VERIFICATION OF THE SEECOF–19 SUMMER 2018 CLIMATE OUTLOOK AND SEASONAL BULLETIN FOR THE TERRITORY OF UKRAINE

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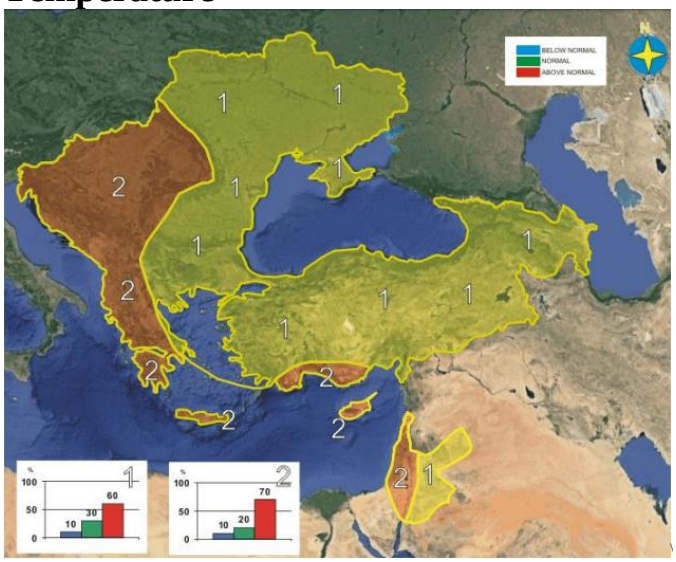
VERIFICATION OF THE SEECOF–19 SUMMER 2018 CLIMATE OUTLOOK FOR THE TERRITORY OF UKRAINE COMPARED TO THE 1981–2010 BASE PERIOD

Temperature



According to the SEECOF-19 outlook for the summer 2018 in Ukraine, seasonal temperature was expected warmer (upper tercile) whith 60% probability, normal whith 30% and below (low tercile) with 10% probability, compared to the 1981–2010 climatological base period.

Climatological monitoring showed that the the summer 2018 was warm in Ukraine with above normal temperature based on the tercile method (Figure 1).

Verification showed that the temperature reached upper tercile which was indicated in the outlook with the 60% probability.

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

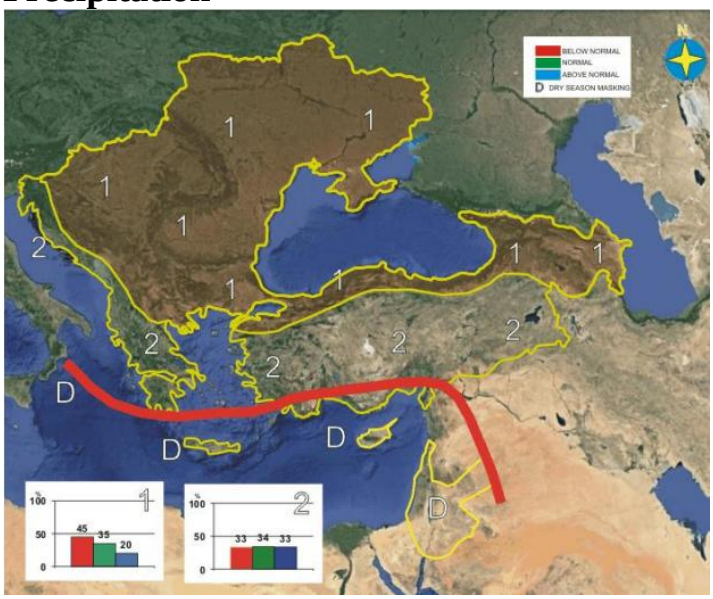
Summer 2018			Air Temperature (°C)				
synop		Station	Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	5	17.6	18.1	18.3	19.4
2	33889	Izmail	4	21.5	21.9	22.5	23.4
3	34415	Izym	7	19.7	20.5	20.9	22.0
4	33998	Ai-Petri	4	14.4	15.1	15.5	17.2
5	99915	Askaniya Nova	4	21.6	21.9	22.5	23.9
6	33464	Bila Cerkva	2	18.5	18.8	19.6	20.7
7	34434	Bilovodsk	13	19.6	20.3	20.8	21.3
8	33446	Bilopillya	4	18.1	18.4	18.7	20.3
9	33354	Baryshyvka	5	18.6	19.0	19.1	20.5
10	34717	Berdiyansk	4	22.3	23.1	23.6	**24.9**
11	33907	Behtery	3	21.5	22.0	22.5	24.0
12	33717	Bobrynec	5	20.2	20.9	21.0	22.5
13	33297	Brody	4	17.5	17.9	18.3	19.5
14	33862	V.Oleksandrivka.	4	21.1	21.6	22.1	23.9
15	33562	Vinnyca	6	18.0	18.3	18.6	20.1
16	33777	Voznesensk	4	21.5	21.8	22.1	23.9
17	34615	Volnovaha	4	19.8	20.9	21.5	23.2
18	33376	Hadyach	7	18.8	19.4	20.0	21.1
19	33577	Haisyn	5	18.9	19.1	19.4	21.1
20	34407	Hybinyha	6	19.5	20.6	21.2	22.2
21	34606	Hylyai Pole	7	19.9	20.9	21.4	22.8
22	34504	Dnipro	7	20.1	21.2	21.8	22.5
23	33524	Dolyna	7	16.7	17.4	17.9	18.6
24	33058	Dryzhba	10	17.6	18.1	18.3	19.2
25	33325	Zhitomyr	3	17.9	18.1	18.8	20.6
26	34601	Zaporizzhya	5	20.8	21.6	22.0	23.8
27	33484	Zolotonosha	6	19.4	19.8	20.2	21.4
28	34208	Zolochiv	8	18.7	19.4	19.9	20.8
29	33548	Kamyanec-Podilskiy	5	18.4	18.9	19.2	20.5
30	33983	Kerch	2	21.5	22.3	22.7	**24.9**
31	33345	Kyiv	3	19.1	19.5	19.8	21.5

32	34609	Kyrylivka	3	19.4	20.5	21.0	22.8
33	33621	Kobelyaky	7	19.7	20.8	21.2	22.3
34	33173	Kovel	3	17.7	18.0	18.5	19.8
35	33261	Konotop	6	18.6	19.1	19.5	20.5
36	33215	Korosten	5	17.9	18.2	18.4	19.9
37	33299	Kremenec	4	17.7	17.9	18.4	19.7
38	33791	Kryviy Rih	6	20.4	20.9	21.1	23.1
39	33711	Kropyvnutsky	4	19.5	20.2	20.4	22.1
40	34409	Lozova	7	19.6	20.4	21.1	22.1
41	33377	Lubnu	6	19.2	19.8	20.1	21.2
42	33187	Luck	2	17.7	18.0	18.5	20.1
43	33393	Lviv	4	17.0	17.4	18.0	19.1
44	33761	Liybashivka	6	19.9	20.2	20.5	21.9
45	33075	Lybeshiv	3	17.6	18.0	18.2	19.7
46	33846	Mykolaiv	4	21.7	22.3	22.6	23.9
47	33663	Mohyliv-Podilskiy	8	19.5	19.9	20.2	21.5
48	33312	Novohrad Volynskiy	3	17.7	18.1	18.4	20.2
49	33877	Nyzhni Sirohozy	5	21.1	21.8	22.3	23.8
50	33557	Nova Ushica	7	18.0	18.5	18.9	20.2
51	33246	Nizhin	4	18.3	18.7	19.1	20.3
52	33837	Odesa	4	21.3	21.6	21.8	23.7
53	33203	Olevsk	4	17.6	17.8	18.1	19.5
54	33848	Ochakiv	4	21.4	21.8	22.0	23.9
55	33699	Pervomaisk	4	20.4	20.9	21.1	23.0
56	33515	*Play	4	11.1	11.5	12.2	13.7
57	33646	Pozhezhevska	6	11.1	11.6	12.0	**13.3**
58	33506	Poltava	6	19.2	20.1	20.6	21.8
59	33301	Rivne	3	17.5	17.8	18.3	19.8
60	33287	Rava-Ryska	3	17.2	17.6	18.1	19.4
61	33647	Rahiv	2	16.8	17.4	17.7	19.0
62	33268	Romny	7	18.6	19.1	19.4	20.4
63	33946	Simferopol	4	20.6	21.4	21.6	23.5
64	33896	Sarata	6	21.0	21.7	22.0	22.9
65	33088	Sarny	4	17.9	18.2	18.5	20.1
66	33614	Svitlovodsk	4	20.4	21.0	21.3	22.7

67	33067	Svityaz	2	17.8	18.0	18.7	20.1
68	34421	Svatove	9	19.7	20.3	21.0	21.7
69	33657	Selyatyn	4	14.4	14.9	15.2	16.4
70	33049	Semenivka	9	17.8	18.2	18.5	19.3
71	33833	Serbka	4	21.2	21.5	21.8	23.5
72	33516	Slavske	**1**	14.7	15.3	15.5	**17.0**
73	33593	Smila	7	19.2	19.9	20.2	21.3
74	33961	Strilcove	4	22.0	22.6	23.0	24.5
75	33275	Symy	4	18.4	19.0	19.4	20.7
76	33415	Ternopil	5	17.2	17.5	18.1	19.4
77	33228	Teteriv	5	18.5	18.7	19.0	20.6
78	33511	Tyrka	3	15.1	15.6	15.9	17.0
79	33631	Uzhhorod	4	19.5	19.9	20.2	21.7
80	33587	Uman	5	18.8	19.1	19.4	21.0
81	34300	Kharkiv	5	19.4	20.1	20.7	22.1
82	33902	Kherson	4	21.6	21.9	22.3	24.2
83	33429	Khmelnitskiy	5	17.6	17.9	18.2	19.7
84	33638	Khyst	3	19.0	19.4	19.9	21.2
85	33487	Chercasy	6	19.1	19.7	20.0	21.3
86	33658	Chernivci	6	18.6	18.9	19.4	20.5
87	33135	Chernihiv	9	18.4	18.8	19.0	20.0
88	33924	Chornomorske	4	21.4	21.8	22.2	23.4
89	33536	Chortkiv	5	17.8	18.1	18.6	19.8
90	33317	Shepetivka	6	17.5	17.8	18.3	19.5
91	33136	Snovsk	5	18.3	18.7	19.0	20.2
92	33392	Yavoriv	5	17.5	17.8	18.4	19.4
93	33356	Yahotyn	5	19.0	19.4	19.6	21.1
94	33645	Yaremche	6	16.0	16.5	16.7	18.0

Rank – 1961-2018 (warmest season), *Play – rank 1981-2017

Precipitation



The SEECOF–19 climate outlook indicated probabilities for below (45%), near (35%) and above (20%) normal precipitation for all Ukraine.

Monitoring of precipitation showed unequal distribution dry, normal and wet summer conditions across the country. Most of the territory of Ukraine was in a dry range 38% of stations, nomal conditions were on 33% of stations and wet conditions were fixed by 26% of stations based on the tercile method with 1981–2010 climatological base period (Figure 2).

In the western part of the country were prevailed the normal and wet conditions. On the rest of the territory were dominated dry conditions with separate cells of the norm and above norm precipitation and sesonal forecast was more corected for this part of the country.

Summer 2017			Precipitation (mm)				
synop		Station	Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	31	215	236	283	264
2	33889	Izmail	18	112	125	143	114
3	34415	Izym	4	138	154	169	67
4	33998	Ai-Petri	55	138	153	212	316
5	99915	Askaniya Nova	**1**	94	109	149	**49**
6	33464	Bila Cerkva	30	189	219	230	210
7	34434	Bilovodsk	46	114	133	153	179
8	33446	Bilopillya	40	210	220	253	263
9	33354	Baryshyvka	27	195	224	262	192
10	34717	Berdiyansk	16	81	96	132	81
11	33907	Behtery	34	68	83	117	103
12	33717	Bobrynec	38	151	182	198	189
13	33297	Brody	37	209	242	290	287
14	33862	V.Oleksandrivka.	26	131	154	169	135
15	33562	Vinnyca	45	201	221	273	295
16	33777	Voznesensk	6	152	170	189	114
17	34615	Volnovaha	16	121	143	175	109
18	33376	Hadyach	28	161	174	207	181
19	33577	Haisyn	39	183	201	229	247
20	34407	Hybinyha	17	141	163	176	136
21	34606	Hylyai Pole	47	119	130	153	216
22	34504	Dnipro	24	130	146	159	132
23	33524	Dolyna	53	290	350	384	587
24	33058	Dryzhba	10	197	220	260	147
25	33325	Zhitomyr	44	195	242	271	287
26	34601	Zaporizzhya	17	119	148	158	92
27	33484	Zolotonosha	30	170	186	211	193
28	34208	Zolochiv	3	147	177	200	81
29	33548	Kamyanec-Podilskiy	37	214	245	297	254
30	33983	Kerch	13	94	110	139	85
31	33345	Kyiv	32	199	216	231	219

32	34609	Kyrylivka	25	130	150	198	144
33	33621	Kobelyaky	34	115	137	167	166
34	33173	Kovel	22	190	229	266	189
35	33261	Konotop	6	170	189	202	128
36	33215	Korosten	23	187	227	269	209
37	33299	Kremenec	22	219	245	310	227
38	33791	Kryviy Rih	5	137	149	169	83
39	33711	Kropyvnutsky	26	152	181	213	161
40	34409	Lozova	11	123	165	183	106
41	33377	Lubnu	48	175	194	250	256
42	33187	Luck	38	171	200	237	238
43	33393	Lviv	51	221	251	287	355
44	33761	Liybashivka	9	145	168	204	120
45	33075	Lybeshiv	6	229	271	274	175
46	33846	Mykolaiv	12	104	114	131	92
47	33663	Mohyliv-Podilskiy	49	201	231	267	296
48	33312	Novohrad Volynskiy	38	216	232	258	263
49	33877	Nyzhni Sirohozy	53	110	129	155	232
50	33557	Nova Ushica	45	211	262	303	308
51	33246	Nizhin	21	200	218	234	181
52	33837	Odesa	15	98	128	164	92
53	33203	Olevsk	11	214	252	287	191
54	33848	Ochakiv	11	91	109	123	72
55	33699	Pervomaisk	15	169	201	243	147
56	33515	*Play	6	365	424	485	276
57	33646	Pozhezhevska	40	404	455	478	536
58	33506	Poltava	28	154	170	196	169
59	33301	Rivne	12	195	236	256	154
60	33287	Rava-Ryska	46	215	230	257	291
61	33647	Rahiv	14	286	314	378	276
62	33268	Romny	21	178	189	228	177
63	33946	Simferopol	17	100	136	179	100
64	33896	Sarata	47	126	150	195	211
65	33088	Sarny	20	205	224	275	202
66	33614	Svitlovodsk	6	147	173	208	86

67	33067	Svityaz	23	186	209	231	190
68	34421	Svatove	16	133	152	168	112
69	33657	Selyatyn	58	310	384	435	**760**
70	33049	Semenivka	36	182	209	241	234
71	33833	Serbka	5	136	150	178	86
72	33516	Slavske	36	304	378	418	402
73	33593	Smila	33	159	176	217	202
74	33961	Strilcove	40	71	93	130	113
75	33275	Symy	3	161	189	213	114
76	33415	Ternopil	25	204	242	268	216
77	33228	Teteriv	19	196	224	270	195
78	33511	Tyrka	46	326	350	369	453
79	33631	Uzhhorod	25	185	204	264	193
80	33587	Uman	20	197	219	253	179
81	34300	Kharkiv	5	128	143	171	90
82	33902	Kherson	31	90	105	128	114
83	33429	Khmelnitskiy	24	241	264	313	242
84	33638	Khyst	23	241	282	354	260
85	33487	Chercasy	33	169	193	206	193
86	33658	Chernivci	47	230	263	275	327
87	33135	Chernihiv	47	170	197	210	262
88	33924	Chornomorske	16	54	67	90	52
89	33536	Chortkiv	50	207	246	275	322
90	33317	Shepetivka	23	224	257	294	229
91	33136	Snovsk	3	169	215	245	112
92	33392	Yavoriv	47	242	261	279	302
93	33356	Yahotyn	20	176	198	229	166
94	33645	Yaremche	55	372	400	452	617

Rank – 1961-2017 (Driest season), *Play – rank 1981-2017

Assessment of the SEECOF-19 Climate outlook for summer 2018

Countru	Sesonal Temperature (JJA)		Sesonal Precipitation (JJA)		Hight impact Events
	Observed	SEECOF-19 climate outlook	Observed	SEECOF-19 climate outlook	
Ukraine	above normal	above normal	below normal (38% stations) normal (35% stations) abow normal (27% stations)	below normal 45% normal 35% abow normal 20%	During the summer season, meteorological extraordinary phenomenas were observed in many regions of the country. Were recorded very heavy rains (30-98 mm precipitation per 2-10 hours, in Novodnistrovsk 116 mm per 13 hours), showers (30-42 mm per hour), squalls (speed 25-38 m/c), big hail (diameter 22-35 mm), tornado 29/06/2018 in Zaporizzya region. Unfavorable weather conditions localy caused loss power, telecommunications, utilities and transport. August was arid in most regions of Ukraine and in the sousern and the eastern parts were areas without precipitations at all. The biggest daily presipitation for all history of observations was recorded in Rahiv (Zakarpattya region) – 82 mm on 17 th of August and in Selyatyn (Chernivtsi region – 98 mm) on 26 th of August.

Analysis of the summer 2018 season for Ukraine compared to the 1981-2010 base period

Temperature

The average air temperature during summer 2018 was from 19,2°C in the north to 24,9°C in the south and in Carpathian mountains was 13..18°C.

Deviations the mean air summer temperature from average values of the 1981-2010 base period were +1..3°C (Figure.1).

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

From month to month average temperature deviation was inhomogeneous.

June was warm with deviations (+1,5…3°C) of the average temperature from the base values (1981-2010) for most of the territory of Ukraine, only in the northeast were some stations whith normal temperature conditions (0…+1°C).

In July, the temperature conditions were close to the average long-term values in most part of the territory of the country with deviations in the range 0 ... + 1°C, only eastern and southeastern parts were deviations +1..2°C.

August became the hottest month of summer 2018 with positive deviations +2…3,5°C compared to the average values of the 1981-2010 base period.

Maximum temperature was in the range from 29,0°C in Chernivtsi region (west) to 38.2°C in Odesa and Kherson regions (south), in Carpathian mountains (highlands) 21...23°C (Figure 2).

The highest daily air temperature during summer 2018, measuring 38,2°C was observed on 16th of August in Kherson (1) and Askaniya Nova (2) and on 17th of August in Rozdilna (3).

Temperaratura 35°C and above is a very dangerous phenomenon for the northwestern part of Ukraine and temperature 40°C and above is very dangerous phenomenon for the southeastern part of Ukraine.

For summer 2018 dangerous phenomenon 35…38°C was recorded only in the southeastern part of the country and 40°C was not observed. August was hottest month during the summer 2018.

The minimum temperature ranged from 0.0°C in Luhansk region (east of the country) to +13.6°C on the coast of the seas in Odessa region (southwest), in Carpathian mountains +0.3..1.0°C (Figure 3).

The lowest air temperature during summer 2018, measuring 0.0°C was observed on 2 th of June in Bilovodsk of the Luhansk region and 0.3°C was observed on 23th of June in Pozhezhevska of the Ivano-Frankivsk region (Carpathian highland).

Precipitation

In summer 2018 dry conditions were dominanted in the southeastern part (23..79% of the norm), in the northwestern part were normal and excess of the precipitation (80..196%) compared to the average values of the 1981-2010 base period (Figure.4).

Seasonal precipitation was ranged from 32 mm (23% of the norm) in Donetsk region to 760 mm (196%) in the Carpathian region (Figure 4).

The biggest daily presipitation for all history of observations was recorded in Rahiv of the Zakarpattya region – 82 mm on 17 th of August and in Selyatyn of the Chernivtsi region – 98 mm on 26 th of August.

The strong showers were marked:

- in Bilopillya (Vinnitsa region) on 14 th of June – fell 94 mm of precipitation per 4 hours;
- in Hulai Pole (Zaporizhya region) on 25 th of July – fell 85 mm of precipitation per 3 hours;
- in Rahiv (Zakarpattya region) on 17 th of August – fell 78 mm of precipitation per 3 hours;
- in Selyatyn of the Chernivtsi region on 26 th of August – fell 98 mm of precipitation per 3 hours.

Long rain was recorded in Novodnistrovsk (Chernivtsi region) on 29-30 th of June – fell 116 mm of precipitation per 13 hours;

August was arid in many territories of Ukraine, in particular in the sousen and the eastern parts were regions with dryest conditions for all history of observations. In Askaniya Nova (Kherson regions) it was driest summer since 1961.

From month to month in summer precipitation was not homogeneous.

June was wet in the western part of the country and dry in the eastern part, on the rest part of the territory of Ukraine were mixed conditions.

In July were normal and wet conditions in most areas of the country.

August was dry in most of the country, the month rainfalls were 10…60% from the average month amount (1981-2010 base period), in south, east and center of the country were areas where rainfall was not at all.

Analysis of the 2018 summer season for Ukraine compared to the 1961-1990 base period

Temperature

Deviations of the average air temperature were +1,7..3,2°C above the climate norm (1961-1990) (Figure 1).

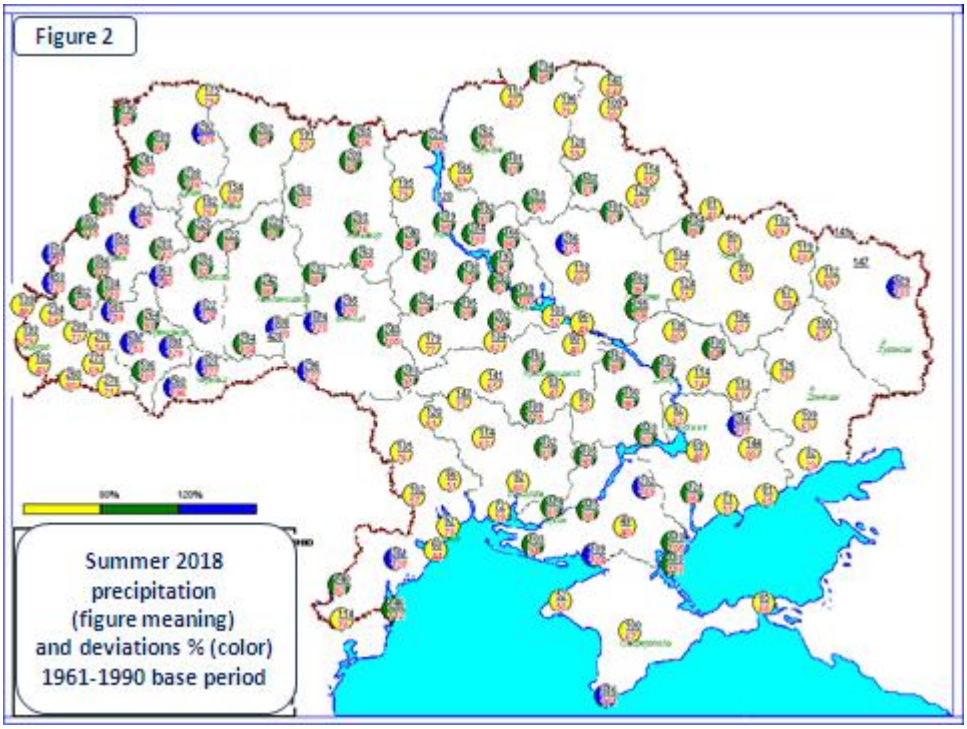
According to the tercile method (with 1961–1990 climatological norm), mean air temperature in summer was in the warm category.

Precipitation

Unequal distribution dry, normal and wet summer conditions across the country, but most stations of the southeastern part and Zakarpattya region recorded insufficient wetting (23-79%) compared to the 1961-1990 climate norm, but in the rest of territory were many places with norm (80..118%) and whith excess moisture (122..196%) (Figure 2).

According to the tercile method (with 1961–1990 climatological norm), summer presipitation were in the dry category at most stations of the southeastern part and Zakarpattya region. In most areas of the western part of the country were fixed normal and wet category.

Figure 2



During the summer 2018 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 and minimum 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 Summer 2018
Kyiv (north)

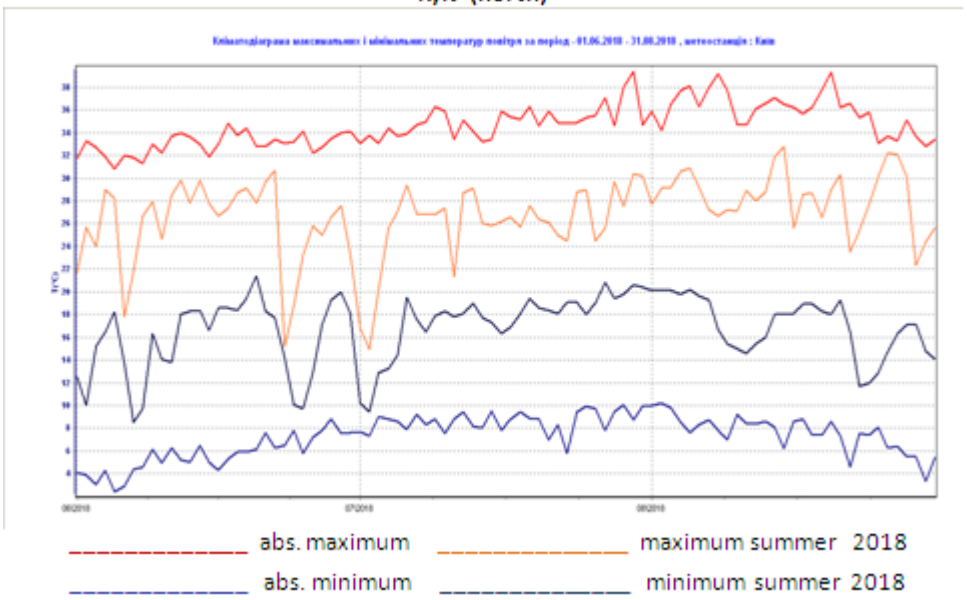
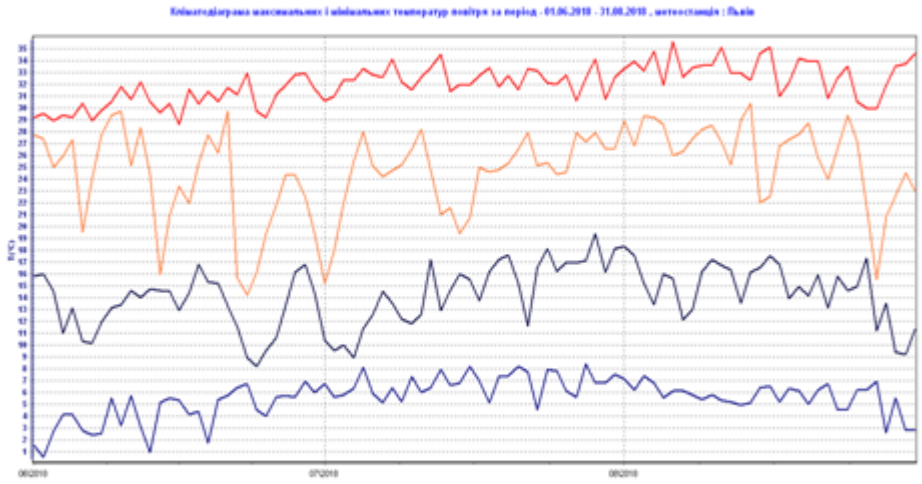


Figure 4

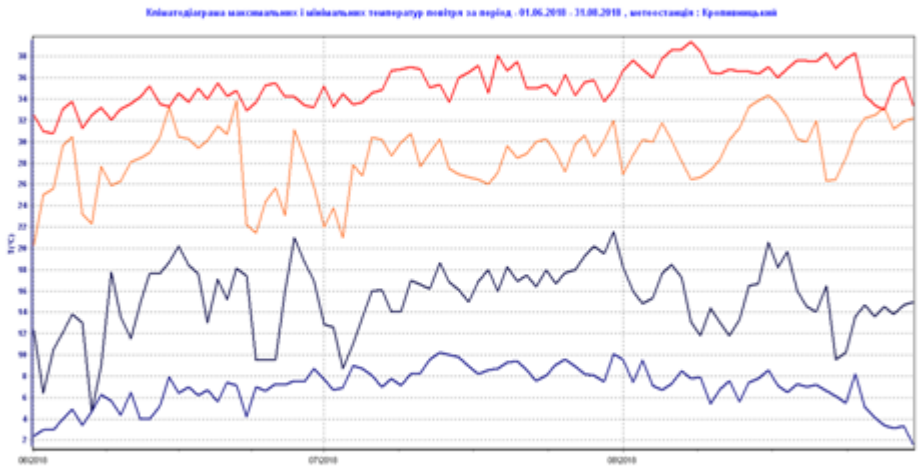
Maximum and minimum temperature Summer 2018
L'viv (west)



_____ abs. maximum _____ maximum summer 2018
_____ abs. minimum _____ minimum summer 2018

Figure 5

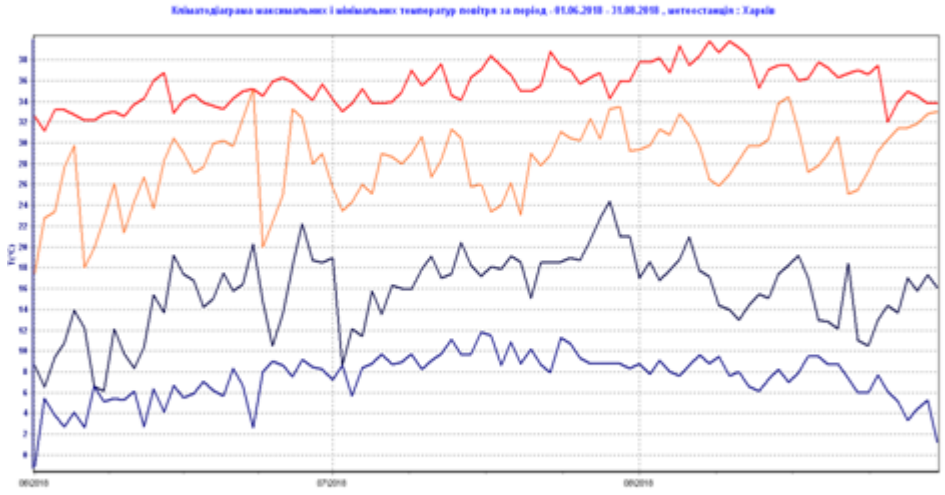
Maximum and minimum temperature Summer 2018
Kropyvnytski (center)



_____ abs. maximum _____ maximum summer 2018
_____ abs. minimum _____ minimum summer 2018

Figure 6

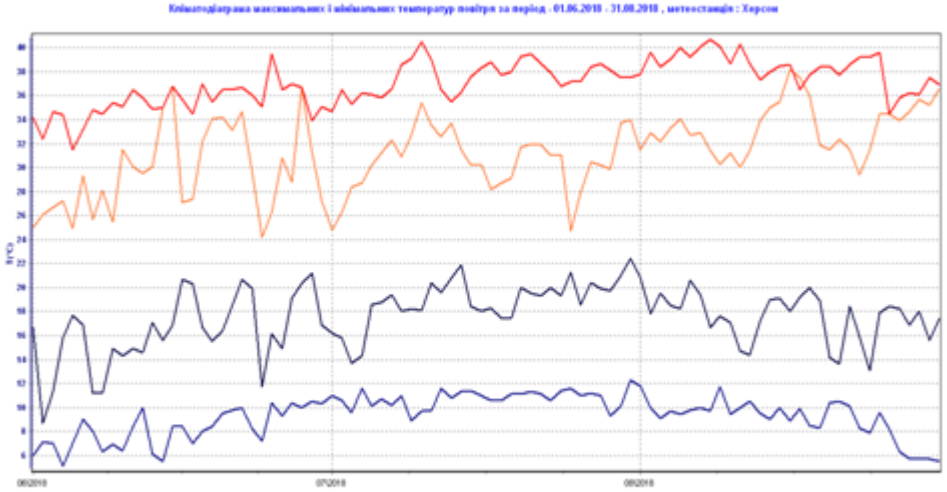
Maximum and minimum temperature Summer 2018
Kharkiv (east)



_____ abs. maximum _____ maximum summer 2018
_____ abs. minimum _____ minimum summer 2018

Figure 7

Maximum and minimum temperature Summer 2018
Kherson (south)



_____ abs. maximum _____ maximum summer 2018
_____ abs. minimum _____ minimum summer 2018