

# Phytosociological Research Center

www.globalbioclimatics.org

## Worldwide Bioclimatic Classification System

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

(Adapted to Synoptical Table 14/02/2020)

SAN JUAN (PERU)

Altitude: 31 m.

Latitude: 15°23'S Longitude: 75°9'W

Temperature observation period.: 1989-1994 (6)

Rainfall observation period....: 1989-1994 (6)

(C/mm)	Ti	Mi	mi	M' i	m' i	Pi	EPI
Jan.	21.95	25.56	18.33	28.89	12.22	0.3	103.17
Feb.	22.78	26.67	18.89	28.89	10.00	1.0	97.30
Mar.	22.50	26.67	18.33	28.89	15.00	2.0	101.68
Apr.	21.11	25.00	17.22	27.78	13.89	10.4	83.44
May.	19.45	22.78	16.11	26.11	13.89	23.9	70.72
Jun.	17.22	20.00	14.44	22.78	11.11	2.3	53.05
Jul.	16.11	18.89	13.33	26.11	8.89	0.8	47.85
Aug.	15.56	18.33	12.78	22.22	7.78	0.3	46.91
Sep.	16.11	18.89	13.33	22.22	10.00	3.6	49.33
Oct.	17.50	20.56	14.44	22.78	8.89	0.5	62.38
Nov.	18.89	22.22	15.56	27.22	12.78	4.8	72.79
Dec.	20.56	23.89	17.22	28.89	12.78	0.8	90.41
Year	19.15	22.45	15.83	26.07	11.44	51	879.04

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	503
Compensated thermicity index.....(Itc):	503
Simple continentality index.....(Ic):	7.2
Diurnality index.....(Id):	8.3
Annual ombrothermic index.....(Io):	0.22
Monthly dry ombrothermic index.....(Iod1):	0.01
Bimonthly dry ombrothermic index.....(Iod2):	0.03
Threemonthly dry ombrothermic index.....(Iod3):	0.03
Fourmonthly dry ombrothermic index.....(Iod4):	0.08
Annual ombro-evaporation index.....(Ioe):	0.06
Annual positive temperature.....(Tp):	2297
Annual negative temperature.....(Tn):	0
Dry station temperature.....(Td):	653
Positive precipitation.....(Pp):	51

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	0	0	1	11	0

Latitudinal Belt...: Eutropical

Continentality.....: Hyperoceanic - Low Euhyperoceanic

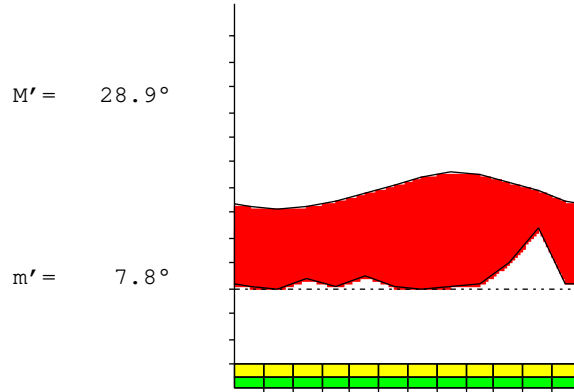
Bioclimate(Variant): TROPICAL DESERTIC (PLUVISEROTIN, HYPERARID)

Bioclimatic Belt...: UPPER THERMOTROPICAL LOW HYPERARID

SAN JUAN (PERU)

31 m

P= 51 15° 23'S 75° 9'W 6/6 y.  
 T= 19.1 ° Ic= 7.2 Tp= 2297 Tn= 0  
 m= 12.8 ° M= 18.3 ° Itc= 503 Io= 0.2



TROPICAL DESERTIC (PLUVISEROTIN)  
 UPPER THERMOTROPICAL LOW HYPERARID

WATER INDEX CARD SAN JUAN (PERU)  
 Altitude: 31 m. Latitude: 15° 23'S

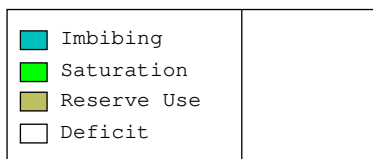
(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jul.	16.1	48	1	0	0	1	47	0	0	-0.9
Aug.	15.6	47	0	0	0	0	47	0	0	-0.9
Sep.	16.1	49	4	0	0	4	46	0	0	-0.9
Oct.	17.5	62	1	0	0	1	62	0	0	-0.9
Nov.	18.9	73	5	0	0	5	68	0	0	-0.9
Dec.	20.6	90	1	0	0	1	90	0	0	-0.9
Jan.	22.0	103	0	0	0	0	103	0	0	-0.9
Feb.	22.8	97	1	0	0	1	96	0	0	-0.9
Mar.	22.5	102	2	0	0	2	100	0	0	-0.9
Apr.	21.1	83	10	0	0	10	73	0	0	-0.8
May.	19.5	71	24	0	0	24	47	0	0	-0.6
Jun.	17.2	53	2	0	0	2	51	0	0	-0.9
Year	19.1	879	51	*	*	51	828	0	0	*

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

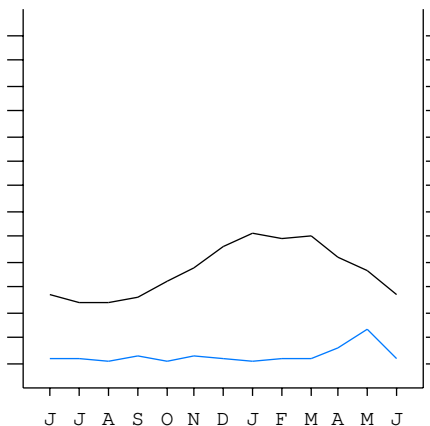
SAN JUAN (PERU)

15°23'S 75°9'W 31 m 6/6 y.

T= 19.1 Ic= 7.2 TROPICAL DESERTIC (PLUVISEROTIN)  
 m= 12.8 Tp= 2297 UPPER THERMOTROPICAL  
 M= 18.3 Tn= 0 LOW HYPERARID  
 M' = 28.9 Itc= 503  
 m' = 7.8 Io= 0.2  
 P= 51 mm ———  
 PE= 879 mm ———



All over the year,  
 there is hydic deficit



SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

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

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

Bioclimatic types [A2e.2a.2b]  
 + Macrobioclimate .....: A. TROPICAL  
 + Bioclimate .....: 2. DESERTIC  
 + Bioclimatic variant .: PLUVISEROTIN, HYPERARID  
 + Thermic type.....: 2. THERMOTROPICAL  
 + Thermic subtype.....: a. UPPER  
 + Ombrothermic type ...: 2. HYPERARID  
 + Ombrothermic subtype : b. LOW

Bioclimatic Classification .....Trde(Pse).Ttr.Har.Eho

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 38  
 Coldest semester of the year.....(Psw): 12  
 Warmest four months period of the year.....(Pcml): 14  
 Following warmest four months period.....(Pcm2): 27  
 Positive precipitation dryest 3 months.....(Ppd): 2  
 Positive precipitation dryest 2 months.....(Ppd2): 1  
 Positive precipitation dryest 1 month.....(Ppd1): 0  
 Positive precipitation warmest 3 months.....(Pps): 3  
 Positive precipitation warmest 2 months.....(Pps2): 3  
 Positive precipitation warmest 1 month.....(Pps1): 1  
 Positive precipitation coldest 3 months.....(Ppw): 5  
 Positive precipitation coldest 2 months.....(Ppw2): 1  
 Positive precipitation coldest 1 month.....(Ppw1): 0

Seasons	Jun+Jul+Aug Ttr3-3	Sep+Oct+Nov Ttr4-4	Dec+Jan+Feb Ttr1-1	Mar+Apr+May Ttr2-2
Rainfall	3	8	2	36

Tropical rainfall rhythms: 2 > 4 > 3 > 1

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 22.8  
 Average coldest month [T].....(Tmin): 15.6  
 Maximum temp. warmest month [M].....(Tmmax): 26.7  
 Minimum temp. coldest month [m].....(Tmmin): 12.8  
 Absolute Max.temp. warmest month [M'].....(Tamax): 28.9  
 Absolute Min.temp. coldest month [m'].....(Tamin): 7.8  
 First warmest contrasted month [M].....(Tcmax): 26.7 (3)  
 First coldest contrasted month [m].....(Tcmin): 18.3 (3)  
 Dry station temperature.....(Td): 653  
 Positive temperature dryest 3 months.....(Tpd): 653  
 Positive temperature dryest 2 months.....(Tpd2): 317  
 Positive temperature dryest 1 month.....(Tpd1): 220  
 Positive temperature warmest 3 months.....(Tps): 672  
 Positive temperature warmest 2 months.....(Tps2): 453  
 Positive temperature warmest 1 month.....(Tps1): 228  
 Positive temperature coldest 3 months.....(Tpw): 478  
 Positive temperature coldest 2 months.....(Tpw2): 317  
 Positive temperature coldest 1 month.....(Tpw1): 156

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 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	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

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 17.34  
 Mediterranean index of January.....(Im1): No  
 Mediterranean index of January & February.....(Im2): No  
 Mediterranean index of December to February...(Im3): No

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	8	3	10	20	104	239	23	8	3	36	5	48
Tp	206	220	228	225	211	195	172	161	156	161	175	189
Io (Iom)	0.04	0.01	0.04	0.09	0.49	1.23	0.13	0.05	0.02	0.22	0.03	0.25
Seasons	Dec+Jan+Feb			Mar+Apr+May			Jun+Jul+Aug			Sep+Oct+Nov		
Pp(x10)/Tp	21 / 653			363 / 631			34 / 489			89 / 525		
Io (Iot)	0.032			0.576			0.070			0.170		
Semesters	December-May						June-November					
Pp(x10)/Tp	384 / 1284						123 / 1014					
Io (Iosm)	0.299						0.121					

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

Aridity Value Index (AVI)

[10xPP/TP=IO]: 507/2297=0.22 Lower hyperarid (3) [2138]

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	8	3	10	20	104	239	23	8	3	36	5	48
Tp [T*10]	206	220	228	225	211	195	172	161	156	161	175	189
Iom [Pp/Tp]	4	1	4	9	49	123	13	5	2	22	3	25
Avm [200-Iom]	196	199	196	191	151	77	187	195	198	178	197	175
Seasons	Dec+Jan+Feb			Mar+Apr+May			Jun+Jul+Aug			Sep+Oct+Nov		
Pp / Tp	21 / 653			363 / 631			34 / 489			89 / 525		
Iot [Pp/Tp]	3			58			7			17		
Avs E[Avm<200]	590			419			580			549		
Lower ultrahyperarid [9]							Upper ultrahyperarid [2]					
Lower hyperarid [2]							Strong lower arid [1]					
Weak lower arid [1]							Weak lower semiarid [1]					

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....(Sp): 7.22  
 CI of Gorezinski (1920) [1.7\*Sp/sin(Lat)-20.4] .....: 25.87  
 CI of Conrad (1946) [1.7\*Sp/sin(Lat+10)-14] .....: 14.63  
 + Hyperoceanic (-20<CI<20)  
 CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....: 1.18  
 + Subcontinental (1.1<CI<1.7)  
 Rainfall Index of Lang (1925) [R=P/T] .....: 2.65  
 + Steppic (40>R>0)  
 Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....: 1.74  
 + Extremely arid -desert- (5>Ia>0)  
 I of Emberger (1930) [Q=100\*P/(Tmax<sup>2</sup>-Tmin<sup>2</sup>)] .....: 9.25  
 + Arid (30>Q>0)  
 I of Dantin & Revenga (1940) [DR=100\*T/P] .....: 37.76  
 + Extremely arid (DR>6)  
 Aridity Index of UNEP [I=P/PE] .....: 0.06  
 + Arid (0.2>Im>0.05)  
 Potential Erosion I of Fournier (1960) [K=Pi<sup>2</sup>/P].....: 11.27  
 + Very low (K<60)

SAN JUAN (PERU)

Latitude: 15°23'S Longitude: 75°9'W Altitude: 31 m

BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)  
 + Climate .....: A. Warm and temperate warm  
 + Region .....: 1. Termoeremic (Desertic warm)  
 + Thermic type: 2. Macrothermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.00	0.00	0.01	0.03	0.09	0.01	0.00	0.00	0.01	0.00	0.01	0.00
T-E ratio	9.88	10.25	10.13	9.50	8.75	7.75	7.25	7.00	7.25	7.88	8.50	9.25
Precipitation-effectiveness: 1.66						Temperature-efficiency .....: 103.38						
Moisture Index [MI=100*(P-PE)/PE] .....: -94.23 + E.Dry (-110<MI<-66.7)												
Index of dryness [DI=100*d/PE] .....: 94.23 + Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE] .....: 0.00 + No surplus (0<HI<10)												
Potential Evapotranspiration PE .....: 879.04 + Third mesothermic (855<PE<997)												

