

# Phytosociological Research Center

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## Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 14/02/2020)

SANTIAGO DEL ESTERO (ARGENTINA) Altitude: 188 m.

Latitude: 27°46'S Longitude: 64°18'W

Temperature observation period.: 1941-1950 (10)

Rainfall observation period....: 1941-1950 (10)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	27.70	35.80	20.00	44.60	10.70	74.0	171.22
Feb.	26.20	33.60	19.60	43.20	9.70	104.0	134.35
Mar.	23.20	30.00	17.10	40.70	6.30	87.0	105.07
Apr.	20.20	26.90	14.10	37.50	1.70	28.0	68.13
May.	16.70	23.30	10.60	35.20	-4.30	18.0	42.75
Jun.	13.60	20.30	7.40	31.70	-5.60	10.0	24.74
Jul.	13.00	20.80	5.90	33.90	-5.20	3.0	23.29
Aug.	15.60	24.10	7.40	38.80	-6.50	3.0	38.02
Sep.	19.10	27.50	11.00	41.80	-4.10	8.0	62.91
Oct.	22.10	30.30	14.20	44.40	2.70	65.0	98.21
Nov.	24.80	33.00	17.40	43.00	6.60	63.0	130.90
Dec.	27.50	35.60	19.30	44.60	8.20	51.0	172.21
Year	20.81	28.43	13.67	39.95	1.68	514	1071.8

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	475
Compensated thermicity index.....(Itc):	475
Simple continentality index.....(Ic):	14.7
Diurnality index.....(Id):	16.7
Annual ombrothermic index.....(Io):	2.06
Monthly dry ombrothermic index.....(Iod1):	0.23
Bimonthly dry ombrothermic index.....(Iod2):	0.21
Threemonthly dry ombrothermic index.....(Iod3):	0.29
Fourmonthly dry ombrothermic index.....(Iod4):	0.39
Annual ombro-evaporation index.....(Ioe):	0.48
Annual positive temperature.....(Tp):	2497
Annual negative temperature.....(Tn):	0
Dry station temperature.....(Td):	477
Positive precipitation.....(Pp):	514

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	0	5	3	4	0

Latitudinal Belt...: Subtropical

Continentality.....: Oceanic - High Euoceanic

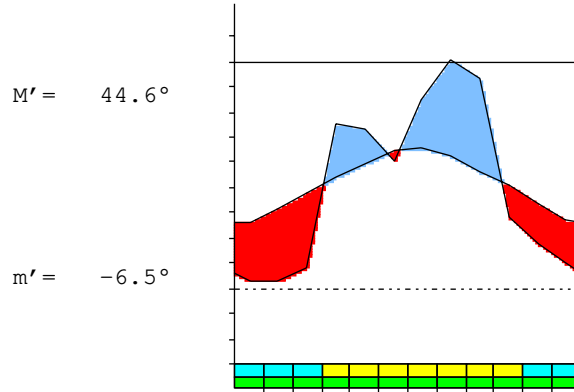
Bioclimate(Variant): TROPICAL XERIC (BIXERIC, DRY)

Bioclimatic Belt...: LOW MESOTROPICAL LOW DRY

SANTIAGO DEL ESTERO (ARGENTINA)

188 m

P= 514      27° 46'S      64° 18'W      10/10 y.  
 T= 20.8 °    Ic= 14.7      Tp= 2497      Tn= 0  
 m= 5.9 °      M= 20.8 °    Itc= 475      Io= 2.1



TROPICAL XERIC (BIXERIC)  
 LOW MESOTROPICAL LOW DRY

WATER INDEX CARD      SANTIAGO DEL ESTERO (ARGENTINA)

Altitude: 188 m.      Latitude: 27° 46'S

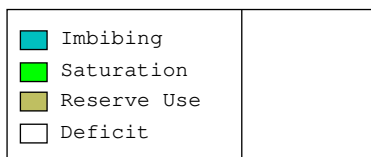
(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jul.	13.0	23	3	0	0	3	20	0	0	-0.8
Aug.	15.6	38	3	0	0	3	35	0	0	-0.9
Sep.	19.1	63	8	0	0	8	55	0	0	-0.8
Oct.	22.1	98	65	0	0	65	33	0	0	-0.3
Nov.	24.8	131	63	0	0	63	68	0	0	-0.5
Dec.	27.5	172	51	0	0	51	121	0	0	-0.7
Jan.	27.7	171	74	0	0	74	97	0	0	-0.5
Feb.	26.2	134	104	0	0	104	30	0	0	-0.2
Mar.	23.2	105	87	0	0	87	18	0	0	-0.1
Apr.	20.2	68	28	0	0	28	40	0	0	-0.5
May.	16.7	43	18	0	0	18	25	0	0	-0.5
Jun.	13.6	25	10	0	0	10	15	0	0	-0.5
Year	20.8	1072	514	*	*	514	558	0	0	*

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

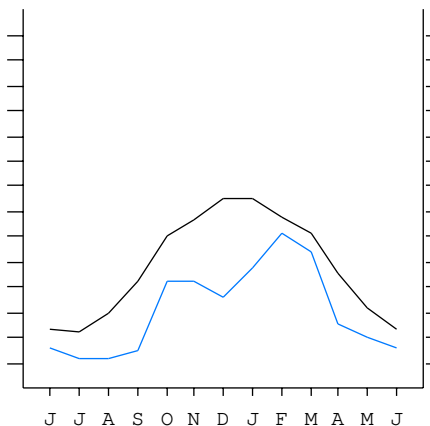
SANTIAGO DEL ESTERO (ARGENTINA)

27°46'S    64°18'W    188 m 10/10 y.

T= 20.8    Ic= 14.7    TROPICAL XERIC (BIXERIC)  
 m= 5.9    Tp= 2497    LOW MESOTROPICAL  
 M= 20.8    Tn= 0    LOW DRY  
 M' = 44.6    Itc= 475  
 m' = -6.5    Io= 2.1  
 P= 514    mm ———  
 PE= 1072    mm ———



All over the year,  
 there is hydic deficit



SANTIAGO DEL ESTERO (ARGENTINA)

Latitude: 27°46'S Longitude: 64°18'W Altitude: 188 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continentality Index [B2a]  
 + Type .....: B. Oceanic  
 + Subtype .....: 2. Euoceanic  
 + Variant .....: a. High  
 Thermic types [A3.A2]  
 + Latitudinal zone ....: A. Warm  
 + Latitudinal belt ....: 3. Subtropical  
 + Thermic type .....: A. Warm  
 + Thermic subtype .....: 2. Warm  
 Bioclimatic types [A3c.3b.5b]  
 + Macrobioclimate .....: A. TROPICAL  
 + Bioclimate .....: 3. XERIC  
 + Bioclimatic variant .: BIXERIC, DRY  
 + Thermic type.....: 3. MESOTROPICAL  
 + Thermic subtype.....: b. LOW  
 + Ombrothermic type ...: 5. DRY  
 + Ombrothermic subtype : b. LOW  
 Bioclimatic Classification .....Trxe (Bix) .Mtr.Dry.Euo

SANTIAGO DEL ESTERO (ARGENTINA)

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 444  
 Coldest semester of the year.....(Psw): 70  
 Warmest four months period of the year.....(Pcm1): 292  
 Following warmest four months period.....(Pcm2): 143  
 Positive precipitation dryest 3 months.....(Ppd): 14  
 Positive precipitation dryest 2 months.....(Ppd2): 6  
 Positive precipitation dryest 1 month.....(Ppd1): 3  
 Positive precipitation warmest 3 months.....(Pps): 229  
 Positive precipitation warmest 2 months.....(Pps2): 125  
 Positive precipitation warmest 1 month.....(Pps1): 74  
 Positive precipitation coldest 3 months.....(Ppw): 16  
 Positive precipitation coldest 2 months.....(Ppw2): 13  
 Positive precipitation coldest 1 month.....(Ppw1): 3

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	16	136	229	133

Seasonal rainfall rhythms: S > P > F > W

SANTIAGO DEL ESTERO (ARGENTINA)

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 27.7  
 Average coldest month [T].....(Tmin): 13.0  
 Maximum temp. warmest month [M].....(Tmax): 35.8  
 Minimum temp. coldest month [m].....(Tmin): 5.9  
 Absolute Max.temp. warmest month [M'].....(Tamax): 44.6  
 Absolute Min.temp. coldest month [m'].....(Tamin): -6.5  
 First warmest contrasted month [M].....(Tcmax): 24.1 (8)  
 First coldest contrasted month [m].....(Tcmin): 7.4 (8)  
 Dry station temperature.....(Td): 477  
 Positive temperature dryest 3 months.....(Tpd): 477  
 Positive temperature dryest 2 months.....(Tpd2): 286  
 Positive temperature dryest 1 month.....(Tpd1): 130  
 Positive temperature warmest 3 months.....(Tps): 814  
 Positive temperature warmest 2 months.....(Tps2): 552  
 Positive temperature warmest 1 month.....(Tps1): 277  
 Positive temperature coldest 3 months.....(Tpw): 422  
 Positive temperature coldest 2 months.....(Tpw2): 266  
 Positive temperature coldest 1 month.....(Tpw1): 130

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

SANTIAGO DEL ESTERO (ARGENTINA)

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 2.09  
 Mediterranean index of January.....(Im1): 2.31  
 Mediterranean index of January & February....(Im2): 1.72  
 Mediterranean index of December to February...(Im3): 2.09

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	510	740	1040	870	280	180	100	30	30	80	650	630
Tp	275	277	262	232	202	167	136	130	156	191	221	248
Io (Iom)	1.85	2.67	3.97	3.75	1.39	1.08	0.74	0.23	0.19	0.42	2.94	2.54
Seasons	Summer			Autumn			Winter			Spring		
Pp(x10)/Tp	2290 / 814			1330 / 601			160 / 422			1360 / 660		
Io (Iot)	2.813			2.213			0.379			2.061		
Semesters	December-May						June-November					
Pp(x10)/Tp	3620 / 1415						1520 / 1082					
Io (Iosm)	2.558						1.405					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 5140/2497=2.06 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	510	740	1040	870	280	180	100	30	30	80	650	630
Tp [T*10]	275	277	262	232	202	167	136	130	156	191	221	248
Iom [Pp/Tp]	185	267	397	375	139	108	74	23	19	42	294	254
Avm [200-Iom]	15	***	***	***	61	92	126	177	181	158	***	***
Seasons	Summer			Autumn			Winter			Spring		
Pp / Tp	2290 / 814			1330 / 601			160 / 422			1360 / 660		
Iot [Pp/Tp]	281			221			38			206		
Avs E[Avm<200]	***			***			484			***		
Upper ultrahyperarid [1]							Lower hyperarid [1]					
Upper hyperarid [1]							Strong lower arid [1]					
Strong upper arid [1]							Strong lower semiarid [1]					
Weak lower semiarid [1]							Weak upper semiarid [1]					

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....(Sp): 14.70  
 CI of Gorezinski (1920) [1.7\*Sp/sin(Lat)-20.4] .....: 33.24  
 CI of Conrad (1946) [1.7\*Sp/sin(Lat+10)-14] .....: 26.80  
 + Oceanic (20<CI<40)  
 CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....: 1.43  
 + Subcontinental (1.1<CI<1.7)  
 Rainfall Index of Lang (1925) [R=P/T] .....: 24.70  
 + Steppic (40>R>0)  
 Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....: 16.68  
 + Semiarid -mediterranean- (20>Ia>15)  
 I of Emberger (1930) [Q=100\*P/(Tmax<sup>2</sup>-Tmin<sup>2</sup>)] .....: 41.22  
 + Semiarid (50>Q>30)  
 I of Dantin & Revenga (1940) [DR=100\*T/P] .....: 4.05  
 + Arid (6>DR>3)  
 Aridity Index of UNEP [I=P/PE] .....: 0.48  
 + Semiarid (0.5>Im>0.2)  
 Potential Erosion I of Fournier (1960) [K=Pi<sup>2</sup>/P].....: 21.04  
 + Very low (K<60)

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)  
 + Climate .....: A. Warm and temperate warm  
 + Region .....: 5. Bixeric (Bixeric)  
 + Thermic type: 2. Macrothermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.25	0.38	0.33	0.10	0.07	0.04	0.01	0.01	0.03	0.24	0.22	0.17
T-E ratio	12.47	11.79	10.44	9.09	7.52	6.12	5.85	7.02	8.60	9.95	11.16	12.38
Precipitation-effectiveness: 18.38						Temperature-efficiency .....: 112.37						
Moisture Index [MI=100*(P-PE)/PE] .....: -52.04 + D.Semiarid (-66.7<MI<-33.3)												
Index of dryness [DI=100*d/PE] .....: 52.04 + Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE] .....: 0.00 + No surplus (0<HI<10)												
Potential Evapotranspiration PE .....: 1071.81 + Forth mesothermic (997<PE<1440)												

