# VERIFICATION OF THE SEECOF–28
# WINTER 2022 – 2023 CLIMATE OUTLOOK
# AND
# SEASONAL BULLETIN
# FOR THE TERRITORY OF UKRAINE

**Kyiv, 10 April 2023**


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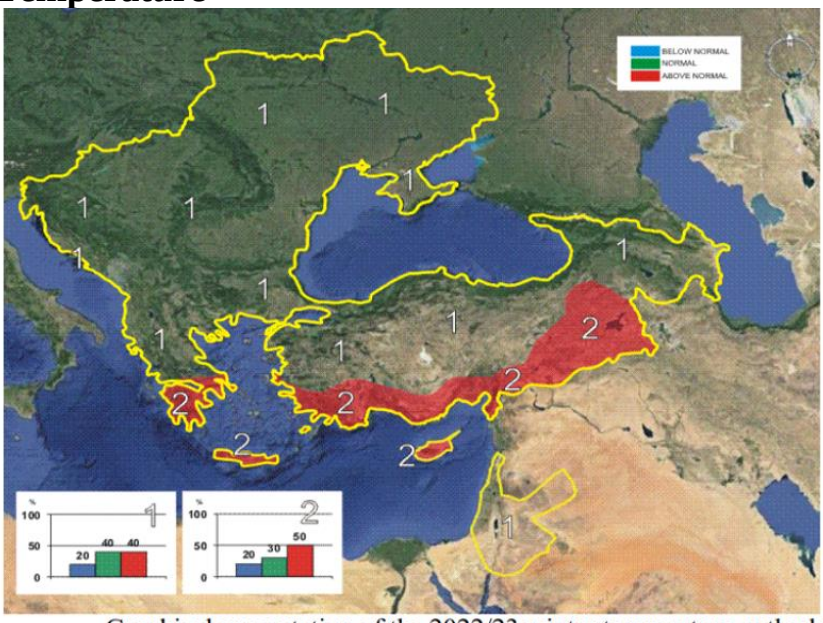
# VERIFICATION OF THE SEECOF–28 WINTER 2022-23 CLIMATE OUTLOOK FOR THE TERRITORY OF UKRAINE (1981–2010 BASE PERIOD)

## Temperature




Graphical presentation of the 2022/23 winter temperature outlook

According to the SEECOF-28 outlook for the winter 2022-23 in Ukraine, seasonal temperature was expected warmer (upper tercile) and normal with equal probability 40% and below (low tercile) with probability (20%) compared to the 1981–2010 climatological base period.

Climatological monitoring showed that the winter 2022-23 was warm for the territory of Ukraine based on the tercile method (Figure 1.).

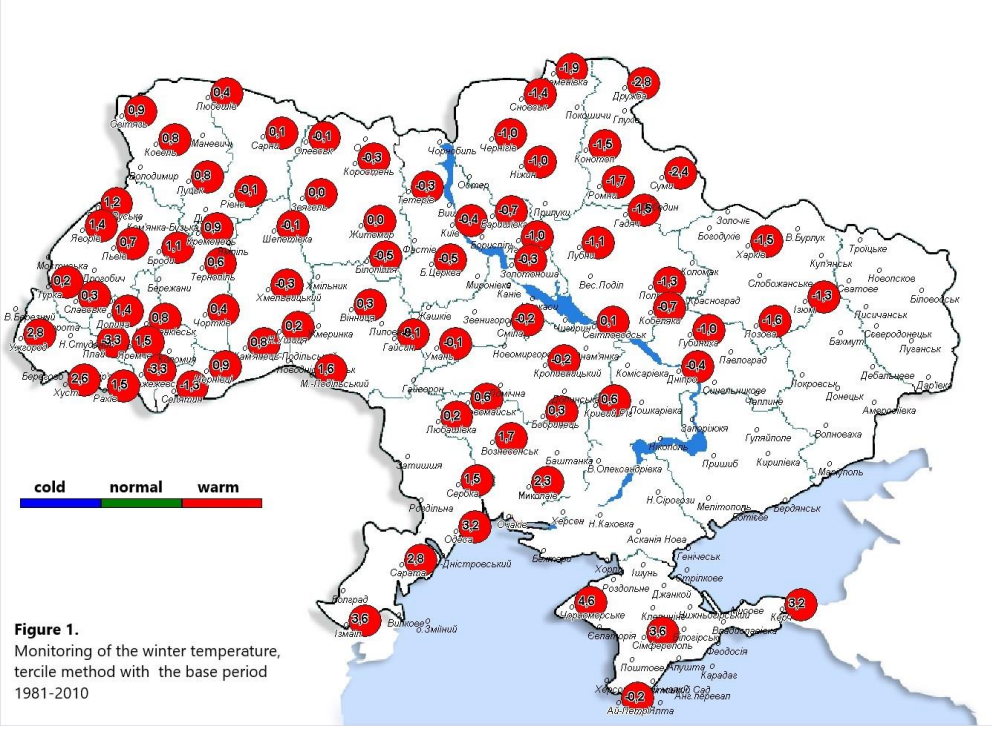



**Figure 1.**
Monitoring of the winter temperature, tercile method with the base period 1981-2010

**Note**: Tercile analysis of meteorological elements was performed on the basis of the data from 78 meteorological stations.

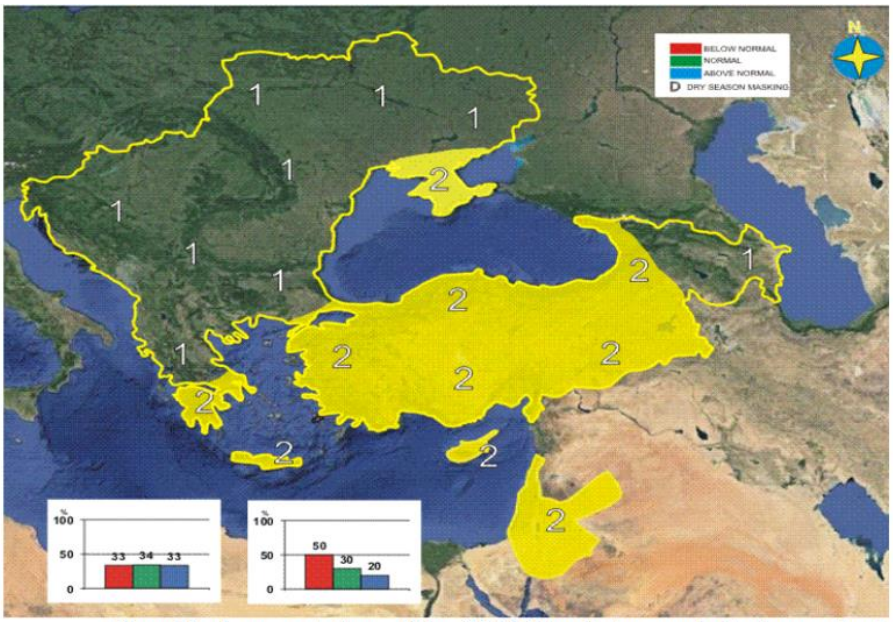
| Winter 2022-23 | | | Air Temperature (°C) | | | | |
|---|---|---|---|---|---|---|---|
| synop | | Station | Rank | 33 | 50 | 66 | Observed |
| 1 | 33998 | Ai-Petri | 3 | -3,1 | -2,6 | -2,2 | -0,2 |
| 2 | 33526 | Ivano-Frankivsk | 9 | -3,0 | -2,2 | -1,4 | 0,8 |
| 3 | 33889 | Izmail | 3 | -0,4 | 0,4 | 1,4 | 3,6 |
| 4 | 34415 | Izym | 11 | -4,2 | -3,6 | -2,8 | -1,3 |
| 5 | 33464 | Bila Cerkva | 6 | -3,5 | -2,8 | -2,0 | -0,5 |
| 6 | 33446 | Bilopillya | 5 | -3,7 | -3,1 | -2,2 | -0,5 |
| 7 | 33354 | Baryshyvka | 7 | -3,6 | -2,7 | -2,3 | -0,7 |
| 8 | 33717 | Bobrynec | 5 | -3,1 | -2,6 | -1,6 | 0,3 |
| 9 | 33297 | Brody | 5 | -2,2 | -1,8 | -0,8 | 1,1 |
| 10 | 33562 | Vinnyca | 2 | -3,5 | -3,3 | -2,3 | 0,3 |
| 11 | 33777 | Voznesensk | 3 | -1,8 | -1,4 | -0,2 | 1,7 |
| 12 | 33376 | Hadyach | 5 | -4,4 | -3,7 | -3,1 | -1,5 |
| 13 | 33577 | Haisyn | 6 | -3,2 | -2,8 | -1,8 | -0,1 |
| 14 | 34407 | Hybinyha | 9 | -4,1 | -3,4 | -2,7 | -1,0 |
| 15 | 34504 | Dnipro | 5 | -3,6 | -2,8 | -2,4 | -0,4 |
| 16 | 33524 | Dolyna | 5 | -2,5 | -1,5 | -0,7 | 1,4 |
| 17 | 33058 | Dryzhba | 8 | -5,4 | -4,5 | -4,2 | -2,8 |
| 18 | 33325 | Zhitomyr | 4 | -3,4 | -2,7 | -1,9 | 0,0 |
| 19 | 33484 | Zolotonosha | 5 | -3,4 | -2,5 | -2,0 | -0,3 |
| 20 | 33312 | Zviahel | 3 | -2,9 | -2,3 | -1,3 | 0.0 |
| 21 | 33548 | Kamyanec-Podilskiy | 4 | -3,1 | -2,6 | -1,1 | 0,8 |
| 22 | 33983 | Kerch | 7 | 0,3 | 1,3 | 1,9 | 3,2 |
| 23 | 33345 | **Kyiv** | 6 | -3,2 | -2,4 | -1,9 | -0,4 |
| 24 | 33621 | Kobelyaky | 5 | -3,7 | -2,8 | -2,5 | -0,7 |
| 25 | 33173 | Kovel | 5 | -2,2 | -1,6 | -0,8 | 0,8 |
| 26 | 33261 | Konotop | 4 | -4,6 | -3,7 | -3,1 | -1,5 |
| 27 | 33215 | Korosten | 5 | -3,3 | -2,4 | -1,7 | -0,3 |
| 28 | 33299 | Kremenec | 4 | -2,4 | -1,9 | -1,0 | 1,1 |
| 29 | 33791 | Kryviy Rih | 3 | -3,3 | -2,5 | -1,8 | 0,6 |
| 30 | 33711 | Kropyvnutsky | 4 | -3,5 | -2,9 | -2,0 | -0,2 |
| 31 | 34409 | Lozova | 10 | -4,2 | -3,9 | -3,3 | -1,6 |
| 32 | 33377 | Lubnu | 4 | -4,0 | -3,2 | -2,9 | -1,1 |
| 33 | 33187 | Luck | 3 | -2,7 | -2,1 | -1,2 | 0,8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 34 | 33393 | Lviv | 4 | -2,8 | -2,2 | -1,2 | 0,7 |
| 35 | 33761 | Liybashivka | 4 | -3,0 | -2,4 | -1,1 | 0,2 |
| 36 | 33075 | Lybeshiv | 6 | -2,4 | -1,6 | -0,9 | 0,4 |
| 37 | 33846 | Mykolaiv | 3 | -1,7 | -1,1 | -0,3 | 2,3 |
| 38 | 33663 | Mohyliv-Podilskiy | 4 | -2,1 | -1,4 | -0,2 | 1,6 |
| 39 | 33557 | Nova Ushica | 4 | -3,4 | -2,8 | -1,5 | 0.2 |
| 40 | 33246 | Nizhin | 4 | -4,1 | -3,3 | -2,8 | -1.0 |
| 41 | 33837 | Odesa | 3 | -0,4 | 0,1 | 1,0 | 3.2 |
| 42 | 33203 | Olevsk | 6 | -3,1 | -2,4 | -1,4 | -0.1 |
| 43 | 33699 | Pervomaisk | 4 | -2,8 | -2,1 | -0,8 | 0.6 |
| 44 | 33515 | *Play | 2 | -6,5 | -5,9 | -5,3 | -3.3 |
| 45 | 33646 | Pozhezhevska | 4 | -6,2 | -5,6 | -5,2 | -3.3 |
| 46 | 33506 | Poltava | 7 | -4,3 | -3,4 | -3,0 | -1.3 |
| 47 | 33301 | Rivne | 5 | -2,9 | -2,3 | -1,6 | -0.1 |
| 48 | 33287 | Rava-Ryska | 4 | -2,4 | -1,6 | -0,7 | 1.2 |
| 49 | 33647 | Rahiv | **1** | -2,8 | -2,1 | -1,7 | 1.5 |
| 50 | 33268 | Romny | 4 | -4,8 | -3,9 | -3,5 | -1.7 |
| 51 | 33946 | Simferopol | 3 | 0,2 | 1,1 | 1,7 | 3.6 |
| 52 | 33896 | Sarata | 2 | -0,9 | -0,3 | 0,8 | 2.8 |
| 53 | 33088 | Sarny | 7 | -2,8 | -2,2 | -1,2 | 0.1 |
| 54 | 33614 | Svitlovodsk | 4 | -3,0 | -2,3 | -1,7 | 0.1 |
| 55 | 33067 | Svityaz | 5 | -2,7 | -1,5 | -0,7 | 0.9 |
| 56 | 33657 | Selyatyn | 2 | -5,2 | -4,8 | -4,0 | -1.3 |
| 57 | 33049 | Semenivka | 3 | -4,9 | -4,0 | -3,6 | -1.9 |
| 58 | 33833 | Serbka | 4 | -1,9 | -1,3 | -0,3 | 1.5 |
| 59 | 33317 | Shepetivka | 3 | -3,3 | -2,7 | -1,7 | -0,1 |
| 60 | 33516 | Slavske | 2 | -4,4 | -3,9 | -2,7 | 0.3 |
| 61 | 33136 | Snovsk | 5 | -4,4 | -3,4 | -3,1 | -1,4 |
| 62 | 33593 | Smila | 5 | -3,8 | -2,7 | -2,0 | -0.2 |
| 63 | 33275 | Symy | 7 | -5,1 | -4,5 | -3,8 | -2.4 |
| 64 | 33415 | Ternopil | 2 | -3,5 | -2,9 | -1,9 | 06 |
| 65 | 33228 | Teteriv | 5 | -3,3 | -2,5 | -1,7 | -0.3 |
| 66 | 33511 | Tyrka | 4 | -3,9 | -3,4 | -1,9 | 0.2 |
| 67 | 33631 | Uzhhorod | 2 | -1,7 | -1,0 | 0,2 | 2,8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 68 | 33587 | Uman | 4 | -3,6 | -2,8 | -1,7 | -0,1 |
| 69 | 34300 | Kharkiv | 6 | -5,2 | -3,9 | -3,2 | -1,5 |
| 70 | 33429 | Khmelnitskiy | 5 | -3,7 | -3,2 | -1,8 | -0,3 |
| 71 | 33638 | Khyst | **1** | -2,5 | -1,8 | -0,3 | 2,6 |
| 72 | 33658 | Chernivci | 6 | -2,8 | -2,1 | -0,8 | 0,9 |
| 73 | 33135 | Chernihiv | 3 | -4,3 | -3,0 | -2,9 | -1,0 |
| 74 | 33924 | Chornomorske | 3 | 1,2 | 2,0 | 2,5 | 4,6 |
| 75 | 33536 | Chortkiv | 5 | -3,3 | -2,6 | -1,4 | 0,4 |
| 76 | 33392 | Yavoriv | 4 | -2,5 | -1,9 | -0,7 | 1,4 |
| 77 | 33356 | Yahotyn | 6 | -3,9 | -3,0 | -2,6 | -1,0 |
| 78 | 33645 | Yaremche | 4 | -2,5 | -2,0 | -0,8 | 1,5 |

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

## Precipitation




Graphical presentation of the 2022/23 winter precipitation outlook

The SEECOF–28 climate outlook indicated equal probabilities for below (33%), normal (34%) and above normal (33%) conditions for the most of the territory of Ukraine, only for the southernmost part of the country were denoted dry (50%), normal (30%) and wet (20%) conditions.

Monitoring of precipitation showed wet and normal conditions in most of the country. (Figure 2). Dry conditions were prevailed in Odesa region and Crimea, it also were fixed in some plases in the central and eastern parts of Ukraine based on the tercile method with 1981–2010 climatological base period.

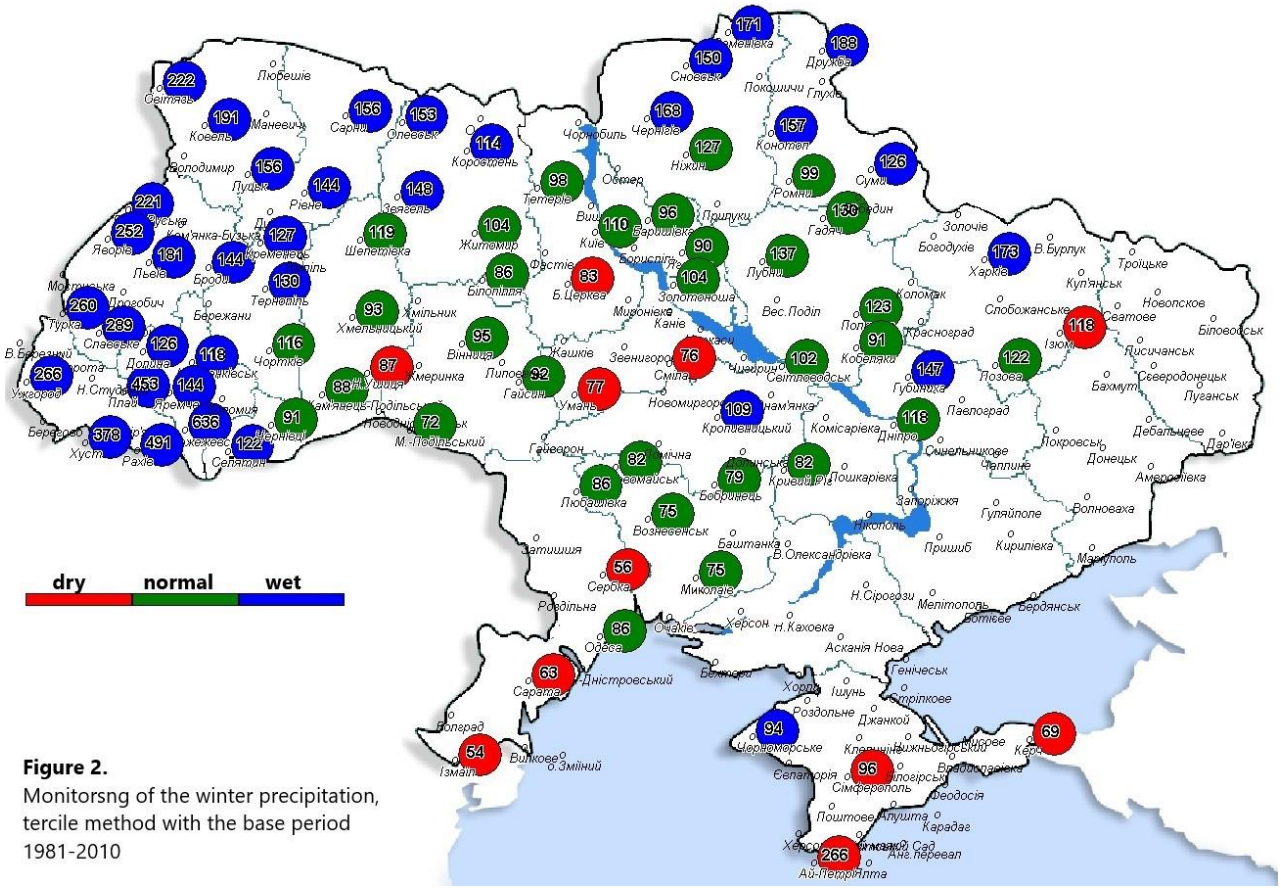



**Figure 2.**
Monitorsng of the winter precipitation, tercile method with the base period 1981-2010

**Note**: Tercile analysis of meteorological elements was performed on the basis of the data from 77 meteorological stations.

| Winter 2022-23 | | | Precipitation (mm) | | | | |
|---|---|---|---|---|---|---|---|
| synop | | Station | Rank | 33 | 50 | 66 | Observed |
| 1 | 33998 | Ai-Petri | 54 | 317 | 358 | 427 | 266 |
| 2 | 33526 | Ivano-Frankivsk | 18 | 83 | 91 | 104 | 118 |
| 3 | 33889 | Izmail | 6 | 73 | 84 | 97 | 54 |
| 4 | 34415 | Izym | 12 | 123 | 137 | 150 | 118 |
| 5 | 33464 | Bila Cerkva | 47 | 87 | 95 | 114 | 83 |
| 6 | 33446 | Bilopillya | 45 | 80 | 99 | 103 | 86 |
| 7 | 33354 | Baryshyvka | 31 | 79 | 94 | 105 | 96 |
| 8 | 33717 | Bobrynec | 46 | 77 | 95 | 115 | 79 |
| 9 | 33297 | Brody | 19 | 100 | 113 | 123 | 144 |
| 10 | 33562 | Vinnyca | 38 | 77 | 88 | 103 | 95 |
| 11 | 33777 | Voznesensk | 42 | 64 | 91 | 109 | 75 |
| 12 | 33376 | Hadyach | 30 | 110 | 128 | 133 | 130 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 13 | 33577 | Haisyn | 45 | 88 | 97 | 107 | 92 |
| 14 | 34407 | Hybinyha | 18 | 105 | 118 | 126 | 147 |
| 15 | 34504 | Dnipro | 40 | 112 | 120 | 139 | 118 |
| 16 | 33524 | Dolyna | 22 | 90 | 102 | 118 | 126 |
| 17 | 33058 | Dryzhba | 5 | 112 | 121 | 148 | 188 |
| 18 | 33325 | Zhitomyr | 31 | 81 | 103 | 107 | 104 |
| 19 | 33484 | Zolotonosha | 38 | 94 | 104 | 117 | 104 |
| 20 | 33312 | Zviahel | 13 | 106 | 119 | 131 | 148 |
| 21 | 33548 | Kamyanec-Podilskiy | 38 | 83 | 97 | 115 | 88 |
| 22 | 33983 | Kerch | 53 | 86 | 105 | 120 | 69 |
| 23 | 33345 | **Kyiv** | 46 | 110 | 119 | 127 | 110 |
| 24 | 33621 | Kobelyaky | 44 | 88 | 113 | 127 | 91 |
| 25 | 33173 | Kovel | **1** | 92 | 103 | 120 | 191 |
| 26 | 33261 | Konotop | 15 | 100 | 115 | 125 | 157 |
| 27 | 33215 | Korosten | 21 | 85 | 99 | 102 | 114 |
| 28 | 33299 | Kremenec | 25 | 101 | 111 | 122 | 127 |
| 29 | 33791 | Kryviy Rih | 39 | 68 | 83 | 93 | 82 |
| 30 | 33711 | Kropyvnutsky | 19 | 76 | 82 | 101 | 109 |
| 31 | 34409 | Lozova | 32 | 108 | 118 | 130 | 115 |
| 32 | 33377 | Lubnu | 34 | 115 | 129 | 141 | 137 |
| 33 | 33187 | Luck | 4 | 70 | 83 | 95 | 156 |
| 34 | 33393 | Lviv | 11 | 113 | 120 | 145 | 181 |
| 35 | 33761 | Liybashivka | **1** | 74 | 87 | 107 | 86 |
| 36 | 33846 | Mykolaiv | 42 | 68 | 88 | 109 | 75 |
| 37 | 33663 | Mohyliv-Podilskiy | 44 | 69 | 85 | 99 | 72 |
| 38 | 33557 | Nova Ushica | 48 | 88 | 100 | 116 | 87 |
| 39 | 33246 | Nizhin | 28 | 105 | 118 | 127 | 127 |
| 40 | 33837 | Odesa | 44 | 81 | 102 | 120 | 86 |
| 41 | 33203 | Olevsk | 14 | 102 | 115 | 126 | 153 |
| 42 | 33699 | Pervomaisk | 44 | 81 | 106 | 113 | 82 |
| 43 | 33515 | *Play | 12 | 265 | 299 | 358 | 453 |
| 44 | 33646 | Pozhezhevska | 3 | 208 | 227 | 251 | 636 |
| 45 | 33506 | Poltava | 29 | 93 | 118 | 126 | 123 |
| 46 | 33301 | Rivne | 5 | 73 | 80 | 92 | 144 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 47 | 33287 | Rava-Ryska | 5 | 95 | 112 | 120 | 221 |
| 48 | 33647 | Rahiv | 5 | 229 | 245 | 321 | 491 |
| 49 | 33268 | Romny | 42 | 90 | 122 | 135 | 99 |
| 50 | 33946 | Simferopol | 48 | 99 | 125 | 140 | 96 |
| 51 | 33896 | Sarata | 48 | 66 | 85 | 101 | 63 |
| 52 | 33088 | Sarny | 5 | 86 | 96 | 108 | 156 |
| 53 | 33614 | Svitlovodsk | 30 | 78 | 93 | 102 | 102 |
| 54 | 33067 | Svityaz | **1** | 89 | 96 | 108 | 222 |
| 55 | 33657 | Selyatyn | 17 | 78 | 90 | 102 | 122 |
| 56 | 33049 | Semenivka | 7 | 100 | 125 | 131 | 171 |
| 57 | 33833 | Serbka | 51 | 61 | 79 | 84 | 56 |
| 58 | 33317 | Shepetivka | 34 | 107 | 111 | 125 | 119 |
| 59 | 33516 | Slavske | 4 | 149 | 163 | 177 | 289 |
| 60 | 33136 | Snovsk | 20 | 102 | 126 | 135 | 150 |
| 61 | 33593 | Smila | 49 | 83 | 105 | 113 | 76 |
| 62 | 33275 | Symy | 24 | 85 | 106 | 116 | 126 |
| 63 | 33415 | Ternopil | 12 | 77 | 89 | 96 | 130 |
| 64 | 33228 | Teteriv | 47 | 97 | 109 | 118 | 98 |
| 65 | 33511 | Tyrka | 3 | 153 | 165 | 179 | 260 |
| 66 | 33631 | Uzhhorod | 5 | 159 | 187 | 203 | 266 |
| 67 | 33587 | Uman | 52 | 92 | 108 | 123 | 77 |
| 68 | 34300 | Kharkiv | 8 | 90 | 96 | 116 | 173 |
| 69 | 33429 | Khmelnitskiy | 45 | 86 | 102 | 112 | 93 |
| 70 | 33638 | Khyst | 10 | 259 | 277 | 325 | 378 |
| 71 | 33658 | Chernivci | 30 | 69 | 86 | 91 | 91 |
| 72 | 33135 | Chernihiv | 8 | 97 | 120 | 128 | 168 |
| 73 | 33924 | Chornomorske | 31 | 68 | 76 | 93 | 94 |
| 74 | 33536 | Chortkiv | 29 | 90 | 102 | 117 | 116 |
| 75 | 33392 | Yavoriv | 2 | 117 | 136 | 157 | 252 |
| 76 | 33356 | Yahotyn | 41 | 75 | 96 | 108 | 90 |
| 77 | 33645 | Yaremche | 10 | 93 | 109 | 110 | 144 |

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

# Assessment of the SEECOF-28 Climate outlook for winter 2022-23

| Countru | Sesonal Temperature (DJF) | | Sesonal Precipitation (DJF) | | Hight impact Events |
|---|---|---|---|---|---|
| | Observed | SEECOF-28 climate outlook | Observed | SEECOF-28 climate outlook | |
| Ukraine | **above**<br>normal | **above and normal (40%)**<br>**below normal (20%)** | **above** normal (46%)<br>**normal** (40%)<br>**below** normal (14%) | **above (33%)**<br>**normal (34%)**<br>**below (33%)** | Meteorological extraordinary phenomena were observed<br><br>**In December**<br>10-11th - **heavy rain** (amount of precipitation 60-88 mm) in Zakarpattia regions,<br>**heavy snowfall** (30-57 mm, snow depth 20-30 sm) in Volyn and Lviv regions.<br><br>**In January** were recorded<br>18-19th **heavy snowfalls** (60-80 mm) in Carpathian mountains, **heavy rain** (60-80 mm) in Zakarpattia region.<br><br>**In Fabruary** were recorded<br>18, 21th - **strong wind** 25 m/c in Khmelnytsk region,<br>25 th - **strong wind** 26 m/c in Ivano-Frankivsk region.<br>18-19th - **heavy snowfalls** (60-82 mm) in Carpathian mountains, **heavy rain** (60-70 mm) in Zakarpattia region.<br>25th - **heavy rain** (30-52 mm) in Zakarpattia region, **heavy snowfalls** (20-48 mm) in Carpathian mountains.<br><br>Unfavorable weather conditions caused loss power, telecommunications, utilities and transport. |

# Short analysis of the winter season 2022-2023 for Ukraine compared to the 1981-2010 base period

## Temperature

The average winter temperature 2022-23 was ranged from -2.8°C in the northeast to 4.4°C in the southwest of Ukraine (4.6°C in Crimea) and on highlands of the Carpathian mountains was –3.3°C.

Deviations of the mean air winter temperature from average values of the 1981-2010 base period were +2.3 …+4.3°C (Figure.1).

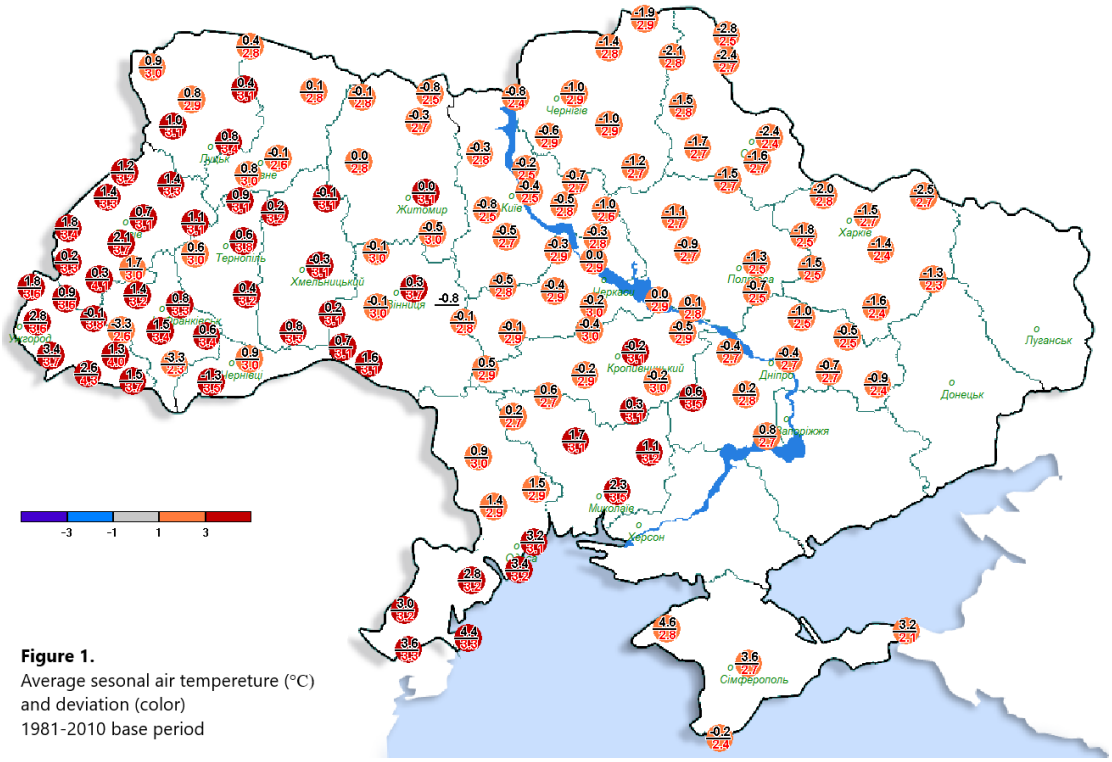



**Figure 1.**
Average sesonal air tempereture (°C) and deviation (color) 1981-2010 base period

**Note**: Climatological analysis of meteorological elements was performed on the basis of the data from 134 meteorological stations.

The minimum temperature ranged from –7°C in Odesa region (southwest of the country) to –25°C in Sumy region (northeast). In the Carpathian mountains minimum temperature was –15... –25°C.
The lowest air temperature during winter 2022-23, measuring –25.3°C was observed on 08th of Jenuary in Druzhba (Sumy region).

Maximum temperature was in the range from 8°C in Sumy region (northeast) to 19°C in Odessa region (southwest) and 21°C in Crimea. In Carpathian mountains (highlands) 5…6°C.
The highest daily air temperature during the winter 2022-23, measuring 20,8°C was observed on 20th of Jenuary in Simferopol.

## Precipitation

In the winter 2022-23 were dominated wet and normal conditions (81…247%), in Kremia, Odesa region and some places in central part were fixed dry conditions (58…79%) compared to the average values of the 1981-2010 base period (Figure.2).

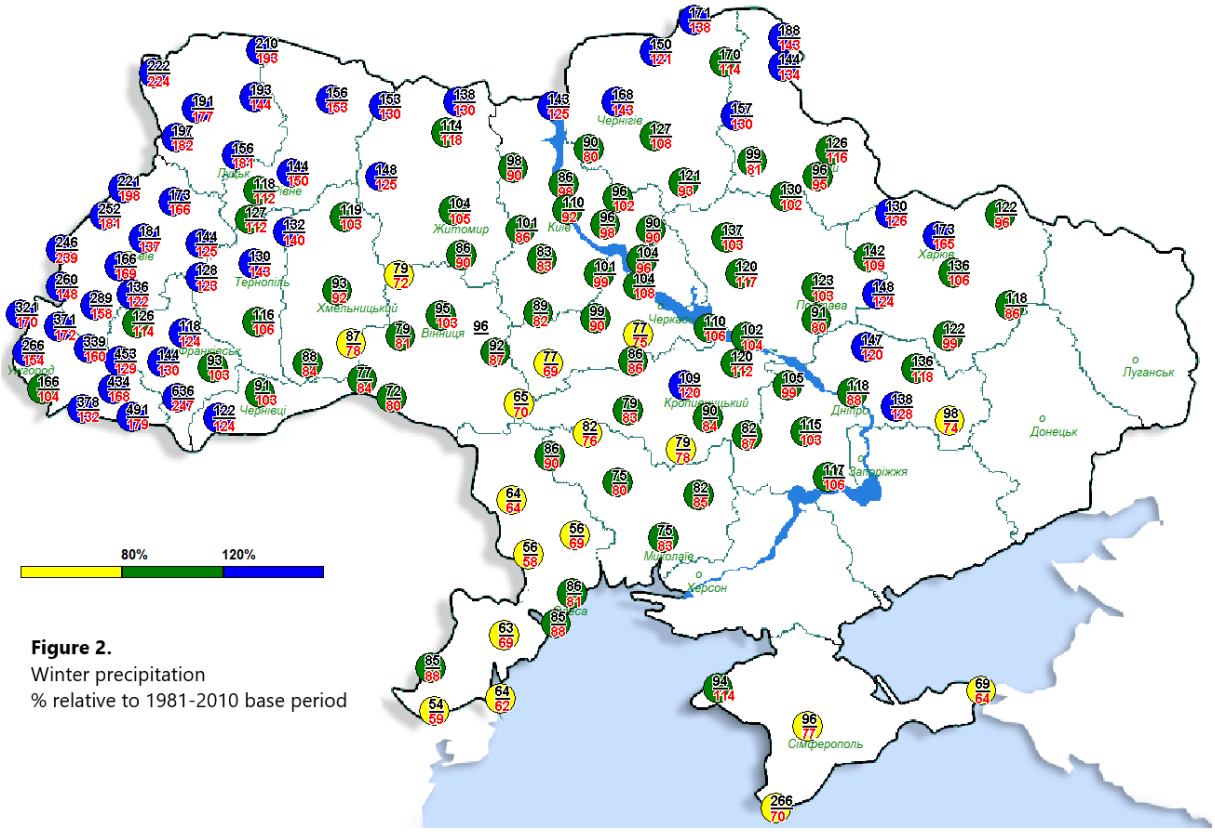



**Figure 2.**
Winter precipitation
% relative to 1981-2010 base period

Seasonal precipitation was ranged from 54 mm (59% of the norm) in Izmail (Odesa region) to 491 mm (179%) in Rakhiv (Zakarpattia region) and 636 mm (247%) in the hightland of Carpathian (Pozhezhevska) (Figure 2).

The biggest daily presipitation 52 mm was recorded on 18th of January in Play (hightland of Carpathian) and on 25 th of February in Rakhiv (Zakarpattia region).

Winter 2022-23 was not very snowy but maximum snow depth was recorded from 1-12 cm in southern part to 20-33 cm in northern and western parts of Ukraine. In Carpathian and Crimea mountains (highlands) was recorded snow depth 27…85 cm.

Number of days with snow cover in the winter 2022-23 was 2..19 days in the southern part of Ukraine, 10…41 days in the central and eastern parts, 20…74 days in the western and northern parts, 42…88 days in Crimea and Carpathian mountains.