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)

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<th>M'i</th>
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**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): 6.34  
Annual positive temperature..............(Tp): 2497  
Annual negative temperature..............(Tn): 0  
Dry station temperature...................(Td): 477  
Positive precipitation....................(Pp): 514

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<th>P:2T-4T</th>
<th>PT-2T</th>
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Latitudinal Belt....: Subtropical  
Continentialty.....: Oceanic - High Euoceanic  
Bioclimate(Variant): TROPICAL XERIC (BIXERIC,DRY)  
Bioclimatic Belt....: LOW MESOTROPICAL LOW DRY
**SANTIAGO DEL ESTERO (ARGENTINA)** 188 m

\[
\begin{align*}
P &= 514 \text{ mm} \\
T &= 20.8° \\
m &= 5.9° \\
M &= 20.8° \\
M' &= 44.6° \\
m' &= -6.5° \\
Ic &= 14.7° \\
Tp &= 2497 \\
Tn &= 0 \\
Itc &= 475 \\
Io &= 2.1° \\
PE &= 1072 \\
\end{align*}
\]

**TROPICAL XERIC (BIXERIC)**

LOW MESOTROPICAL LOW DRY

**WATER INDEX CARD SANTIAGO DEL ESTERO (ARGENTINA)**

Altitude: 188 m. Latitude: 27° 46’S

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<th>P</th>
<th>VR</th>
<th>R</th>
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*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.

\[
\begin{align*}
T &= 20.8° \\
m &= 5.9° \\
M &= 20.8° \\
M' &= 44.6° \\
m' &= -6.5° \\
Ic &= 14.7° \\
Tp &= 2497 \\
Tn &= 0 \\
Itc &= 475 \\
Io &= 2.1° \\
P &= 514 \text{ mm} \\
PE &= 1072 \text{ mm} \\
\end{align*}
\]

All over the year, there is hydric 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
+ 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 : c. BIXERIC,DRY
+ Thermic type.........: 3. MESOTROPICAL
+ Thermic subtype......: b. LOW
+ Ombrothermic type ...: 5. DRY
+ Ombrothermic subtype : b. LOW

Bioclimatic Classification ..................: Trxe(Bix).Mtr.Dry

SANTIAGO DEL ESTERO (ARGENTINA)
Latitude: 27°46'S Longitude: 64°18'W Altitude: 188 m

PRECIPITATION PARAMETERS

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<th>Summer</th>
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<td>Tr1−W</td>
<td>Tr2−P</td>
<td>Tr3−S</td>
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Positive temperature dryest 3 months.................(Tp(d)): 477
Positive temperature dryest 2 months...............(Tp(d2)): 286
Positive temperature dryest 1 month...............(Tp(d1)): 130
Positive temperature warmest 3 months..........(Tp(s)): 814
Positive temperature warmest 2 months.........(Tp(s2)): 552
Positive temperature warmest 1 month........(Tp(s1)): 277
Positive temperature coldest 3 months........(Tp(w)): 422
Positive temperature coldest 2 months..........(Tp(w2)): 266
Positive temperature coldest 1 month..........(Tp(w1)): 130

Seasonal rainfall rhythms:  S > P > F > W

SANTIAGO DEL ESTERO (ARGENTINA)
Latitude: 27°46'S Longitude: 64°18'W Altitude: 188 m

TEMPERATURE PARAMETERS

Average warmest month [T].........................(Tmax): 27.7
Average coldest month [T].......................(Tmin): 13.0
Minimum temp. warmest month [M]...............(Tmmax): 35.8
Minimum temp. coldest month [m]...............(Tmmin): 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
### SANTIAGO DEL ESTERO (ARGENTINA)

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

#### SEASONAL PARAMETERS

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<tr>
<th>Ultragelid ([M'&lt;=0] Pf)</th>
<th>Jan</th>
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<th>May</th>
<th>Jun</th>
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<tr>
<th>Hypergelid ([M &lt;=0] Pf)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
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<tr>
<th>Gelid ([T &lt;=0] Pf)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
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<tr>
<th>Subgelid ([m &lt;=0] Pf)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
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<thead>
<tr>
<th>Pregelid ([m'&lt;=0] Pf)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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<thead>
<tr>
<th>Agelid ([m'&gt; 0] Pf)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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<thead>
<tr>
<th>HiperAgelid ([all&gt;0] Pf)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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### SANTIAGO DEL ESTERO (ARGENTINA)

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

#### OMBROTHERMIC PARAMETERS

<table>
<thead>
<tr>
<th>Annual aridity index ([PE/Tp])</th>
<th>(Iar): 2.09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mediterranean index of January</td>
<td>(I1m1): 2.31</td>
</tr>
<tr>
<td>Mediterranean index of January &amp; February</td>
<td>(I1m2): 1.72</td>
</tr>
<tr>
<td>Mediterranean index of December to February</td>
<td>(I1m3): 2.09</td>
</tr>
</tbody>
</table>

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

### SANTIAGO DEL ESTERO (ARGENTINA)

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

#### Aridity Value Index (AVI)

<table>
<thead>
<tr>
<th>[10xPP/TP=IO]: 5140/2497=2.06 There is No Yearly Aridity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Months</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Pp (P*10)</td>
</tr>
<tr>
<td>Tp (T*10)</td>
</tr>
<tr>
<td>Iom (Pp/Tp)</td>
</tr>
<tr>
<td>Avm (200-Iom)</td>
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<thead>
<tr>
<th>Seasons</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Pp / Tp</td>
<td>2290 / 814</td>
<td>1330 / 601</td>
<td>160 / 422</td>
<td>1360 / 660</td>
</tr>
<tr>
<td>Iot (Pp/Tp)</td>
<td>281</td>
<td>221</td>
<td>38</td>
<td>206</td>
</tr>
<tr>
<td>Avs E[Avm&lt;200]</td>
<td>***</td>
<td>***</td>
<td>484</td>
<td>***</td>
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</table>

- Upper ultrahyperarid [1]
- Upper hyperarid [1]
- Strong upper arid [1]
- Strong lower semi-arid [1]
- Weak lower semi-arid [1]
- Weak upper semi-arid [1]
SANTIAGO DEL ESTERO (ARGENTINA)

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

BIOCLINIC INDICES I

CI of Supan (1884) \[\text{Tmax}-\text{Tmin}\] (Sp): 14.70
CI of Gorezinski (1920) \[1.7*\text{Sp}/\sin(\text{Lat})-20.4\] : 33.24
CI of Conrad (1946) \[1.7*\text{Sp}/\sin(\text{Lat}+10)-14\] : 26.80
+ Oceanic \(20<\text{CI}<40\)
CI of Currey (1974) \[\text{CI}=\text{Sp}/(1+\text{Lat}/3)\] : 1.43
+ Steppic \(40>\text{RI}>0\)

Aridity Index of Martonne (1926) \[\text{Ia} = \text{P}/(\text{T}+10)\] : 16.68
+ Semi-arid - Mediterranean \((20>\text{Ia}>15)\)
I of Emberger (1930) \[\text{Q} = 100*\text{P}/(\text{Tmax}^2-\text{Tmin}^2)\] : 41.22
+ Semi-arid \((50>\text{Q}>30)\)
I of Dantin & Revenga (1940) \[\text{DR} = 100*\text{T}/\text{P}\] : 4.05
+ Arid \((6>\text{DR}>3)\)

Aridity Index of UNEP \[\text{I} = \text{P}/\text{PE}\] : 0.48
+ Semi-arid \((0.5>\text{I}>0.2)\)

Potential Erosion I of Fournier (1960) \[\text{K} = \text{Pi}^2/\text{P}\] : 21.04
+ Very low \((\text{K}<60)\)

SANTIAGO DEL ESTERO (ARGENTINA)

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

BIOCLINIC INDICES II

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

Thornthwaite (1948)

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<tbody>
<tr>
<td>P-E ratio</td>
<td>0.25</td>
<td>0.38</td>
<td>0.33</td>
<td>0.10</td>
<td>0.07</td>
<td>0.04</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.24</td>
<td>0.22</td>
</tr>
<tr>
<td>T-E ratio</td>
<td>12.47</td>
<td>11.79</td>
<td>10.44</td>
<td>9.09</td>
<td>7.52</td>
<td>6.12</td>
<td>5.85</td>
<td>7.02</td>
<td>8.60</td>
<td>9.95</td>
<td>11.16</td>
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Precipitation-effectiveness: 18.38
Temperature-efficiency: 112.37

Moisture Index \[\text{MI} = 100*(\text{P}-\text{PE})/\text{PE}\] : -52.04
+ D.Semi-arid \((-66.7<\text{MI}<-33.3)\)
Index of dryness \[\text{DI} = 100*\text{d}/\text{PE}\] : 52.04
+ Strong deficit \((33.3<\text{DI})\)
Index of humidity \[\text{HI} = 100*\text{s}/\text{PE}\] : 0.00
+ No surplus \((0<\text{HI}<10)\)

Potential Evapotranspiration \[\text{PE} = 1071.81\]
+ Forth mesothermic \((997<\text{PE}<1440)\)