



**VERIFICATION OF THE SEECOF-20  
WINTER 2018-19 CLIMATE OUTLOOK  
AND  
SEASONAL BULLETIN  
FOR THE TERRITORY OF UKRAINE**

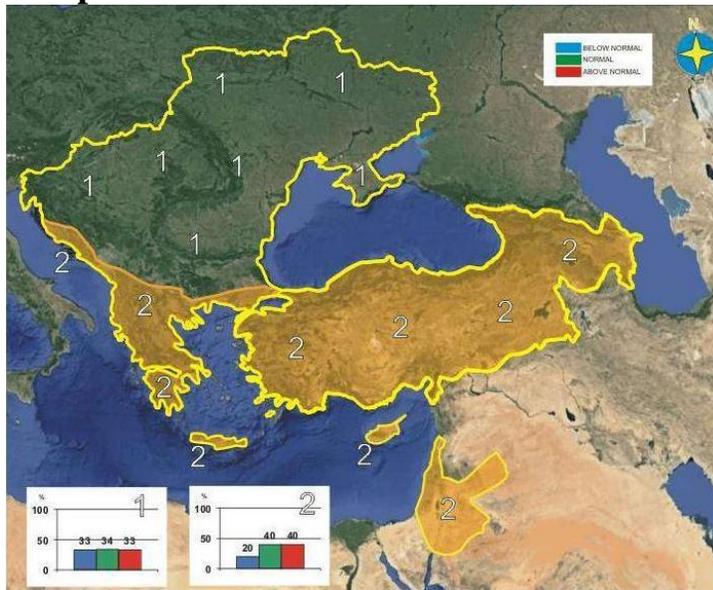
**Kyiv, 18 April 2019**

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# VERIFICATION OF THE SEECOF-20 WINTER 2018-19 CLIMATE OUTLOOK FOR THE TERRITORY OF UKRAINE (1981-2010 BASE PERIOD)

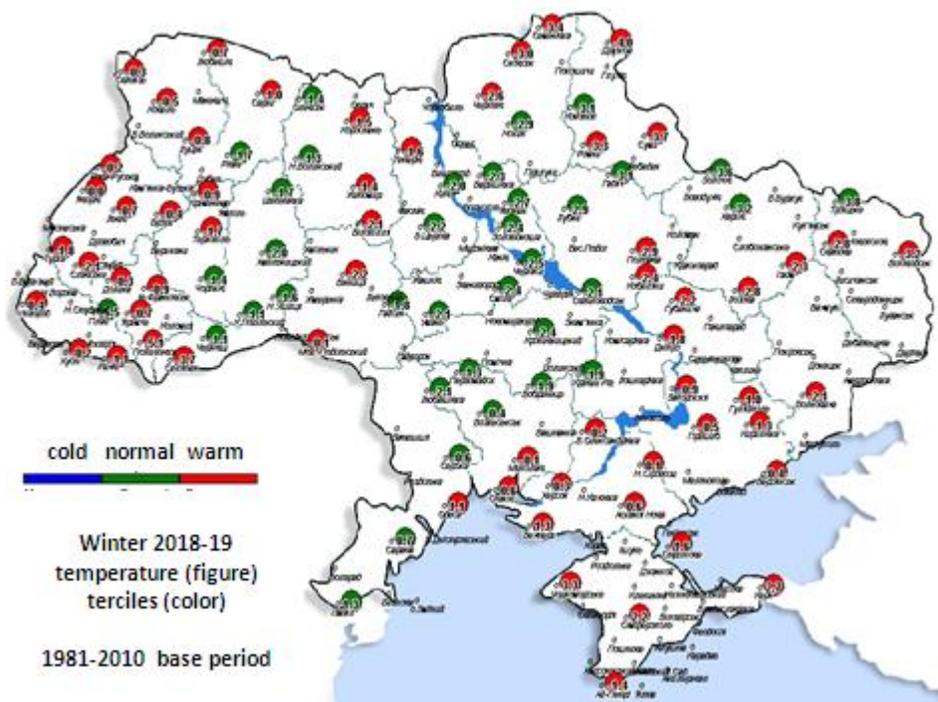
## Temperature



According to the SEECOF-20 outlook for the the winter 2018-19 in Ukraine, seasonal temperature was expected warmer (upper tercile), normal and below (low tercile) with equal probability (33, 34, 33%) compared to the 1981-2010 climatological base period.

Climatological monitoring showed that the the winter 2018-19 was warm and normal in Ukraine based on the tercile method (Figure 1.).

**Figure 1.**



**Note:** Tercile analysis of meteorological elements was performed on the basis of the data from 94 main meteorological stations.

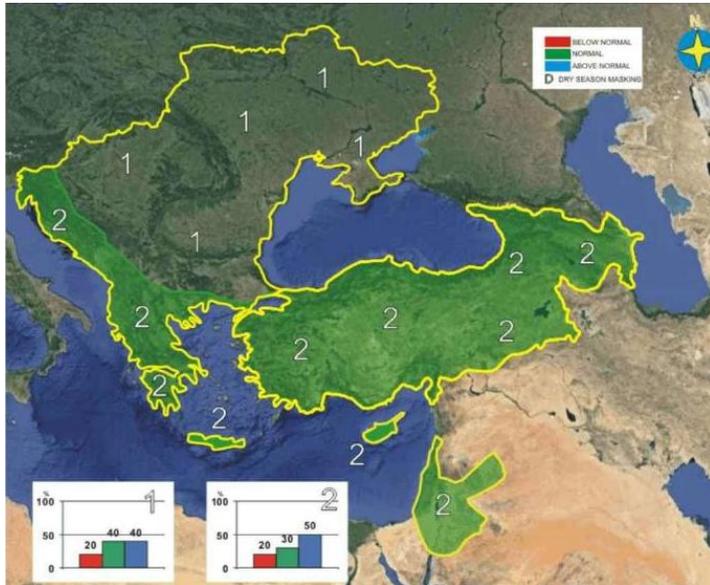
Winter 2018-19			Air Temperature (°C)				
synop		Station	Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	14	-3.0	-2.2	-1.4	-0.9
2	33889	Izmail	18	-0.4	0.4	1.4	1.3
3	34415	Izym	15	-4.2	-3.6	-2.8	-2.3
4	33998	Ai-Petri	12	-3.1	-2.6	-2.2	-1.4
5	99915	Askaniya Nova	10	-1.5	-0.9	0.0	0.6
6	33464	Bila Cerkva	18	-3.5	-2.8	-2.0	-2.2
7	34434	Bilovodsk	15	-5.4	-4.3	-3.6	-3.2
8	33446	Bilopillya	15	-3.7	-3.1	-2.2	-2.1
9	33354	Baryshyvka	17	-3.6	-2.7	-2.3	-2.3
10	34717	Berdiyansk	10	-1.8	-1.5	-0.9	0.4
11	33907	Behtery	14	-0.6	-0.2	0.8	1.3
12	33717	Bobryniec	20	-3.1	-2.6	-1.6	-1.9
13	33297	Brody	14	-2.2	-1.8	-0.8	-0.4
14	33862	V.Oleksandrivka.	13	-2.2	-1.3	-0.6	-0.2
15	33562	Vinnyca	16	-3.5	-3.3	-2.3	-2.2
16	33777	Voznesensk	17	-1.8	-1.4	-0.2	-0.4
17	34615	Volnovaha	14	-4.2	-3.7	-3.0	-2.1
18	33376	Hadyach	17	-4.4	-3.7	-3.1	-3.1
19	33577	Haisyn	16	-3.2	-2.8	-1.8	-1.8
20	34407	Hybinyha	16	-4.1	-3.4	-2.7	-2.2
21	34606	Hyliai Pole	11	-3.3	-2.5	-1.9	-1.0
22	34504	Dnipro	14	-3.6	-2.8	-2.4	-1.8
23	33524	Dolyna	13	-2.5	-1.5	-0.7	-0.3
24	33058	Dryzhba	15	-5.4	-4.5	-4.2	-4.0
25	33325	Zhitomyr	12	-3.4	-2.7	-1.9	-1.4
26	34601	Zaporizzhya	13	-2.5	-2.1	-1.3	-0.9
27	33484	Zolotonosha	19	-3.4	-2.5	-2.0	-2.4
28	34208	Zolochiv	17	-5.1	-4.4	-3.6	-3.6
29	33548	Kamyanec-Podilskiy	15	-3.1	-2.6	-1.1	-1.1
30	33983	Kerch	10	0.3	1.3	1.9	2.7
31	33345	<b>Kyiv</b>	18	-3.2	-2.4	-1.9	-2.0
32	34609	Kyrylivka	11	-3.9	-3.1	-2.4	-1.3

33	33621	Kobelyaky	17	-3.7	-2.8	-2.5	-2.4
34	33173	Kovel	13	-2.2	-1.6	-0.8	-0.5
35	33261	Konotop	16	-4.6	-3.7	-3.1	-3.1
36	33215	Korosten	11	-3.3	-2.4	-1.7	-1.5
37	33299	Kremenec	15	-2.4	-1.9	-1.0	-0.9
38	33791	Kryviy Rih	19	-3.3	-2.5	-1.8	-1.9
39	33711	Kropyvnutsky	21	-3.5	-2.9	-2.0	-2.4
40	34409	Lozova	16	-4.2	-3.9	-3.3	-2.8
41	33377	Lubnu	17	-4.0	-3.2	-2.9	-2.9
42	33187	Luck	12	-2.7	-2.1	-1.2	-0.8
43	33393	Lviv	12	-2.8	-2.2	-1.2	-0.7
44	33761	Liybashivka	23	-3.0	-2.4	-1.1	-2.1
45	33075	Lybeshiv	13	-2.4	-1.6	-0.9	-0.7
46	33846	Mykolaiv	14	-1.7	-1.1	-0.3	-0.1
47	33663	Mohyliv-Podilskiy	15	-2.1	-1.4	-0.2	-0.1
48	33312	Novohrad Volynskiy	14	-2.9	-2.3	-1.3	-1.3
49	33877	Nyzhni Sirohozy	11	-2.1	-1.5	-0.5	0.1
50	33557	Nova Ushica	15	-3.4	-2.8	-1.5	-1.6
51	33246	Nizhin	16	-4.1	-3.3	-2.8	-2.9
52	33837	Odesa	16	-0.4	0.1	1.0	1.1
53	33203	Olevsk	12	-3.1	-2.4	-1.4	-1.4
54	33848	Ochakiv	14	-1.2	-0.7	0.1	0.6
55	33699	Pervomaisk	18	-2.8	-2.1	-0.8	-1.3
56	33515	*Play	22	-6.5	-5.9	-5.3	-5.5
57	33646	Pozhezhevskya	20	-6.2	-5.6	-5.2	-5.1
58	33506	Poltava	16	-4.3	-3.4	-3.0	-2.9
59	33301	Rivne	14	-2.9	-2.3	-1.6	-1.7
60	33287	Rava-Ryska	12	-2.4	-1.6	-0.7	-0.2
61	33647	Rahiv	16	-2.8	-2.1	-1.7	-1.1
62	33268	Romny	15	-4.8	-3.9	-3.5	-3.3
63	33946	Simferopol	15	0.2	1.1	1.7	2.2
64	33896	Sarata	17	-0.9	-0.3	0.8	0.7
65	33088	Sarny	12	-2.8	-2.2	-1.2	-1.0
66	33614	Svitlovodsk	23	-3.0	-2.3	-1.7	-2.1
67	33067	Svityaz	13	-2.7	-1.5	-0.7	-0.3

68	34421	Svatove	14	-5.0	-4.0	-3.3	-2.8
69	33657	Selyatyn	16	-5.2	-4.8	-4.0	-3.7
70	33049	Semenivka	12	-4.9	-4.0	-3.6	-3.4
71	33833	Serbka	19	-1.9	-1.3	-0.3	-0.6
72	33516	Slavske	14	-4.4	-3.9	-2.7	-2.1
73	33593	Smila	20	-3.8	-2.7	-2.0	-2.4
74	33961	Strilcove	11	-0.6	0.2	1.0	1.6
75	33275	Symy	15	-5.1	-4.5	-3.8	-3.7
76	33415	Ternopil	13	-3.5	-2.9	-1.9	-1.7
77	33228	Teteriv	10	-3.3	-2.5	-1.7	-1.6
78	33511	Tyrka	16	-3.9	-3.4	-1.9	-1.8
79	33631	Uzhhorod	18	-1.7	-1.0	0.2	0.4
80	33587	Uman	18	-3.6	-2.8	-1.7	-2.1
81	34300	Kharkiv	17	-5.2	-3.9	-3.2	-3.2
82	33902	Kherson	14	-1.7	-0.8	0.1	0.3
83	33429	Khmelnitskiy	15	-3.7	-3.2	-1.8	-2.0
84	33638	Khyst	17	-2.5	-1.8	-0.3	-0.2
85	33487	Chercasy	20	-3.8	-2.7	-2.1	-2.5
86	33658	Chernivci	16	-2.8	-2.1	-0.8	-1.1
87	33135	Chernihiv	11	-4.3	-3.0	-2.9	-2.6
88	33924	Chornomorske	10	1.2	2.0	2.5	3.3
89	33536	Chortkiv	15	-3.3	-2.6	-1.4	-1.4
90	33317	Shepetivka	15	-3.3	-2.7	-1.7	-1.7
91	33136	Snovsk	13	-4,4	-3,4	-3,1	-3,0
92	33392	Yavoriv	10	-2.5	-1.9	-0.7	0.0
93	33356	Yahotyn	18	-3.9	-3.0	-2.6	-2.7
94	33645	Yaremche	16	-2.5	-2.0	-0.8	-0.7

Rank – 1961-2019 (warmest season), \*Play – rank 1981-2019

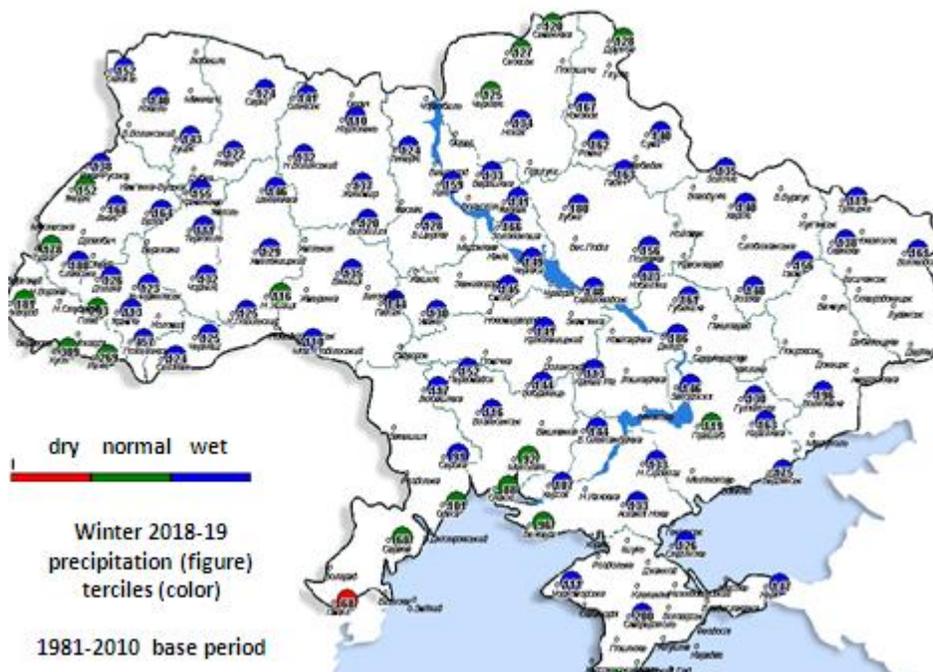
## Precipitation



The SEECOF–20 climate outlook indicated equal probabilities for below (33%), near (34%) and above (33%) normal conditions for the territory of Ukraine.

Monitoring of precipitation showed wet winter conditions across the country. (Figure 2). Most of the territory of Ukraine was in the wet range, normal conditions were fixed only in some places in the western, northern and southern part and one station fixed dry conditions (tercile method with 1981–2010 climatological base period).

**Figure 2.**



**Note:** Tercile analysis of meteorological elements was performed on the basis of the data from 94 main meteorological stations.

<b>Winter 2018-19</b>			<b>Precipitation (mm)</b>				
<b>synop</b>		<b>Station</b>	<b>Rank</b>	<b>33</b>	<b>50</b>	<b>66</b>	<b>Observed</b>
1	33526	Ivano-Frankivsk	13	83	91	104	123
2	33889	Izmail	43	73	84	97	68
3	34415	Izymb	20	123	137	150	156
4	33998	Ai-Petri	24	317	358	427	422
5	99915	Askaniya Nova	10	59	84	88	133
6	33464	Bila Cerkva	14	87	95	114	128
7	34434	Bilovodsk	15	104	115	139	161
8	33446	Bilopillya	11	80	99	103	120
9	33354	Baryshyvka	9	79	94	105	133
10	34717	Berdiyansk	12	108	116	135	175
11	33907	Behtery	25	75	84	96	96
12	33717	Bobryniec	15	77	95	115	144
13	33297	Brody	5	100	113	123	164
14	33862	V.Oleksandrivka.	9	72	89	125	144
15	33562	Vinnyca	12	77	88	103	135
16	33777	Voznesensk	23	64	91	109	116
17	34615	Volnovaha	10	121	139	153	196
18	33376	Hadyach	13	110	128	133	163
19	33577	Haisyn	14	88	97	107	144
20	34407	Hybinyha	10	105	118	126	161
21	34606	Hyliai Pole	17	89	116	125	130
22	34504	Dnipro	10	112	120	139	186
23	33524	Dolyna	20	90	102	118	126
24	33058	Dryzhba	28	112	121	148	128
25	33325	Zhitomyr	11	81	103	107	137
26	34601	Zaporizzhya	18	103	115	139	146
27	33484	Zolotonosha	10	94	104	117	166
28	34208	Zolochiv	22	101	116	133	135
29	33548	Kamyanec-Podilskiy	19	83	97	115	125
30	33983	Kerch	10	86	105	120	147
31	33345	Kyiv	12	110	119	127	159
32	34609	Kyrylivka	18	121	136	149	163

33	33621	Kobelyaky	8	88	113	127	173
34	33173	Kovel	9	92	103	120	140
35	33261	Konotop	11	100	115	125	167
36	33215	Korosten	23	85	99	102	110
37	33299	Kremenec	9	101	111	122	155
38	33791	Kryviy Rih	19	68	83	93	113
39	33711	Kropyvnutsky	10	76	82	101	141
40	34409	Lozova	13	108	118	130	148
41	33377	Lubnu	13	115	129	141	180
42	33187	Luck	4	70	83	95	143
43	33393	Lviv	12	113	120	145	168
44	33761	Liybashivka	23	74	87	107	117
45	33075	Lybeshiv	4	105	116	122	147
46	33846	Mykolaiv	33	68	88	109	92
47	33663	Mohyliv-Podilskiy	22	69	85	99	110
48	33312	Novohrad Volynskiy	27	106	119	131	132
49	33877	Nyzhni Sirohozy	11	74	82	100	133
50	33557	Nova Ushica	27	88	100	116	116
51	33246	Nizhin	21	105	118	127	134
52	33837	Odesa	35	81	102	120	101
53	33203	Olevsk	20	102	115	126	141
54	33848	Ochakiv	35	65	85	97	88
55	33699	Pervomaisk	13	81	106	113	152
56	33515	*Play	31	265	299	358	293
57	33646	Pozhezhevskya	7	208	227	251	457
58	33506	Poltava	14	93	118	126	156
59	33301	Rivne	12	73	80	92	122
60	33287	Rava-Ryska	16	95	112	120	138
61	33647	Rahiv	27	229	245	321	269
62	33268	Romny	14	90	122	135	162
63	33946	Simferopol	2	99	125	140	200
64	33896	Sarata	43	66	85	101	68
65	33088	Sarny	16	86	96	108	124
66	33614	Svitlovodsk	8	78	93	102	148
67	33067	Svityaz	7	89	96	108	152

68	34421	Svatove	22	100	119	133	138
69	33657	Selyatyn	13	78	90	102	124
70	33049	Semenivka	28	100	125	131	120
71	33833	Serbka	24	61	79	84	91
72	33516	Slavske	21	149	163	177	180
73	33593	Smila	13	83	105	113	145
74	33961	Strilcove	10	79	90	99	126
75	33275	Symy	15	85	106	116	140
76	33415	Ternopil	18	77	89	96	111
77	33228	Teteriv	22	97	109	118	124
78	33511	Tyrka	24	153	165	179	178
79	33631	Uzhhorod	30	159	187	203	181
80	33587	Uman	27	92	108	123	130
81	34300	Kharkiv	14	90	96	116	140
82	33902	Kherson	20	76	88	104	107
83	33429	Khmelnitskiy	15	86	102	112	129
84	33638	Khyst	24	259	277	325	309
85	33487	Chercasy	9	79	95	101	149
86	33658	Chernivci	11	69	86	91	125
87	33135	Chernihiv	27	97	120	128	125
88	33924	Chornomorske	19	68	76	93	111
89	33536	Chortkiv	16	90	102	117	132
90	33317	Shepetivka	13	107	111	125	146
91	33136	Snovsk	30	102	126	135	127
92	33392	Yavoriv	26	117	136	157	152
93	33356	Yahotyn	10	75	96	108	141
94	33645	Yaremche	24	93	109	110	113

Rank – 1961-2018 (Wettest season), \*Play – rank 1981-2018

## Assessment of the SEECOF-18 Climate outlook for winter 2018-19

Country	Seasonal Temperature (DJF)		Seasonal Precipitation (DJF)		High impact Events
	Observed	SEECOF-20 climate outlook	Observed	SEECOF-20 climate outlook	
Ukraine	<p style="text-align: center;"><b>above normal</b> (66% stations)</p> <p style="text-align: center;">and</p> <p style="text-align: center;"><b>normal</b> (34% stations)</p>	No predictive signal	<p style="text-align: center;"><b>above normal</b> (81% stations)</p> <p style="text-align: center;"><b>normal</b> (18% stations)</p> <p style="text-align: center;"><b>below normal</b> (1%)</p>	No predictive signal	<p>Meteorological extraordinary phenomenas were observed in <b>December 25<sup>th</sup></b> were recorded very heavy snowfalls (20-32 mm precipitation per 8-12 hours) and strong blizzard (for 12-15 hours with wind gust 17-21 m/c) in Poltava, Kharkiv, Kropivnytsky, Dnipro regions, in Odessa was fixed strong wind (gust 26 m/c). <b>In January</b> extraordinary phenomenas very heavy snowfalls (20-28 mm precipitation per 12 hours and strong wind 28 m/c) were fixed in Carpathian mountains only locally (not on territories but by separate stations).</p> <p>Unfavorable weather conditions caused loss power, telecommunications, utilities and transport.</p>

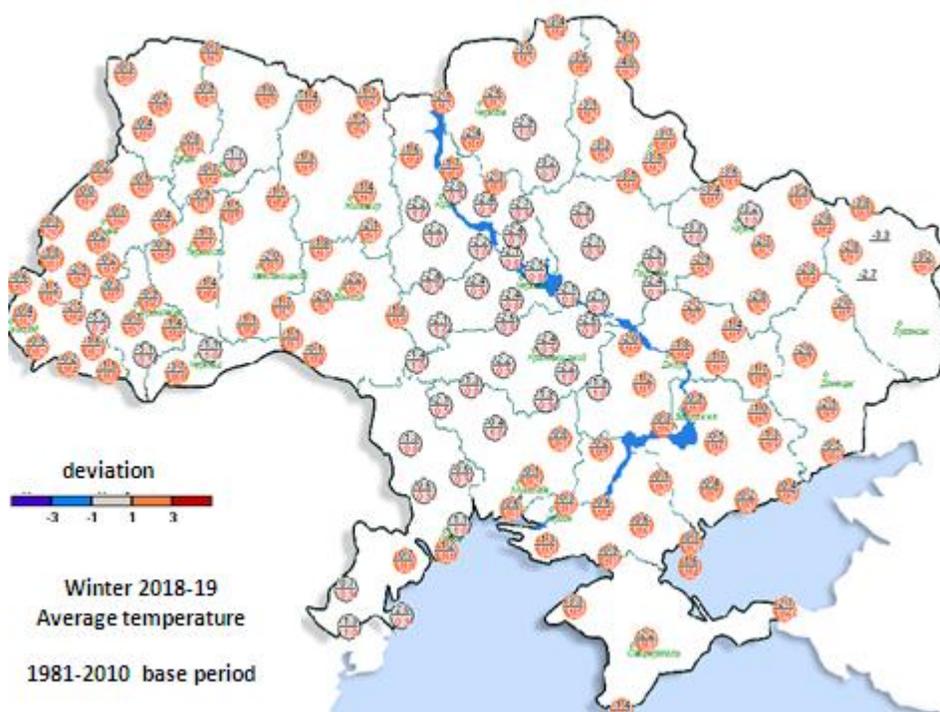
# Analysis of the winter season 2018-19 for Ukraine compared to the 1981-2010 base period

## Temperature

The average air temperature during winter 2018-19 was in the range from  $-4.0^{\circ}\text{C}$  in the northeast to  $+1.3^{\circ}\text{C}$  in the southwest of Ukraine, in Crimea was  $+2.2 \dots +3.3^{\circ}\text{C}$  and on highlands of the Carpathian mountains was  $-5.1 \dots -5.5^{\circ}\text{C}$ .

Deviations the mean air winter temperature from average values of the 1981-2010 base period were  $+1.1 \dots +1.9^{\circ}\text{C}$ , in the Carpathian mountains (highlands) and in the central part were deviations  $+0.4 \dots +1.0^{\circ}\text{C}$  (Figure.1).

**Figure 1.**



**Note:** Climatological analysis of meteorological elements was performed on the basis of the data from 163 meteorological stations.

From month to month average temperature deviation was inhomogeneous compared to the average values of the 1981-2010 base period.

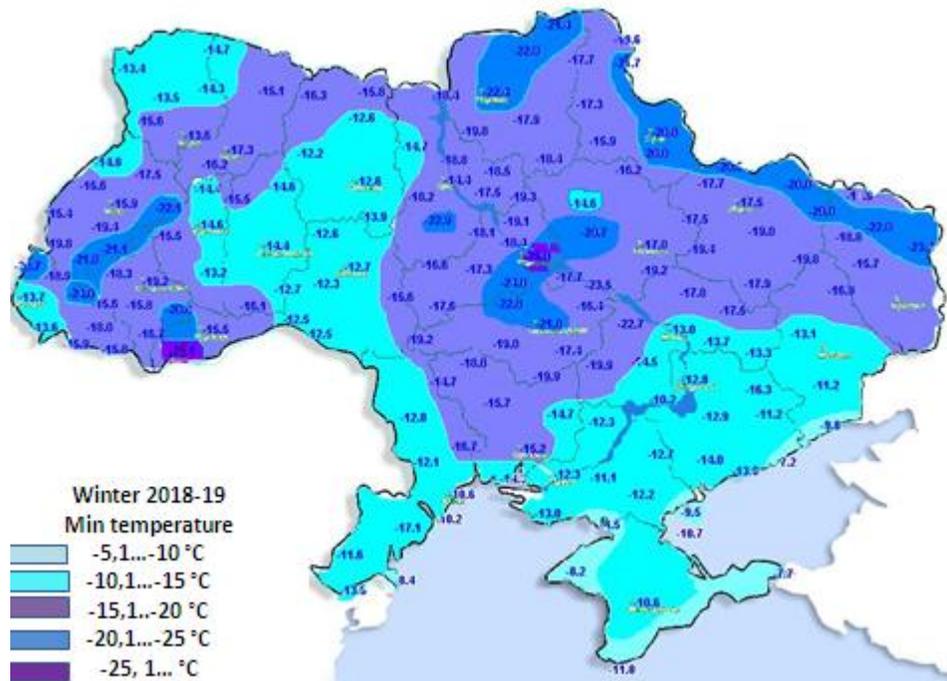
**In December** the temperature conditions were close to the average values across the country with deviations in the range  $-0.7 \dots +1.0^{\circ}\text{C}$ , only in the west were slight warm conditions with deviations  $+1.1 \dots +1.8^{\circ}\text{C}$ .

**In January** the temperature conditions were close to the average values across the country with deviations in the range  $-1.5 \dots +1.5^{\circ}\text{C}$ , only in the southeast (including the Crimea) were slight warm conditions with deviations  $+1.6 \dots +2.2^{\circ}\text{C}$ .

**February** was **anomaly warm** with deviations  $+3 \dots +4.6^{\circ}\text{C}$  for most of the territory of Ukraine, only in the Carpathian mountains and in some places southern and eastern parts were warm conditions with deviations  $+1.8 \dots +3.0^{\circ}\text{C}$ .

The minimum temperature ranged from  $-25.8^{\circ}\text{C}$  in Cherkasy region (center of the country) to  $-7.2^{\circ}\text{C}$  on the coast of the Azov sea (southeast). In the Carpathian mountains minimum temperature was  $-25.3^{\circ}\text{C}$ . (Figure 2)

**Figure 2.**



The lowest air temperature during winter 2018-19, measuring  $-25,8^{\circ}\text{C}$  was observed on 22<sup>th</sup> of Jenuary in Cherkasy, also measuring  $-25,3^{\circ}\text{C}$  was fixed on 8<sup>th</sup> of Jenuary in Selyatyn in Carpathian mountains.

Winter 2018-19 was not cold and the minimum temperatures were mostly in the range  $-10 \dots -18^{\circ}\text{C}$ , only on separate days in some places it was declined to  $-20 \dots -25^{\circ}\text{C}$ .

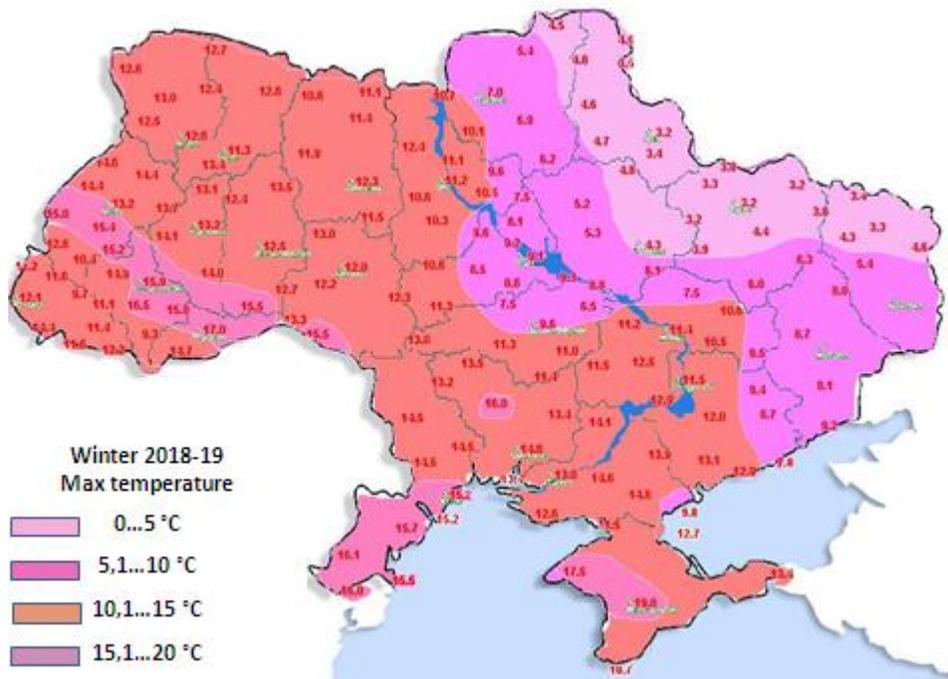
Absolute minimum winter temperatures recorded in the history of observations are  $-27 \dots -42^{\circ}\text{C}$ , in the south of country and Transcarpathia region  $-23 \dots -34^{\circ}\text{C}$ .

The lowest temperatures in winter seasons have been recorded since 2000 are  $-23 \dots -35^{\circ}\text{C}$ , in the south of country and Transcarpathia region  $-23 \dots -34^{\circ}\text{C}$ .

In most regions (west, north, center and east) there is an increase in the minimum temperatures but in the south and Transcarpathian region, the minimum temperatures do not rise like this on the rest of Ukraine.

Maximum temperature was in the range from +3.0°C in Kharkiv region (northeast) to +17.0°C in Chernivtsi (west) and to +19.0°C in the Crimea (south). In Carpathian mountains (highlands) +9.3...+9.7°C (Figure 3).

**Figure 3.**



The highest daily air temperature during the winter 2018-19, measuring +19,0°C was observed on 4<sup>th</sup> of February in Simferopol in the Crimea and 17.0°C on 17<sup>th</sup> of February in Chernivtsi.

**February** was warmest month in the winter season 2018-19.

Absolute maximum winter temperatures recorded in the history of observations are +10...+18°C, in the south and west part of Ukraine +19..+24°C.

### **Precipitation**

In the winter 2018-19 were dominated wet and normal conditions (90..177% of the norm), but in the western and southwestern parts was separate stations had some dry conditions (60...75%) compared to the average values of the 1981-2010 base period (Figure.4).

**Figure 4.**



Seasonal precipitation was ranged from 62 mm (60% of the norm) in the Odessa region (Vylkove) to 457 mm (177%) in the Carpathian region (Pozhezhevskya) (Figure 4).

The biggest daily precipitation was recorded in Pozhezhevskya (Carpathian) – 40 mm on 18<sup>th</sup> of January.

From month to month the winter precipitation was not homogeneous.

**December** and **January** was wet on most areas, the month precipitation were 100...273% of norm, except Odesa region where in December were dry conditions 44...76%.

**In February** were dry conditions on most areas (20...75%) and in some places in the eastern part were very dry (1..15%).

Winter 2018-19 was snowy on the territory of Ukraine. Maximum snow depth was 50...69 cm in Poltava region, in separate places in Cherkasy, Kirovograd regions and Carpathian mountains, in Crimea mountains (highlands) was 71 cm (Figure 5.).

The number of days with snow cover during the winter period was different across the country. Most days with snow cover were in the northern, central, eastern and Carpathian regions of Ukraine 70..90 days, in some places 100..112 days. In the southern part were 10..40 days. The winter lasted from the middle of November to the end of February.

Figure 5.



# Analysis of the winter season 2018-19 for Ukraine compared to the 1961-1990 base period

## Temperature

Deviations of the mean air temperature were +1.5..2.8°C above the climate norm (1961-1990) (Figure 1).

**Figure 1.**

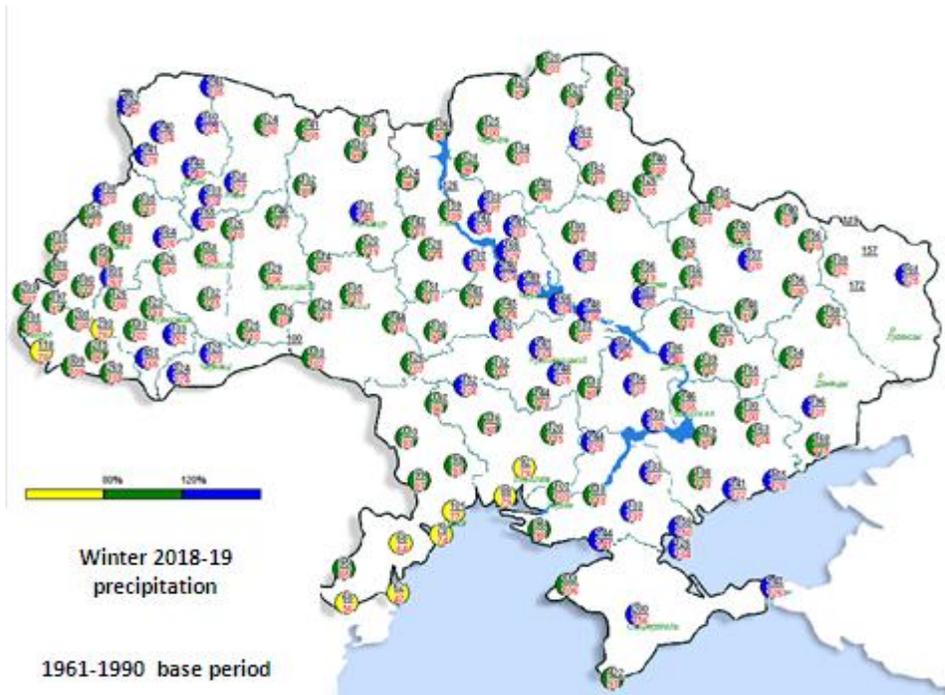


According to the tercile method (with 1961–1990 climatological norm), mean air temperature in the winter 2018-19 was in the warm category.

## Precipitation

Most stations recorded normal and excess moisture (100...166%) compared to the 1961-1990 climate norm, but in the western and southeastern part were places with some dry conditions (50...80%) (Figure 2).

**Figure 2.**



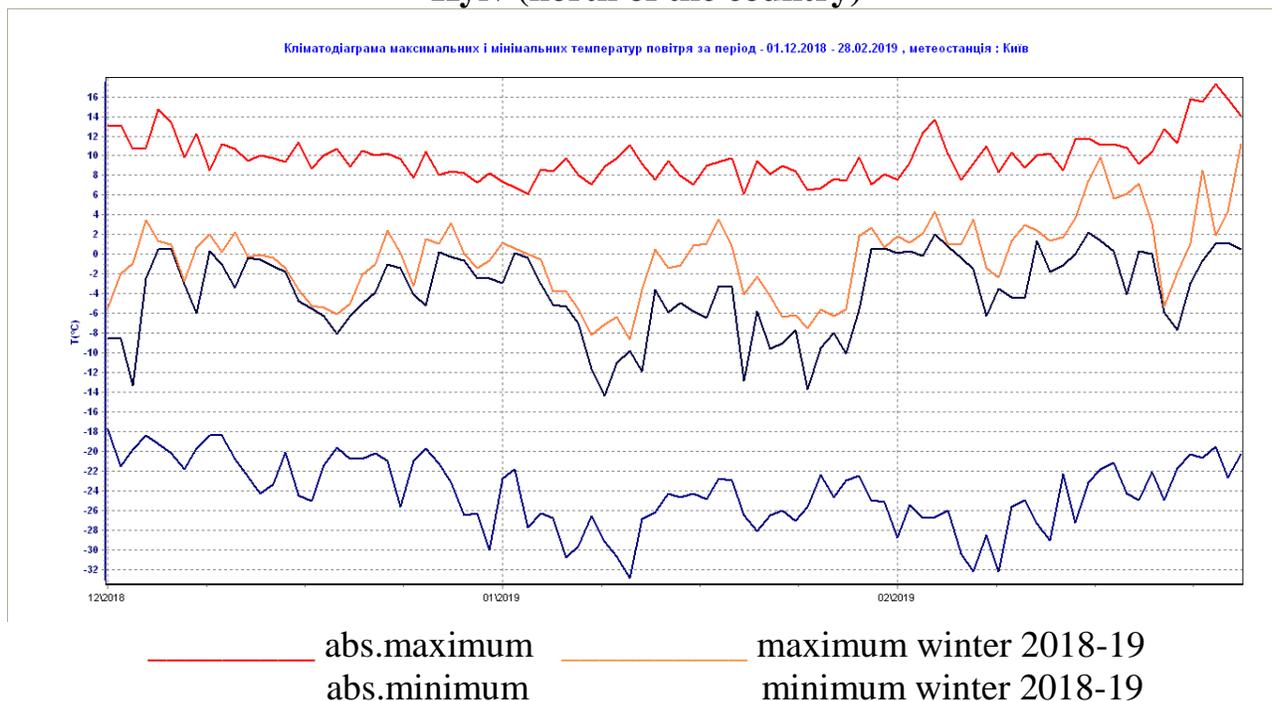
According to the tercile method (with 1961–1990 climatological norm), winter 2018-19 precipitation were in the normal and wet category.

During the winter 2018-19 maximum and minimum daily temperatures at most stations of Ukraine remained in the range of recorded daily absolute temperatures (min...max).

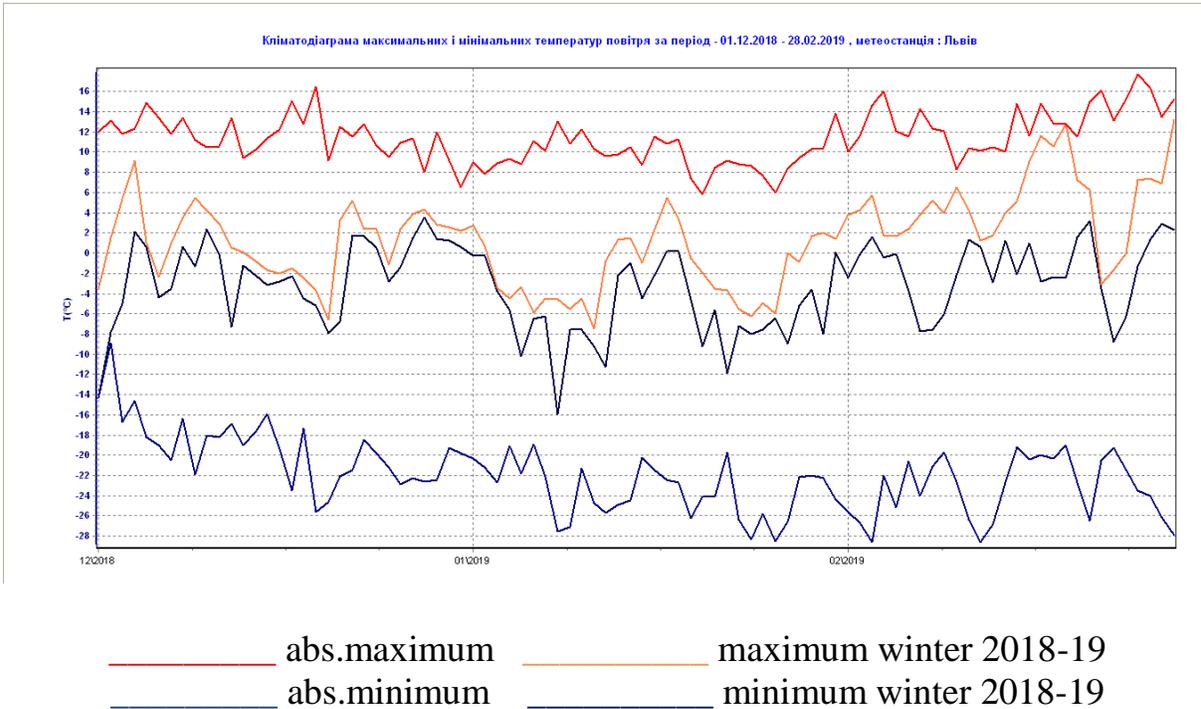
Only on separate days the maximum temperatures approached and reached fixed absolute values.

Graphs with minimum and maximum temperatures for selected cities listed below (Figure. 3, 4, 5, 6, 7).

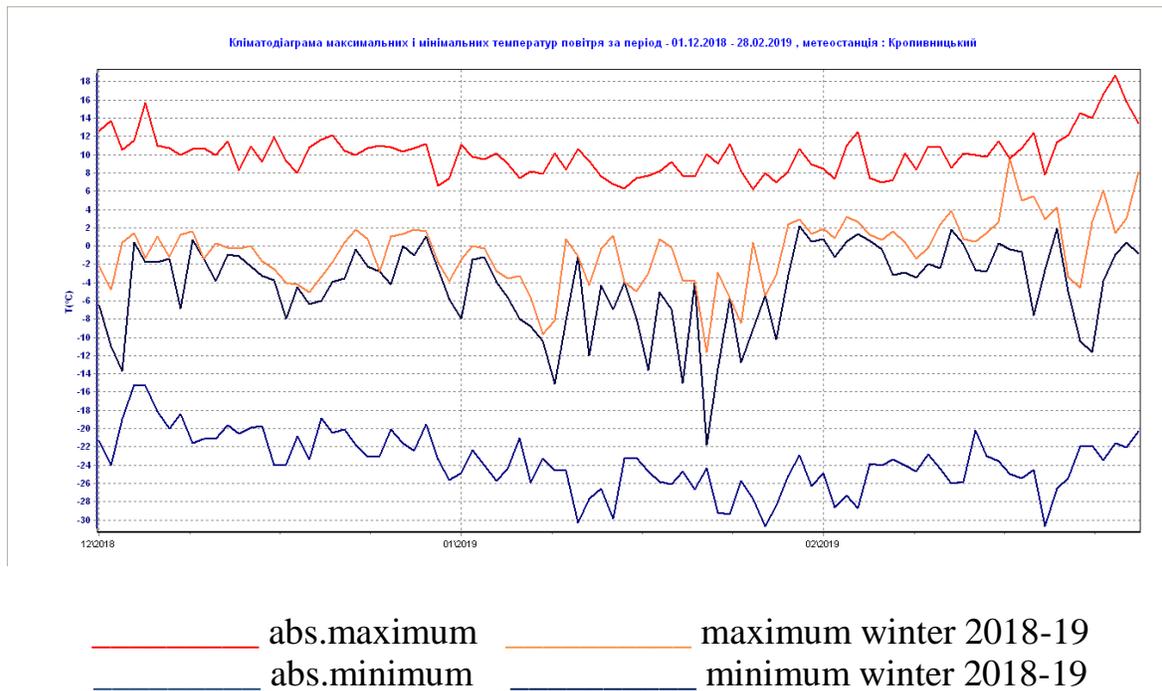
**Figure 3. Maximum and minimum temperature in the winter 2018-19 Kyiv (north of the country)**



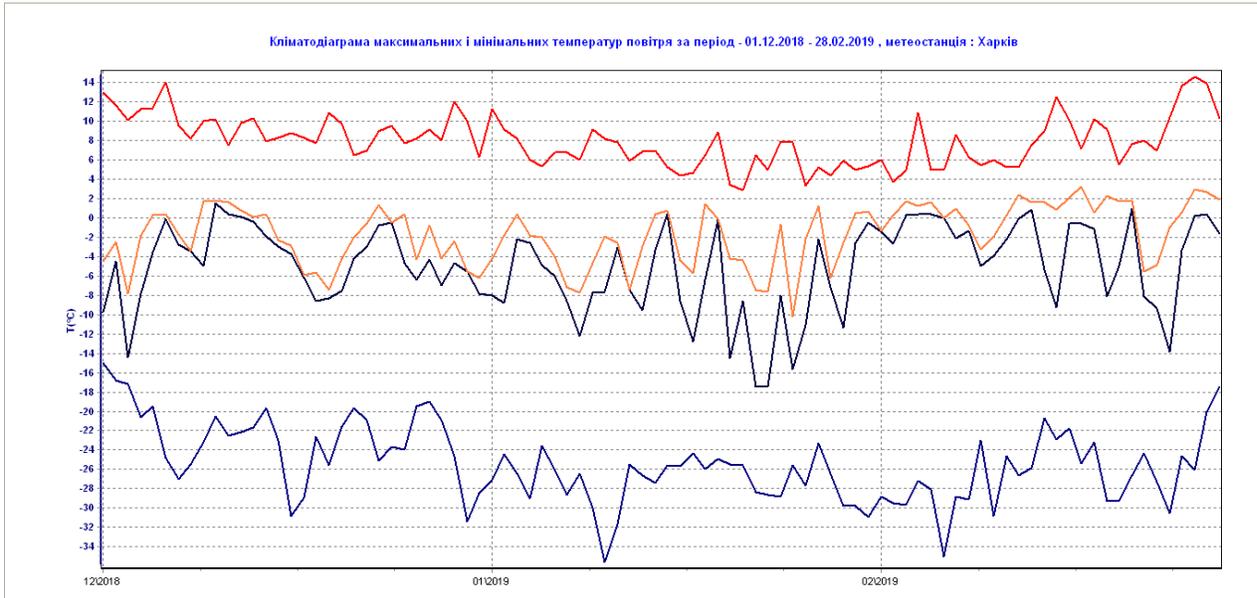
**Figure 4. Maximum and minimum temperature in the winter 2018-19  
L'viv (west of the country)**



**Figure 5. Maximum and minimum temperature in the winter 2018-19  
Kropivnytsky (center of the country)**

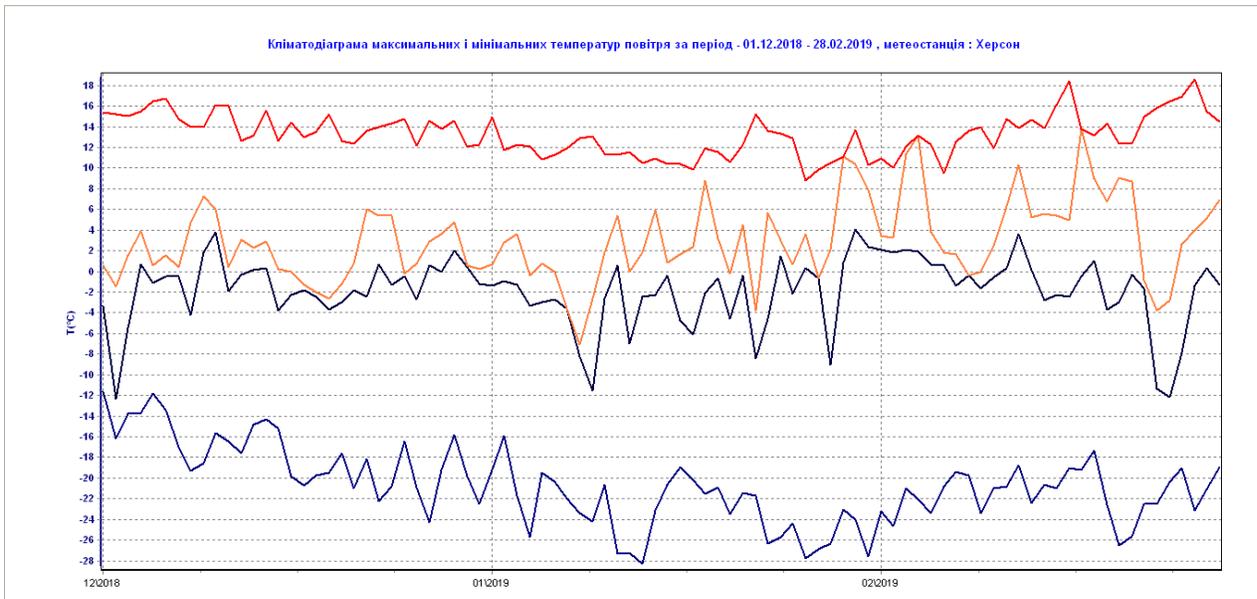


**Figure 6. Maximum and minimum temperature in the winter 2018-19  
Kharkiv (east of the country)**



— abs.maximum      — maximum winter 2018-19  
— abs.minimum      — minimum winter 2018-19

**Figure 7. Maximum and minimum temperature in the winter 2018-19  
Kherson (south of the country)**



— abs.maximum      — maximum winter 2018-19  
— abs.minimum      — minimum winter 2018-19