of UNEP [I=P/PE] .....	1.46
+ Humid (I>0.65)	
Potential Erosion I of Fournier (1960) [K=Pi <sup>2</sup> /P] .....	17.99
+ 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	0.46	0.32	0.42	0.27	0.40	0.54	0.78	0.79	0.75	0.50	0.40	0.28	
T-E ratio	10.98	10.80	10.17	8.68	7.38	6.16	6.07	6.30	7.15	8.28	9.05	10.30	
Precipitation-effectiveness:	59.12					Temperature-efficiency .....							101.34
Moisture Index [MI=100*(P-PE)/PE] .....												45.78	
+ 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] .....												45.77	
+ Strong surplus (20<HI)													
Potential Evapotranspiration PE .....												904.13	
+ Third mesothermic (855<PE<997)													

