

Phytosociological Research Center

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Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 30/08/2017)

DUKEN (KAZAKHSTAN)

Altitude: 143 m.

Latitude: 44°24'N Longitude: 54°46'E

Temperature observation period.: 1952-1962 (11)

Rainfall observation period....: 1952-1962 (11)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	-7.80	-3.10	-11.40	6.00	-23.00	8.0	0.00
Feb.	-6.60	-1.30	-10.50	9.00	-22.00	14.0	0.00
Mar.	-0.20	6.10	-5.40	18.00	-17.00	12.0	0.00
Apr.	10.00	17.60	3.20	29.00	-5.00	18.0	40.95
May.	18.40	26.20	9.20	35.00	1.00	18.0	105.23
Jun.	24.00	31.50	14.50	38.00	6.00	15.0	152.67
Jul.	26.80	34.20	17.50	40.00	12.00	13.0	179.27
Aug.	25.20	33.10	16.00	41.00	9.00	3.0	151.63
Sep.	17.50	25.80	8.60	35.00	1.00	7.0	80.57
Oct.	8.40	16.80	1.20	27.00	-8.00	11.0	27.49
Nov.	1.00	5.70	-4.90	18.00	-17.00	11.0	1.33
Dec.	-5.10	-0.50	-9.00	9.00	-20.00	11.0	0.00
Year	9.30	16.01	2.42	25.42	-6.92	141	739.14

BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	-52
Compensated thermicity index.....(Itc):	233
Simple continentality index.....(Ic):	34.6
Diurnality index.....(Id):	17.2
Annual ombrothermic index.....(Io):	0.73
Monthly estival ombrothermic index.....(Ios1):	0.12
Bimonthly estival ombrothermic index.....(Ios2):	0.31
Threemonthly estival ombrothermic index.....(Ios3):	0.41
Fourmonthly estival ombrothermic index.....(Ios4):	0.52
Annual ombro-evaporation index.....(Ioe):	1.10
Annual positive temperature.....(Tp):	1313
Annual negative temperature.....(Tn):	197
Estival temperature.....(Ts):	760
Positive precipitation.....(Pp):	96

N. of	P>4T	P:2T-4T	PT-2T	P<T	T<0
Months	1	0	2	5	4

Latitudinal Belt...: High eutemperate

Continentalty.....: Continental - Low Eucontinental

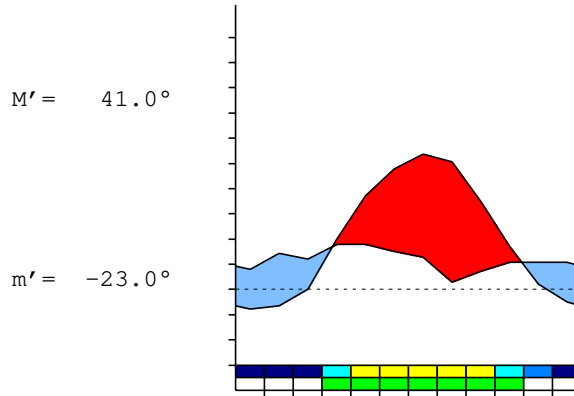
Bioclimate.....: MEDITERRANEAN DESERTIC-CONTINENTAL

Bioclimatic Belt...: LOW SUPRAMEDITERRANEAN UPPER ARID

DUKEN (KAZAKHSTAN)

143 m

P= 141 44° 24'N 54° 46'E 11/11 y.
 T= 9.3° Ic= 34.6 Tp= 1313 Tn= 197
 m= -11.4° M= -3.1° Itc= 233 Io= 0.7



MEDITERRANEAN DESERTIC-CONTINENTAL
 LOW SUPRAMEDITERRANEAN UPPER ARID

WATER INDEX CARD

DUKEN (KAZAKHSTAN)

Altitude: 143 m.

Latitude: 44° 24'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	-7.8	0	8	8	29	0	0	0	0	*
Feb.	-6.6	0	14	14	43	0	0	0	0	*
Mar.	-0.2	0	12	12	55	0	0	0	0	*
Apr.	10.0	41	18	-23	32	41	0	0	0	-0.5
May.	18.4	105	18	-32	0	50	56	0	0	-0.8
Jun.	24.0	153	15	0	0	15	138	0	0	-0.9
Jul.	26.8	179	13	0	0	13	166	0	0	-0.9
Aug.	25.2	152	3	0	0	3	149	0	0	-0.9
Sep.	17.5	81	7	0	0	7	74	0	0	-0.9
Oct.	8.4	27	11	0	0	11	16	0	0	-0.5
Nov.	1.0	1	11	10	10	1	0	0	0	7.2
Dec.	-5.1	0	11	11	21	0	0	0	0	*
Year	9.3	739	141	*	*	141	598	0	0	*

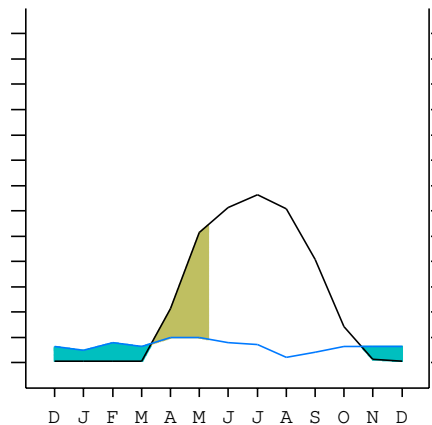
R = Reserve VR = Variation of the reserve RE = Real evapotranspiration
 DR = Drainage HC = Humidity coefficient DF = Deficit SP = Superavit

DUKEN (KAZAKHSTAN)

44°24'N 54°46'E 143 m 11/11 y.

T= 9.3 Ic= 34.6 MEDITERRANEAN DESERTIC-CONTINENTAL
 m= -11.4 Tp= 1313 LOW SUPRAMEDITERRANEAN
 M= -3.1 Tn= 197 UPPER ARID
 M' = 41.0 Itc= 233
 m' = -23.0 Io= 0.7
 P= 141 mm ———
 PE= 739 mm ———

Imbibing	19 Oct.
Saturation	11 Mar.
Reserve Use	11 May.
Deficit	



DUKEN (KAZAKHSTAN)

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SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [C3a]
 + Type: C. Continental
 + Subtype: 3. Eucontinental
 + Variant: a. Low

Thermic types [B1.B5]
 + Latitudinal zone: B. Temperate
 + Latitudinal belt: 1. High eutemperate
 + Thermic type: B. Temperate
 + Thermic subtype: 5. Subtemperate

Bioclimatic types [B3.4b.3a]
 + Macrobioclimate: B. MEDITERRANEAN
 + Bioclimate: 3. DESERTIC-CONTINENTAL
 + Bioclimatic variant ..:
 + Thermic type.....: 4. SUPRAMEDITERRANEAN
 + Thermic subtype.....: b. LOW
 + Ombrothermic type ...: 3. ARID
 + Ombrothermic subtype : a. UPPER

Bioclimatic Classification: Mexo.Sme.Ari

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 74
 Coldest semester of the year.....(Psw): 67
 Warmest four months period of the year.....(Pcm1): 49
 Following warmest four months period.....(Pcm2): 40
 Positive precipitation dryest 3 months.....(Ppd): 21
 Positive precipitation dryest 2 months.....(Ppd2): 10
 Positive precipitation dryest 1 month.....(Ppd1): 3
 Positive precipitation warmest 3 months.....(Pps): 31
 Positive precipitation warmest 2 months.....(Pps2): 16
 Positive precipitation warmest 1 month.....(Pps1): 13
 Positive precipitation coldest 3 months.....(Ppw): 0
 Positive precipitation coldest 2 months.....(Ppw2): 0
 Positive precipitation coldest 1 month.....(Ppw1): 0

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	33	48	31	29

Seasonal rainfall rhythms: P > W > S > F

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 26.8
 Average coldest month [T].....(Tmin): -7.8
 Maximum temp. warmest month [M].....(Tmmax): 34.2
 Minimum temp. coldest month [m].....(Tmmin): -11.4
 Absolute Max.temp. warmest month [M'].....(Tamax): 41.0
 Absolute Min.temp. coldest month [m'].....(Tamin): -23.0
 First warmest contrasted month [M].....(Tcmax): 25.8 (9)
 First coldest contrasted month [m].....(Tcmin): 8.6 (9)
 Estival temperature.....(Ts): 760
 Positive temperature dryest 3 months.....(Tpd): 511
 Positive temperature dryest 2 months.....(Tpd2): 427
 Positive temperature dryest 1 month.....(Tpd1): 252
 Positive temperature warmest 3 months.....(Tps): 760
 Positive temperature warmest 2 months.....(Tps2): 520
 Positive temperature warmest 1 month.....(Tps1): 268
 Positive temperature coldest 3 months.....(Tpw): 0
 Positive temperature coldest 2 months.....(Tpw2): 0
 Positive temperature coldest 1 month.....(Tpw1): 0

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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		
Ultragelid...[M' <=0] (Pf)												
Hypergelid...[M <=0] (Pf)	o	o										o
Gelid.....[T <=0] (Pf)	o	o	o									o
Subgelid.....[m <=0] (Pf)	o	o	o								o	o
Pregelid.....[m' <=0] (Pf)	o	o	o	o						o	o	o
Agelid.....[m' > 0] (Pf)					o	o	o	o	o			
HiperAgelid..[all>0] (Pf)					o	o	o	o	o			

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 5.24
 Mediterranean index of July.[PE/P].....(Im1): 13.79
 Mediterranean index of July & August.....(Im2): 20.68
 Mediterranean index of June, July & August....(Im3): 15.60

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	*	*	*	*	180	180	150	130	30	70	110	110
Tp	*	*	*	*	100	184	240	268	252	175	84	10
Io (Iom)	*	*	*	*	1.80	0.98	0.63	0.49	0.12	0.40	1.31	11.0
Seasons	Winter			Spring			Summer			Autumn		
Pp(x10)/Tp	*/*			*/*			310 / 760			290 / 269		
Io (Iot)	*			*			0.408			1.078		
Semesters	December-May						June-November					
Pp(x10)/Tp	*/*						600 / 1029					
Io (Iosm)	*						0.583					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 960/1313=0.73 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	*	*	*	*	180	180	150	130	30	70	110	110
Tp [T*10]	*	*	*	*	100	184	240	268	252	175	84	10
Iom [Pp/Tp]	!!	!!	!!	!!	180	98	63	49	12	40	131	\$\$
Avm [200-Iom]	***	***	***	***	20	102	138	151	188	160	69	***
Seasons	Winter			Spring			Summer			Autumn		
Pp / Tp	* / *			* / *			310 / 760			290 / 269		
Iot [Pp/Tp]	**			**			41			108		
Avs E[Avm<200]	***			122			477			***		
Upper ultrahyperarid [1]					Upper hyperarid [1]							
Strong lower arid [2]					Weak lower arid [1]							
Weak upper arid [1]					Weak lower semiarid [1]							
Strong upper semiarid [1]					Weak upper semiarid [1]							

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin]	(Sp):	34.60
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4]		63.67
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14]		58.34
+ Subcontinental (40<CI<60)		
CI of Currey (1974) [CI=Sp/(1+Lat/3)]		2.19
+ Continental (1.7<CI<2.3)		
Rainfall Index of Lang (1925) [R=P/T]		15.16
+ Steppic (40>R>0)		
Aridity Index of Martonne (1926) [Ia=P/(T+10)]		7.31
+ Arid -steppic- (15>Ia>5)		
I of Emberger (1930) [Q=100*P/(Tmax ² -Tmin ²)]		13.56
+ Arid (30>Q>0)		
I of Dantin & Revenga (1940) [DR=100*T/P]		6.60
+ Extremely arid (DR>6)		
Aridity Index of UNEP [I=P/PE]		0.19
+ Arid (0.2>Im>0.05)		
Potential Erosion I of Fournier (1960) [K=Pi ² /P]		2.30
+ Very low (K<60)		

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)
 + Climate

- + Climate
- + Region
- + Thermic type: 5. Meso-microthermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.06	0.10	0.08	0.08	0.06	0.05	0.04	0.01	0.02	0.05	0.07	0.08
T-E ratio	0.00	0.00	0.00	4.50	8.28	10.80	12.06	11.34	7.88	3.78	0.45	0.00
Precipitation-effectiveness: 6.96						Temperature-efficiency						59.08
Moisture Index [MI=100*(P-PE)/PE]												-80.92
+ E.Dry (-110<MI<-66.7)												
Index of dryness [DI=100*d/PE]												80.92
+ Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE]												0.00
+ No surplus (0<HI<10)												
Potential Evapotranspiration PE												739.14
+ Second mesothermic (712<PE<855)												

