



**VERIFICATION OF THE SEECOF-29
SUMMER 2023 CLIMATE OUTLOOK
AND
SEASONAL BULLETIN
FOR THE TERRITORY OF UKRAINE**

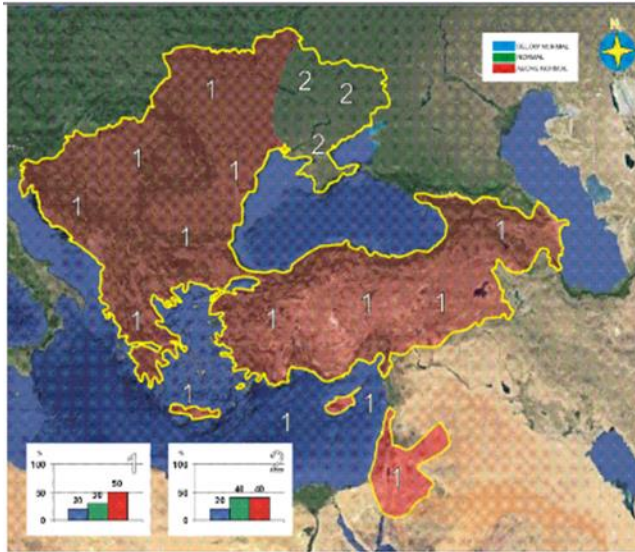
Kyiv, 17 October 2023

**UKRAINIAN HYDROMETEOROLOGICAL CENTER
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VERIFICATION OF THE SEECOF- 29 SUMMER 2023 CLIMATE OUTLOOK FOR THE TERRITORY OF UKRAINE COMPARED TO THE 1981-2010 BASE PERIOD

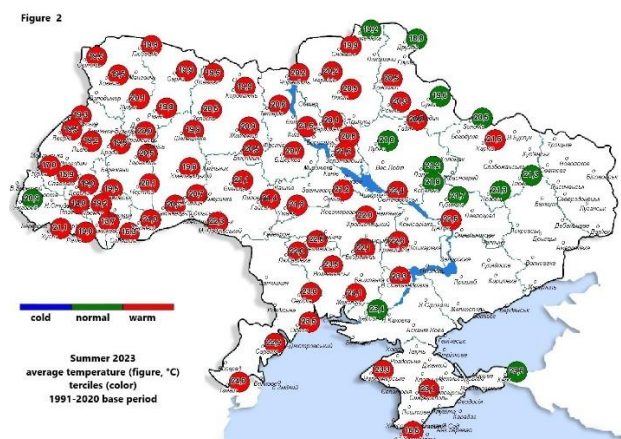
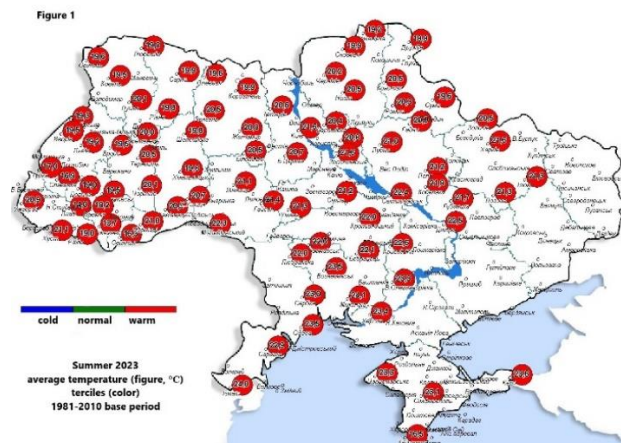
Temperature



According to the SEECOF-29 outlook for the summer 2023 in Ukraine, seasonal temperature was expected warmer (upper tercile) with 50% probability in the western part and equal (upper and normal tercile) with 40% probability in the eastern part of the country, compared to the 1981-2010 climatological base period.

Climatological monitoring showed that the summer 2022 was warm in Ukraine with above normal temperature based on the tercile method (Figure 1).

Verification showed that outlook with the 50% probability was more correct for the entire territory of Ukraine. However, when using the different climatological base period 1991-2020, normal conditions exist in the eastern part of the country (Figure 2).



Note: Tercile analysis of meteorological elements was performed on the basis of the data obtained from 81 meteorological stations.

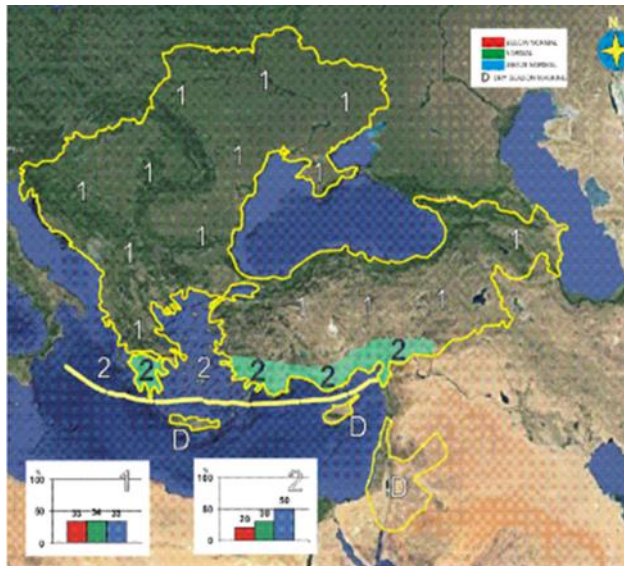
Summer 2023			Air Temperature (°C) 1981-2010 base period				
synop		Station	Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	7	17,6	18,1	18,3	19,5
2	33889	Izmail	5	21,5	21,9	22,5	24,0
3	33415	Izyum	20	19,7	20,5	20,9	21,3
4	33998	Ai-Petri	10	14,4	15,1	15,5	16,5
5	33464	Bila Cerkva	3	18,5	18,8	19,6	20,7
6	33446	Bilopilla	3	18,1	18,4	18,7	20,5
7	33354	Baryshyvka	8	18,6	19,0	19,1	20,4
8	33717	Bobryniec	8	20,2	20,9	21,0	22,1
9	33297	Brody	6	17,5	17,9	18,3	19,5
10	33862	V.Oleksandrivka	9	21,1	21,6	22,1	23,3
11	33562	Vinnytsa	2	18,0	18,3	18,6	21,1
12	33777	Voznesensk	6	21,5	21,8	22,1	23,5
13	33376	Hadyach	13	18,8	19,4	20,0	20,9
14	33577	Haisyn	5	18,9	19,1	19,4	21,4
15	34407	Hybinyha	18	19,5	20,6	21,2	21,7
16	34504	Dnipro	8	20,1	21,2	21,8	22,5
17	33524	Dolyna	5	16,7	17,4	17,9	19,0
18	33058	Dryzhba	17	17,6	18,1	18,3	18,8
19	33325	Zhytomyr	3	17,9	18,1	18,8	20,8
20	333312	Zviahel	3	17,7	18,1	18,4	20,5
21	33484	Zolotonosha	7	19,4	19,8	20,2	21,6
22	34208	Zolochiv	16	18,7	19,4	19,9	20,5
23	33548	Kamyanec-Podilskiy	5	18,4	18,9	19,2	20,9
24	33983	Kerch	13	21,5	22,3	22,7	23,6
25	33345	Kyiv	4	19,1	19,5	19,8	21,6
26	33621	Kobeliaky	13	19,7	20,8	21,2	21,8
27	33173	Kovel	8	17,7	18,0	18,5	19,5
28	33261	Konotop	9	18,6	19,1	19,5	20,5
29	33215	Korosten	9	17,9	18,2	18,4	19,9
30	33299	Kremenec	4	17,7	17,9	18,4	20,0
31	33791	Kryvyi Rih	10	20,4	20,9	21,1	22,6
32	33711	Kropyvnytskyi	7	19,5	20,2	20,4	22,0
33	34409	Lozova	23	19,6	20,4	21,1	21,3

34	33377	Lubny	11	19,2	19,8	20,1	21,0
35	33187	Lutck	5	17,7	18,0	18,5	20,1
36	33393	Lviv	6	17,0	17,4	18,0	19,2
37	33761	Liybashivka	5	19,9	20,2	20,5	22,0
38	33075	Lubeshiv	5	17,6	18,0	18,2	19,8
39	33663	Mohyliv-Podilskyi	2	19,5	19,9	20,2	22,3
40	33846	Mykolaiv	4	21,7	22,3	22,6	24,1
41	33557	Nova Ushytsa	5	18,0	18,5	18,9	20,7
42	33246	Nizhyn	3	18,3	18,7	19,1	20,5
43	33837	Odesa	7	21,3	21,6	21,8	23,5
44	33203	Olevsk	5	17,6	17,8	18,1	19,6
45	33699	Pervomaisk	11	20,4	20,9	21,1	22,6
46	33515	*Play	5	11,1	11,5	12,2	14,0
47	33646	Pozhezhevska	5	11,1	11,6	12,0	13,7
48	33506	Poltava	14	19,2	20,1	20,6	21,2
49	33301	Rivne	5	17,5	17,8	18,3	19,8
50	33287	Rava-Ryska	8	17,2	17,6	18,1	19,3
51	33647	Rahiv	4	16,8	17,4	17,7	19,0
52	33268	Romny	12	18,6	19,1	19,4	20,3
53	33946	Simferopol	5	20,6	21,4	21,6	23,1
54	33896	Sarata	8	21,0	21,7	22,0	22,9
55	33088	Sarny	8	17,9	18,2	18,5	19,9
56	33614	Svitlovodsk	10	20,4	21,0	21,3	22,4
57	33067	Svityaz	10	17,8	18,0	18,7	19,6
58	33657	Selyatyn	6	14,4	14,9	15,2	16,3
59	33049	Semenivka	14	17,8	18,2	18,5	19,2
60	33833	Serbka	8	21,2	21,5	21,8	23,0
61	33516	Slavske	5	14,7	15,3	15,5	16,9
62	33593	Smila	10	19,2	19,9	20,2	21,2
63	33136	Snovsk	12	18,3	18,7	19,0	19,9
64	33275	Symy	21	18,4	19,0	19,4	19,6
65	33415	Ternopil	1	17,2	17,5	18,1	20,5
66	33228	Teteriv	8	18,5	18,7	19,0	20,6
67	33511	Tyrka	5	15,1	15,6	15,9	17,0
68	33631	Uzhhorod	13	19,5	19,9	20,2	20,9

69	33587	Uman	4	18,8	19,1	19,4	21,3
70	34300	Kharkiv	13	19,4	20,1	20,7	21,6
71	33902	Kherson	11	21,6	21,9	22,3	23,4
72	33429	Khmelnitskiy	4	17,6	17,9	18,2	19,8
73	33638	Khyst	7	19,0	19,4	19,9	21,1
74	33658	Chernivci	5	18,6	18,9	19,4	21,0
75	33135	Chernihiv	8	18,4	18,8	19,0	20,2
76	33924	Chornomorske	5	21,4	21,8	22,2	23,3
77	33536	Chortkiv	5	17,8	18,1	18,6	20,1
78	33317	Shepetivka	4	17,5	17,8	18,3	19,8
79	33392	Yavoriv	4	17,5	17,8	18,4	19,5
80	33356	Yahotyn	13	19,0	19,4	19,6	20,8
81	33645	Yaremche	4	16,0	16,5	16,7	18,2

Rank – 1961-2023 (warmest season), *Play – rank 1981-2023

Precipitation



The SEECOF–29 climate outlook indicated approximately equal probabilities for below-, near- or above normal precipitation for the entire territory of Ukraine.

Monitoring of precipitation showed unequal distribution dry, normal and wet summer conditions across the country. In the western and north-eastern parts were dominated normal and wet conditions, in the rest of the territory of Ukraine were prevailed dry conditions, with separate normal and wet places based on the tercile method 1981–2010 climatological period (Figure 3).

When using the different climatological base period 1991–2020, there are some more normal points in the central part of the country (Figure 4).

Figure 3

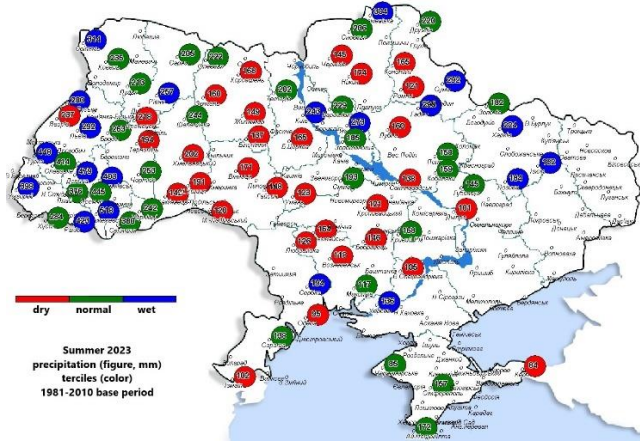
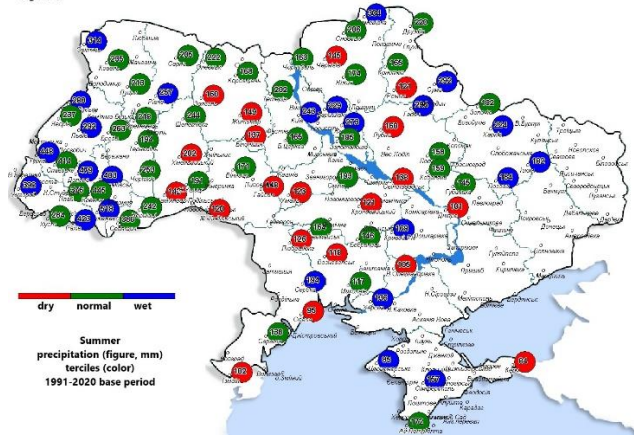


Figure 4



Note: Tercile analysis of meteorological elements was performed on the basis of the data obtained from 81 meteorological stations.

Summer 2023			Precipitation (mm) 1981-2010 base period				
synop	Station		Rank	33	50	66	Observed
1	33526	Ivano-Frankivsk	5	215	236	283	403
2	33889	Izmail	51	112	125	143	102
3	33415	Izium	20	138	154	169	182
4	33998	Ai-Petri	29	138	153	212	172
5	33464	Bila Cerkva	46	189	219	230	165
6	33446	Bilopilla	57	210	220	253	137
7	33354	Baryshyvka	24	195	224	262	229
8	33717	Bobryniec	40	151	182	198	146
9	33297	Brody	28	209	242	290	263
10	33862	V.Oleksandrivka	51	131	154	169	105
11	33562	Vinnytsa	46	201	221	273	171
12	33777	Voznesensk	54	152	170	189	118
13	33376	Hadyach	6	161	174	207	295
14	33577	Haisyn	53	183	201	229	148
15	34407	Hybinyha	37	141	163	176	145
16	34504	Dnipro	53	130	146	159	101
17	33524	Dolyna	13	290	350	384	479
18	33058	Dryzhba	28	197	220	260	220
19	33325	Zhytomyr	52	195	242	271	149
20	333312	Zviahel	55	216	232	258	160
21	33484	Zolotonosha	35	170	186	211	185
22	34208	Zolochiv	33	147	177	200	182
23	33548	Kamyanec-Podilskiy	60	214	245	297	142

24	33983	Kerch	49	94	110	139	84
25	33345	Kyiv	19	199	216	231	243
26	33621	Kobeliaky	29	115	137	167	159
27	33173	Kovel	29	190	229	266	235
28	33261	Konotop	42	170	189	202	165
29	33215	Korosten	47	187	227	269	168
30	33299	Kremenec	42	219	245	310	218
31	33791	Kryvyi Rih	20	137	149	169	168
32	33711	Kropyvnytskyi	48	152	181	213	121
33	34409	Lozova	18	123	165	183	184
34	33377	Lubny	45	175	194	250	160
35	33187	Lutck	30	171	200	237	213
36	33393	Lviv	20	221	251	287	292
37	33761	Liybashivka	50	145	168	204	126
38	33075	Lubeshiv	12	229	271	274	227
39	33663	Mohyliv-Podilskyi	58	201	231	267	120
40	33846	Mykolaiv	35	104	114	131	117
41	33557	Nova Ushytsa	45	211	262	303	191
42	33246	Nizhyn	43	200	218	234	174
43	33837	Odesa	44	98	128	164	95
44	33203	Olevsk	34	214	252	287	222
45	33699	Pervomaisk	41	169	201	243	164
46	33515	*Play	37	365	424	485	376
47	33646	Pozhezhevska	25	404	455	478	518
48	33506	Poltava	39	154	170	196	158
49	33301	Rivne	21	195	236	256	257
50	33287	Rava-Ryska	18	215	230	257	280
51	33647	Rahiv	14	286	314	378	423
52	33268	Romny	59	178	189	228	121
53	33946	Simferopol	24	100	136	179	157
54	33896	Sarata	41	126	150	195	138
55	33088	Sarny	41	205	224	275	205
56	33614	Svitlovodsk	46	147	173	208	138
57	33067	Svityaz	9	186	209	231	314
58	33657	Selyatyn	29	310	384	435	380

59	33049	Semenivka	7	182	209	241	304
60	33833	Serbka	16	136	150	178	194
61	33516	Slavske	23	304	378	418	414
62	33593	Smila	31	159	176	217	193
63	33136	Snovsk	32	169	215	245	206
64	33275	Symy	4	161	189	213	292
65	33415	Ternopil	43	204	242	268	194
66	33228	Teteriv	36	196	224	270	202
67	33511	Tyrka	14	326	350	369	448
68	33631	Uzhhorod	4	185	204	264	398
69	33587	Uman	57	197	219	253	123
70	34300	Kharkiv	10	128	143	171	224
71	33902	Kherson	21	90	105	128	136
72	33429	Khmelnitskiy	49	241	264	313	202
73	33638	Khyst	31	241	282	354	284
74	33658	Chernivci	31	230	263	275	242
75	33135	Chernihiv	50	170	197	210	145
76	33924	Chornomorske	27	54	67	90	85
77	33536	Chortkiv	27	207	246	275	253
78	33317	Shepetivka	32	224	257	294	244
79	33392	Yavoriv	41	242	261	279	237
80	33356	Yahotyn	9	176	198	229	273
81	33645	Yaremche	24	372	400	452	445

Rank – 1961-2023 (wettest season), *Play – rank 1981-2023

Assessment of the SEECOF-29 Climate outlook for summer 2023

Country	Seasonal Temperature (JJA)		Seasonal Precipitation (JJA)		High impact Events
	Observed	SEECOF-29 climate outlook	Observed	SEECOF-29 climate outlook	
Ukraine	above normal	<p>above normal (western part)</p> <p>above and normal (eastern part)</p>	<p>above normal (28% stations)</p> <p>normal (31% stations)</p> <p>below normal (41% stations)</p>	<p>above normal 33</p> <p>normal 34</p> <p>below normal 33</p>	<p>During summer meteorological extraordinary phenomenas were observed in many regions of the country.</p> <p>Heavy rains 30-80 mm precipitation with duration from 2 to 12 hours were recorded in the western, northern and north-eastern parts of the country and in Odesa region.</p> <p>Heavy showers 30-43 mm/hour. In Odesa was recorded 57 mm/hour 20/07/23.</p> <p>Storm winds and squalls (with speed 25-29 m/c) were fixed in Zakarpattia (Uzhhorod), Kyiv (Baryshivka) regions and Odesa.</p> <p>Locally caused loss power, telecommunications, utilities and transport.</p>

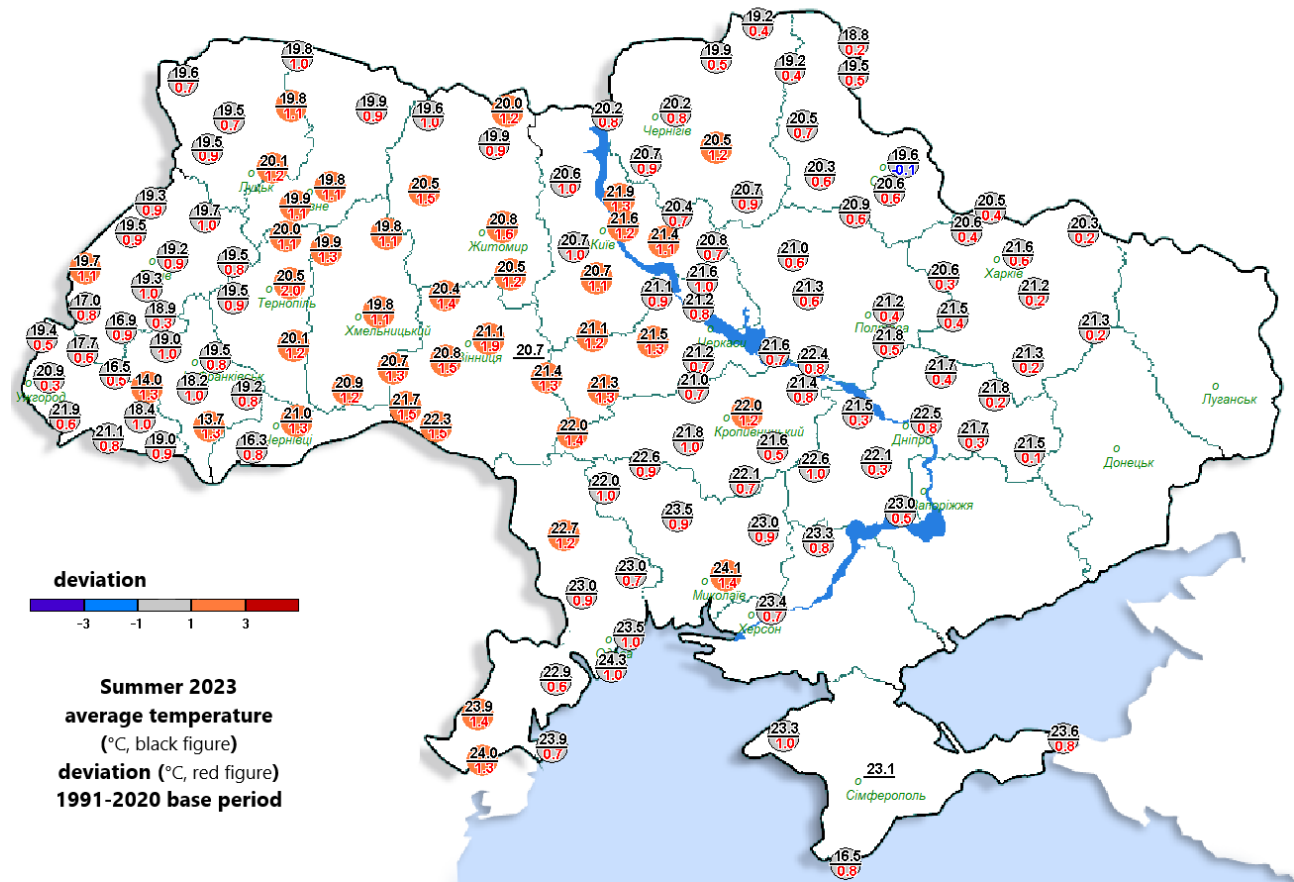
Analysis of the summer 2023 season for Ukraine compared to the 1991-2020 base period

Temperature

The average air temperature during summer 2023 was from 19°C in the northeast to 24°C in the southwest and in Carpathian and Crimea mountains was 13...17°C.

Deviations the mean air summer temperature from average values of the 1991-2020 base period were +0,2...1,9°C (Figure.1).

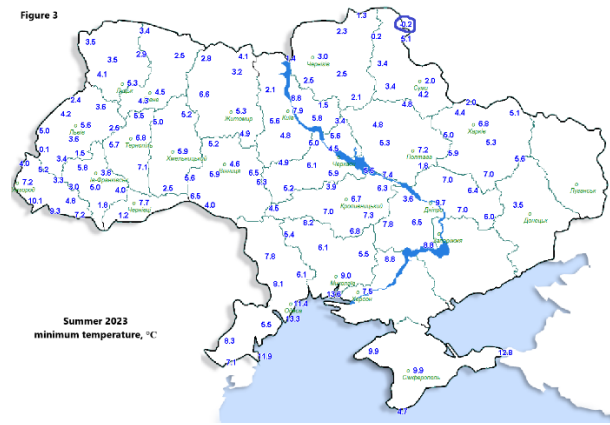
Figure 1



Maximum temperature was in the range from 32,8°C in Sumy region (northeast) to 39,6°C in Mykolaiv (south), in Carpathian and Crimea mountains (highlands) 25...29°C (Figure 2).

The highest daily air temperature during summer 2023, measuring 39,6°C was observed on 6th of July in Mykolaiv.

Temperatura 40°C and above is a very dangerous phenomenon (red level) for Ukraine was not recorded in summer 2023. But summer season started on 13-20th of May and finished on 1-9th of October.



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

Number of tropical days was in the range from 10 to 30 days in the entire of the country. In the southern part number of tropical days was 32-49 days and the maximum 50-52 days were fixed in the south part of Odesa and Mykolaiv regions. The number of days with maximum temperature 35°C and above were fixed from 1-3 days in the western and northern parts to 10-13 days in the south part of the country.

The minimum temperature ranged from -0,2°C in Sumy region (north-east of the country) to 13,6°C on the coast of the sea in Mykolaiv region (south), in Carpathian and Crimea mountains from 1.8 to 4,7 °C (Figure 3).

The lowest air temperature during summer 2023, measuring -0,2°C was observed on 4th of June in Druzhba Sumy 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 34 (42-49 in Odesa region) and they were located in the southern part (especially in coastal zone) and on the banks of rivers in central parts of Ukraine.

Minimum number of tropical night were fixed in the rest of the country, it was from 1 to 9.

Precipitation

In summer 2023 normal and wet conditions were dominated in Ukraine (80...202% of the norm), but in some places were dry conditions (45...79 %) compared to the average values of the 1991-2020 base period (Figure.4).

Seasonal precipitation was ranged from 73 mm in Odesa region to 397 mm in Chernihiv region and 228...540 mm in the Carpathian region (Figure 4).

The biggest daily precipitation
 24/06 in Berezhany 69 mm (Ternopil region),
 09/07 in Hadiach 88 mm (Poltava region),
 09/07 in Slobozhanske 89 mm (Kharkiv region),
 14/07 in Boryspil 63 mm (Kyiv region).

Figure 4

