

# Phytosociological Research Center

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## Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 30/08/2017)

COTONOU (BENIN)

Altitude: 5 m.

Latitude: 6°21'N Longitude: 2°23'E

Temperature observation period.: 1989-1994 (6)

Rainfall observation period....: 1984-1994 (11)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	Epi
Jan.	25.00	26.67	23.33	32.22	18.89	33.0	112.85
Feb.	26.39	27.78	25.00	33.89	21.11	33.0	123.62
Mar.	27.22	28.33	26.11	34.44	21.11	116.8	145.50
Apr.	26.95	28.33	25.56	35.00	21.11	124.5	141.89
May.	25.83	27.22	24.44	34.44	21.11	25.4	131.02
Jun.	24.45	25.56	23.33	32.78	18.33	36.6	106.70
Jul.	24.45	25.56	23.33	31.67	20.00	88.9	108.75
Aug.	23.89	25.00	22.78	30.56	20.56	38.1	99.58
Sep.	24.45	25.56	23.33	31.67	20.00	66.0	103.62
Oct.	25.28	26.67	23.89	32.78	21.67	134.6	118.34
Nov.	26.11	27.78	24.44	33.33	21.67	58.4	126.92
Dec.	25.83	27.22	24.44	32.78	19.44	12.7	124.84
Year	25.49	26.81	24.17	32.96	20.42	768	1443.6

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	733
Compensated thermicity index.....(Itc):	733
Simple continentality index.....(Ic):	3.3
Diurnality index.....(Id):	3.3
Annual ombrothermic index.....(Io):	2.51
Monthly dry ombrothermic index.....(Iod1):	0.49
Bimonthly dry ombrothermic index.....(Iod2):	0.90
Three monthly dry ombrothermic index.....(Iod3):	1.02
Four monthly dry ombrothermic index.....(Iod4):	1.33
Annual ombro-evaporation index.....(Ioe):	0.97
Annual positive temperature.....(Tp):	3059
Annual negative temperature.....(Tn):	0
Dry station temperature.....(Td):	772
Positive precipitation.....(Pp):	768

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

Latitudinal Belt...: Equatorial

Continentality.....: Hyperoceanic - Low Ultrahyperoceanic

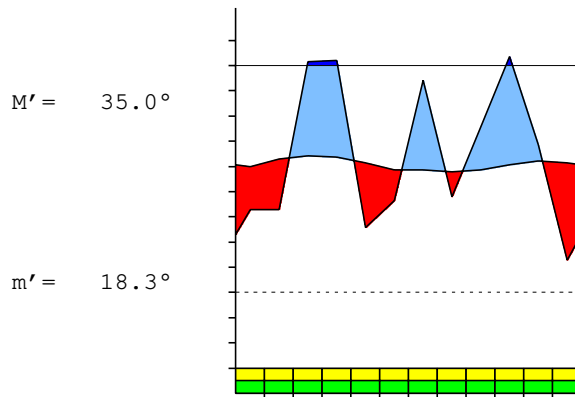
Bioclimate(Variant): TROPICAL XERIC (BIXERIC, DRY)

Bioclimatic Belt...: UPPER INFRATROPICAL LOW DRY

COTONOU (BENIN)

5 m

P= 768            6° 21'N            2° 23'E            6/11 y.  
 T= 25.5°        Ic= 3.3            Tp= 3059            Tn= 0  
 m= 22.8°        M= 25.0°            Itc= 733            Io= 2.5



TROPICAL XERIC (BIXERIC)  
 UPPER INFRATROPICAL LOW DRY

WATER INDEX CARD

COTONOU (BENIN)

Altitude: 5 m.

Latitude: 6° 21'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	25.0	113	33	0	0	33	80	0	0	-0.7
Feb.	26.4	124	33	0	0	33	91	0	0	-0.7
Mar.	27.2	146	117	0	0	117	29	0	0	-0.1
Apr.	27.0	142	125	0	0	125	17	0	0	-0.1
May.	25.8	131	25	0	0	25	106	0	0	-0.8
Jun.	24.5	107	37	0	0	37	70	0	0	-0.6
Jul.	24.5	109	89	0	0	89	20	0	0	-0.1
Aug.	23.9	100	38	0	0	38	61	0	0	-0.6
Sep.	24.5	104	66	0	0	66	38	0	0	-0.3
Oct.	25.3	118	135	16	16	118	0	0	0	0.1
Nov.	26.1	127	58	-16	0	75	52	0	0	-0.5
Dec.	25.8	125	13	0	0	13	112	0	0	-0.8
Year	25.5	1444	768	*	*	768	676	0	0	*

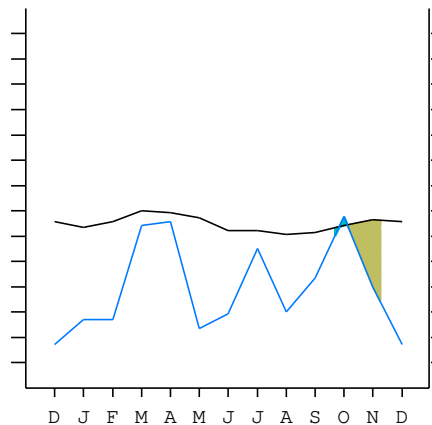
R = Reserve    VR = Variation of the reserve    RE = Real evapotranspiration  
 DR = Drainage    HC = Humidity coefficient    DF = Deficit    SP = Superavit

COTONOU (BENIN)

6°21'N    2°23'E    5 m    6/11 y.

T= 25.5    Ic= 3.3    TROPICAL XERIC (BIXERIC)  
 m= 22.8    Tp= 3059    UPPER INFRATROPICAL  
 M= 25.0    Tn= 0    LOW DRY  
 M' = 35.0    Itc= 733  
 m' = 18.3    Io= 2.5  
 P= 768    mm    ———  
 PE= 1444    mm    ———

Imbibing	21 Sep.
Saturation	6 Oct.
Reserve Use	8 Nov.
Deficit	



COTONOU (BENIN)

Latitude: 6°21'N Longitude: 2°23'E Altitude: 5 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [A1b]  
 + Type .....: A. Hyperoceanic  
 + Subtype .....: 1. Ultrahyperoceanic  
 + Variant .....: b. Low

Thermic types [A1.A1]  
 + Latitudinal zone ....: A. Warm  
 + Latitudinal belt ....: 1. Equatorial  
 + Thermic type .....: A. Warm  
 + Thermic subtype .....: 1. Torrid

Bioclimatic types [A3c.1a.5b]  
 + Macrobioclimate .....: A. TROPICAL  
 + Bioclimate .....: 3. XERIC  
 + Bioclimatic variant .: c. BIXERIC, DRY  
 + Thermic type.....: 1. INFRATROPICAL  
 + Thermic subtype.....: a. UPPER  
 + Ombrothermic type ...: 5. DRY  
 + Ombrothermic subtype : b. LOW  
 Bioclimatic Classification .....: Trxe(Bix).Itr.Dry

COTONOU (BENIN)

Latitude: 6°21'N Longitude: 2°23'E Altitude: 5 m

PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 378  
 Coldest semester of the year.....(Psw): 390  
 Warmest four months period of the year.....(Pcm1): 300  
 Following warmest four months period.....(Pcm2): 230  
 Positive precipitation dryest 3 months.....(Ppd): 79  
 Positive precipitation dryest 2 months.....(Ppd2): 46  
 Positive precipitation dryest 1 month.....(Ppd1): 13  
 Positive precipitation warmest 3 months.....(Pps): 274  
 Positive precipitation warmest 2 months.....(Pps2): 241  
 Positive precipitation warmest 1 month.....(Pps1): 117  
 Positive precipitation coldest 3 months.....(Ppw): 164  
 Positive precipitation coldest 2 months.....(Ppw2): 127  
 Positive precipitation coldest 1 month.....(Ppw1): 38

Seasons	Dec+Jan+Feb Ttr1-1	Mar+Apr+May Ttr2-2	Jun+Jul+Aug Ttr3-3	Sep+Oct+Nov Ttr4-4
Rainfall	78	266	163	259

Tropical rainfall rhythms: 2 > 4 > 3 > 1

COTONOU (BENIN)

Latitude: 6°21'N Longitude: 2°23'E Altitude: 5 m

TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 27.2  
 Average coldest month [T].....(Tmin): 23.9  
 Maximum temp. warmest month [M].....(Tmmax): 28.3  
 Minimum temp. coldest month [m].....(Tmmin): 22.8  
 Absolute Max.temp. warmest month [M'].....(Tamax): 35.0  
 Absolute Min.temp. coldest month [m'].....(Tamin): 18.3  
 First warmest contrasted month [M].....(Tcmax): 26.7 (1)  
 First coldest contrasted month [m].....(Tcmin): 23.3 (1)  
 Dry station temperature.....(Td): 772  
 Positive temperature dryest 3 months.....(Tpd): 772  
 Positive temperature dryest 2 months.....(Tpd2): 508  
 Positive temperature dryest 1 month.....(Tpd1): 258  
 Positive temperature warmest 3 months.....(Tps): 806  
 Positive temperature warmest 2 months.....(Tps2): 542  
 Positive temperature warmest 1 month.....(Tps1): 272  
 Positive temperature coldest 3 months.....(Tpw): 728  
 Positive temperature coldest 2 months.....(Tpw2): 483  
 Positive temperature coldest 1 month.....(Tpw1): 239

COTONOU (BENIN)

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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

COTONOU (BENIN)

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 1.88  
 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)	127	330	330	1168	1245	254	366	889	381	660	1346	584
Tp	258	250	264	272	270	258	245	245	239	245	253	261
Io (Iom)	0.49	1.32	1.25	4.29	4.62	0.98	1.50	3.64	1.59	2.70	5.32	2.24
Seasons	Dec+Jan+Feb			Mar+Apr+May			Jun+Jul+Aug			Sep+Oct+Nov		
Pp(x10)/Tp	787 / 772			2667 / 800			1636 / 728			2590 / 758		
Io (Iot)	1.019			3.334			2.248			3.415		
Semesters	December-May						June-November					
Pp(x10)/Tp	3454 / 1572						4226 / 1486					
Io (Iosm)	2.197						2.843					

COTONOU (BENIN)

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 7680/3059=2.51 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	127	330	330	1168	1245	254	366	889	381	660	1346	584
Tp [T*10]	258	250	264	272	270	258	245	245	239	245	253	261
Iom [Pp/Tp]	49	132	125	429	462	98	150	364	159	270	532	224
Avm [200-Iom]	151	68	75	***	***	102	50	***	41	***	***	***
Seasons	Dec+Jan+Feb			Mar+Apr+May			Jun+Jul+Aug			Sep+Oct+Nov		
Pp / Tp	787 / 772			2667 / 800			1636 / 728			2590 / 758		
Iot [Pp/Tp]	102			333			225			342		
Avs E[Avm<200]	294			***			***			***		
Strong lower arid [1]							Weak upper arid [1]					
Strong lower semiarid [1]							Weak lower semiarid [3]					
Strong 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] .....	30.78
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14] .....	6.11
+ Hyperoceanic (-20<CI<20)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....	1.07
+ Oceanic (0.6<CI<1.1)	
Rainfall Index of Lang (1925) [R=P/T] .....	30.13
+ Steppic (40>R>0)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....	21.64
+ Subhumid (30>Ia>20)	
I of Emberger (1930) [Q=100*P/(Tmax <sup>2</sup> -Tmin <sup>2</sup> )] .....	270.75
+ Humid (Q>90)	
I of Dantin & Revenga (1940) [DR=100*T/P] .....	3.32
+ Arid (6>DR>3)	
Aridity Index of UNEP [I=P/PE] .....	0.53
+ Subhumid - dry (0.65>I>0.5)	
Potential Erosion I of Fournier (1960) [K=Pi <sup>2</sup> /P] .....	23.59
+ Very low (K<60)	

COTONOU (BENIN)

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)  
 + Climate .....

- + Climate .....
- + Region .....
- + Thermic type: 1. Megathermic

Thornthwaite (1948)													
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
P-E ratio	0.11	0.10	0.42	0.45	0.08	0.12	0.33	0.13	0.24	0.51	0.20	0.04	
T-E ratio	11.25	11.88	12.25	12.13	11.62	11.00	11.00	10.75	11.00	11.38	11.75	11.62	
Precipitation-effectiveness:	27.18					Temperature-efficiency .....							137.63
Moisture Index [MI=100*(P-PE)/PE] .....													
+ D.Semiarid (-66.7<MI<-33.3)													
Index of dryness [DI=100*d/PE] .....													
+ Strong deficit (33.3<DI)													
Index of humidity [HI=100*s/PE] .....													
+ No surplus (0<HI<10)													
Potential Evapotranspiration PE .....													
+ Megathermic (PE>1440)													

