



**VERIFICATION OF THE SEECOF-23
SUMMER 2020 CLIMATE OUTLOOK
AND
SEASONAL BULLETIN
FOR THE TERRITORY OF UKRAINE**

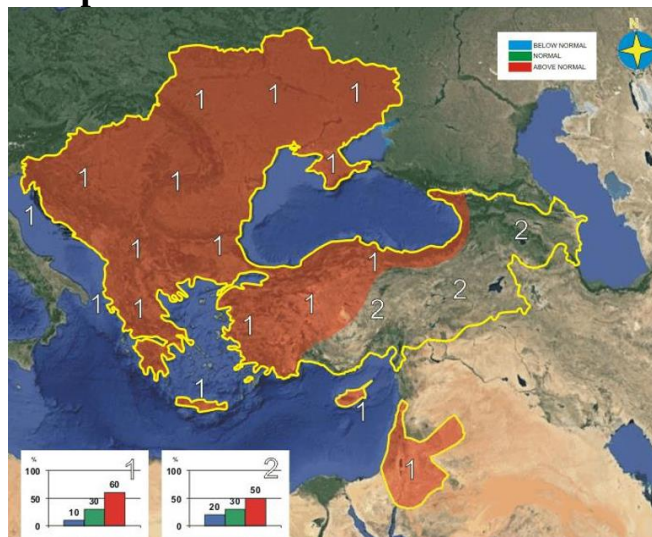
Kyiv, 7 October 2020

**UKRAINIAN HYDROMETEOROLOGICAL CENTER
Department of Meteorology**

web: <http://www.meteo.com.ua>
mail: synoptic@meteo.gov.ua

VERIFICATION OF THE SEECOF– 23 SUMMER 2020 CLIMATE OUTLOOK FOR THE TERRITORY OF UKRAINE COMPARED TO THE 1981–2010 BASE PERIOD

Temperature

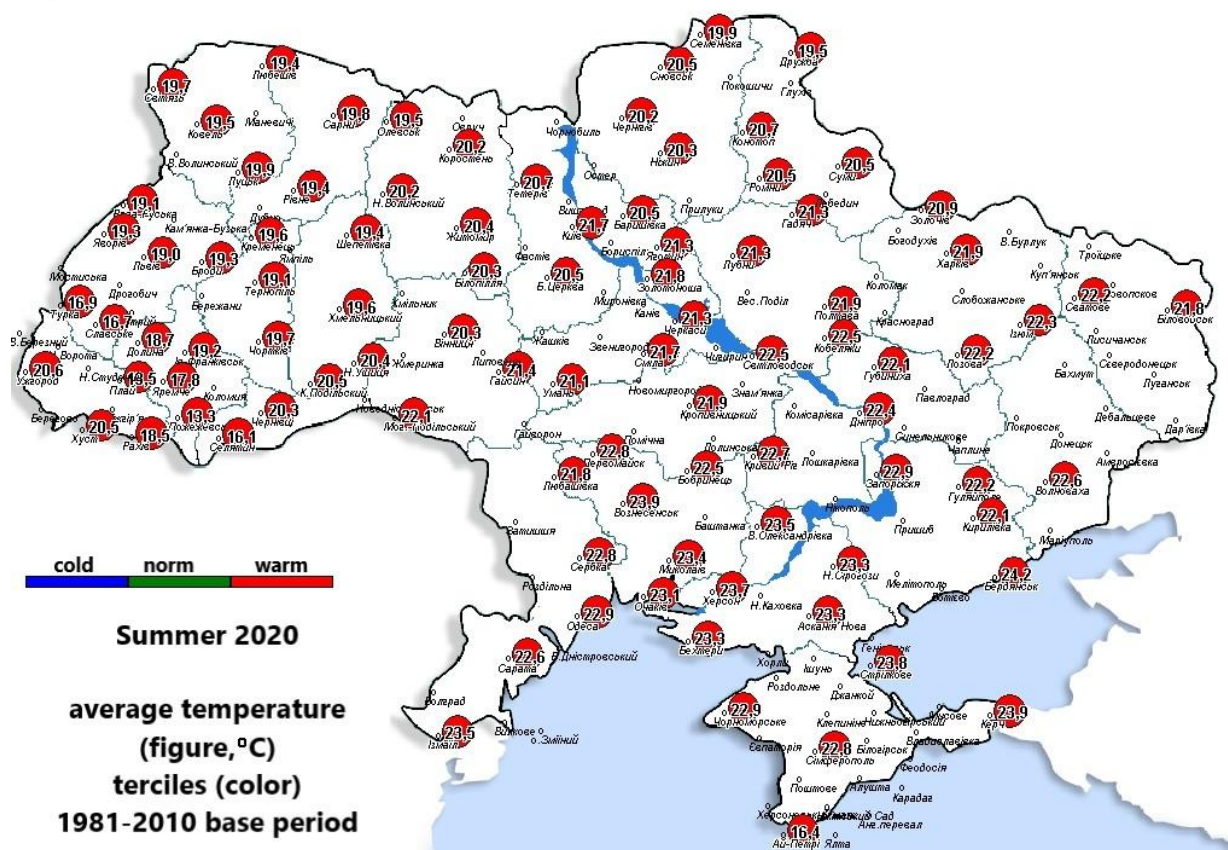


According to the SEECOF-23 outlook for the summer 2020 in Ukraine, seasonal temperature was expected warmer (upper tercile) with 60% probability, normal with 30% and below (low tercile) with 10% probability, compared to the 1981–2010 climatological base period.

Climatological monitoring showed that the summer 2020 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.

Figure 1.



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

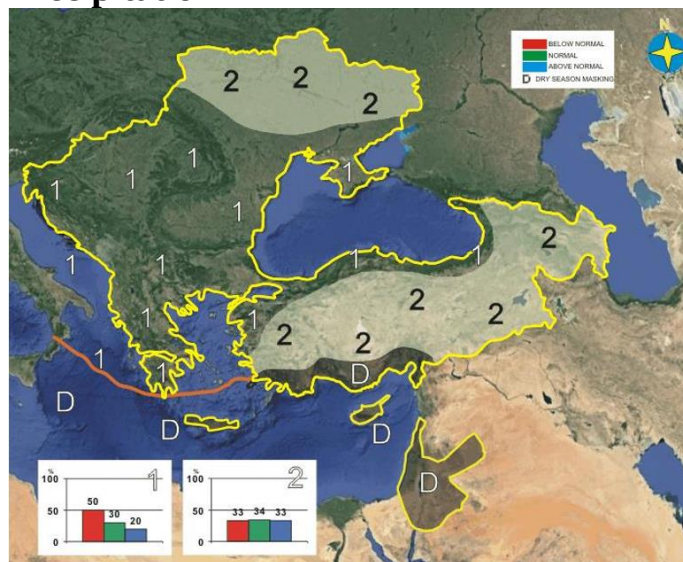
Summer 2019			Air Temperature (°C)				
synop		Station	Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	7	17,6	18,1	18,3	19,2
2	33889	Izmail	5	21,5	21,9	22,5	23,5
3	34415	Izym	5	19,7	20,5	20,9	22,3
4	33998	Ai-Petri	9	14,4	15,1	15,5	16,4
5	99915	Askaniya Nova	11	21,6	21,9	22,5	23,3
6	33464	Bila Cerkva	8	18,5	18,8	19,6	20,5
7	34434	Bilovodsk	8	19,6	20,3	20,8	21,8
8	33446	Bilopillya	5	18,1	18,4	18,7	20,3
9	33354	Baryshyvka	5	18,6	19,0	19,1	20,5
10	34717	Berdiyansk	13	22,3	23,1	23,6	24,2
11	33907	Behtery	8	21,5	22,0	22,5	23,3
12	33717	Bobryniec	5	20,2	20,9	21,0	22,5
13	33297	Brody	8	21,1	21,6	22,1	23,5
14	33862	V.Oleksandrivka.	7	18,0	18,3	18,6	20,3
15	33562	Vinnyca	5	21,5	21,8	22,1	23,9
16	33777	Voznesensk	4	19,8	20,9	21,5	22,6
17	34615	Volnovaha	8	18,8	19,4	20,0	21,3
18	33376	Hadyach	5	18,9	19,1	19,4	21,4
19	33577	Haisyn	5	19,5	20,6	21,2	22,1
20	34407	Hybinyha	8	19,9	20,9	21,4	22,2
21	34606	Hylyai Pole	9	20,1	21,2	21,8	22,4
22	34504	Dnipro	9	16,7	17,4	17,9	18,7
23	33524	Dolyna	7	17,6	18,1	18,3	19,5
24	33058	Dryzhba	6	17,9	18,1	18,8	20,4
25	33325	Zhitomyr	6	20,8	21,6	22,0	22,9
26	34601	Zaporizzhya	9	19,4	19,8	20,2	21,8
27	33484	Zolotonosha	4	18,7	19,4	19,9	20,9
28	34208	Zolochiv	7	18,4	18,9	19,2	20,5
29	33548	Kamyanec-Podilskiy	6	21,5	22,3	22,7	23,9
30	33983	Kerch	9	19,1	19,5	19,8	21,7
31	33345	Kyiv	2	19,4	20,5	21,0	22,1
32	34609	Kyrylivka	8	17,6	18,1	18,3	19,2
33	33621	Kobelyaky	4	19,7	20,8	21,2	22,5
34	33173	Kovel	6	17,7	18,0	18,5	19,5
35	33261	Konotop	5	18,6	19,1	19,5	20,7
36	33215	Korosten	3	17,9	18,2	18,4	20,2

37	33299	Kremenec	7	17,7	17,9	18,4	19,6
38	33791	Kryviy Rih	8	20,4	20,9	21,1	22,7
39	33711	Kropyvnutsky	6	19,5	20,2	20,4	21,9
40	34409	Lozova	7	19,6	20,4	21,1	22,2
41	33377	Lubnu	6	19,2	19,8	20,1	21,3
42	33187	Luck	5	17,7	18,0	18,5	19,9
43	33393	Lviv	7	17,0	17,4	18,0	19,0
44	33761	Liybashivka	7	19,9	20,2	20,5	21,8
45	33075	Lybeshiv	8	17,6	18,0	18,2	19,4
46	33846	Mykolaiv	6	21,7	22,3	22,6	23,4
47	33663	Mohyliv-Podilskiy	5	19,5	19,9	20,2	22,1
48	33312	Novohrad Volynskiy	4	17,7	18,1	18,4	20,2
49	33877	Nyzhni Sirohozy	11	21,1	21,8	22,3	23,3
50	33557	Nova Ushica	6	18,0	18,5	18,9	20,4
51	33246	Nizhin	4	18,3	18,7	19,1	20,3
52	33837	Odesa	10	21,3	21,6	21,8	22,9
53	33203	Olevsk	4	17,6	17,8	18,1	19,5
54	33848	Ochakiv	10	21,4	21,8	22,0	23,1
55	33699	Pervomaisk	7	20,4	20,9	21,1	22,8
56	33515	*Play	7	11,1	11,5	12,2	13,5
57	33646	Pozhezhevska	7	11,1	11,6	12,0	13,3
58	33506	Poltava	5	19,2	20,1	20,6	21,9
59	33301	Rivne	8	17,5	17,8	18,3	19,4
60	33287	Rava-Ryska	8	17,2	17,6	18,1	19,1
61	33647	Rahiv	13	16,8	17,4	17,7	18,5
62	33268	Romny	6	18,6	19,1	19,4	20,5
63	33946	Simferopol	7	20,6	21,4	21,6	22,8
64	33896	Sarata	10	21,0	21,7	22,0	22,6
65	33088	Sarny	7	17,9	18,2	18,5	19,8
66	33614	Svitlovodsk	7	20,4	21,0	21,3	22,5
67	33067	Svityaz	6	17,8	18,0	18,7	19,7
68	34421	Svatove	4	19,7	20,3	21,0	22,2
69	33657	Selyatyn	8	14,4	14,9	15,2	16,1
70	33049	Semenivka	5	17,8	18,2	18,5	19,9
71	33833	Serbka	9	21,2	21,5	21,8	22,8
72	33516	Slavske	7	14,7	15,3	15,5	16,7
73	33593	Smila	3	19,2	19,9	20,2	21,7
74	33961	Strilcove	11	22,0	22,6	23,0	23,8
75	33275	Symy	7	18,4	19,0	19,4	20,5
76	33415	Ternopil	8	17,2	17,5	18,1	19,1

77	33228	Teteriv	5	18,5	18,7	19,0	20,7
78	33511	Tyrka	7	15,1	15,6	15,9	16,9
79	33631	Uzhhorod	17	19,5	19,9	20,2	20,6
80	33587	Uman	5	18,8	19,1	19,4	21,1
81	34300	Kharkiv	8	19,4	20,1	20,7	21,9
82	33902	Kherson	5	21,6	21,9	22,3	23,7
83	33429	Khmelnitskiy	7	17,6	17,9	18,2	19,6
84	33638	Khyst	13	19,0	19,4	19,9	20,5
85	33487	Chercasy	6	19,1	19,7	20,0	21,3
86	33658	Chernivci	9	18,6	18,9	19,4	20,3
87	33135	Chernihiv	6	18,4	18,8	19,0	20,2
88	33924	Chornomorske	10	21,4	21,8	22,2	22,9
89	33536	Chortkiv	8	17,8	18,1	18,6	19,7
90	33317	Shepetivka	8	17,5	17,8	18,3	19,4
91	33136	Snovsk	4	18,3	18,7	19,0	20,5
92	33392	Yavoriv	9	17,5	17,8	18,4	19,3
93	33356	Yahotyn	3	19,0	19,4	19,6	21,3
94	33645	Yaremche	8	16,0	16,5	16,7	17,8

Rank – 1961-2020 (warmest season), *Play – rank 1981-2020

Precipitation

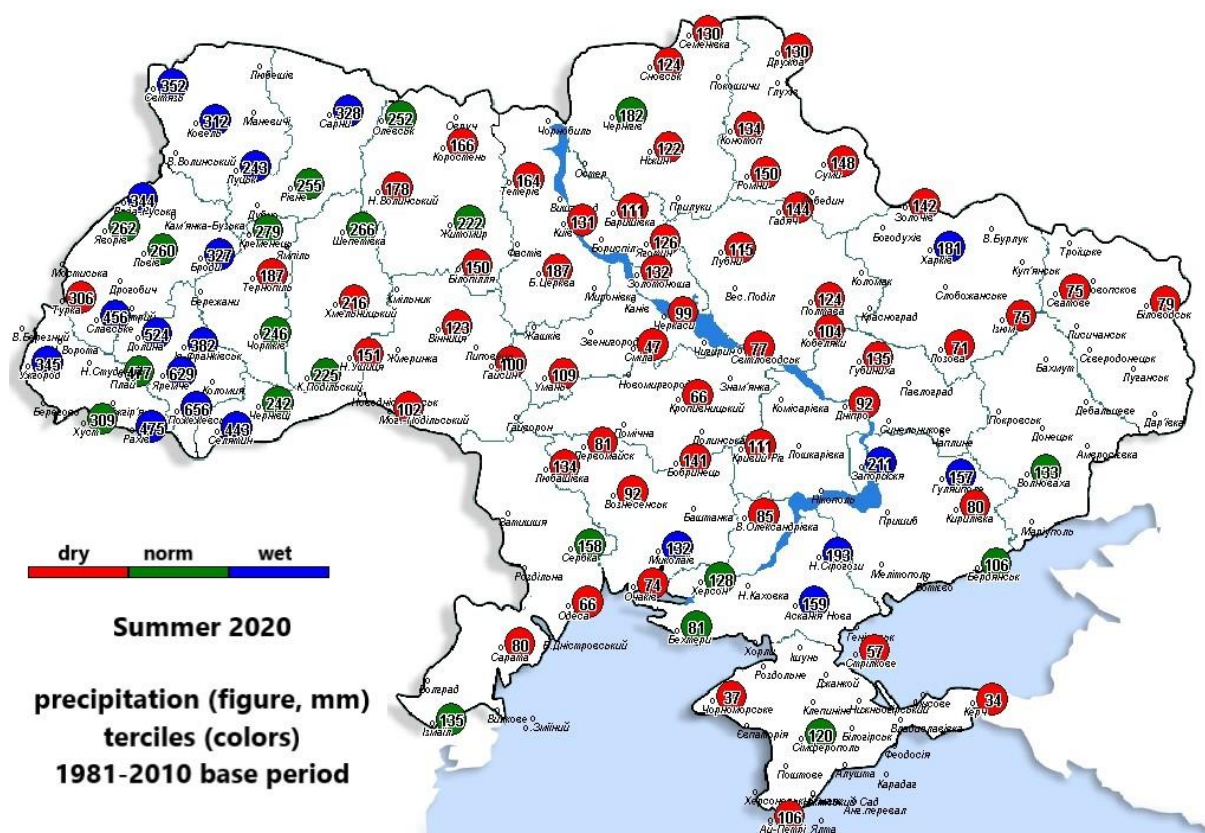


The SEECOF–23 climate outlook indicated approximately equal probabilities for below-, near- or above normal precipitation for most part of Ukraine and dry conditions (50% probabilities) for the south and southwest parts of Ukraine.

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 (56% of stations), normal and wet conditions were on west and separately in south 44% of stations based on the tercile method with 1981–2010 climatological base period (Figure 2).

In the northern, central, eastern parts of the country were prevailed dry conditions. On the rest of the territory were dominated normal and wet conditions. Seasonal forecast was not corrected.

Figure 2.



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

Summer 2017			Precipitation (mm)				
synop	Station		Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	55	215	236	283	382
2	33889	Izmail	31	112	125	143	135
3	34415	Izymb	5	138	154	169	75
4	33998	Ai-Petri	7	138	153	212	106
5	99915	Askaniya Nova	45	94	109	149	159
6	33464	Bila Cerkva	22	189	219	230	187
7	34434	Bilovodsk	7	114	133	153	79
8	33446	Bilopillya	8	210	220	253	150
9	33354	Baryshyvka	5	195	224	262	111
10	34717	Berdiyansk	32	81	96	132	106
11	33907	Behtery	23	68	83	117	81
12	33717	Bobrync	20	151	182	198	141
13	33297	Brody	48	209	242	290	327
14	33862	V.Oleksandrivka.	4	131	154	169	85
15	33562	Vinnyca	6	201	221	273	123
16	33777	Voznesensk	1	152	170	189	92
17	34615	Volnovaha	22	121	143	175	133
18	33376	Hadyach	12	161	174	207	144

19	33577	Haisyn	3	183	201	229	100
20	34407	Hybinyha	18	141	163	176	135
21	34606	Hylyai Pole	35	119	130	153	157
22	34504	Dnipro	7	130	146	159	92
23	33524	Dolyna	53	290	350	384	524
24	33058	Dryzhba	7	197	220	260	130
25	33325	Zhitomyr	28	195	242	271	222
26	34601	Zaporizzhya	49	119	148	158	211
27	33484	Zolotonosha	9	170	186	211	132
28	34208	Zolochiv	18	147	177	200	142
29	33548	Kamyanec-Podilskiy	27	214	245	297	225
30	33983	Kerch	2	94	110	139	34
31	33345	Kyiv	6	199	216	231	131
32	34609	Kyrylivka	3	130	150	198	80
33	33621	Kobelyaky	11	115	137	167	104
34	33173	Kovel	56	190	229	266	312
35	33261	Konotop	10	170	189	202	134
36	33215	Korosten	14	187	227	269	166
37	33299	Kremenec	38	219	245	310	279
38	33791	Kryviy Rih	15	137	149	169	111
39	33711	Kropyvnutsky	1	152	181	213	66
40	34409	Lozova	4	123	165	183	71
41	33377	Lubnu	6	175	194	250	115
42	33187	Luck	42	171	200	237	243
43	33393	Lviv	28	221	251	287	260
44	33761	Liybashivka	16	145	168	204	134
45	33075	Lybeshiv	19	229	271	274	319
46	33846	Mykolaiv	38	104	114	131	132
47	33663	Mohyliv-Podilskiy	3	201	231	267	102
48	33312	Novohrad Volynskiy	12	216	232	258	178
49	33877	Nyzhni Sirohozy	47	110	129	155	193
50	33557	Nova Ushica	6	211	262	303	151
51	33246	Nizhin	2	200	218	234	122
52	33837	Odesa	5	98	128	164	66
53	33203	Olevsk	31	214	252	287	252
54	33848	Ochakiv	13	91	109	123	74
55	33699	Pervomaisk	3	169	201	243	81
56	33515	*Play	31	365	424	485	477
57	33646	Pozhezhevskaya	53	404	455	478	656
58	33506	Poltava	13	154	170	196	124

59	33301	Rivne	40	195	236	256	255
60	33287	Rava-Ryska	56	215	230	257	344
61	33647	Rahiv	54	286	314	378	475
62	33268	Romny	15	178	189	228	150
63	33946	Simferopol	22	100	136	179	120
64	33896	Sarata	5	126	150	195	80
65	33088	Sarny	50	205	224	275	328
66	33614	Svitlovodsk	4	147	173	208	77
67	33067	Svityaz	57	186	209	231	352
68	34421	Svatove	4	133	152	168	75
69	33657	Selyatyn	45	310	384	435	443
70	33049	Semenivka	6	182	209	241	130
71	33833	Serbka	34	136	150	178	158
72	33516	Slavske	51	304	378	418	456
73	33593	Smila	1	159	176	217	47
74	33961	Strilcove	15	71	93	130	57
75	33275	Symy	17	161	189	213	148
76	33415	Ternopil	17	204	242	268	187
77	33228	Teteriv	13	196	224	270	164
78	33511	Tyrka	17	326	350	369	306
79	33631	Uzhhorod	53	185	204	264	345
80	33587	Uman	1	197	219	253	109
81	34300	Kharkiv	38	128	143	171	181
82	33902	Kherson	37	90	105	128	128
83	33429	Khmelnitskiy	18	241	264	313	216
84	33638	Khyst	33	241	282	354	309
85	33487	Chercasy	6	169	193	206	99
86	33658	Chernivci	27	230	263	275	242
87	33135	Chernihiv	25	170	197	210	182
88	33924	Chornomorske	10	54	67	90	37
89	33536	Chortkiv	31	207	246	275	246
90	33317	Shepetivka	34	224	257	294	266
91	33136	Snovsk	7	169	215	245	124
92	33392	Yavoriv	33	242	261	279	262
93	33356	Yahotyn	12	176	198	229	126
94	33645	Yaremche	57	372	400	452	629

Rank – 1961-2020 (Driest season), *Play – rank 1981-2020

Assessment of the SEECOF-23 Climate outlook for summer 2020

Country	Seasonal Temperature (JJA)		Seasonal Precipitation (JJA)		High impact Events
	Observed	SEECOF-23 climate outlook	Observed	SEECOF-23 climate outlook	
Ukraine	above normal	above normal	below normal (56% stations) normal (23% stations) above normal (21% stations)	below normal 33% normal 34% above normal 33% south southwest above 50% normal 30% below 20%	During June and July meteorological extraordinary phenomenas were observed in many regions of the country. In June were recorded heavy rains and showers (30-62 mm precipitation per 1-10 hours), squalls (speed 25-29 m/c). 22-23/06 in Carpathian region were recorded long havy rains 100-158 mm per 11-23 hours. During the rainy periods from 21 to 25 June, hydrological posts recorded the amount of precipitation in range from 100 to 400 mm. These rains caused catastrophic floods in Lviv, Ivano-Frankivsk, Chernivtsi, Zakarpattia regions, it led to tragic consequences such as the death of three people, flooding of 250 settlements. Were flooded agricultural lands, private houses, were destroyed and partially damaged farms, roads, bridges, shore protection, dams. In July were recorded heavy rains (30-60 mm precipitation per 2-9 hours), heavy showers (30-56 mm per 1hour, squall (speed 27 m/c). Unfavorable weather conditions locally caused loss power, telecommunications, utilities and transport. Summer was arid in the former regions of Ukraine, with the exception of the western part, in the center were areas with the driest conditions from 1961.

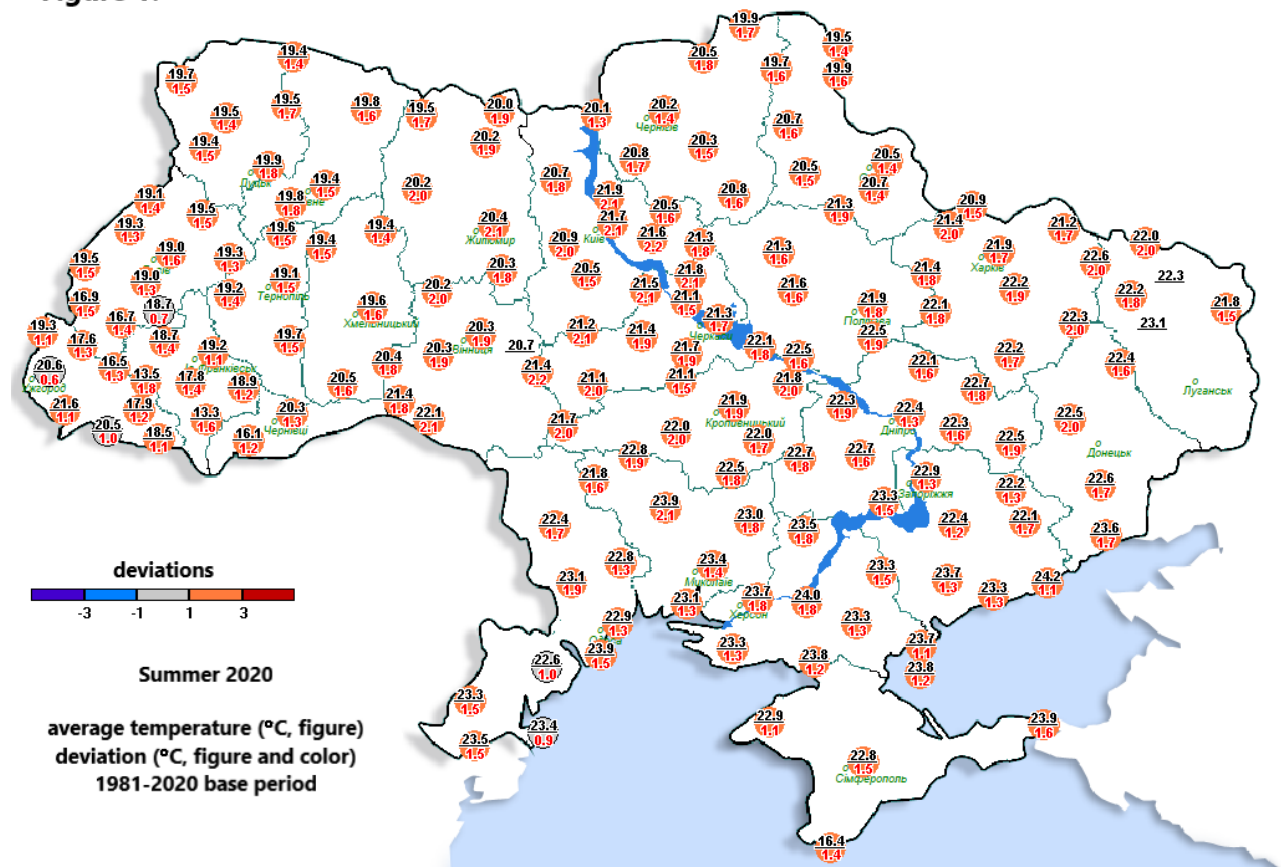
Analysis of the summer 2020 season for Ukraine compared to the 1981-2010 base period

Temperature

The average air temperature during summer 2020 was from 18°C in the west to 24°C in the south and in Carpathian and Crimea mountains was 13...16°C.

Deviations the mean air summer temperature from average values of the 1981-2010 base period were +1...2,2°C (Figure.1).

Figure 1.



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

Maximum temperature was in the range from 29,1°C in Lviv region (west) to 40,5°C in Luhansk region (east), in Carpathian and Crimea mountains (highlands) 23...27°C (Figure 2).

The highest daily air temperature during summer 2020, measuring 40,5°C was observed only one time on 07th of July in Novopetrovsk.

Temperatura 40°C and above is a very dangerous phenomenon (red level) for Ukraine.

Figure 2.



The number of days with maximum temperature 30°C and above was different across Ukraine.

In the western part of the country number of tropical days was in the range from 1 to 15 days, in Transcarpathia – from 15 to 26. In the northern part of the country number of tropical days was in the range from 15 to 31 days. In the central and the eastern parts the number of tropical days was in the range from 20 to 46 days. In the southern part number of tropical days was in the range from 35 to 58.

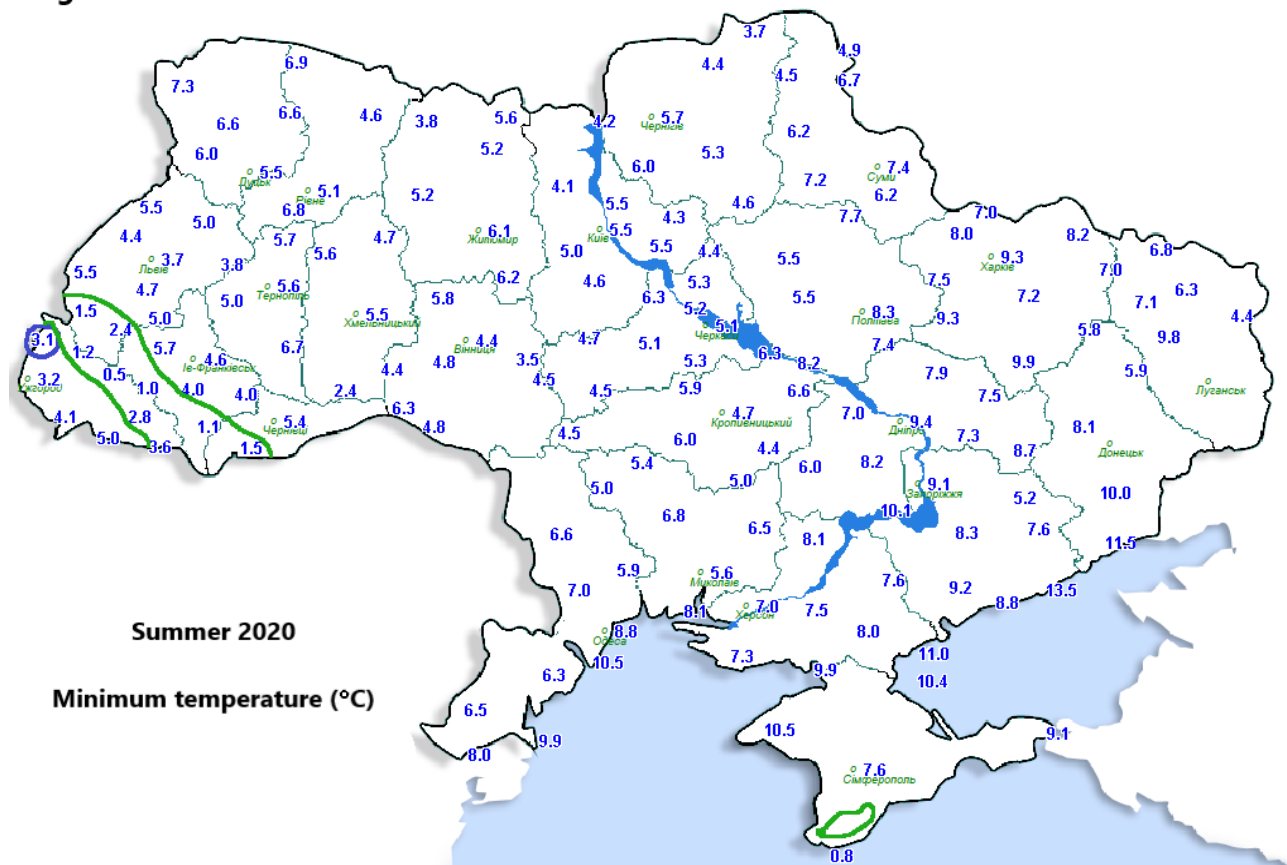
The number of days with maximum temperature 35°C and above in south and east was from 4 to 12 days, in the central part were fixed 1 or 2 days only in some places, in north and west that temperature was null.

The minimum temperature ranged from 3,1°C in Zakarpattia region (west of the country) to 13,5°C on the coast of the sea in Zaporizhzhia region (southeast), in Carpathian and Crimea mountains from +0,5 to 3,6 °C (Figure 3).

The lowest air temperature during summer 2020, measuring 3,1°C was observed on 02th of June in Velykyi Bereznyi of Zakarpattia region.

The number of nights with temperature 20°C and above was different across Ukraine. Maximum number of tropical night was in range from 20 to 44 and they were located in the coastal zone and on the banks of rivers in south of Ukraine. Minimum number of tropical night were fixed in the western part of the country, it was from 1 to 3 and they were located separately. In the rest of the territory of the country number of tropical nights were in range from 4 to 16.

Figure 3.



The amplitudes of temperatures (max – min) was in range from 23°C (in highlands of Carpathian) to 28..32°C on the flat part of the country and maximum amplitudes 34°C were recorded in the eastern part of Ukraine.

The meteorological summer in 2020 (when the average temperature was 15°C and above) started on May-June (27/05....06/06) and ended on September-October 18/09.. 20/10.

Precipitation

In summer 2020 dry conditions were dominated in north, east and central parts (24...79% of the norm), in west and southeast were dominated normal and excess precipitation (85...149 %) compared to the average values of the 1981-2010 base period (Figure.4).

Seasonal precipitation was ranged from 34 mm (24% of the norm) in Crimea to 382 mm (149% of the norm) in Ivano-Frankivsk and 443...656 mm (114...143%) in the Carpathian region (Figure 4).

The biggest daily precipitation

13/06 in Nikopol 88 mm/3h and in Nizhni Sirohozy 62/3h,

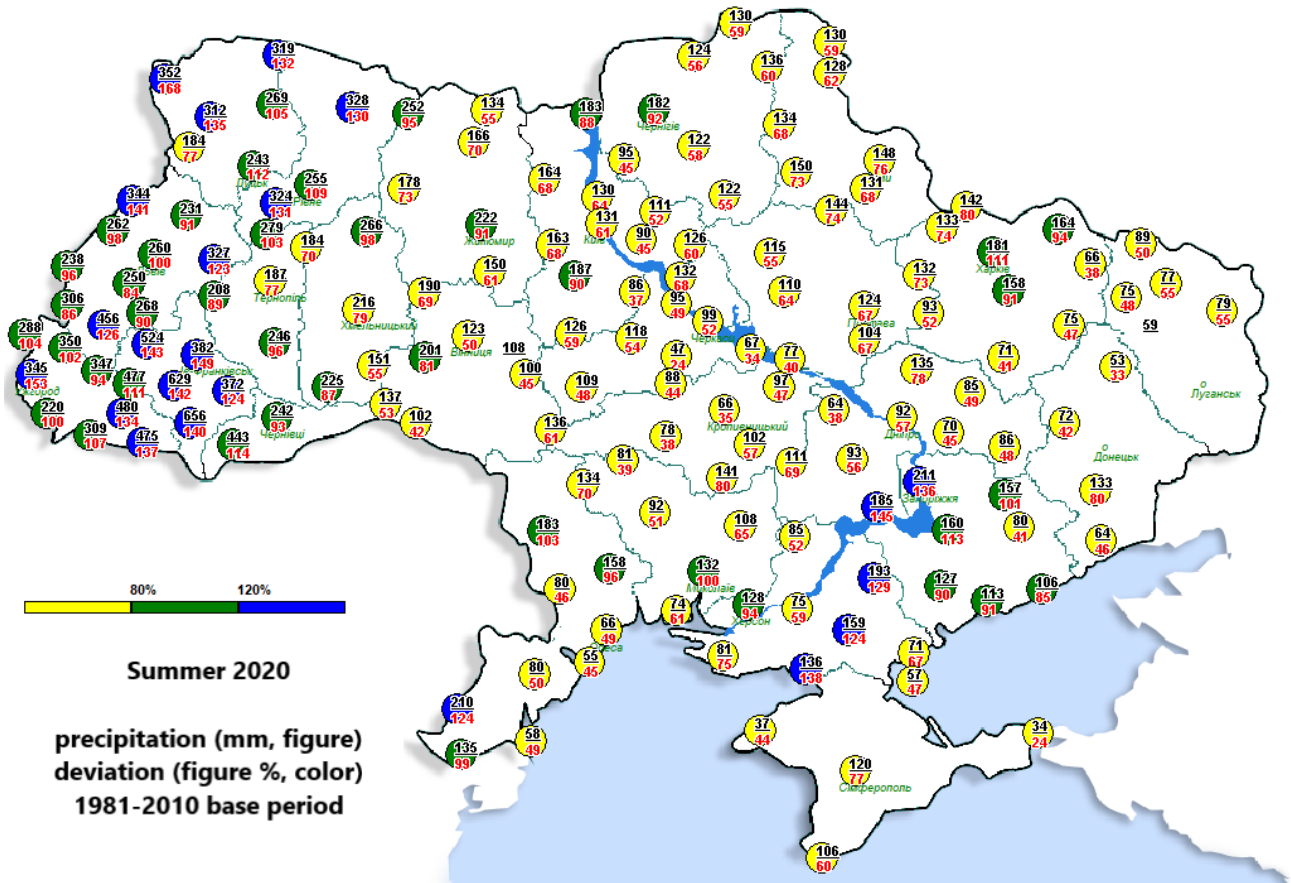
23/06 in Yaremcha 108 mm/16h,

07/07 in Izmail 56/1h,

13/07 in Slobozhanske 104 mm and in Kharkiv 87 mm/12h,

Long rains was recorded in Dolyna on 22-23th of June – fell 158 mm of precipitation per 23 hours and in Svitiaz on 23-24th of June – fell 129 mm per 29 hours.

Figure 4.



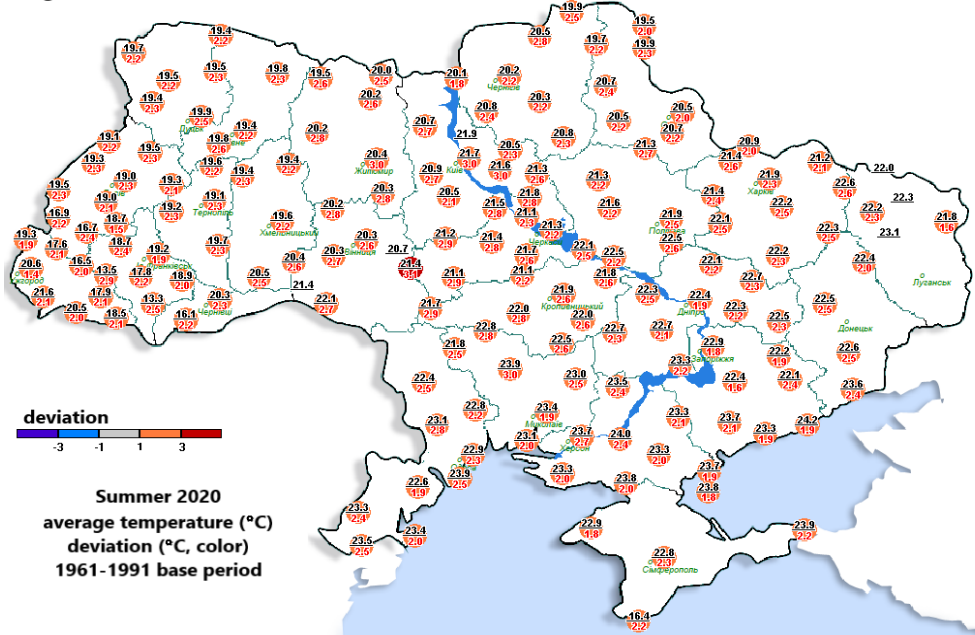
Summer 2020 was the very arid in the central part, there were areas where it was driest since 1961.

Analysis of the 2020 summer season for Ukraine compared to the 1961-1990 base period and to the 1991-2020 base period

Temperature

Deviations of the average air temperature were +1,4...3,1°C above the climate norm (1961-1990) (Figure 1). According to the tercile method (with 1961–1990 climatological norm), mean air temperature in summer 2020 was in the warm category.

Figure 1.



Precipitation

Unequal distribution dry, normal and wet summer conditions across the country, most stations of the western and southeastern parts recorded norm and over-wetting (80-156%) compared to the 1961-1990 climate norm, but in the rest of the territory were prevailed dry conditions (22..78%) (Figure 3).

Figure 3.

