

# Phytosociological Research Center

www.globalbioclimatics.org

## Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 30/08/2017)

GORE (ETHIOPIA)

Altitude: 2005 m.

Latitude: 8°19'N Longitude: 35°33'E

Temperature observation period.: 1988-1994 (7)

Rainfall observation period....: 1968-1994 (27)

| (C/mm) | Ti    | Mi    | mi    | M'i   | m'i   | Pi    | Epi    |
|--------|-------|-------|-------|-------|-------|-------|--------|
| Jan.   | 18.89 | 24.44 | 13.33 | 27.22 | 7.22  | 29.0  | 70.60  |
| Feb.   | 20.56 | 27.78 | 13.33 | 32.22 | 11.11 | 51.1  | 75.78  |
| Mar.   | 20.28 | 26.67 | 13.89 | 28.89 | 11.11 | 85.1  | 82.62  |
| Apr.   | 18.89 | 23.89 | 13.89 | 25.00 | 11.11 | 135.9 | 72.00  |
| May.   | 19.45 | 25.00 | 13.89 | 30.00 | 8.89  | 276.1 | 79.15  |
| Jun.   | 17.78 | 21.67 | 13.89 | 27.22 | 11.11 | 307.1 | 65.28  |
| Jul.   | 18.06 | 23.33 | 12.78 | 27.78 | 12.22 | 276.1 | 68.57  |
| Aug.   | 17.23 | 21.67 | 12.78 | 27.78 | 10.00 | 312.9 | 62.01  |
| Sep.   | 17.50 | 22.22 | 12.78 | 26.11 | 11.11 | 313.4 | 61.49  |
| Oct.   | 18.61 | 23.89 | 13.33 | 27.78 | 11.11 | 163.1 | 69.27  |
| Nov.   | 18.33 | 23.33 | 13.33 | 23.89 | 12.22 | 77.0  | 64.63  |
| Dec.   | 18.34 | 22.78 | 13.89 | 25.00 | 12.22 | 34.0  | 66.02  |
| Year   | 18.66 | 23.89 | 13.43 | 27.41 | 10.79 | 2061  | 837.42 |

### BIOCLIMATIC INDICES AND DIAGNOSIS

|  |      |
|--|------|
| Thermicity index.....(It):                       | 531  |
| Compensated thermicity index.....(Itc):          | 531  |
| Simple continentality index.....(Ic):            | 3.3  |
| Diurnality index.....(Id):                       | 14.5 |
| Annual ombrothermic index.....(Io):              | 9.20 |
| Monthly dry ombrothermic index.....(Iod1):       | 1.54 |
| Bimonthly dry ombrothermic index.....(Iod2):     | 1.69 |
| Three monthly dry ombrothermic index.....(Iod3): | 1.97 |
| Four monthly dry ombrothermic index.....(Iod4):  | 2.51 |
| Annual ombro-evaporation index.....(Ioe):        | 0.42 |
| Annual positive temperature.....(Tp):            | 2239 |
| Annual negative temperature.....(Tn):            | 0    |
| Dry station temperature.....(Td):                | 578  |
| Positive precipitation.....(Pp):                 | 2061 |

| N. of  | P>4T | P:2T-4T | PT-2T | P<T | T<0 |
|--------|------|---------|-------|-----|-----|
| Months | 9    | 1       | 2     | 0   | 0   |

Latitudinal Belt...: Eutropical

Continentalty.....: Hyperoceanic - Low Ultrahyperoceanic

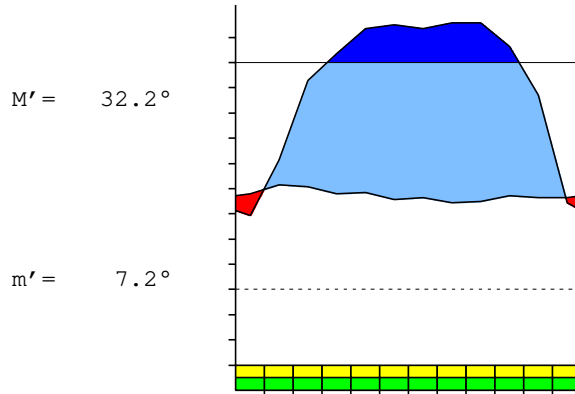
Bioclimate(Variant): TROPICAL PLUVISEASONAL (MESOPHYTIC)

Bioclimatic Belt...: UPPER THERMOTROPICAL UPPER HUMID

GORE (ETHIOPIA)

2005 m

P= 2061      8° 19'N      35° 33'E      7/27 y.  
 T= 18.7°      Ic= 3.3      Tp= 2239      Tn= 0  
 m= 12.8°      M= 21.7°      Itc= 531      Io= 9.2



TROPICAL PLUVISEASONAL (MESOPHYTIC)  
 UPPER THERMOTROPICAL UPPER HUMID

WATER INDEX CARD

GORE (ETHIOPIA)

Altitude: 2005 m.

Latitude: 8° 19'N

| (C/mm) | T    | PE  | P    | VR  | R   | RE  | DF | SP   | DR   | HC   |
|--------|------|-----|------|-----|-----|-----|----|------|------|------|
| Jan.   | 18.9 | 71  | 29   | -42 | 26  | 71  | 0  | 0    | 22   | -0.5 |
| Feb.   | 20.6 | 76  | 51   | -25 | 2   | 76  | 0  | 0    | 11   | -0.3 |
| Mar.   | 20.3 | 83  | 85   | 2   | 4   | 83  | 0  | 0    | 6    | 0.0  |
| Apr.   | 18.9 | 72  | 136  | 64  | 68  | 72  | 0  | 0    | 3    | 0.8  |
| May.   | 19.5 | 79  | 276  | 32  | 100 | 79  | 0  | 165  | 84   | 2.4  |
| Jun.   | 17.8 | 65  | 307  | 0   | 100 | 65  | 0  | 242  | 163  | 3.7  |
| Jul.   | 18.1 | 69  | 276  | 0   | 100 | 69  | 0  | 208  | 185  | 3.0  |
| Aug.   | 17.2 | 62  | 313  | 0   | 100 | 62  | 0  | 251  | 218  | 4.0  |
| Sep.   | 17.5 | 61  | 313  | 0   | 100 | 61  | 0  | 252  | 235  | 4.0  |
| Oct.   | 18.6 | 69  | 163  | 0   | 100 | 69  | 0  | 94   | 164  | 1.3  |
| Nov.   | 18.3 | 65  | 77   | 0   | 100 | 65  | 0  | 12   | 88   | 0.1  |
| Dec.   | 18.3 | 66  | 34   | -32 | 68  | 66  | 0  | 0    | 44   | -0.4 |
| Year   | 18.7 | 837 | 2061 | *   | *   | 837 | 0  | 1223 | 1223 | *    |

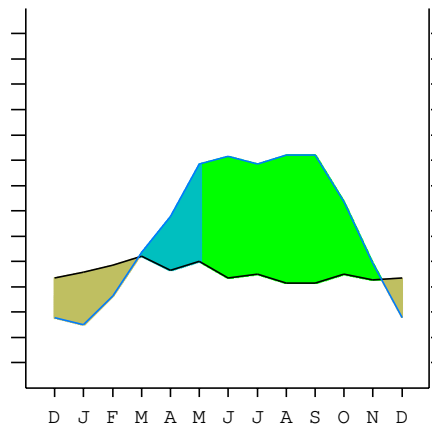
R = Reserve    VR = Variation of the reserve    RE = Real evapotranspiration  
 DR = Drainage    HC = Humidity coefficient    DF = Deficit    SP = Superavit

GORE (ETHIOPIA)

8°19'N    35°33'E    2005 m    7/27 y.

T= 18.7    Ic= 3.3    TROPICAL PLUVISEASONAL (MESOPHYTIC)  
 m= 12.8    Tp= 2239    UPPER THERMOTROPICAL  
 M= 21.7    Tn= 0    UPPER HUMID  
 M' = 32.2    Itc= 531  
 m' = 7.2    Io= 9.2  
 P= 2061    mm    ———  
 PE= 837    mm    ———

|             |         |
|-------------|---------|
| Imbibing    | 28 Feb. |
| Saturation  | 5 May.  |
| Reserve Use | 9 Nov.  |
| Deficit     |         |



GORE (ETHIOPIA)

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SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [A1b]  
 + Type .....: A. Hyperoceanic  
 + Subtype .....: 1. Ultrahyperoceanic  
 + 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 [A4.2a.7a]  
 + Macrobioclimate .....: A. TROPICAL  
 + Bioclimate .....: 4. PLUVISEASONAL  
 + Bioclimatic variant .:  
 + Thermic type.....: 2. THERMOTROPICAL  
 + Thermic subtype.....: a. UPPER  
 + Ombrothermic type ...: 7. HUMID  
 + Ombrothermic subtype : a. UPPER

Bioclimatic Classification .....: Trde.Ttr.Hum

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 611  
 Coldest semester of the year.....(Psw): 1450  
 Warmest four months period of the year.....(Pcm1): 548  
 Following warmest four months period.....(Pcm2): 1210  
 Positive precipitation dryest 3 months.....(Ppd): 114  
 Positive precipitation dryest 2 months.....(Ppd2): 63  
 Positive precipitation dryest 1 month.....(Ppd1): 29  
 Positive precipitation warmest 3 months.....(Pps): 165  
 Positive precipitation warmest 2 months.....(Pps2): 136  
 Positive precipitation warmest 1 month.....(Pps1): 51  
 Positive precipitation coldest 3 months.....(Ppw): 902  
 Positive precipitation coldest 2 months.....(Ppw2): 626  
 Positive precipitation coldest 1 month.....(Ppw1): 313

| Seasons  | Dec+Jan+Feb<br>Ttr1-1 | Mar+Apr+May<br>Ttr2-2 | Jun+Jul+Aug<br>Ttr3-3 | Sep+Oct+Nov<br>Ttr4-4 |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rainfall | 114                   | 497                   | 896                   | 553                   |

Tropical rainfall rhythms: 3 > 4 > 2 > 1

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 20.6  
 Average coldest month [T].....(Tmin): 17.2  
 Maximum temp. warmest month [M].....(Tmmax): 27.8  
 Minimum temp. coldest month [m].....(Tmmin): 12.8  
 Absolute Max.temp. warmest month [M'].....(Tamax): 32.2  
 Absolute Min.temp. coldest month [m'].....(Tamin): 7.2  
 First warmest contrasted month [M].....(Tcmax): 27.8 (2)  
 First coldest contrasted month [m].....(Tcmin): 13.3 (2)  
 Dry station temperature.....(Td): 578  
 Positive temperature dryest 3 months.....(Tpd): 578  
 Positive temperature dryest 2 months.....(Tpd2): 372  
 Positive temperature dryest 1 month.....(Tpd1): 189  
 Positive temperature warmest 3 months.....(Tps): 597  
 Positive temperature warmest 2 months.....(Tps2): 408  
 Positive temperature warmest 1 month.....(Tps1): 206  
 Positive temperature coldest 3 months.....(Tpw): 528  
 Positive temperature coldest 2 months.....(Tpw2): 347  
 Positive temperature coldest 1 month.....(Tpw1): 172

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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): 0.41  
 Mediterranean index of July.[PE/P].....(Im1): No  
 Mediterranean index of July & August.....(Im2): No  
 Mediterranean index of June, July & August....(Im3): No

| Months     | Dec.         | Jan. | Feb. | Mar.        | Apr. | May. | Jun.          | Jul. | Aug. | Sep.        | Oct. | Nov. |
|------------|--------------|------|------|-------------|------|------|---------------|------|------|-------------|------|------|
| Pp(x10)    | 340          | 290  | 511  | 851         | 1359 | 2761 | 3071          | 2761 | 3129 | 3134        | 1631 | 770  |
| Tp         | 183          | 189  | 206  | 203         | 189  | 195  | 178           | 181  | 172  | 175         | 186  | 183  |
| Io (Iom)   | 1.85         | 1.54 | 2.49 | 4.20        | 7.19 | 14.2 | 17.3          | 15.3 | 18.2 | 17.9        | 8.76 | 4.20 |
| Seasons    | Dec+Jan+Feb  |      |      | Mar+Apr+May |      |      | Jun+Jul+Aug   |      |      | Sep+Oct+Nov |      |      |
| Pp(x10)/Tp | 1141 / 578   |      |      | 4971 / 586  |      |      | 8961 / 531    |      |      | 5535 / 544  |      |      |
| Io (Iot)   | 1.974        |      |      | 8.480       |      |      | 16.89         |      |      | 10.17       |      |      |
| Semesters  | December-May |      |      |             |      |      | June-November |      |      |             |      |      |
| Pp(x10)/Tp | 6112 / 1164  |      |      |             |      |      | 14496 / 1075  |      |      |             |      |      |
| Io (Iosm)  | 5.250        |      |      |             |      |      | 13.48         |      |      |             |      |      |

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 20608/2239=9.20 **There is No Yearly Aridity**

| Months                    | Dec.        | Jan. | Feb. | Mar.        | Apr. | May.                    | Jun.        | Jul. | Aug. | Sep.        | Oct. | Nov. |
|---------------------------|-------------|------|------|-------------|------|-------------------------|-------------|------|------|-------------|------|------|
| Pp [P*10]                 | 340         | 290  | 511  | 851         | 1359 | 2761                    | 3071        | 2761 | 3129 | 3134        | 1631 | 770  |
| Tp [T*10]                 | 183         | 189  | 206  | 203         | 189  | 195                     | 178         | 181  | 172  | 175         | 186  | 183  |
| Iom [Pp/Tp]               | 185         | 154  | 249  | 420         | 719  | \$\$                    | \$\$        | \$\$ | \$\$ | \$\$        | 876  | 420  |
| Avm [200-Iom]             | 15          | 46   | ***  | ***         | ***  | ***                     | ***         | ***  | ***  | ***         | ***  | ***  |
| Seasons                   | Dec+Jan+Feb |      |      | Mar+Apr+May |      |                         | Jun+Jul+Aug |      |      | Sep+Oct+Nov |      |      |
| Pp / Tp                   | 1141 / 578  |      |      | 4971 / 586  |      |                         | 8961 / 531  |      |      | 5535 / 544  |      |      |
| Iot [Pp/Tp]               | 197         |      |      | 848         |      |                         | 1689        |      |      | 1017        |      |      |
| Avs E[Avm<200]            | ***         |      |      | ***         |      |                         | ***         |      |      | ***         |      |      |
| Strong upper semiarid [1] |             |      |      |             |      | Weak upper semiarid [1] |             |      |      |             |      |      |
|                           |             |      |      |             |      |                         |             |      |      |             |      |      |
|                           |             |      |      |             |      |                         |             |      |      |             |      |      |
|                           |             |      |      |             |      |                         |             |      |      |             |      |      |

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....(Sp): 3.33  
 CI of Gorezinski (1920) [1.7\*Sp/sin(Lat)-20.4] .....: 18.74  
 CI of Conrad (1946) [1.7\*Sp/sin(Lat+10)-14] .....: 4.01  
 + Hyperoceanic (-20<CI<20)  
 CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....: 0.88  
 + Oceanic (0.6<CI<1.1)  
 Rainfall Index of Lang (1925) [R=P/T] .....: 110.44  
 + Temperate humid (160>R>100)  
 Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....: 71.91  
 + Perhumid (Ia>60)  
 I of Emberger (1930) [Q=100\*P/(Tmax<sup>2</sup>-Tmin<sup>2</sup>)] .....: 338.72  
 + Humid (Q>90)  
 I of Dantin & Revenga (1940) [DR=100\*T/P] .....: 0.91  
 + Humid (2>DR>0)  
 Aridity Index of UNEP [I=P/PE] .....: 2.46  
 + Humid (I>0.65)  
 Potential Erosion I of Fournier (1960) [K=Pi<sup>2</sup>/P].....: 47.66  
 + Very low (K<60)

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BIOCLIMATIC INDICES II

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

| Thornthwaite (1948)  |       |      |      |      |      |                                      |      |      |      |      |      |      |
|--|-------|------|------|------|------|--------------------------------------|------|------|------|------|------|------|
|  | Jan.  | Feb. | Mar. | Apr. | May. | Jun.                                 | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
| P-E ratio  | 0.11  | 0.19 | 0.35 | 0.60 | 1.31 | 1.54                                 | 1.35 | 1.59 | 1.58 | 0.74 | 0.33 | 0.13 |
| T-E ratio  | 8.50  | 9.25 | 9.13 | 8.50 | 8.75 | 8.00                                 | 8.13 | 7.75 | 7.88 | 8.37 | 8.25 | 8.25 |
| Precipitation-effectiveness:   | 98.24 |      |      |      |      | Temperature-efficiency .....: 100.76 |      |      |      |      |      |      |
| Moisture Index [MI=100*(P-PE)/PE] .....: 146.09<br>+ A.Extremely humid (MI>100)<br>Index of dryness [DI=100*d/PE] .....: 0.00<br>+ No deficit (0<DI<16.7)<br>Index of humidity [HI=100*s/PE] .....: 146.08<br>+ Strong surplus (20<HI)<br>Potential Evapotranspiration PE .....: 837.42<br>+ Second mesothermic (712<PE<855) |       |      |      |      |      |                                      |      |      |      |      |      |      |

