

Phytosociological Research Center

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Worldwide Bioclimatic Classification System

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(Adapted to Synoptical Table 30/08/2017)

BALKHASH (KAZAKHSTAN)

Altitude: 423 m.

Latitude: 46°54'N Longitude: 75°0'E

Temperature observation period.: 1966-1994 (29)

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

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	-15.00	-11.11	-18.89	3.89	-46.11	7.4	0.00
Feb.	-13.34	-8.89	-17.78	7.78	-40.00	17.5	0.00
Mar.	-5.28	0.00	-10.56	23.89	-30.00	11.9	0.00
Apr.	7.50	13.33	1.67	27.78	-13.89	8.6	34.50
May.	15.83	22.22	9.44	33.89	-7.22	11.7	95.46
Jun.	21.39	27.78	15.00	41.11	1.11	9.7	138.53
Jul.	24.17	30.56	17.78	41.11	7.78	19.6	161.36
Aug.	21.95	28.33	15.56	38.89	2.78	8.6	132.03
Sep.	15.28	21.67	8.89	37.22	-5.00	10.2	73.93
Oct.	6.67	12.78	0.56	27.78	-20.00	11.4	24.49
Nov.	-3.06	1.67	-7.78	17.22	-32.78	11.9	0.00
Dec.	-11.95	-7.78	-16.11	7.22	-41.11	13.0	0.00
Year	5.35	10.88	-0.19	25.65	-18.70	142	660.30

BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	-247
Compensated thermicity index.....(Itc):	153
Simple continentality index.....(Ic):	39.2
Diurnality index.....(Id):	12.8
Annual ombrothermic index.....(Io):	0.71
Monthly estival ombrothermic index.....(Ios1):	0.39
Bimonthly estival ombrothermic index.....(Ios2):	0.61
Threemonthly estival ombrothermic index.....(Ios3):	0.56
Fourmonthly estival ombrothermic index.....(Ios4):	0.60
Annual ombro-evaporation index.....(Ioe):	0.94
Annual positive temperature.....(Tp):	1128
Annual negative temperature.....(Tn):	486
Estival temperature.....(Ts):	675
Positive precipitation.....(Pp):	80

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

Latitudinal Belt...: High eutemperate

Continentalty.....: Continental - High Eucontinental

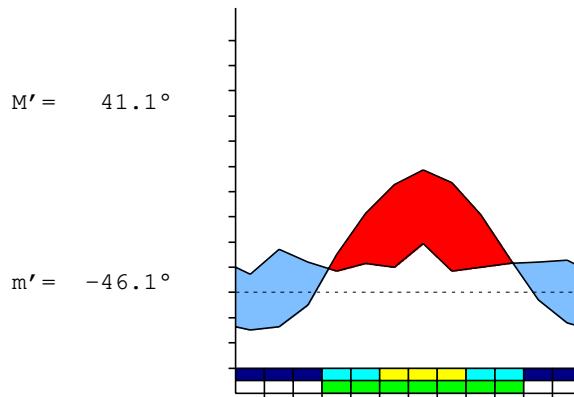
Bioclimate(Variant): MEDITERRANEAN DESERTIC-CONTINENTAL (STEPPIC)

Bioclimatic Belt...: UPPER SUPRAMEDITERRANEAN UPPER ARID

BALKHASH (KAZAKHSTAN)

423 m

P= 142 46° 54'N 75° 0'E 29/11 y.
 T= 5.3° Ic= 39.2 Tp= 1128 Tn= 486
 m= -18.9° M= -11.1° Itc= 153 Io= 0.7



MEDITERRANEAN DESERTIC-CONTINENTAL (STEPPIC)
 UPPER SUPRAMEDITERRANEAN UPPER ARID

WATER INDEX CARD BALKHASH (KAZAKHSTAN)
 Altitude: 423 m. Latitude: 46° 54'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	-15.0	0	7	7	32	0	0	0	0	*
Feb.	-13.3	0	18	18	50	0	0	0	0	*
Mar.	-5.3	0	12	12	62	0	0	0	0	*
Apr.	7.5	34	9	-26	36	34	0	0	0	-0.7
May.	15.8	95	12	-36	0	48	48	0	0	-0.8
Jun.	21.4	139	10	0	0	10	129	0	0	-0.9
Jul.	24.2	161	20	0	0	20	142	0	0	-0.8
Aug.	22.0	132	9	0	0	9	123	0	0	-0.9
Sep.	15.3	74	10	0	0	10	64	0	0	-0.8
Oct.	6.7	24	11	0	0	11	13	0	0	-0.5
Nov.	-3.1	0	12	12	12	0	0	0	0	*
Dec.	-11.9	0	13	13	25	0	0	0	0	*
Year	5.3	660	142	*	*	141	519	0	0	*

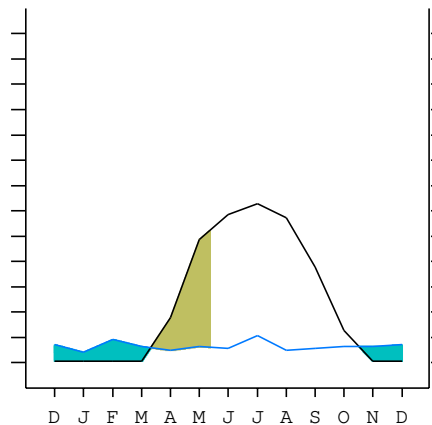
R = Reserve VR = Variation of the reserve RE = Real evapotranspiration
 DR = Drainage HC = Humidity coefficient DF = Deficit SP = Superavit

BALKHASH (KAZAKHSTAN)

46°54'N 75°0'E 423 m 29/11 y.

T= 5.3 Ic= 39.2 MEDITERRANEAN DESERTIC-CONTINENTAL (STEPPIC)
 m= -18.9 Tp= 1128 UPPER SUPRAMEDITERRANEAN
 M= -11.1 Tn= 486 UPPER ARID
 M' = 41.1 Itc= 153
 m' = -46.1 Io= 0.7
 P= 142 mm ———
 PE= 660 mm ———

Imbibing	16 Oct.
Saturation	10 Mar.
Reserve Use	13 May.
Deficit	



BALKHASH (KAZAKHSTAN)

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SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continental Index [C3b]
 + Type: C. Continental
 + Subtype: 3. Eucontinental
 + Variant: b. High
 Thermic types [B1.C6]
 + Latitudinal zone: B. Temperate
 + Latitudinal belt: 1. High eutemperate
 + Thermic type: C. Cold
 + Thermic subtype: 6. Cool
 Bioclimatic types [B3a.4a.3a]
 + Macrobioclimate: B. MEDITERRANEAN
 + Bioclimate: 3. DESERTIC-CONTINENTAL
 + Bioclimatic variant .: a. STEPPIC
 + Thermic type.....: 4. SUPRAMEDITERRANEAN
 + Thermic subtype.....: a. UPPER
 + Ombrothermic type ...: 3. ARID
 + Ombrothermic subtype : a. UPPER
 Bioclimatic Classification: Mexo (Stp) .Sme.Ari

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 68
 Coldest semester of the year.....(Psw): 73
 Warmest four months period of the year.....(Pcm1): 50
 Following warmest four months period.....(Pcm2): 47
 Positive precipitation dryest 3 months.....(Ppd): 30
 Positive precipitation dryest 2 months.....(Ppd2): 19
 Positive precipitation dryest 1 month.....(Ppd1): 0
 Positive precipitation warmest 3 months.....(Pps): 38
 Positive precipitation warmest 2 months.....(Pps2): 28
 Positive precipitation warmest 1 month.....(Pps1): 20
 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	37	32	37	33

Seasonal rainfall rhythms: W > S > F > P

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 24.2
 Average coldest month [T].....(Tmin): -15.0
 Maximum temp. warmest month [M].....(Tmmax): 30.6
 Minimum temp. coldest month [m].....(Tmmin): -18.9
 Absolute Max.temp. warmest month [M'].....(Tamax): 41.1
 Absolute Min.temp. coldest month [m'].....(Tamin): -46.1
 First warmest contrasted month [M].....(Tcmax): 22.2 (5)
 First coldest contrasted month [m].....(Tcmin): 9.4 (5)
 Estival temperature.....(Ts): 675
 Positive temperature dryest 3 months.....(Tpd): 447
 Positive temperature dryest 2 months.....(Tpd2): 372
 Positive temperature dryest 1 month.....(Tpd1): 0
 Positive temperature warmest 3 months.....(Tps): 675
 Positive temperature warmest 2 months.....(Tps2): 461
 Positive temperature warmest 1 month.....(Tps1): 242
 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									o
Gelid.....[T <=0] (Pf)	o	o	o								o	o
Subgelid.....[m <=0] (Pf)	o	o	o								o	o
Pregelid.....[m' <=0] (Pf)	o	o	o	o	o				o	o	o	o
Agelid.....[m' > 0] (Pf)						o	o	o				
HiperAgelid..[all>0] (Pf)						o	o	o				

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 4.67
 Mediterranean index of July.[PE/P].....(Im1): 8.23
 Mediterranean index of July & August.....(Im2): 10.40
 Mediterranean index of June, July & August....(Im3): 11.40

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	*	*	*	*	86	117	97	196	86	102	114	*
Tp	*	*	*	*	75	158	214	242	220	153	67	*
Io (Iom)	*	*	*	*	1.15	0.74	0.45	0.81	0.39	0.67	1.71	*
Seasons	Winter			Spring			Summer			Autumn		
Pp(x10)/Tp	*/*			*/*			379 / 675			*/*		
Io (Iot)	*			*			0.561			*		
Semesters	December-May						June-November					
Pp(x10)/Tp	*/*						*/*					
Io (Iosm)	*						*					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 798/1128=0.71 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	*	*	*	*	86	117	97	196	86	102	114	*
Tp [T*10]	*	*	*	*	75	158	214	242	220	153	67	*
Iom [Pp/Tp]	!!	!!	!!	!!	115	74	45	81	39	67	171	!!
Avm [200-Iom]	***	***	***	***	85	126	155	119	161	133	29	***
Seasons	Winter			Spring			Summer			Autumn		
Pp / Tp	* / *			* / *			379 / 675			* / *		
Iot [Pp/Tp]	**			**			56			**		
Avs E[Avm<200]	***			211			434			162		
Upper hyperarid [1]							Strong lower arid [1]					
Weak lower arid [2]							Strong upper arid [1]					
Weak upper arid [1]							Strong lower semiarid [1]					
Weak lower semiarid [2]							Weak upper semiarid [1]					

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin]	(Sp): 39.17
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4]	70.80
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14]	65.49
+ Continental (60<CI<80)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)]	2.35
+ Hypercontinental (2.3<CI<5)	
Rainfall Index of Lang (1925) [R=P/T]	26.47
+ Steppic (40>R>0)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)]	9.22
+ Arid -steppic- (15>Ia>5)	
I of Emberger (1930) [Q=100*P/(Tmax ² -Tmin ²)]	24.52
+ Arid (30>Q>0)	
I of Dantin & Revenga (1940) [DR=100*T/P]	3.78
+ Arid (6>DR>3)	
Aridity Index of UNEP [I=P/PE]	0.21
+ Semiarid (0.5>Im>0.2)	
Potential Erosion I of Fournier (1960) [K=Pi ² /P]	2.71
+ Very low (K<60)	

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)
 + Climate

- + Climate
- + Region
- + Thermic type: 6. Microthermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.05	0.13	0.09	0.04	0.04	0.03	0.06	0.03	0.04	0.06	0.09	0.09
T-E ratio	0.00	0.00	0.00	3.38	7.12	9.63	10.88	9.88	6.88	3.00	0.00	0.00
Precipitation-effectiveness: 7.44						Temperature-efficiency						50.76
Moisture Index [MI=100*(P-PE)/PE]												-78.57
+ E.Dry (-110<MI<-66.7)												
Index of dryness [DI=100*d/PE]												78.56
+ Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE]												0.00
+ No surplus (0<HI<10)												
Potential Evapotranspiration PE												660.30
+ First mesothermic (570<PE<712)												

