

# Biuletyn Meteorologiczny Meteorological Bulletin

## Karkonoska Stacja Meteorologiczna Uniwersytetu Wrocławskiego na Szrenicy 1991/4

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Zakład Klimatologii i Ochrony Atmosfery  
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Uniwersytet Wrocławski  
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Położenie obserwatorium (observatory location)

Współrzędne geograficzne (coordinates): 15°30'44"E 50°27'47"N

Wysokość nad poziomem morza (altitude): 1364 m

Czas podawany w bieuletynie jest czasem UTC.

UTC time is used in the bulletin.

| Parametr Parameter | Opis                                       | Description                           |
|--------------------|--|---------------------------------------|
| D                  | Dzień                                      | Day                                   |
| T                  | Temperatura powietrza                      | Air temperature                       |
| Tmax               | Temperatura maksymalna                     | Maximum temperature                   |
| Tmin               | Temperatura minimalna                      | Minimum temperature                   |
| Tmin5              | Temperatura minimalna przy gruncie         | Minimum temperature near the ground   |
| U                  | Wilgotność względna                        | Relative humidity                     |
| e                  | Ciśnienie pary wodnej                      | Vapour pressure                       |
| P                  | Ciśnienie atmosferyczne na poziomie stacji | Atmospheric pressure at station level |
| V                  | Prędkość wiatru                            | Wind speed                            |
| α                  | Kierunek wiatru                            | Wind direction                        |
| R                  | Dobowa suma opadu                          | Precipitation                         |
| HS                 | Wysokość pokrywy śnieżnej                  | Snow depth                            |
| SD                 | Usłonecznienie                             | Sunshine duration                     |
| NA                 | Brak danych                                | No data                               |
| m                  | Średnia dobowa                             | Daily mean                            |
| •                  | Zjawisko nie wystąpiło                     | Lack of phenomenon                    |

**Tabela 1. Temperatura powietrza (T), wilgotność względna (U) i ciśnienie atmosferyczne (P)****Table 1. Air temperature (T), relative humidity (U) and atmospheric pressure (P)**

| D  | T [°C] |      |      |      |      |      |       | U [%] |     |     |     |     | P [hPa] |       |       |       |       |       |
|----|--------|------|------|------|------|------|-------|-------|-----|-----|-----|-----|---------|-------|-------|-------|-------|-------|
|    | 00     | 07   | 12   | 18   | Tm   | Tmax | Tmin  | Tmin5 | 00  | 06  | 12  | 18  | Um      | 00    | 06    | 12    | 18    | Pm    |
| 1  | -5.9   | -5.8 | -0.5 | -0.5 | -3.2 | 0.2  | -6.6  | -7.7  | 96  | 97  | 93  | 100 | 97      | 860.8 | 859.0 | 858.7 | 855.3 | 858.5 |
| 2  | 0.1    | 1.6  | 2.5  | 3.0  | 1.8  | 3.4  | -0.6  | -0.8  | 100 | 100 | 100 | 100 | 100     | 854.5 | 852.8 | 852.5 | 853.1 | 853.2 |
| 3  | 3.9    | 3.5  | 9.0  | 5.1  | 5.4  | 9.0  | 2.5   | 1.1   | 97  | 91  | 64  | 79  | 83      | 853.0 | 852.1 | 853.4 | 854.0 | 853.1 |
| 4  | 5.2    | 4.9  | 5.3  | 2.9  | 4.6  | 7.2  | 2.9   | 0.5   | 84  | 83  | 82  | 88  | 84      | 855.5 | 855.0 | 853.9 | 850.5 | 853.7 |
| 5  | 1.6    | 1.7  | 5.0  | 4.3  | 3.2  | 6.3  | 1.2   | -0.6  | 89  | 94  | 83  | 92  | 90      | 848.1 | 847.7 | 849.3 | 852.0 | 849.3 |
| 6  | 3.0    | 3.0  | 4.5  | 3.5  | 3.5  | 5.6  | 1.6   | 1.5   | 96  | 99  | 86  | 80  | 90      | 854.5 | 857.6 | 861.0 | 862.3 | 858.9 |
| 7  | 2.7    | 2.5  | 1.1  | 1.5  | 2.0  | 4.1  | 1.0   | -0.8  | 83  | 91  | 97  | 94  | 91      | 862.1 | 861.2 | 861.1 | 860.5 | 861.2 |
| 8  | 0.0    | -0.7 | -0.5 | -1.5 | -0.7 | 1.6  | -1.5  | -2.8  | 98  | 99  | 100 | 95  | 98      | 861.9 | 861.1 | 861.7 | 863.3 | 862.0 |
| 9  | -1.3   | -2.7 | -0.6 | -1.8 | -1.6 | -0.5 | -3.1  | -3.5  | 100 | 99  | 78  | 83  | 90      | 864.0 | 862.9 | 865.4 | 867.1 | 864.9 |
| 10 | -2.6   | -2.5 | 0.2  | -0.1 | -1.3 | 1.6  | -2.9  | -3.9  | 97  | 99  | 95  | 100 | 98      | 868.4 | 868.7 | 870.6 | 870.7 | 869.6 |
| 11 | -0.5   | 0.4  | 2.3  | 2.9  | 1.3  | 5.7  | -0.7  | -1.7  | 100 | 93  | 95  | 88  | 94      | 871.6 | 872.2 | 873.0 | 872.0 | 872.2 |
| 12 | 2.6    | 3.7  | 7.6  | 3.5  | 4.4  | 7.7  | 1.2   | -2.0  | 85  | 80  | 51  | 75  | 73      | 871.0 | 869.2 | 867.4 | 866.3 | 868.5 |
| 13 | 2.0    | 4.9  | 6.3  | 4.4  | 4.4  | 8.4  | 1.4   | -1.6  | 75  | 51  | 49  | 64  | 60      | 865.9 | 866.3 | 866.6 | 866.0 | 866.2 |
| 14 | 2.2    | 4.1  | 7.7  | 4.3  | 4.6  | 8.2  | 1.9   | -4.1  | 70  | 65  | 58  | 68  | 65      | 866.0 | 866.3 | 868.2 | 868.7 | 867.3 |
| 15 | 3.7    | 4.1  | 8.1  | 5.1  | 5.3  | 9.2  | 2.7   | -0.4  | 71  | 60  | 41  | 53  | 56      | 870.4 | 870.4 | 871.4 | 868.5 | 870.2 |
| 16 | 3.7    | -0.7 | -2.4 | -4.3 | -0.9 | 5.1  | -4.3  | -4.7  | 63  | 83  | 82  | 85  | 78      | 864.6 | 857.3 | 854.5 | 849.5 | 856.5 |
| 17 | -8.0   | -6.8 | -4.2 | -3.7 | -5.7 | -1.9 | -8.1  | -8.5  | 96  | 98  | 92  | 80  | 92      | 848.4 | 849.2 | 851.1 | 851.5 | 850.0 |
| 18 | -4.7   | -5.1 | -4.7 | -5.3 | -5.0 | -3.7 | -5.3  | -6.5  | 96  | 97  | 97  | 97  | 97      | 850.6 | 849.4 | 848.4 | 847.2 | 848.9 |
| 19 | -5.9   | -6.5 | -6.3 | -6.3 | -6.3 | -5.2 | -6.5  | -6.6  | 98  | 98  | 98  | 98  | 98      | 845.1 | 843.7 | 845.2 | 846.8 | 845.2 |
| 20 | -6.4   | -6.7 | -4.8 | -6.6 | -6.1 | -3.9 | -6.8  | -8.0  | 98  | 98  | 97  | 98  | 98      | 847.7 | 847.9 | 850.3 | 852.0 | 849.5 |
| 21 | -8.2   | -9.1 | -6.6 | -7.8 | -7.9 | -5.8 | -10.0 | -11.3 | 97  | 96  | 79  | 88  | 90      | 853.6 | 854.7 | 857.0 | 856.9 | 855.5 |
| 22 | -7.4   | -7.4 | -3.2 | -3.3 | -5.3 | -2.3 | -8.0  | -11.0 | 94  | 91  | 74  | 81  | 85      | 857.0 | 856.1 | 856.7 | 856.0 | 856.5 |
| 23 | -3.6   | -2.6 | -0.7 | -2.0 | -2.2 | 0.1  | -4.2  | -6.3  | 71  | 80  | 83  | 96  | 83      | 856.8 | 857.5 | 858.8 | 860.2 | 858.3 |
| 24 | -3.2   | -2.3 | -0.8 | -1.2 | -1.9 | -0.1 | -3.7  | -8.1  | 92  | 98  | 96  | 74  | 90      | 861.0 | 861.3 | 862.0 | 860.9 | 861.3 |
| 25 | -3.1   | -3.0 | -0.4 | -1.6 | -2.0 | -0.1 | -3.5  | -5.0  | 97  | 99  | 77  | 98  | 93      | 860.4 | 858.6 | 858.5 | 857.1 | 858.6 |
| 26 | -1.4   | -1.6 | -0.6 | 0.3  | -0.8 | 0.7  | -1.9  | -2.0  | 97  | 98  | 100 | 97  | 98      | 856.8 | 856.8 | 856.7 | 857.6 | 857.0 |
| 27 | 0.1    | 1.2  | 4.3  | 1.8  | 1.9  | 6.0  | -1.5  | -4.5  | 95  | 81  | 74  | 95  | 86      | 857.3 | 857.3 | 857.8 | 857.8 | 857.5 |
| 28 | 0.8    | 3.1  | 2.7  | 3.2  | 2.5  | 5.0  | 0.7   | -2.7  | 100 | 76  | 87  | 76  | 85      | 857.5 | 858.2 | 859.2 | 860.1 | 858.8 |
| 29 | 3.3    | 2.9  | 3.1  | 1.9  | 2.8  | 4.8  | 1.8   | -1.1  | 69  | 78  | 88  | 100 | 84      | 861.0 | 861.2 | 862.3 | 861.9 | 861.6 |
| 30 | -0.3   | 0.5  | 0.6  | -0.3 | 0.1  | 2.7  | -1.3  | -3.6  | 99  | 78  | 89  | 100 | 92      | 861.0 | 859.0 | 856.6 | 854.7 | 857.8 |

**Tabela 2. Prędkość (V) i kierunek ( $\alpha$ ) wiatru, dobowa suma opadu (R) i wysokość pokrywy śnieżnej (HS)**  
**Table 2. Wind speed (V) and direction ( $\alpha$ ), daily sum of precipitation (R) and snow cover depth (HS)**

| D  | V [m/s] |    |    |      | $\alpha$ [1-32] |    |    | R[mm] | HS[cm] |
|----|---------|----|----|------|-----------------|----|----|-------|--------|
|    | 06      | 12 | 18 | Vm   | 06              | 12 | 18 |       |        |
| 1  | 5       | 8  | 16 | 9.7  | 20              | 20 | 20 | 2.6   | 6      |
| 2  | 14      | 17 | 12 | 14.3 | 20              | 20 | 20 | 0.3   | 3      |
| 3  | 14      | 13 | 6  | 11.0 | 18              | 20 | 16 | •     | -1     |
| 4  | 2       | 6  | 12 | 6.7  | 4               | 16 | 12 | •     | NA     |
| 5  | 1       | 2  | 2  | 1.7  | 20              | 4  | 4  | 1.5   | NA     |
| 6  | 5       | 5  | 6  | 5.3  | 2               | 4  | 30 | 0.0   | NA     |
| 7  | 6       | 6  | 12 | 8.0  | 20              | 18 | 18 | 1.1   | NA     |
| 8  | 14      | 6  | 5  | 8.3  | 20              | 20 | 24 | 8.6   | -1     |
| 9  | 9       | 6  | 6  | 7.0  | 26              | 22 | 26 | 3.3   | 7      |
| 10 | 7       | 9  | 8  | 8.0  | 32              | 32 | 2  | 0.3   | 3      |
| 11 | 4       | 4  | 4  | 4.0  | 4               | 4  | 4  | •     | -1     |
| 12 | 5       | 6  | 6  | 5.7  | 4               | 4  | 6  | •     | NA     |
| 13 | 2       | 4  | 5  | 3.7  | 4               | 4  | 4  | •     | NA     |
| 14 | 4       | 6  | 7  | 5.7  | 4               | 4  | 4  | 0.0   | NA     |
| 15 | 6       | 2  | 3  | 3.7  | 2               | 4  | 24 | •     | NA     |
| 16 | 11      | 8  | 5  | 8.0  | 22              | 22 | 22 | 2.7   | NA     |
| 17 | 5       | 6  | 7  | 6.0  | 24              | 24 | 20 | 2.4   | 4      |
| 18 | 3       | 5  | 7  | 5.0  | 32              | 2  | 32 | 27.6  | 4      |
| 19 | 9       | 6  | 5  | 6.7  | 30              | 26 | 26 | 9.0   | 21     |
| 20 | 2       | 4  | 7  | 4.3  | 6               | 4  | 2  | 25.4  | 25     |
| 21 | 5       | 4  | 6  | 5.0  | 2               | 24 | 22 | 1.3   | 52     |
| 22 | 10      | 13 | 14 | 12.3 | 20              | 20 | 18 | •     | 48     |
| 23 | 8       | 4  | 5  | 5.7  | 18              | 20 | 8  | 6.7   | 40     |
| 24 | 4       | 7  | 8  | 6.3  | 6               | 6  | 4  | 0.2   | 42     |
| 25 | 9       | 10 | 4  | 7.7  | 6               | 8  | 6  | 2.2   | 35     |
| 26 | 8       | 11 | 6  | 8.3  | 16              | 14 | 14 | 1.4   | 33     |
| 27 | 4       | 2  | 4  | 3.3  | 14              | 6  | 6  | 0.0   | 30     |
| 28 | 5       | 0  | 2  | 2.3  | 6               | 0  | 6  | 1.2   | 22     |
| 29 | 5       | 0  | 2  | 2.3  | 22              | 0  | 4  | 1.0   | 17     |
| 30 | 0       | 7  | 6  | 4.3  | 0               | 20 | 20 | 1.5   | 13     |

**Tabela 3. Liczba dni charakterystycznych w bieżącym miesiącu oraz średnia liczba dni charakterystycznych dla tego miesiąca w wieloleciu 1960 - 2000**

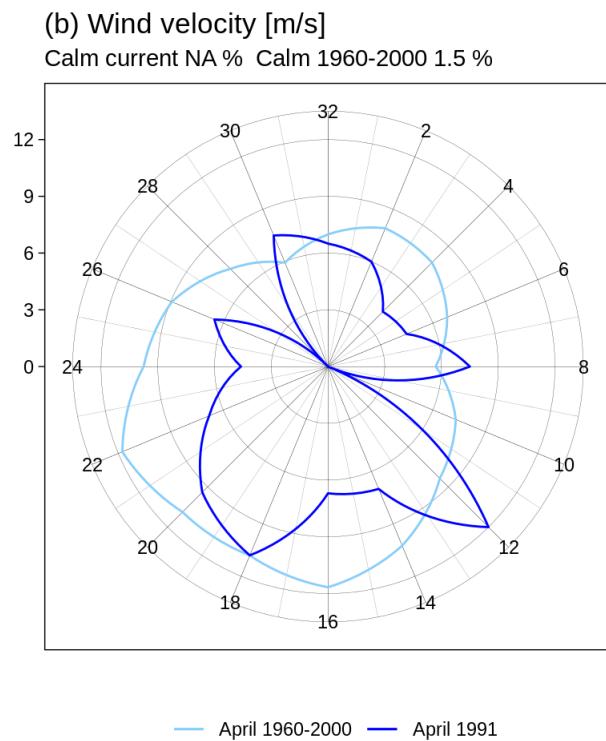
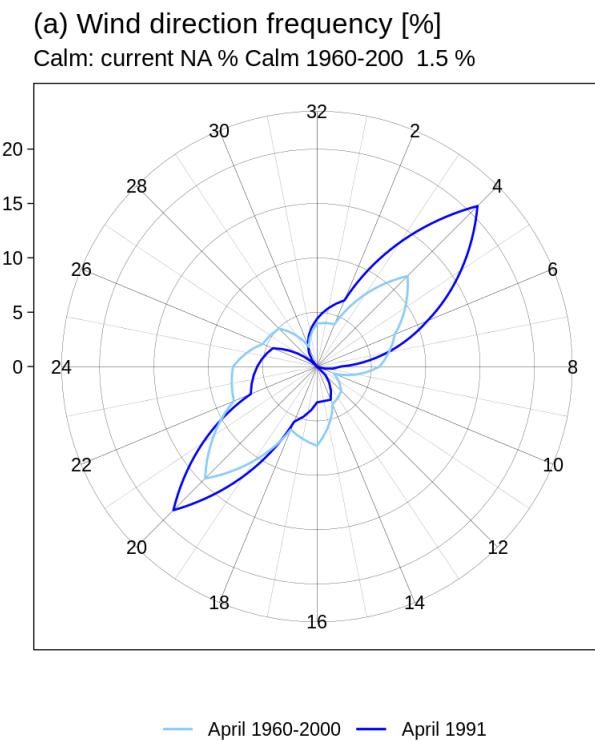
**Table 3. Number of days with threshold value in current month and monthly average number of days with threshold value in the 1960- 2000 period**

| Nazwa / Name                               | 1960-2000 | 1991-IV |
|--|-----------|---------|
| Przymrozkowe ( $T_{min} < 0^{\circ}C$ )    | 20        | 19      |
| Mroźne ( $T_{max} < 0^{\circ}C$ )          | 8         | 9       |
| Bardzo mroźne ( $T_{min} < -10^{\circ}C$ ) | 1         | 0       |
| Ciepłe ( $T_{max} > 20^{\circ}C$ )         | 0         | 0       |
| Gorące ( $T_{max} > 25^{\circ}C$ )         | 0         | 0       |
| $R > 1 \text{ mm}$                         | 13        | 16      |
| $R > 10 \text{ mm}$                        | 3         | 2       |
| Liczba dni z pokrywą śnieżną               | 26        | 18      |

**Tabela 4. Wartości średnie i ekstrema miesięczne na tle charakterystyk miesięcznych dla wielolecia 1960 - 2000**

**Table 4. Average and extreme monthly values vs. average monthly characteristics for the 1960- 2000 period**

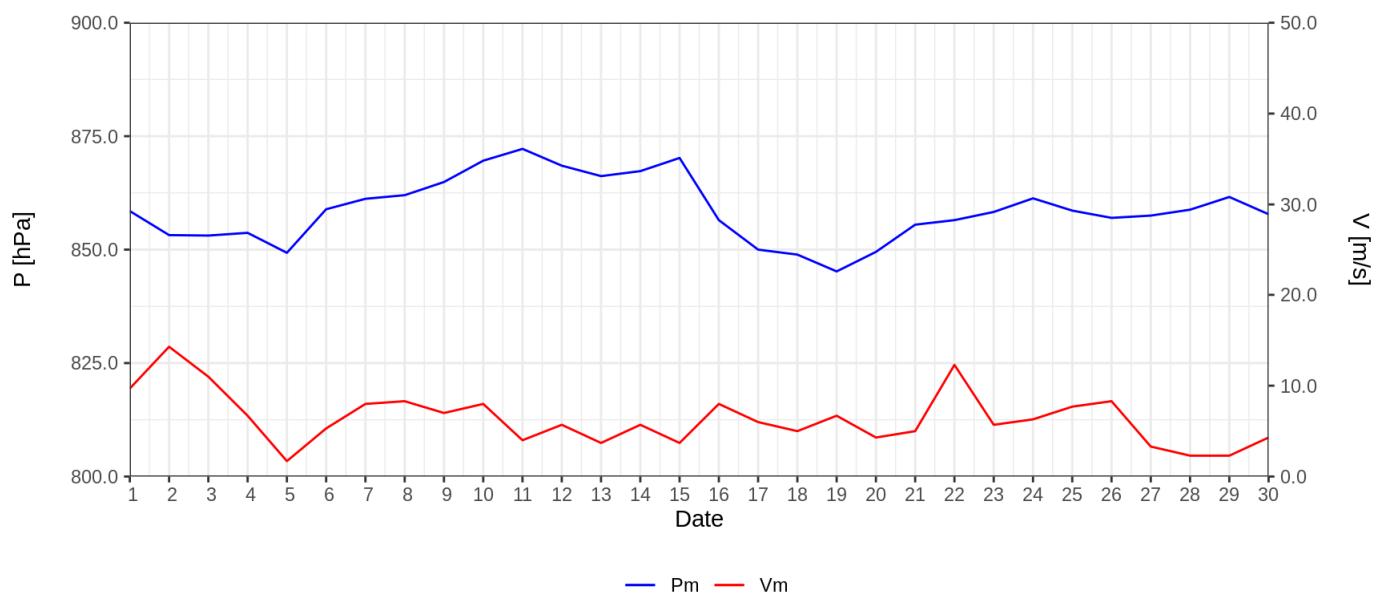
|                   | Opis                      | Description           | 1960-2000          | 1991-IV            |
|-------------------|---------------------------|-----------------------|--------------------|--------------------|
| T [ $^{\circ}C$ ] | Średnia miesięczna        | Monthly average       | 0.5                | -0.1               |
|                   | Maksymalna średnia dobowa | Maximum daily average | 3.4                | 2.6                |
|                   | Minimalna średnia dobowa  | Minimum daily average | -2.0               | -2.1               |
|                   | Średnie maksimum          | Average maximum       | 14.4 (1968-04-23)  | 5.4 (1991-04-03)   |
|                   | Absolutne maksimum        | Absolute maximum      | 19.1 (1968-04-23)  | 9.2 (1991-04-15)   |
|                   | Średnie minimum           | Average minimum       | -10.5 (1968-04-23) | -7.9 (1991-04-03)  |
| P [hPa]           | Absolutne minimum         | Absolute minimum      | -13.0 (1986-04-13) | -10.0 (1991-04-21) |
|                   | Średnia miesięczna        | Monthly average       | 857.0              | 858.7              |
|                   | Maksimum                  | Maximum               | 876.2 (1966-04-30) | 872.2 (1991-04-11) |
| V [m/s]           | Minimum                   | Minimum               | 834.0 (1992-04-01) | 845.2 (1991-04-19) |
|                   | Średnia miesięczna        | Monthly average       | 9.0                | 6.3                |
|                   | Średnie maksimum          | Average maximum       | 11.7               | 8.6                |
| R [mm]            | Absolutne maksimum        | Absolute maximum      | 35.0 (1964-04-19)  | 17.0 (1991-04-02)  |
|                   | Suma miesięczna           | Monthly sum           | 92.2               | 100.3              |
|                   | Maksymalna suma dobowa    | Maximum daily sum     | 36.8 (1961-04-16)  | 27.6 (1991-04-18)  |



Ryc. 1. Częstość (a) i prędkość wiatru (b) wg kierunków

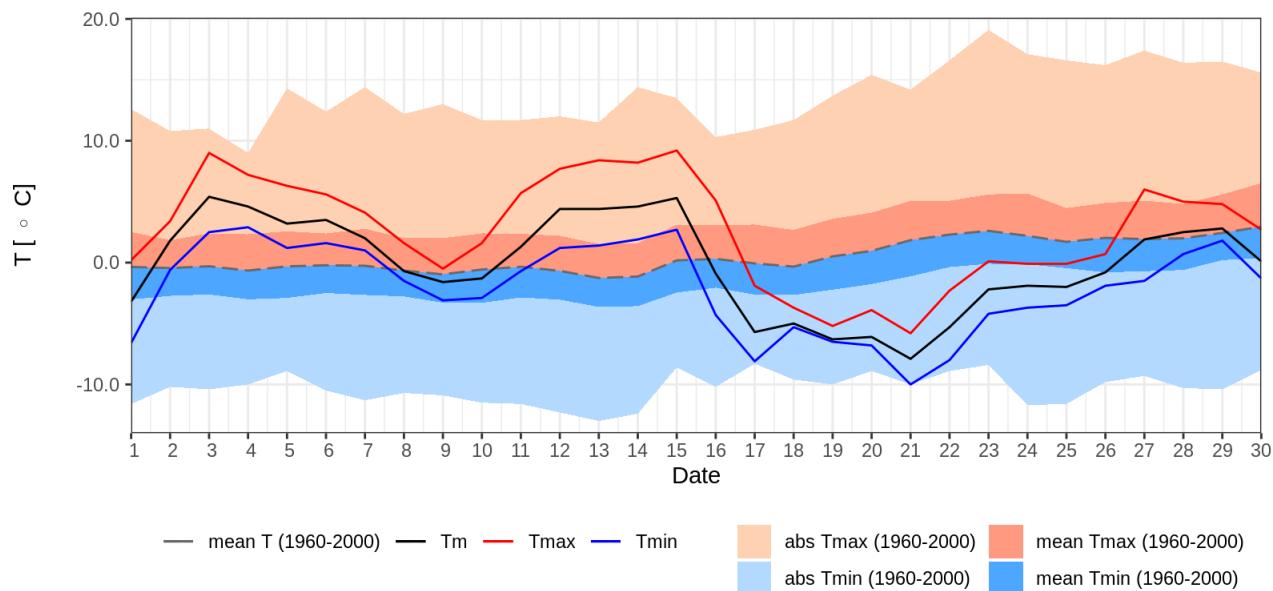
Fig. 1. Wind direction frequency (a) and wind velocity for a given direction (b)

\*) W statystyce dotyczącej kierunku wiatru uwzględniono kierunki wiatru odpowiadające skali 16 stopniowej prezentowanej wartościami [2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32].

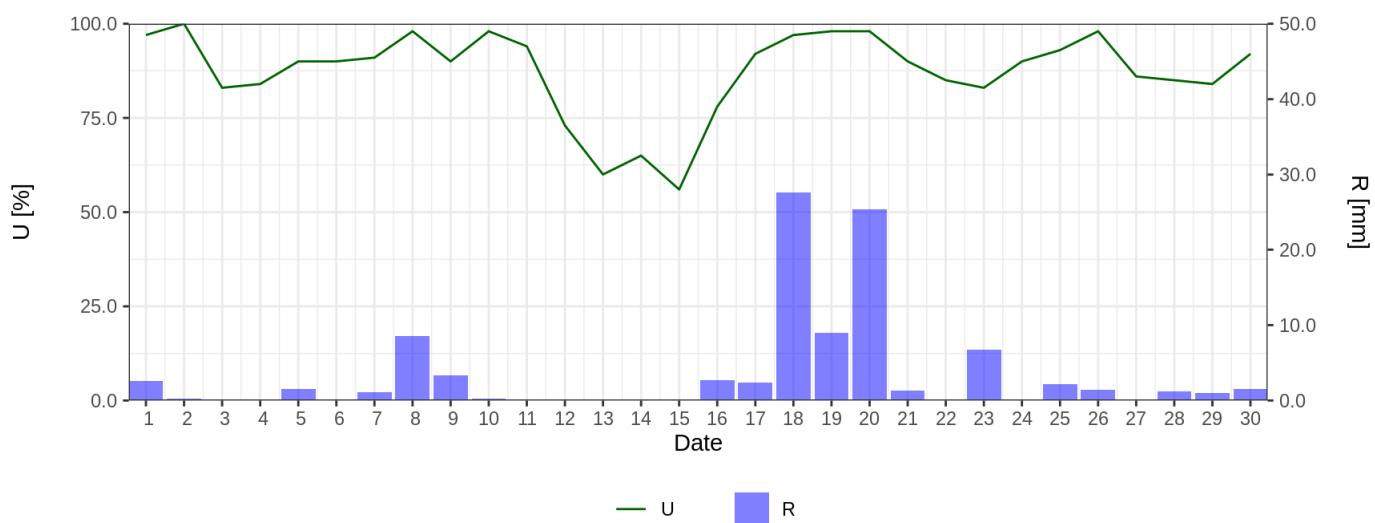


Ryc. 2. Średnie dobowe ciśnienie atmosferyczne i prędkość wiatru

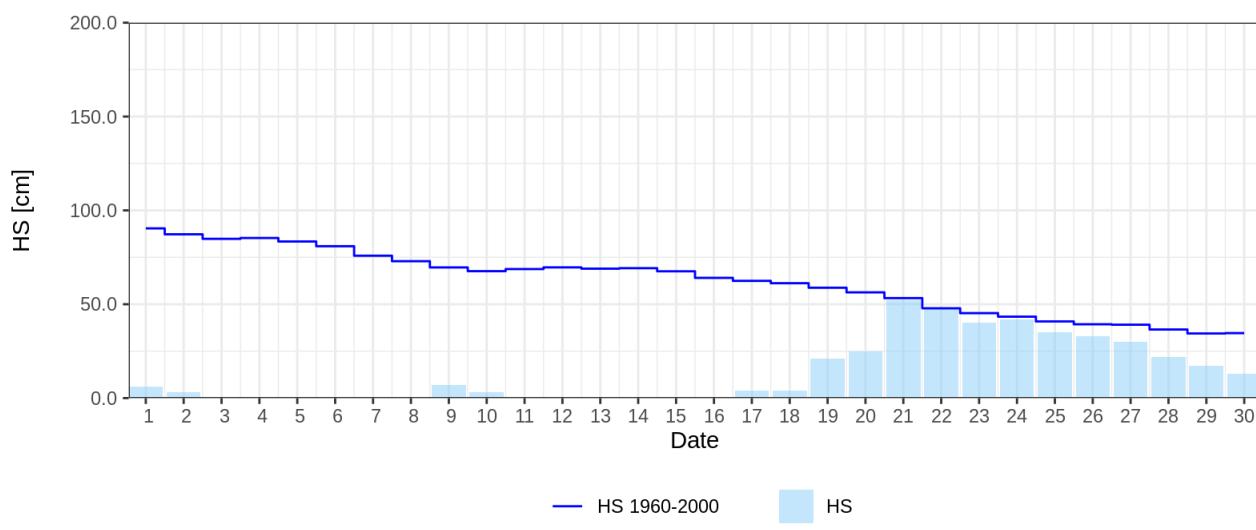
Fig. 2. Daily average air pressure and wind speed



Ryc. 3. Średnia dobowa, minimalna i maksymalna temperatura powietrza dla miesiąca na tle danych z wielolecia 1960 - 2000  
Fig. 3. Daily mean, maximum and minimum air temperature for given month and 1960-2000 period



Ryc. 4. Średnia dobowa wilgotność względna powietrza i dobowe sumy opadu atmosferycznego  
Fig. 4. Mean daily relative humidity and daily sum of precipitation



Ryc. 5. Wysokość pokrywy śnieżnej  
Fig. 5. Snow cover depth