# 1 Analyses of variations in climatic factors in the localities of interest

The site of the works is located on the Argeș river downstream of the Mihăilești - Cornetu lake and on the Dâmbovița river downstream of the bridge on the Bucharest ring road, in the counties of Ilfov, Giurgiu and Călărași.

At the level of each county, the territorial administrative units (TAUs) intersected by the project site are as follows:

- ***Ilfov County***

The project site will cross the following localities in Ilfov County: Vidra, 1 Decembrie, Copăceni, Darăști, Măgurele, Cornetu, Cernica, Glina.

- ***Călăraşi County***

The project site will cross the following localities in Călărași County: Budești, Chirnogi, Crivăț, Curcani, Frumușani, Fundeni, Gălbinași, Mitreni, Oltenița, Plătărești, Radovanu, Șoldanu.

- ***Giurgiu County***

The project site will cross the following localities in Giurgiu County: Adunații Copăceni, Colibași, Comana, Goștinari, Isvoarele, Herăști, Hotarele, Mihăilești, Valea Dragului.

The analysis of the variation of climatic factors will be conducted at the level of each TAU intersected by the project.

In order to analyse the climate variables, temperature variation, precipitation, global solar radiation, wind intensity/velocity, publicly available data were used, as shown in the table below.

| No. | Climate variables | Methodology | Data source |
|---|---|---|---|
| 1 | Low temperature extremes | - Analysis of temperature evolution in the project area | *RO-ADAPT Platform - Analysis of climatic parameters at TAU level (https://www.roadapt.ro/roadapt/#tab-1431-11)* |
| 2 | High temperature extremes | - Analysis of temperature evolution in the project area | *RO-ADAPT Platform - Analysis of climatic parameters at TAU level (https://www.roadapt.ro/roadapt/#tab-1431-11)* |
| 3 | Extreme precipitation (rainfall) | - Analysis of the evolution of annual average rainfall | *RO-ADAPT Platform - Analysis of climatic parameters at TAU level (https://www.roadapt.ro/roadapt/#tab-1431-11)"* |
| 4 | Strong wind | - Analysis of areas with high wind speeds | *RO-ADAPT Platform - Analysis of climatic parameters at TAU level (https://www.roadapt.ro/roadapt/#tab-1431-11)* |

## 2 Generalities about climate factors

The average air temperature is on an upward trend all year round. The maps below show the deviation of the average temperature in January 2024, April 2023, July 2023 and October 2023 from the average temperatures recorded between 1961 and 2023 in the same months.

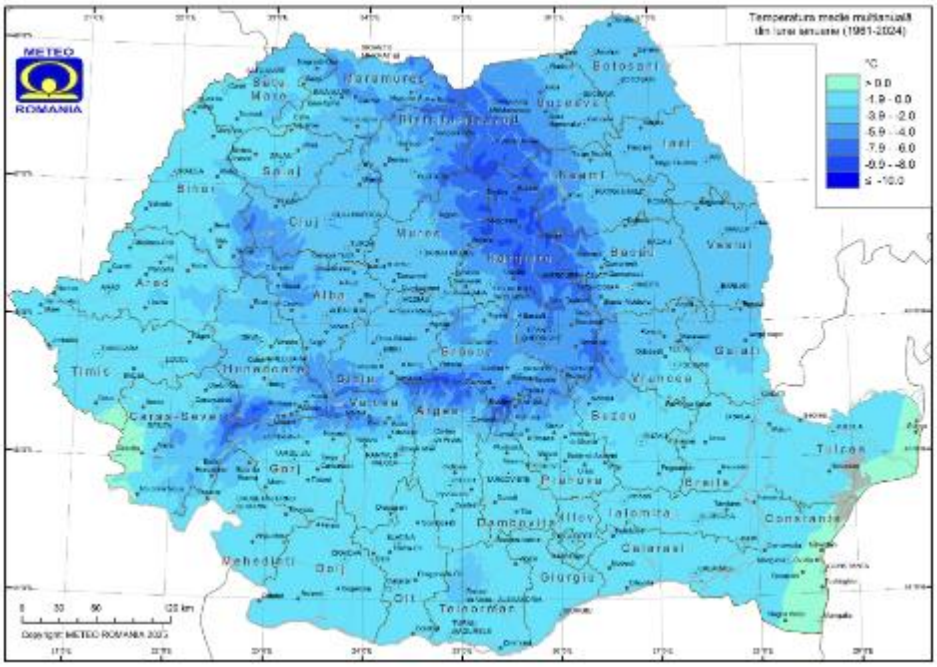



Figure No. 1 *Deviation of the average temperature in January 2024 from multiannual average (1961-2024)*

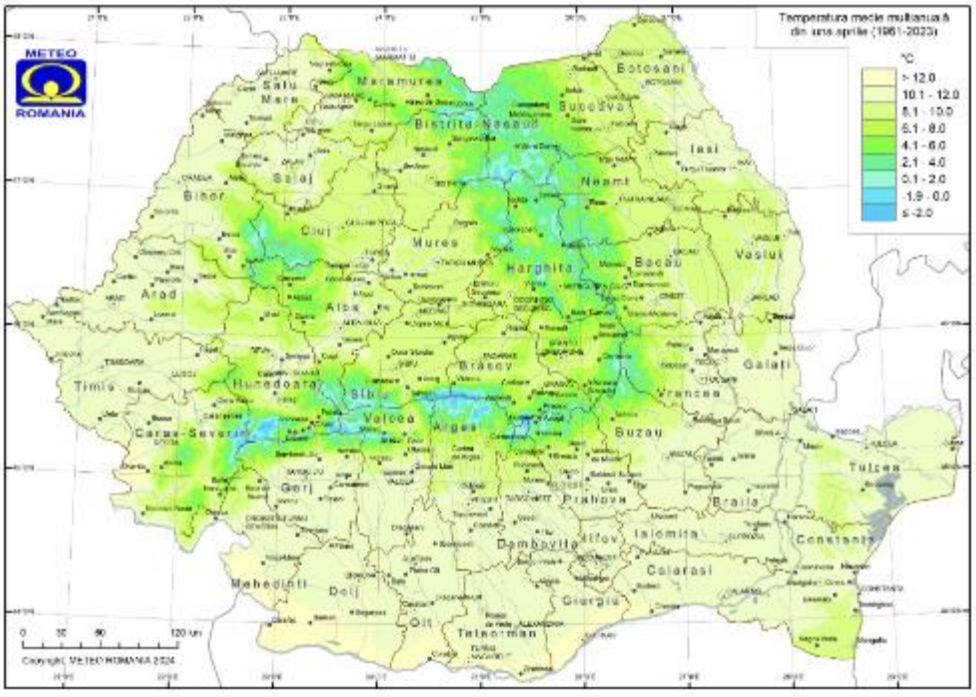



Figure No. 2 - *Deviation of average temperature in April 2023 from the multiannual average (*1961-2023*)*

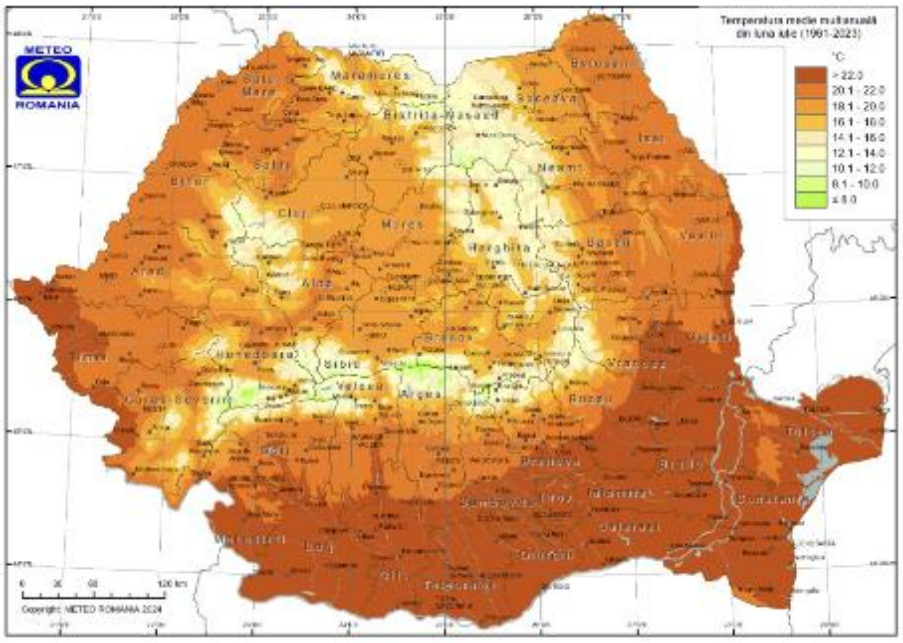



*Figure No. 3 - Deviation of average temperature in July 2023 from multiannual average (*1961-2023*)*

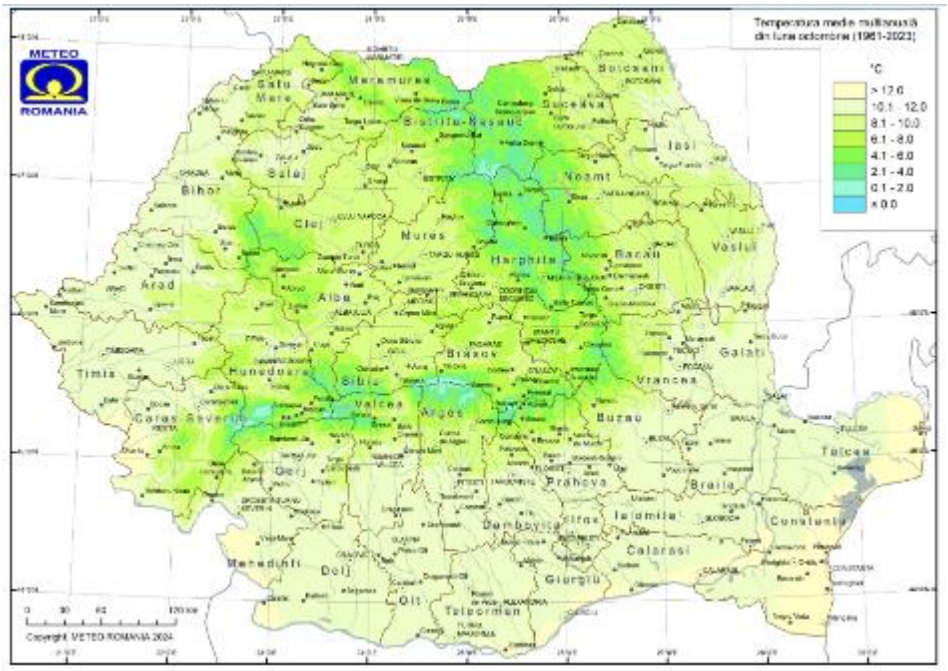



*Figure No. 4 - Deviation of average temperature in October 2023 from multiannual average (*1961-2023*)*

In accordance with the report of the National Hydrology Authority on *"Climate Change - from physical fundamentals to risks and adaptation*", a "heat wave" is defined in Romania, in accordance with the measures taken to combat the effects on the population, as an interval of at least 2 days with a maximum temperature of over 37 degrees. Persistent heatwaves have become extremely common over the past decade, compared with earlier periods.

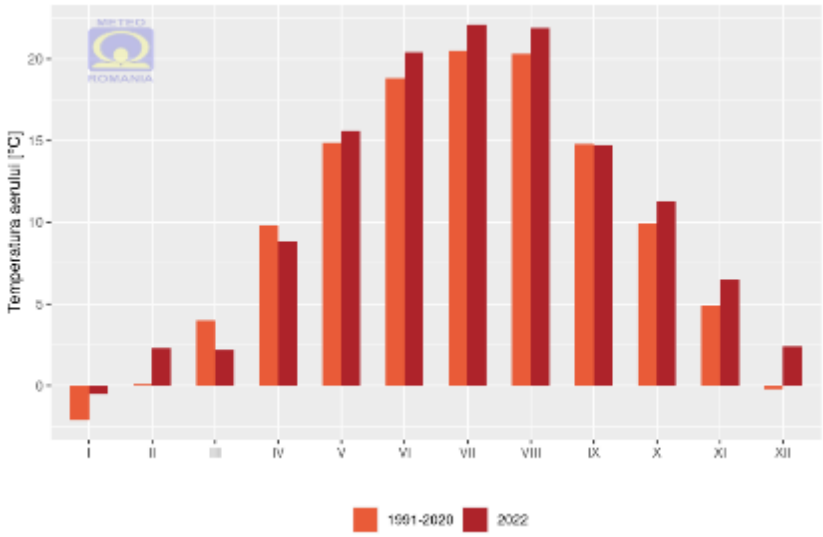



*Figure No. 5 - Evolution of the average monthly temperature in Romania in 2023, compared to the median of the standard climatological interval (1991 -2022)*

The lack of atmospheric precipitation is one of the major factors contributing to dryness and drought. Excess rainfall also leads to flooding and excess moisture.

The regime and territorial occurrence of atmospheric precipitation is determined by: the general atmospheric circulation and the particularities of the active surface structure.

Analysis of the multiannual variation of annual precipitation on Romania's territory indicate the occurrence of a series of dry years after 1980. The main cause is the decrease in precipitation amounts in conjunction with the upward trend in average annual temperature.

With the onset of the phenomenon of decreasing precipitation in recent years, another phenomenon has emerged, namely the decrease in the flow of most rivers under the effect of factors such as:

- the decline in annual rainfall since the 1980s
- increase in average annual air temperature leading to increased evaporation and evapotranspiration;
- decrease in groundwater levels with negative implications for groundwater supply in seasons low in precipitation.

Precipitation is determined by air humidity and atmospheric cloudiness. Air humidity values are quite high, ranging between 75-80%, reflecting the influence of the westerly circulation. The cloud amount has annual mean values of 5.5 and corresponds to a relative humidity of less than 75%.

According to data provided by the Romanian Weather Service, the maps below show the deviation of the average temperature in January 2024, April 2023, July 2023 and October 2023 from the average temperatures recorded between 1961 and 2023 in the same months.

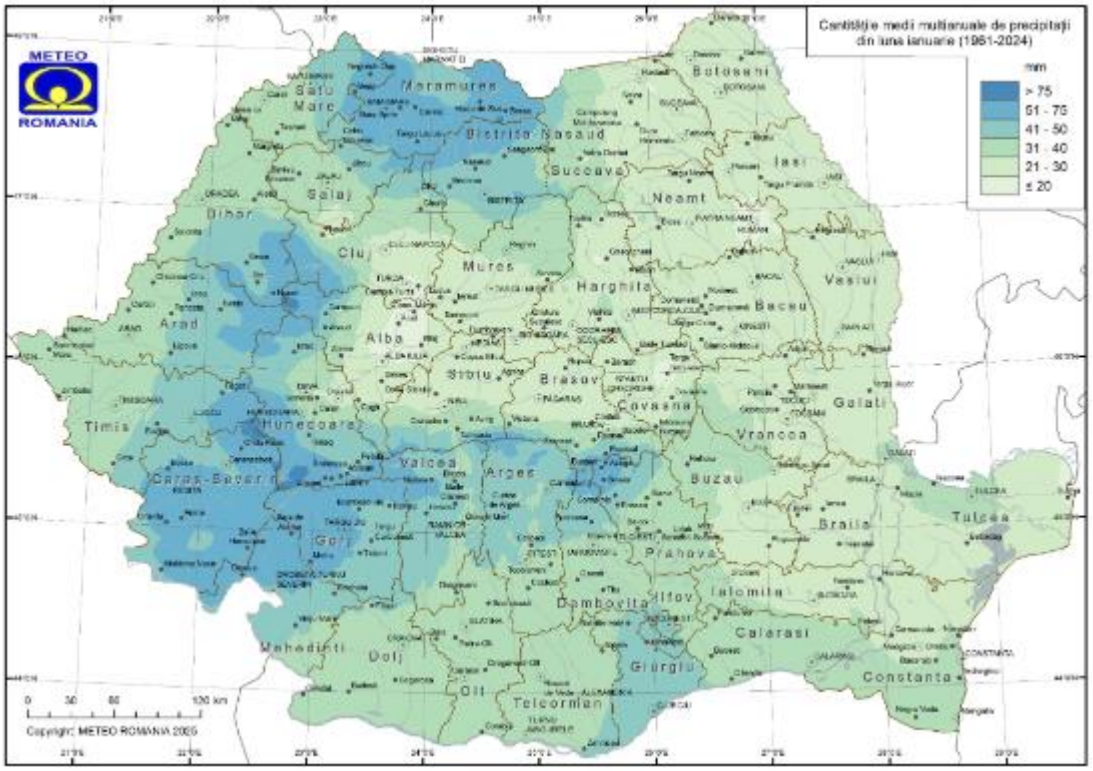



*Figure No. 6-**Deviation of average monthly precipitation in** **January** **2024 compared to 1961 -2024***

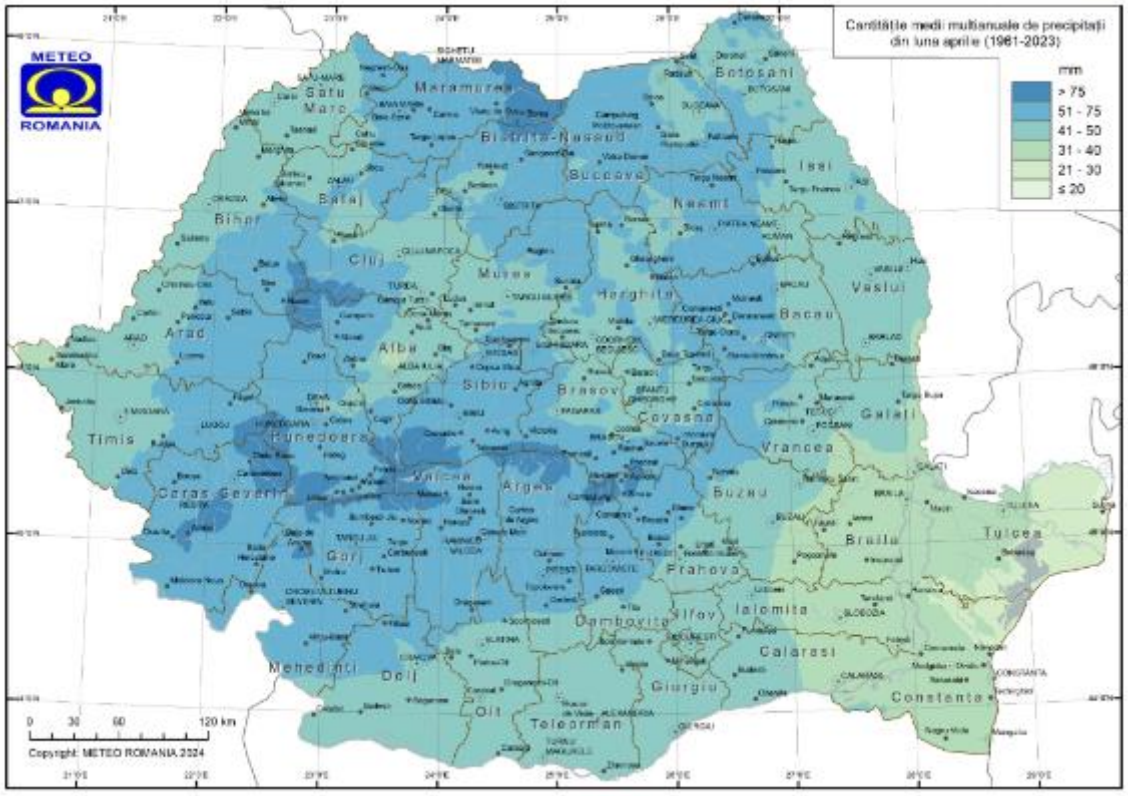



*Figure No. 7 - **Deviation of average monthly precipitation in** **April 2023 compared to 1961 -2023***

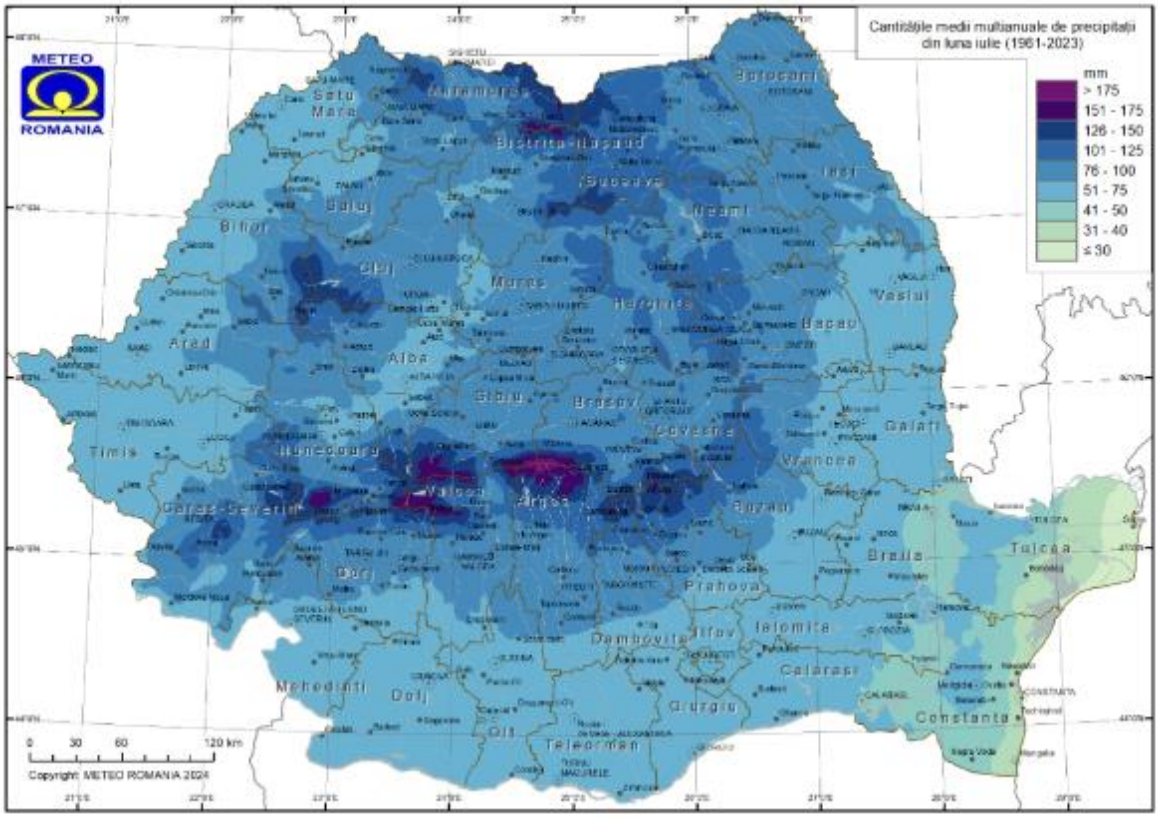



*Figure No. 8 - Deviation of average monthly precipitation in July 2023 compared to 1961 - 2023*

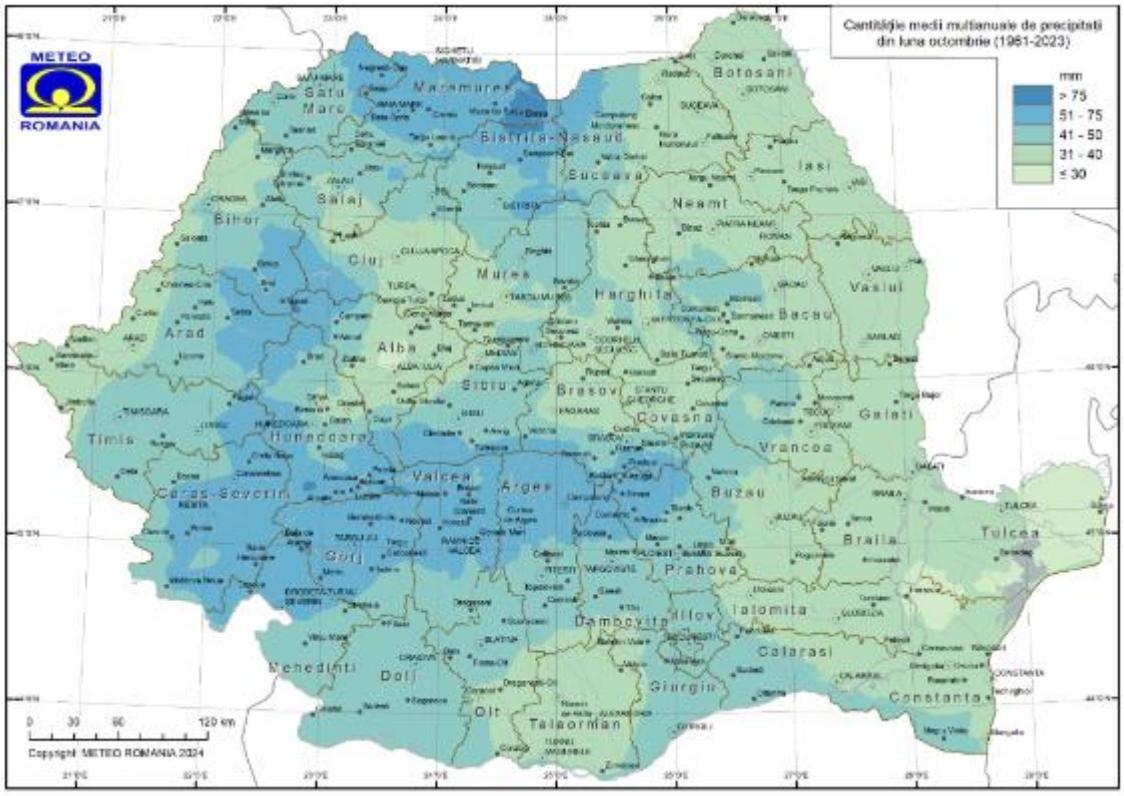



*Figure No. 9 -* ***Deviation of average monthly precipitation in*** **October 2023** ***compared to 1961 -*****2023**

Annual mean wind speed decreases of 93% were recorded at all stations in Romania. These data indicate an average annual wind speed of 1-2 m/s.

The available data leads to the conclusion that there will be a reduction in the average wind speed in the project reference area. With regard to extreme wind speeds (thunderstorms, tornadoes), “Tornadoes in Romania” (B. Antonescu, A. Bell - 2014) shows that they are possible in the project area, but are not a characteristic of the site.

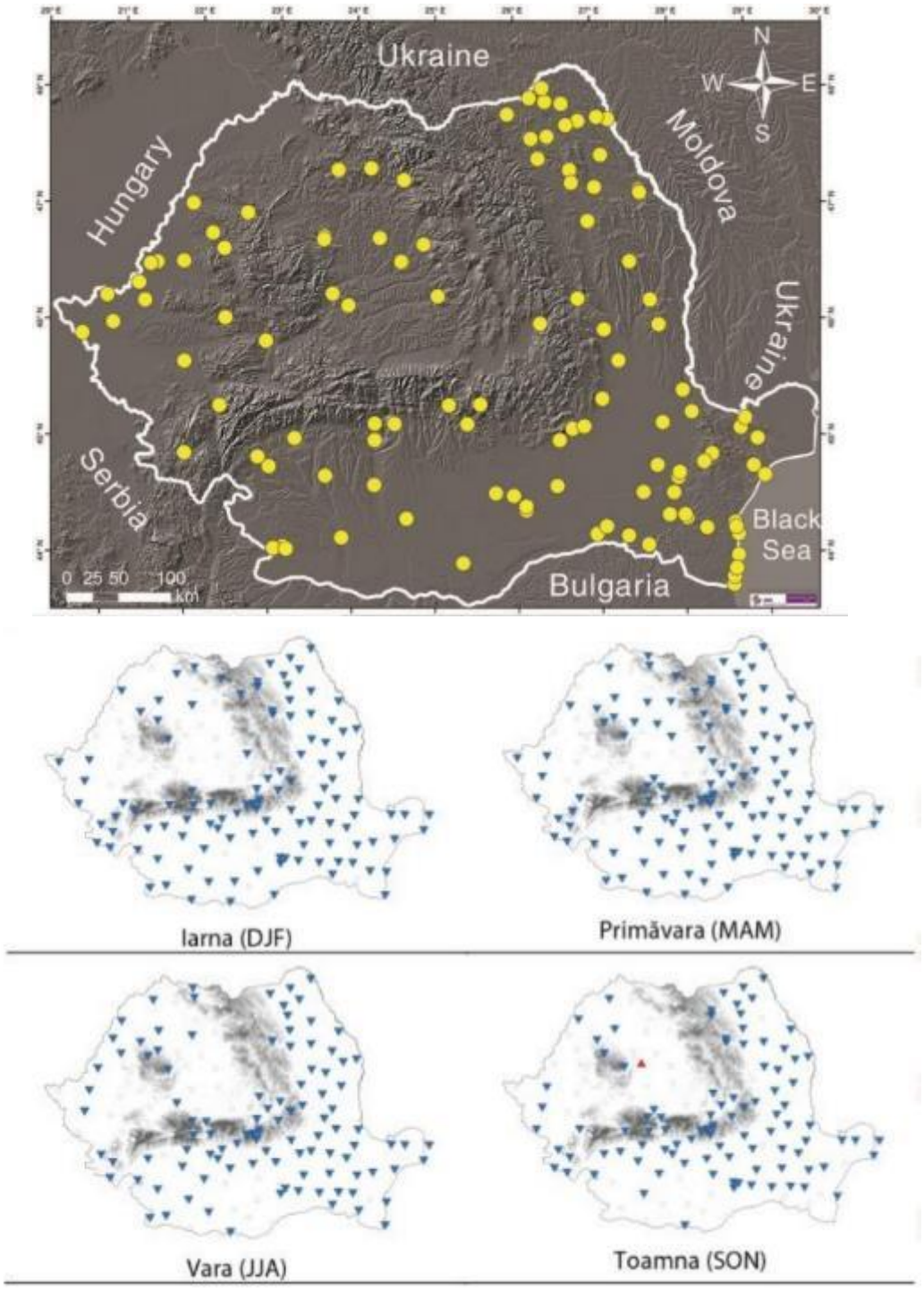



*Figure No. 10 -* ***Trends in mean wind speed and extreme wind events***

# 3 Climate factors - Ilfov County

## *3.1 Vidra*

### 3.1.1 Temperature variability

As for the temperature evolution at the Vidra weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

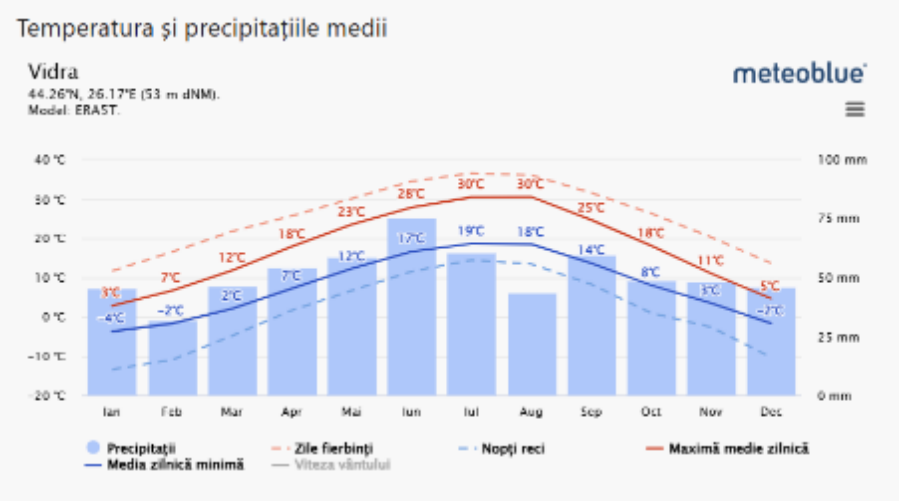



*Figure No. 11* ***- Average value of extreme temperatures over the last 30 years at Vidra weather station*** [1]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

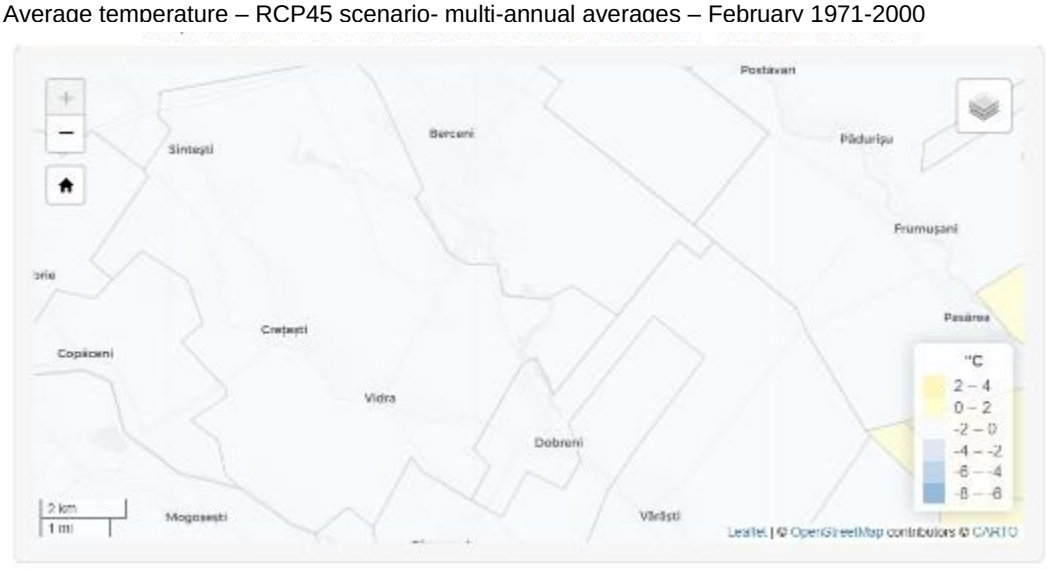
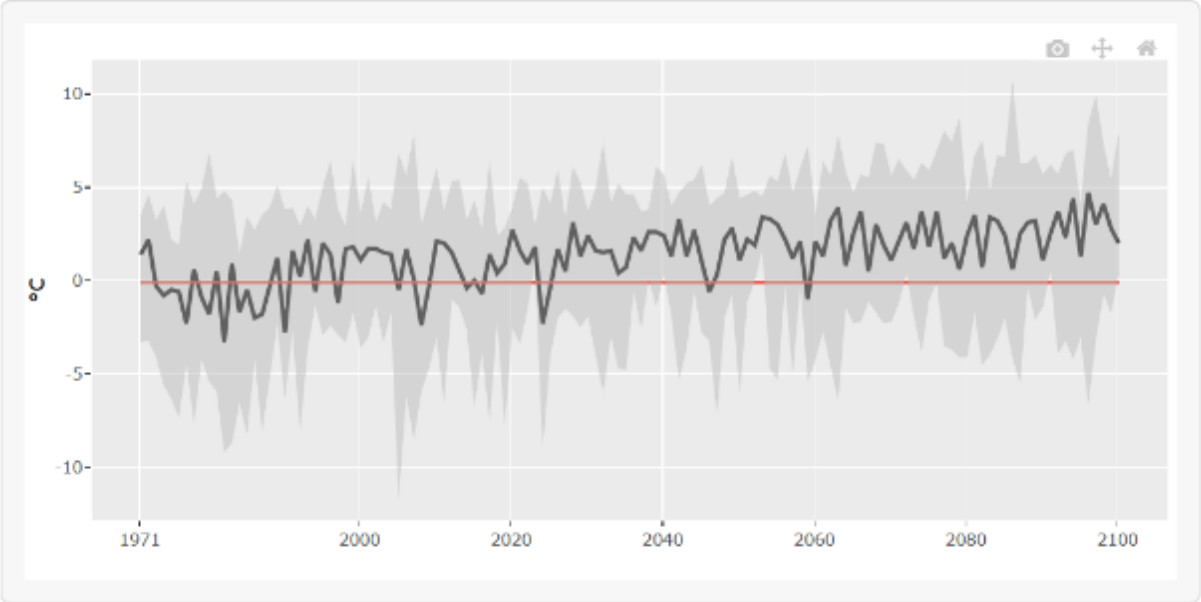



*Figure No. 12 - Average temperature in Vidra TAU (period 1971 -2000)*

[1] Source: *www.meteoblue.com*

Average temperature in February RCP45 (Vidra - County of Ilfov) - reference period 1971-2000
Average values for 1971-2000

-0.1




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February RCP45 (Vidra - County of Ilfov) - reference period 1971-2000
Average values for 1971-2000

-0.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.1 | -1.2 | 6.5 | 2071 | 2.2 | 6.6 | -1.1 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February RCP45 (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2 | 0.3 | 7.9 | 2100 | 2.1 | 8 | 0.4 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.1.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

With the impact that climate change may have on infrastructure in particular, this factor can have negative effects on the population. In this respect, it is recommended that road/naval infrastructure projects should consider the use of materials that contribute to the reduction of such stress.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.7 W/m$^2$.

Solar radiation - RCP45 Scenario - multi-annual average values in February, period 1971-2000


Global solar radiation in February RCP45 (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93 | 68 | 128.9 | 2071 | -10.7 | 25.2 | -35.7 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February RCP45 (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.2 | 59 | 136 | 2100 | 4.5 | 32.3 | -44.7 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

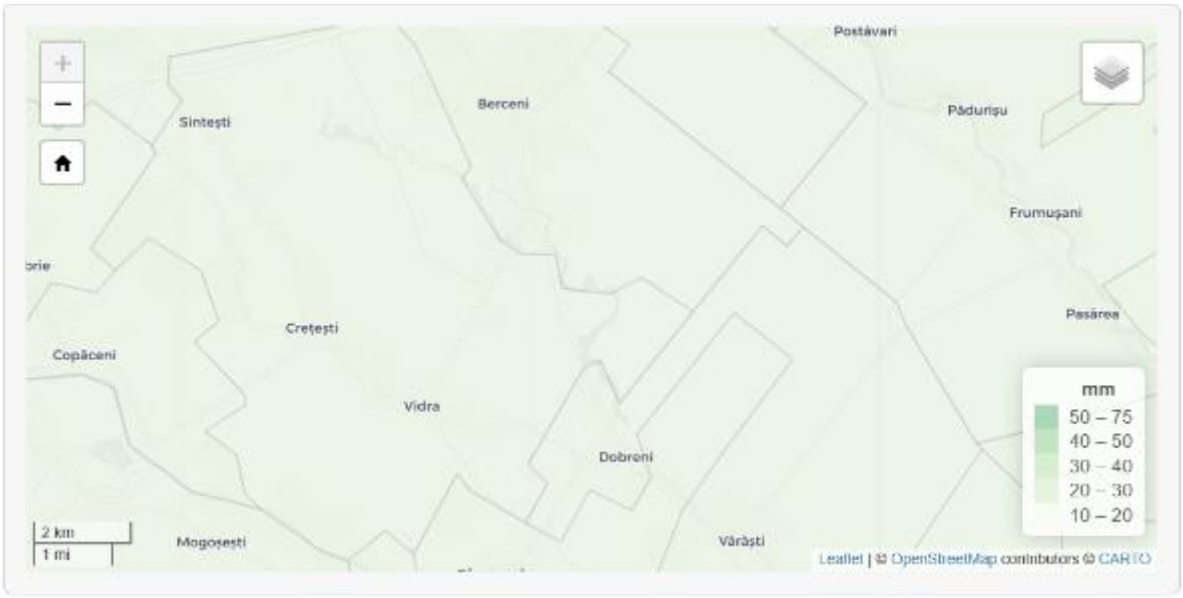
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93 W/mp, and at the level of year 2100 it is estimated at 108.2 W/mp, which is higher than the multiannual average value of 103.7 W/mp. We can observe a decreasing trend of solar radiation in the Vidra ATU in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.1.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.3 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 24.6 m, and by 2100 it will reach 27.4 mm. An increasing precipitation trend can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values 1971-2000




Rainfall in February - RCP45 Scenario (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

24

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 40.8 | 4.4 | 78.8 | 2071 | 70.4 | 229 | -81.6 | 24 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

24

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 10 | 3.4 | 58.5 | 2100 | -58.2 | 144.3 | -85.8 | 24 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.1.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

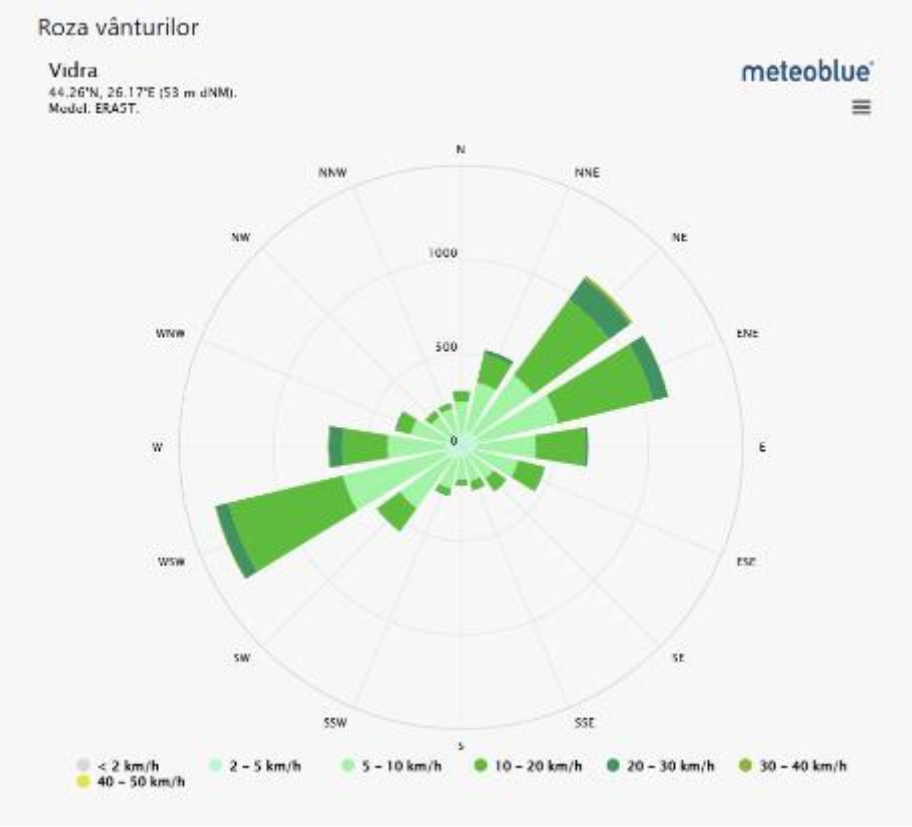



Figure No. 12 - *Wind rose*

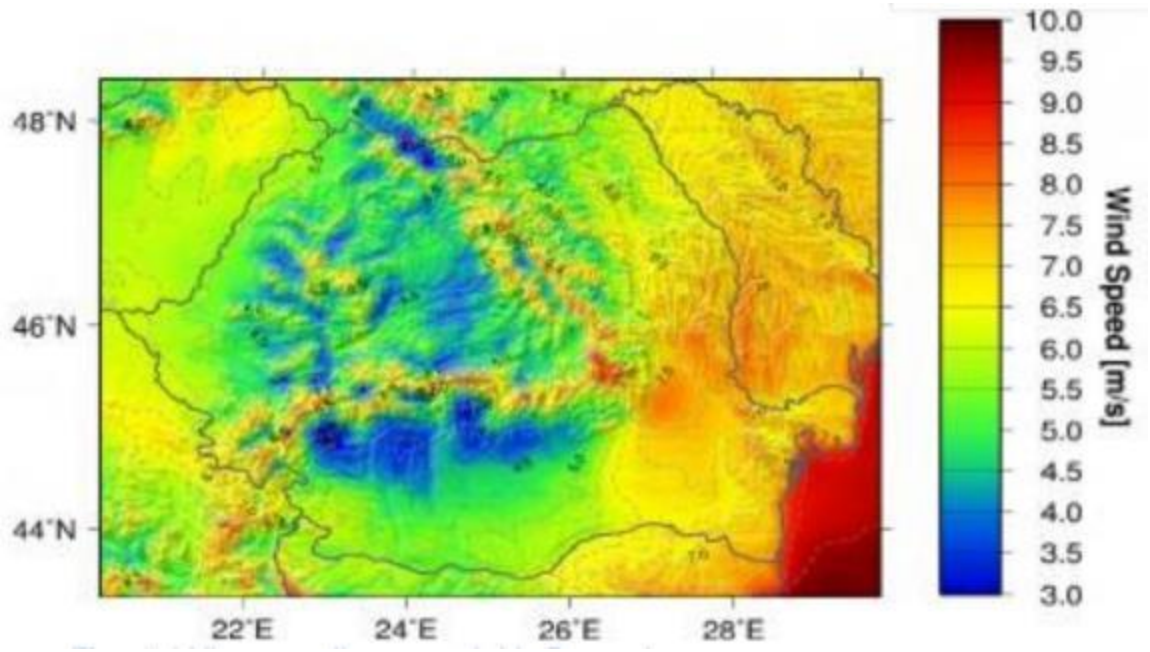



*Figure No. 13* - *Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

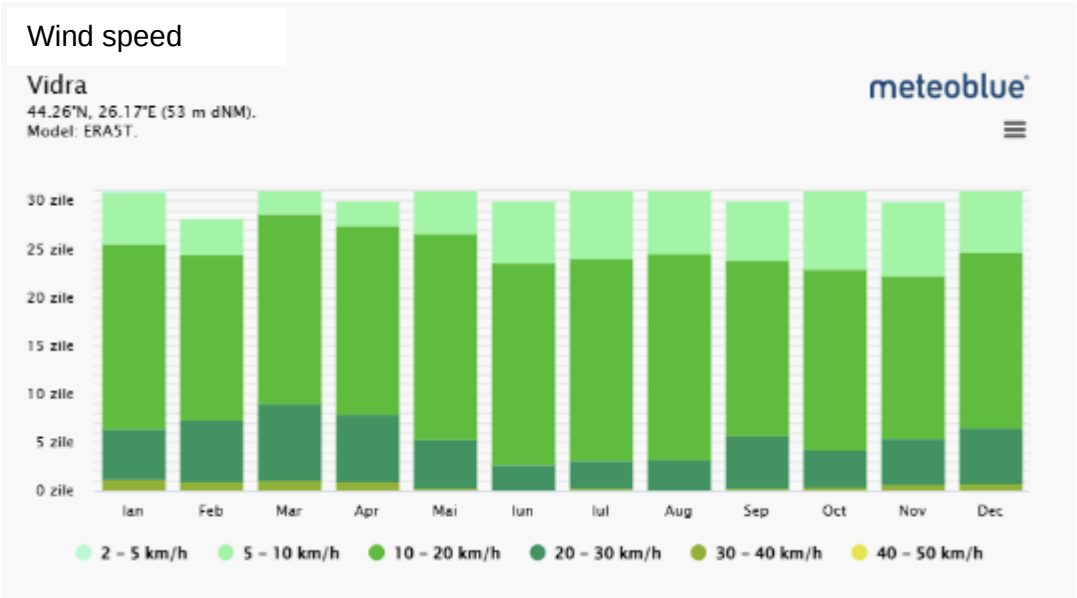



*Figure No. 14*- *The chart for Drânceni shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3 | 4.2 | 2071 | -0.3 | 0.7 | -0.5 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Vidra - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.3 | 2.5 | 4.8 | 2100 | -0.2 | 1.3 | -1 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

### *3.2 1 Decembrie*

#### 3.2.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

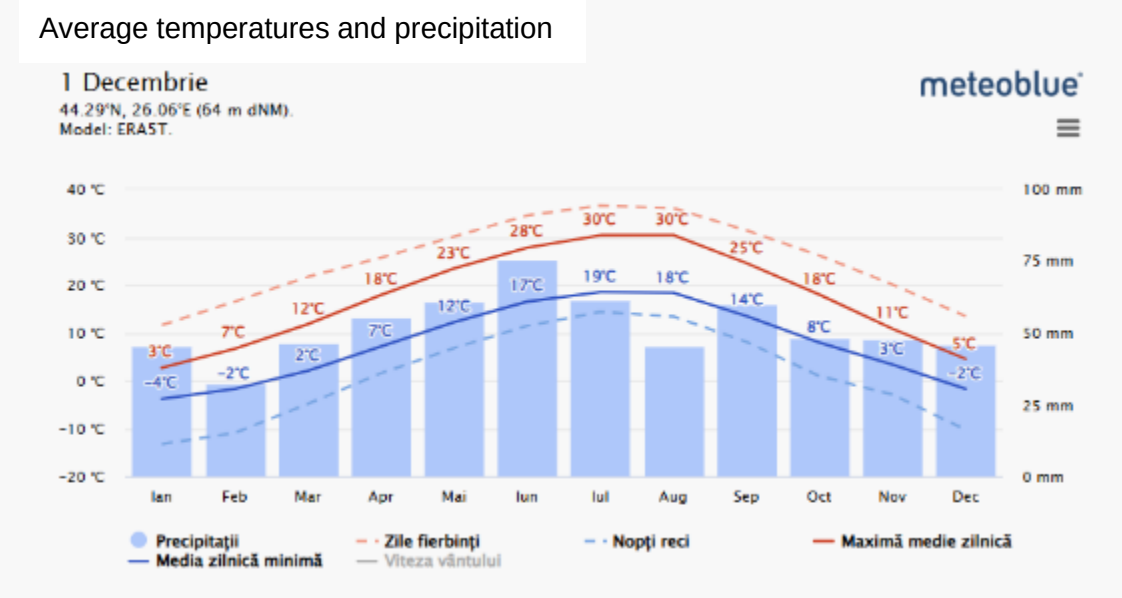



*Figure No. 15***- *Average value of extreme temperatures over the last 30 years at the weather station*[2]**

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

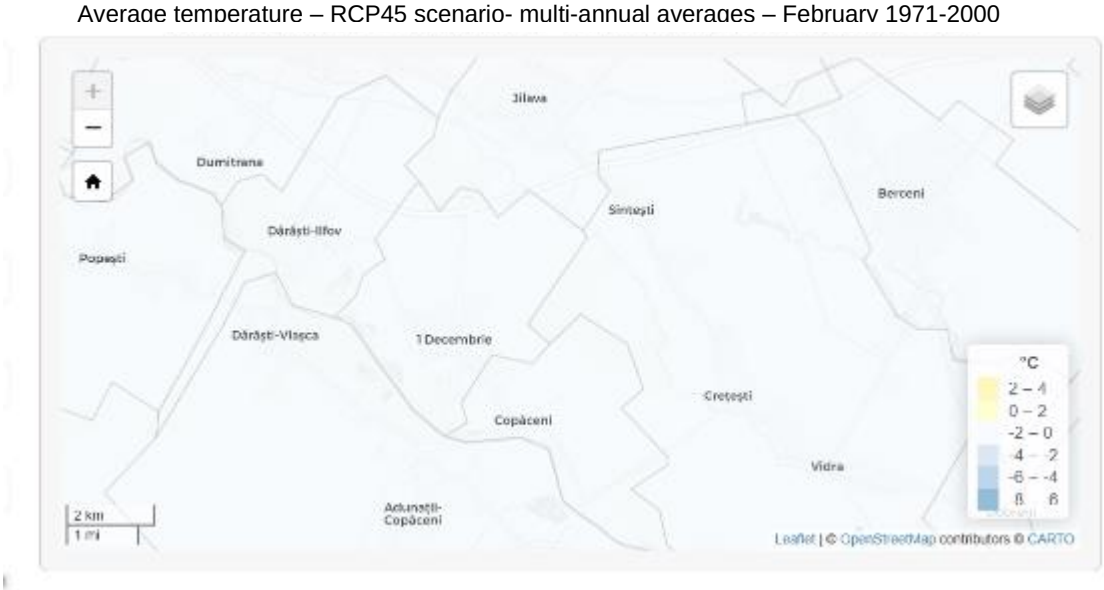
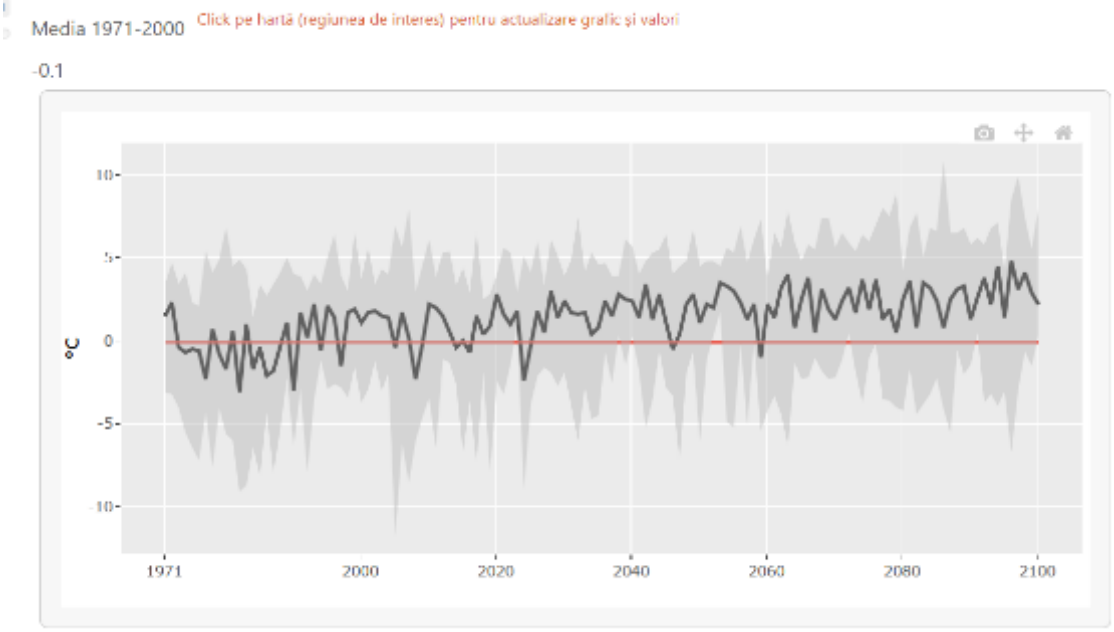



*Figure No. 16 - Average temperature in 1 Decembrie TAU (period 1971 -2000)*

[2] Source: *www.meteoblue.com*

Average temperature in February RCP45 (1 Decembrie - County of Ilfov) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February RCP45 (1 Decembrie - County of Ilfov) - reference period

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.4 | -1.1 | 6.5 | 2071 | 2.5 | 6.6 | -1 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February RCP45 (1 Decembrie - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.2 | 0.4 | 8 | 2100 | 2.3 | 8.1 | 0.5 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

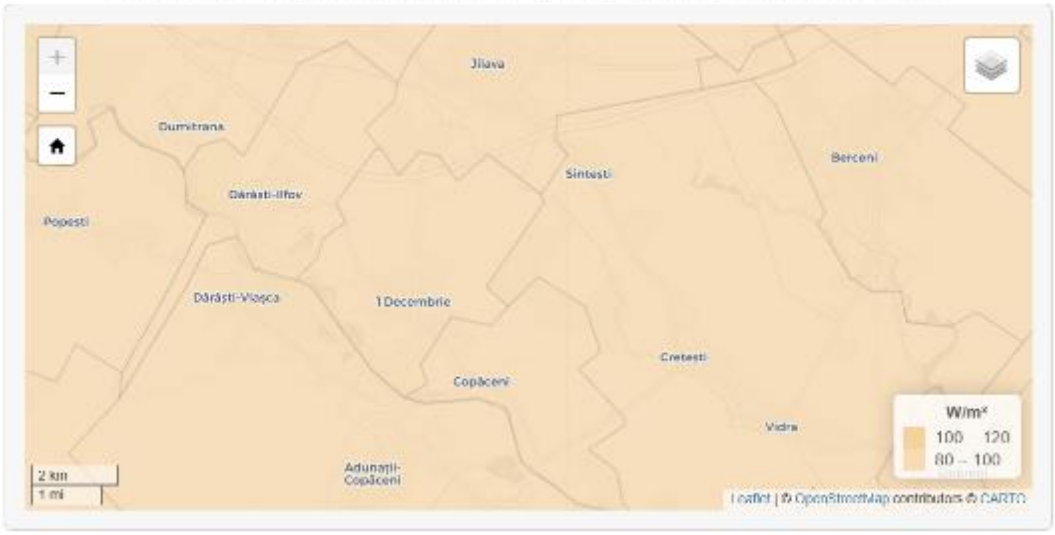
### 3.2.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.8 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February,




Global solar radiation in February RCP45 (1 Decembrie - County of Ilfov) - reference period 1971-

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.8

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93.9 | 68.3 | 128.3 | 2071 | -9.9 | 24.5 | -35.5 | 103.8 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February RCP45 (1 Decembrie - County of Ilfov) - reference period 1971-2000
Average value for the period 1971-2000

103.8

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108 | 59.2 | 135.9 | 2100 | 4.2 | 32.1 | -44.6 | 103.8 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

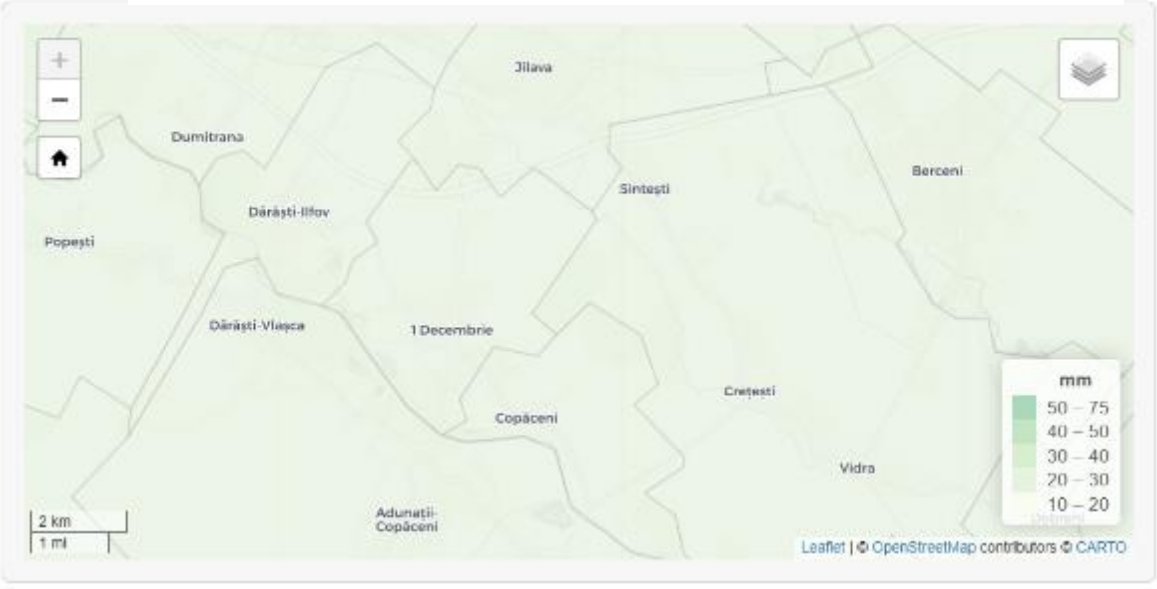
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.9 W/mp, and at the level of year 2100 it is estimated at 108 W/mp, which is higher than the multiannual average value of 103.8 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.2.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.8 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.4 m, and by 2100 it will reach 9 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (1 Decembrie - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.8

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 41.4 | 3.1 | 80.6 | 2071 | 74.2 | 239.1 | -87 | 23.8 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (1 Decembrie - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.8

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 9 | 3.4 | 58.3 | 2100 | -62.1 | 145.3 | -85.7 | 23.8 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.2.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

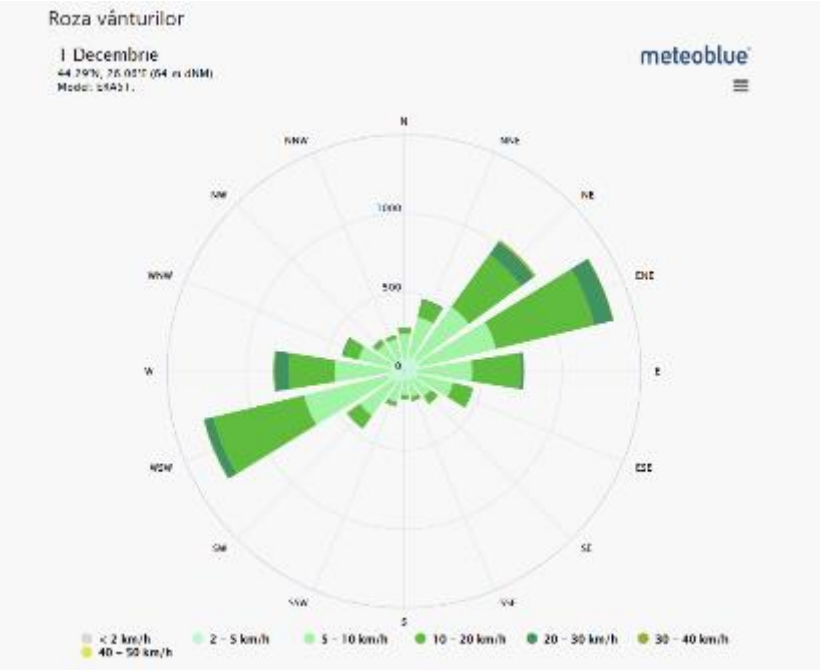



*Figure No. 17- Wind rose*

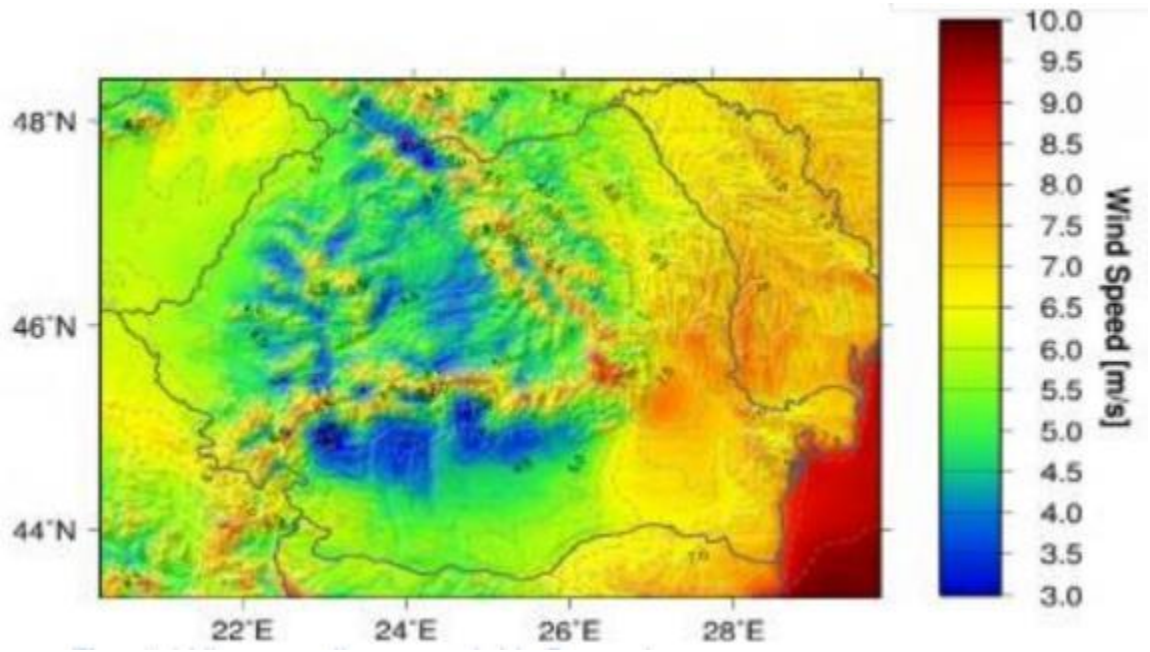



*Figure No. 18- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

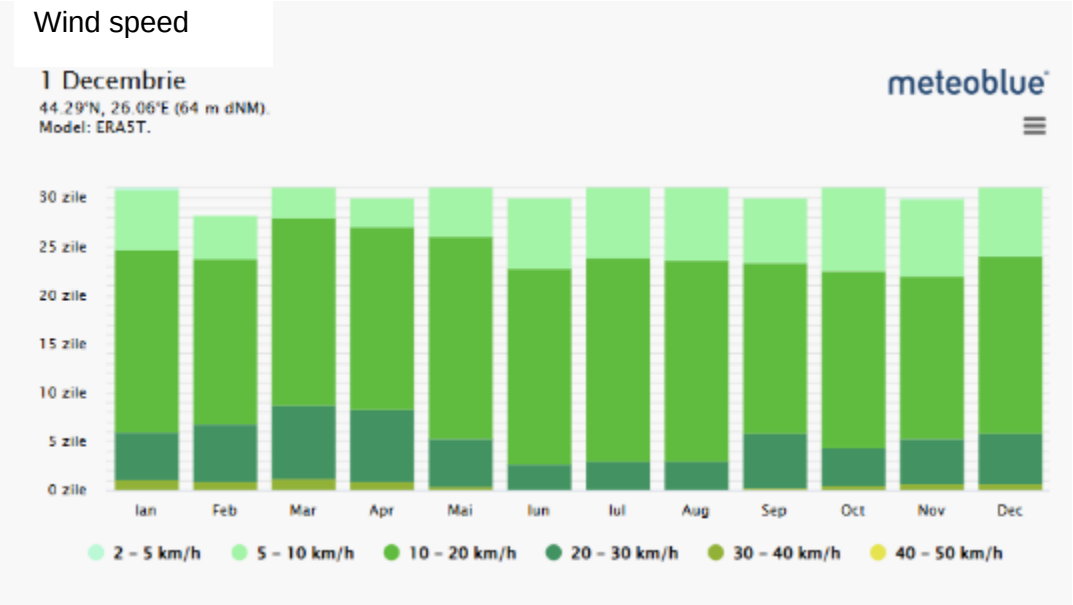



*Figure No. 19- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.4 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.2 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (1 Decembrie - County of Ilfov) - reference

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 2.9 | 4.2 | 2071 | -0.2 | 0.8 | -0.5 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (1 Decembrie - County of Ilfov) - reference

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.2 | 2.6 | 4.7 | 2100 | -0.2 | 1.3 | 0.8 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *3.3 Copăceni*

### 3.3.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

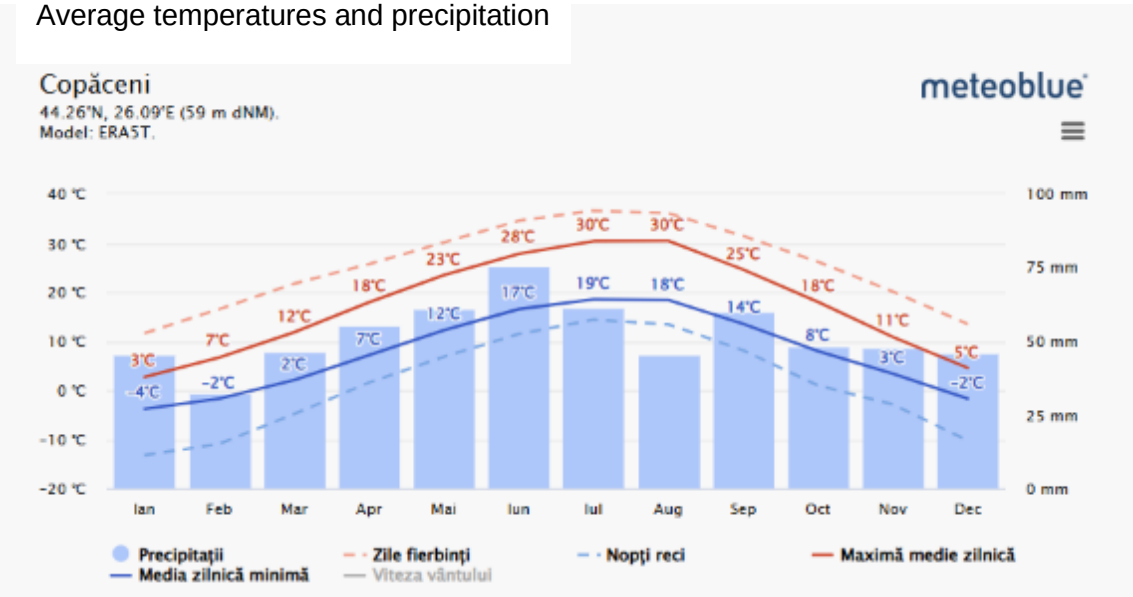



*Figure No. 20* ***- Average value of extreme temperatures over the last 30 years at the weather station[3]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

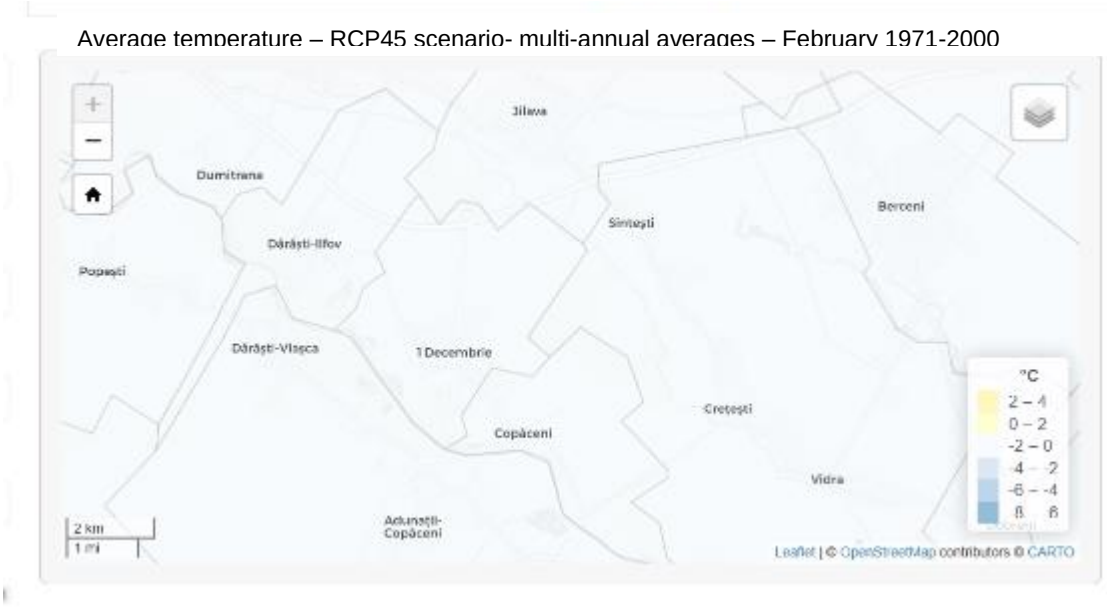
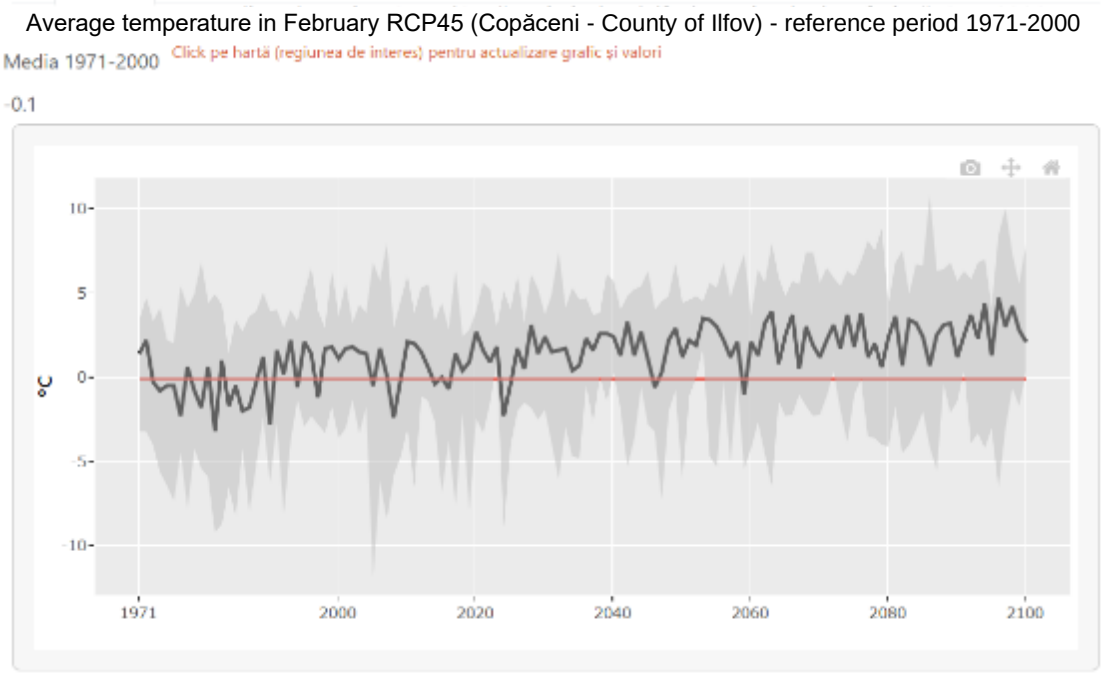



*Figure No. 21 - Average temperature at TAU level (period 1971 -2000)*

[3] Source: *www.meteoblue.com*

Average temperature in February RCP45 (Copăceni - County of Ilfov) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February RCP45 (Copăceni - County of Ilfov) - reference period 1971-2000


Average temperature in February RCP45 (Copăceni - County of Ilfov) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.3.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

With the impact that climate change may have on infrastructure in particular, this factor can have negative effects on the population. In this respect, it is recommended that road/naval infrastructure projects should consider the use of materials that contribute to the reduction of such stress.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.9 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February RCP45 (Copăceni - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.9

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.6 | 67.8 | 128.8 | 2071 | -11.3 | 24.9 | -36.1 | 103.9 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February RCP45 (Copăceni - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.9

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.4 | 58.9 | 136.2 | 2100 | 4.5 | 32.3 | -45 | 103.9 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.6 W/mp, and at the level of year 2100 it is estimated at 108.4 W/mp, which is higher than the multiannual average value of 103.9 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.3.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 m, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Copăceni - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

24.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 41 | 4.6 | 78.4 | 2071 | 70.3 | 225.6 | -80.9 | 24.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Copăceni - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

24.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 10.1 | 3.4 | 58.3 | 2100 | -58.1 | 142.1 | -85.9 | 24.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.3.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

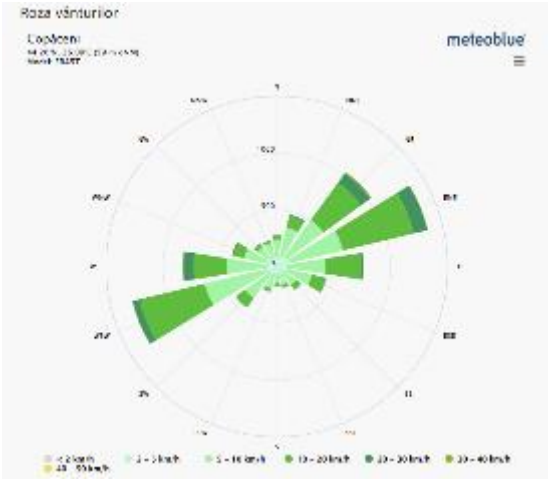



*Figure No. 22- Wind rose*

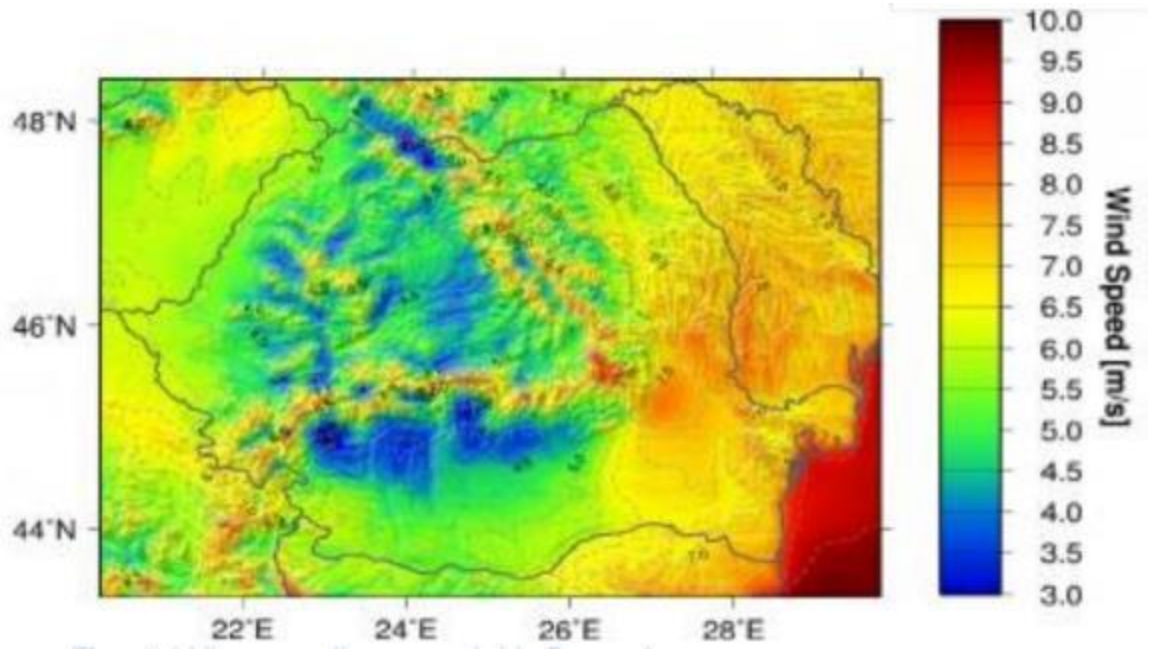



*Figure No. 23- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

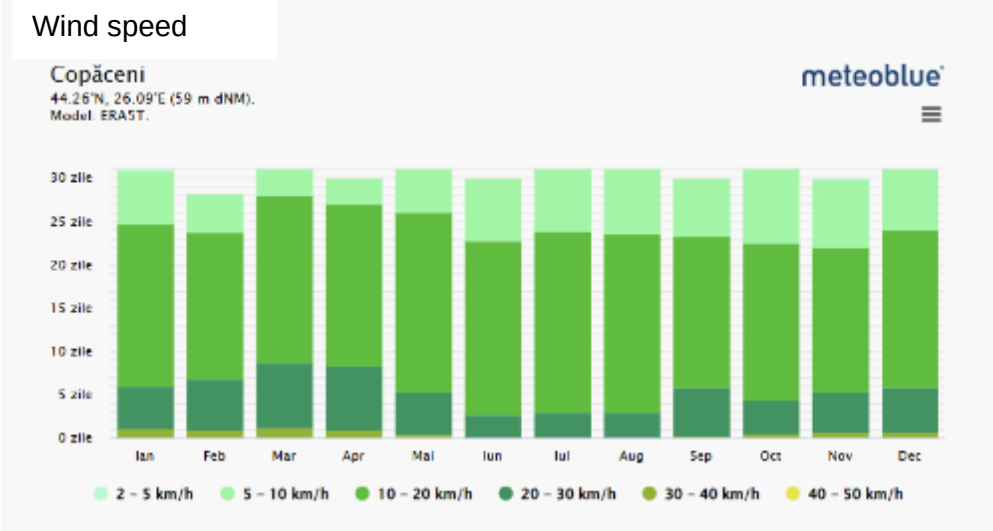



*Figure No. 24- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Copăceni - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3 | 4.2 | 2071 | -0.3 | 0.7 | -0.5 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Copăceni - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.3 | 2.5 | 4.8 | 2100 | -0.2 | 1.3 | -1 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

### *3.4 Dărăști*

#### 3.4.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

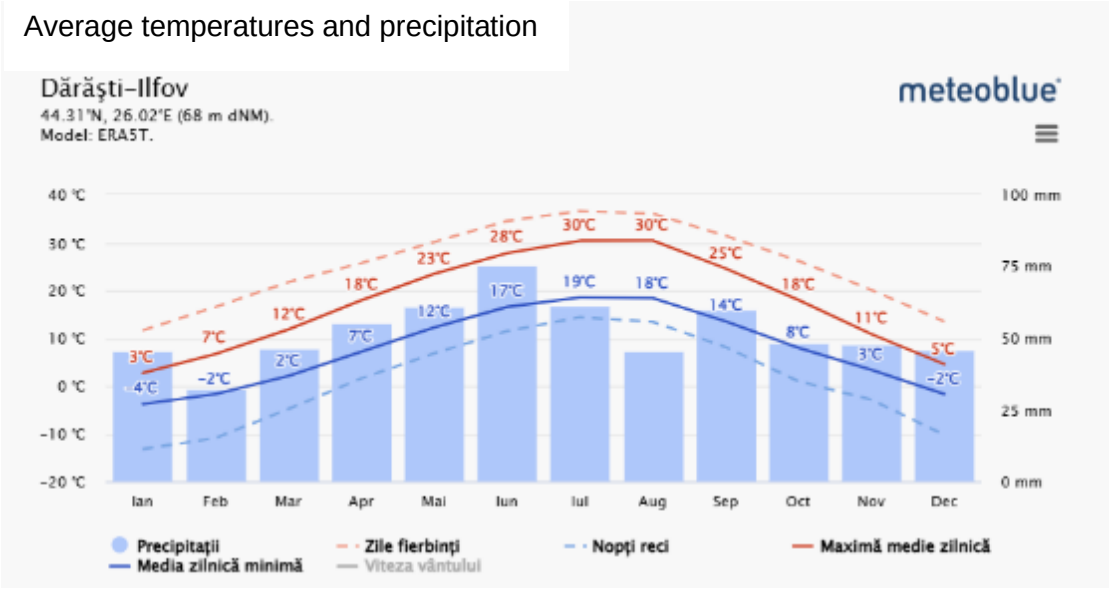



*Figure No. 25* ***- Average value of extreme temperatures over the last 30 years at the weather station[4]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

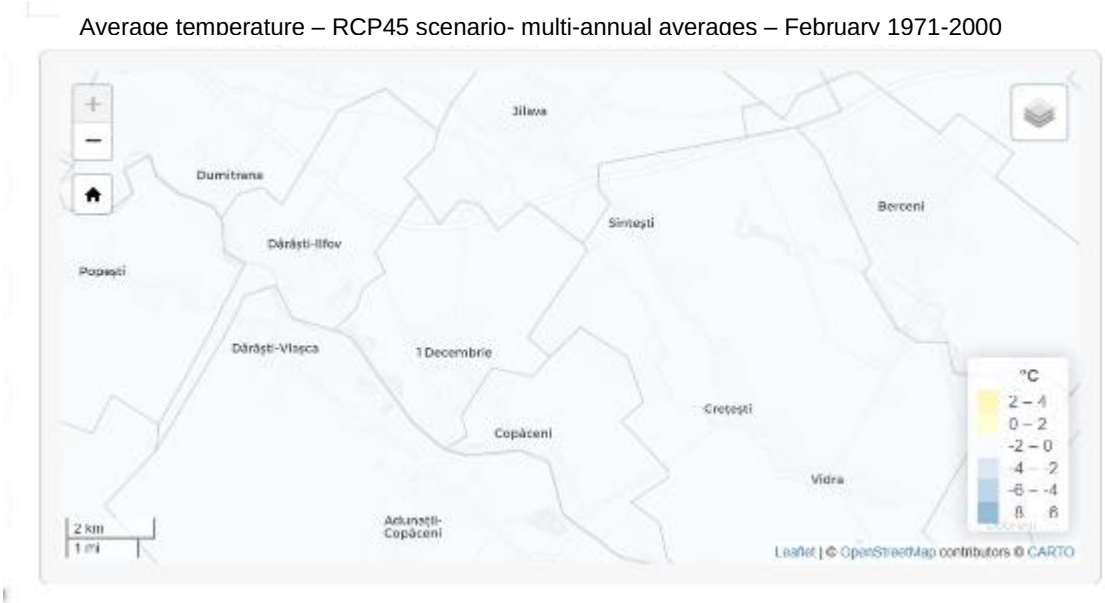
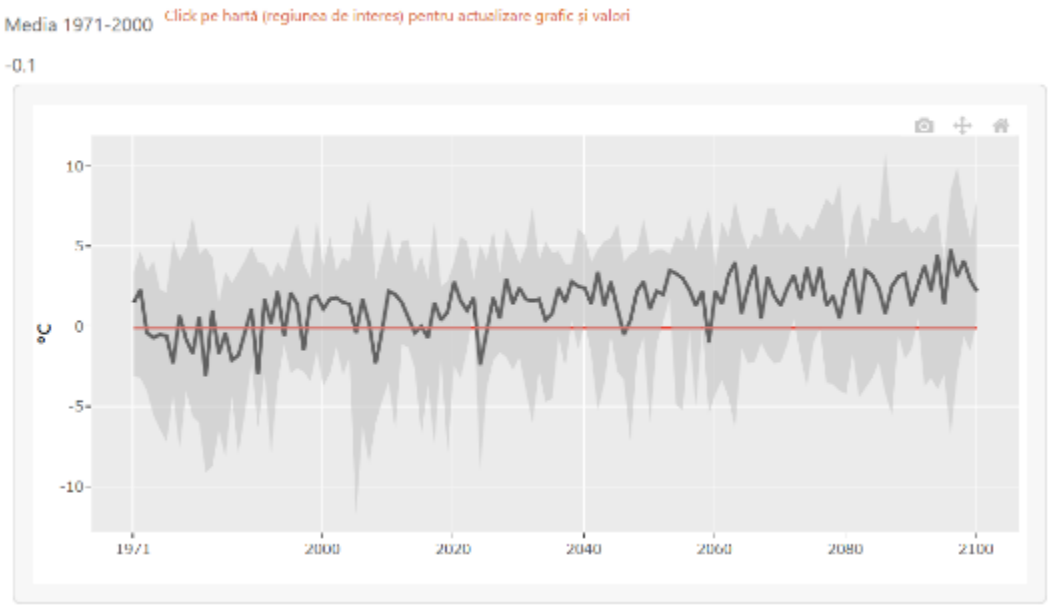



*Figure No. 26 - Average temperature in Dărăşti TAU (period 1971 -2000)*

[4] Source: *www.meteoblue.com*

Average temperature in February RCP45 (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February RCP45 (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.4 | -1.1 | 6.5 | 2071 | 2.5 | 6.6 | -1 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February RCP45 (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.2 | 0.4 | 8 | 2100 | 2.3 | 8.1 | 0.5 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.4.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 104.1 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 94.4 | 68.3 | 127.3 | 2071 | -9.7 | 23.2 | -35.8 | 104.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.9 | 59.5 | 135.9 | 2100 | 3.8 | 31.8 | -44.6 | 104.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 94.4 W/mp, and at the level of year 2100 it is estimated at 107.9 W/mp, which is higher than the multiannual average value of 104.1 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.4.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.8 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.4 m, and by 2100 it will reach 9 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.8

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 41.4 | 3.1 | 80.6 | 2071 | 74.2 | 239.1 | 87 | 23.8 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.8

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 9 | 3.4 | 58.3 | 2100 | -62.1 | 145.3 | -85.7 | 23.8 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.4.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

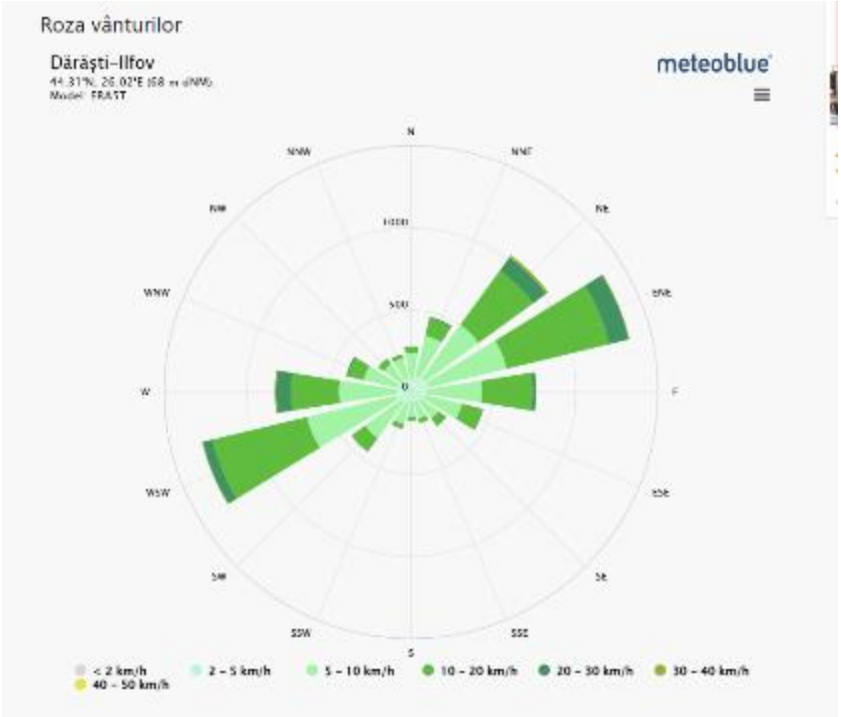



*Figure No. 27- Wind rose*

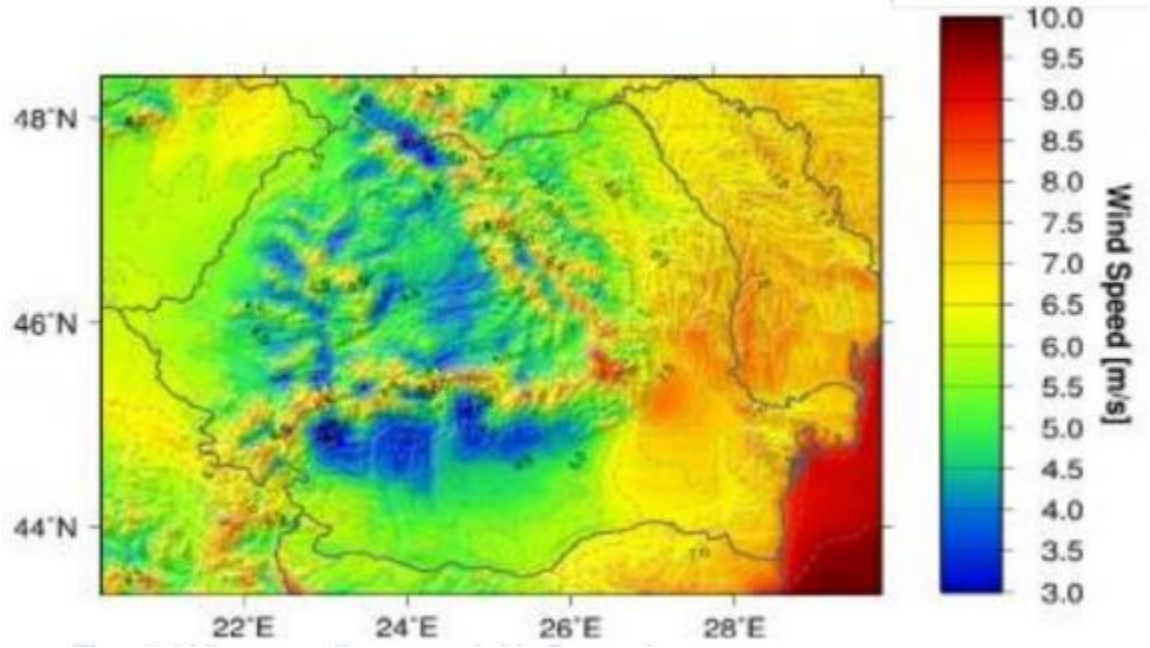



*Figure No. 28- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

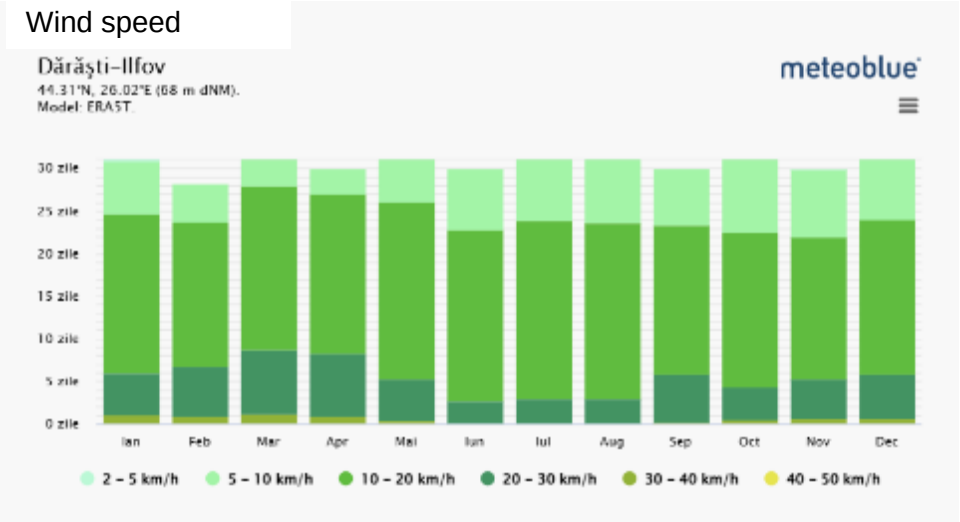



*Figure No. 29- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.2 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Dărăşti - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows | Copy | CSV | Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 2.9 | 4.2 | 2071 | -0.3 | 0.7 | -0.6 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Dărăști - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows ▾ Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.2 | 2.6 | 4.7 | 2100 | -0.3 | 1.2 | -0.9 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *3.5 Măgurele*

### 3.5.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

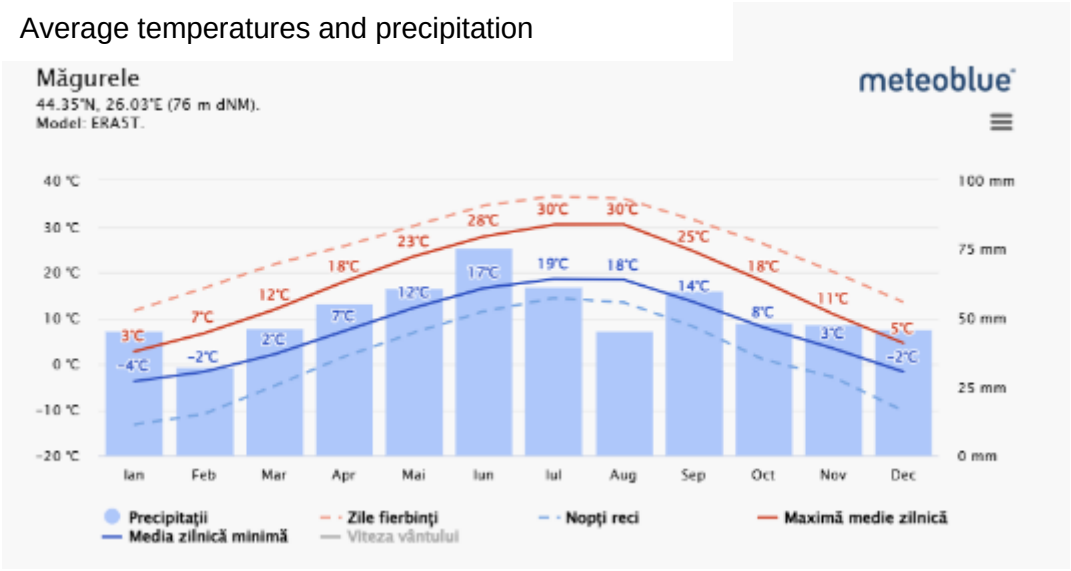



*Figure No. 30* ***- Average value of extreme temperatures over the last 30 years at the weather station[5]***

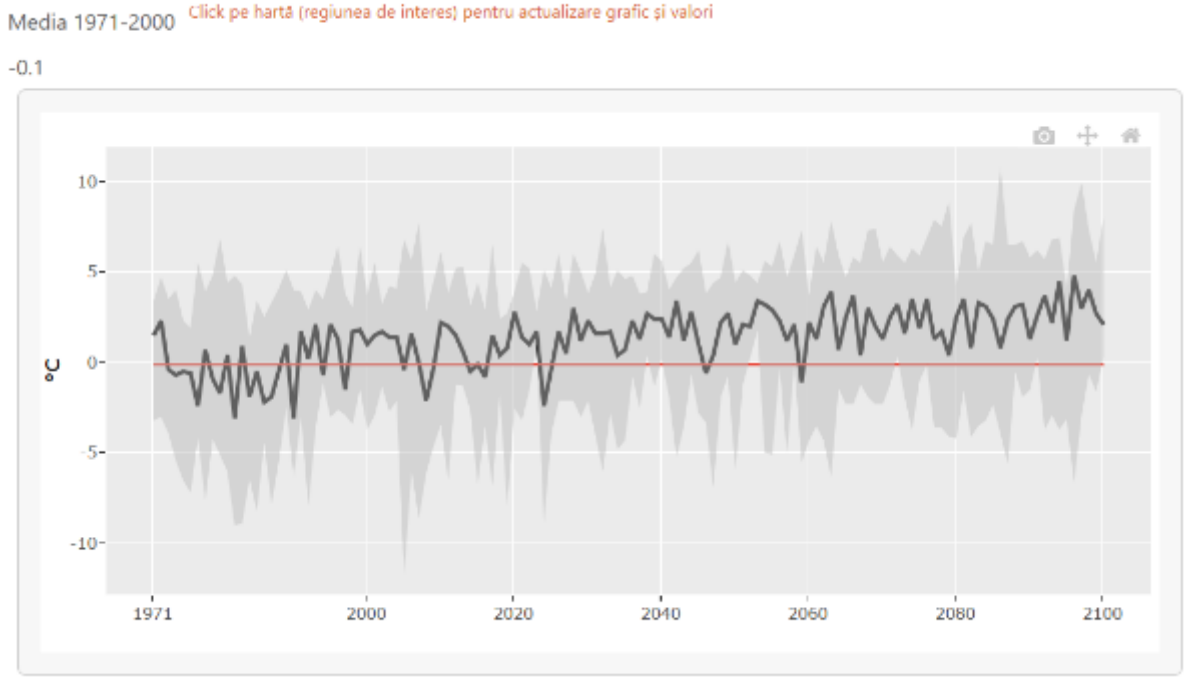
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

[5] Source: *www.meteoblue.com*

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 31 - Average temperature at TAU level (period 1971 -2000)*

Average temperature in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.5.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 104 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 95 | 68.4 | 127.2 | 2071 | -9 | 23.2 | -35.6 | 104 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.7 | 59.9 | 135.6 | 2100 | 3.7 | 31.6 | -44.1 | 104 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 95 W/mp, and at the level of year 2100 it is estimated at 107.7 W/mp, which is higher than the multiannual average value of 104 W/mp. We can observe a decreasing

trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.5.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.2 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 40.1 m, and by 2100 it will reach 10 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000


Rainfall in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.2

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 40.1 | 3.6 | 84.9 | 2071 | 73.1 | 266.5 | -84.5 | 23.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 10 | 3.3 | 59.8 | 2100 | -56.8 | 158.2 | -85.8 | 23.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.5.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

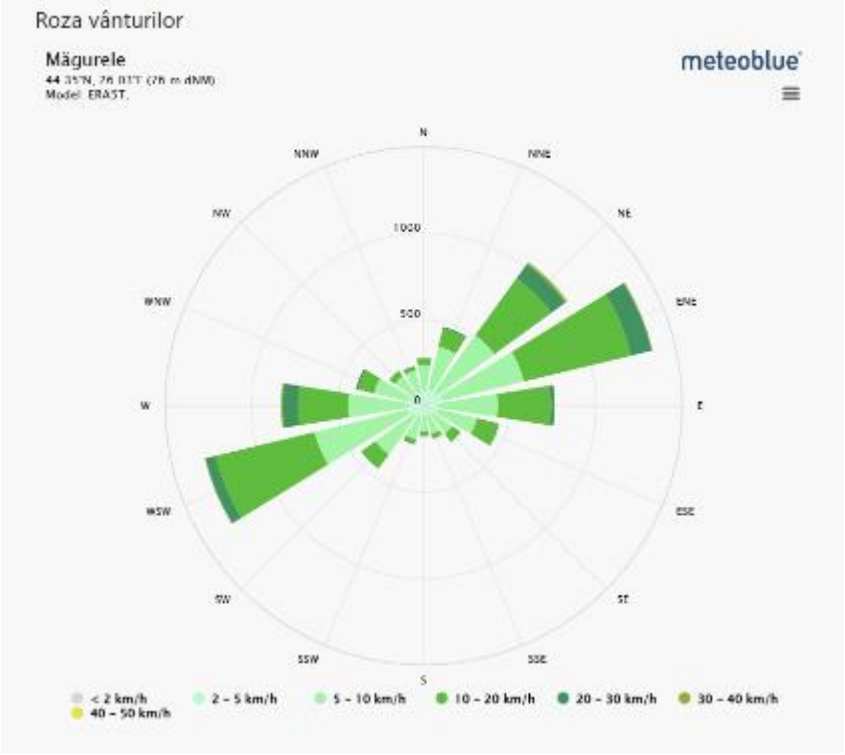



*Figure No. 32- Wind rose*

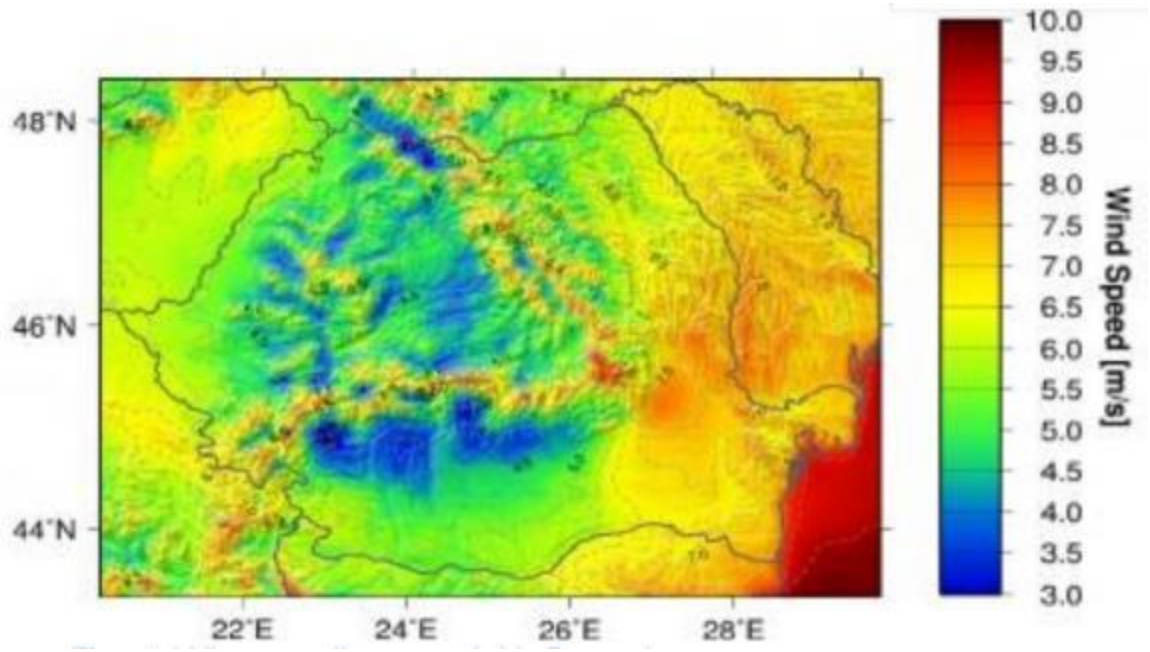



*Figure No. 33- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

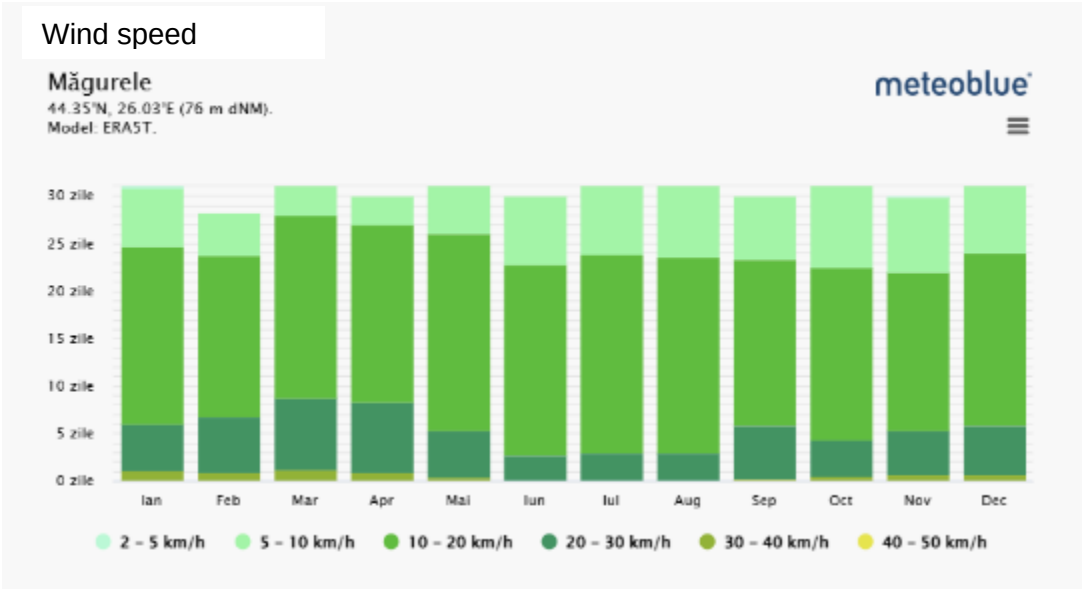



*Figure No. 34- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.1 m/s, and 3.1 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.3

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.1 | 2.8 | 4 | 2071 | -0.2 | 0.7 | -0.5 | 3.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Măgurele - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.3

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.1 | 2.6 | 4.5 | 2100 | -0.2 | 1.2 | -0.7 | 3.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area, there is a low risk of exposure of the project to this climatic factor.

## *3.6 Cornetu*

### 3.6.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

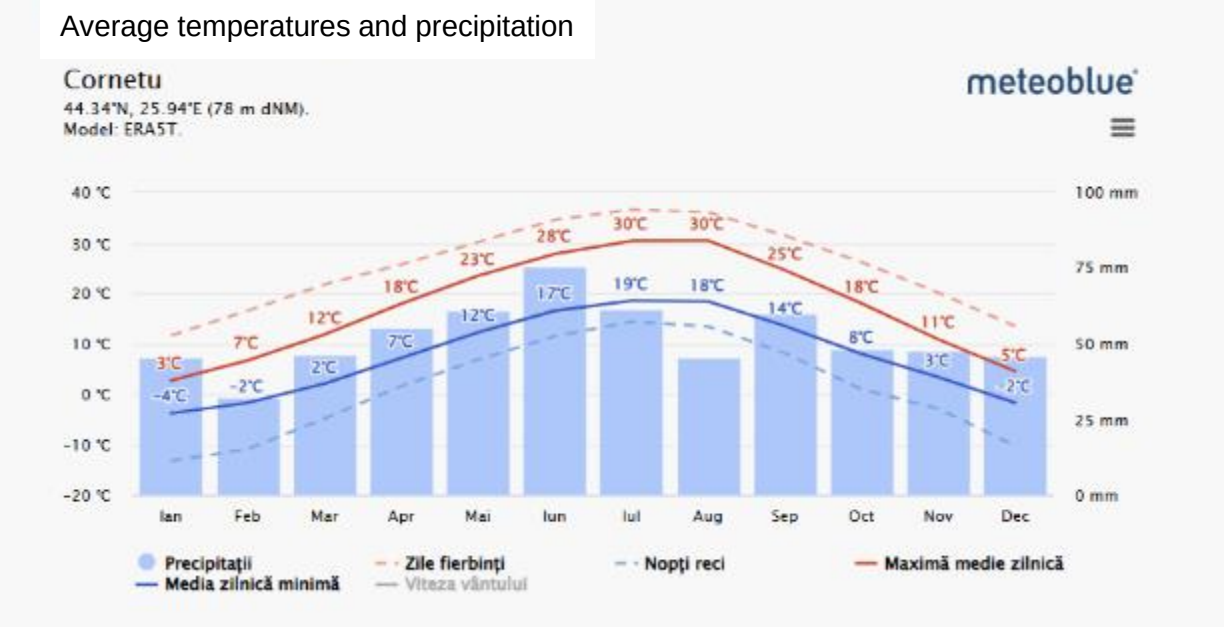



*Figure No. 35* ***- Average value of extreme temperatures over the last 30 years at the weather station[6]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

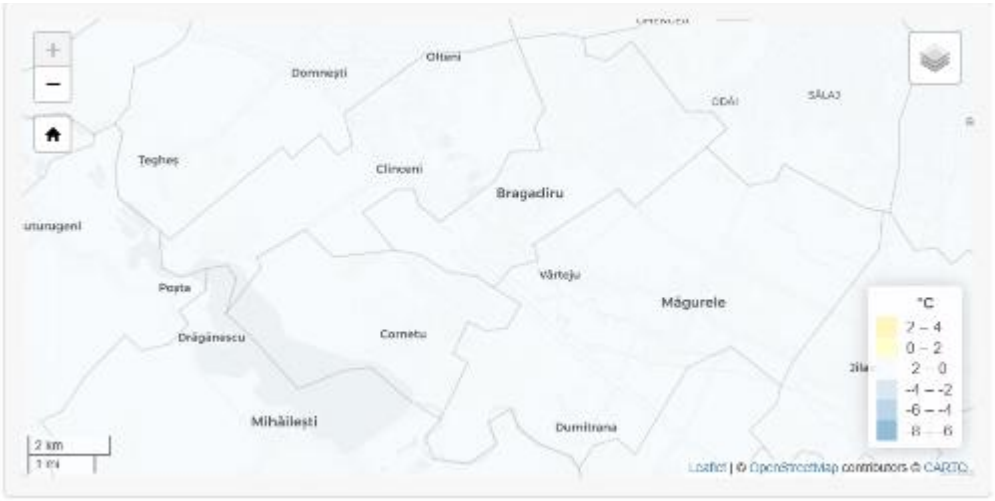
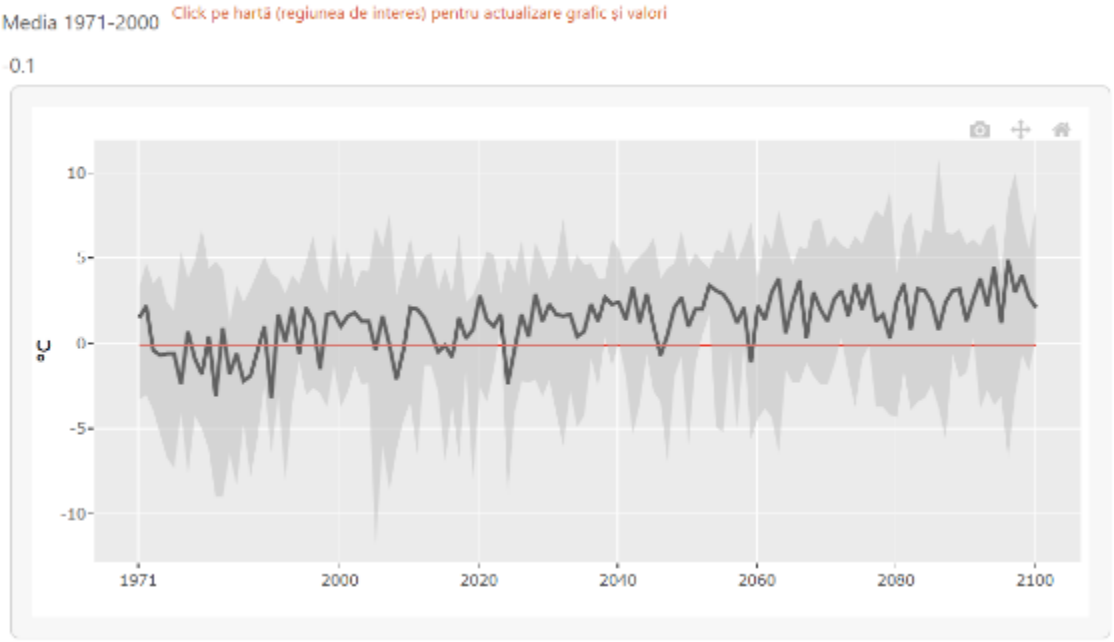



*Figure No. 36 - Average temperature at TAU level (period 1971 -2000)*

[6] Source: *www.meteoblue.com*

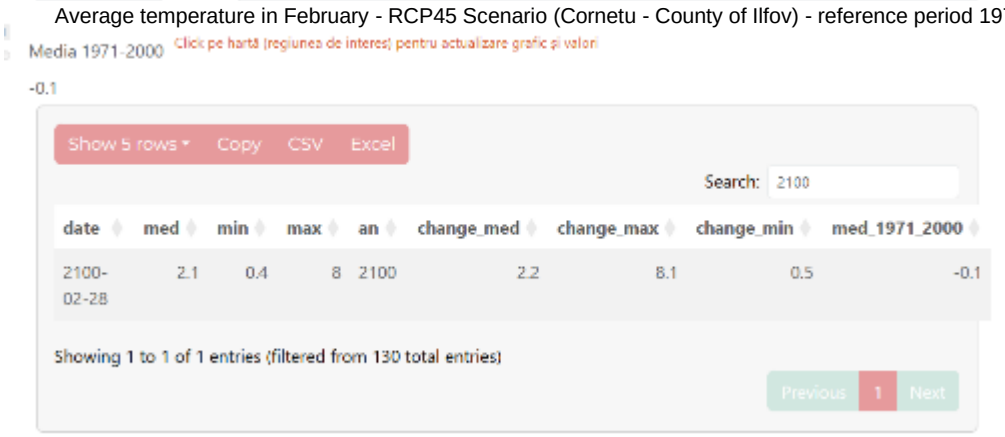
Average temperature in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000




In 2071 and 2100, respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000



According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above-mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.6.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces, or who may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect, it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.9 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.2

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 95.6 | 68.4 | 126.3 | 2071 | -8.6 | 22.1 | -35.8 | 104.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.7 | 60.3 | 135.5 | 2100 | 3.5 | 31.3 | 43.9 | 104.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

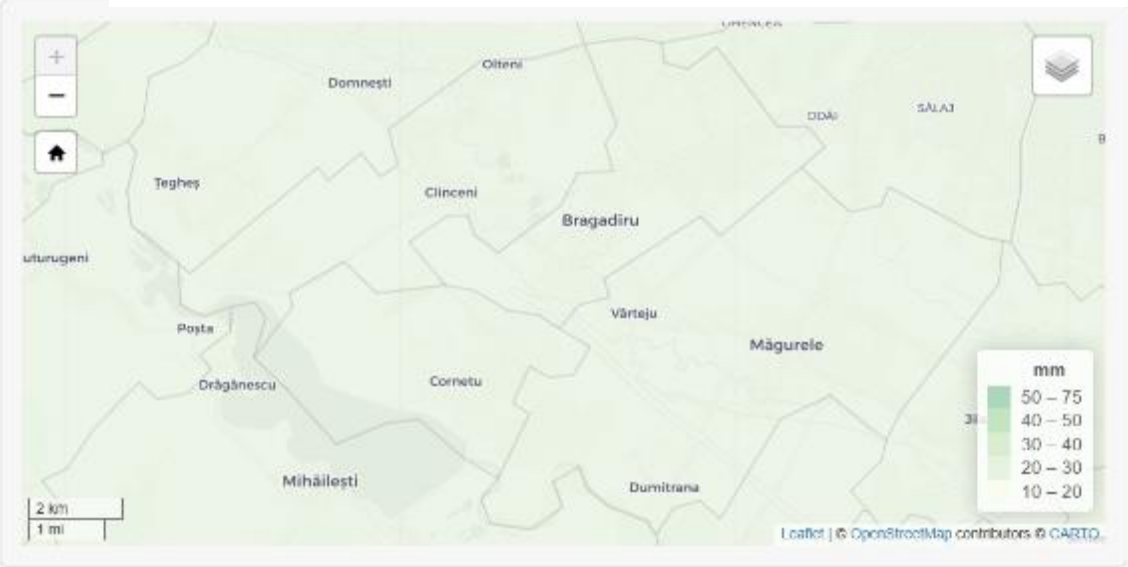
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 95.6 W/mp, and at the level of year 2100 it is estimated at 107.7 W/mp, which is higher than the multiannual average value of 104.2 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.6.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.4 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 40.6 m, and by 2100 it will reach 10.6 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071, but also for the period 2071-2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 40.6 | 3.9 | 84.9 | 2071 | 73.2 | 262.1 | -83.4 | 23.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Cornetu - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 10.6 | 3.4 | 62.8 | 2100 | -54.8 | 167.8 | -85.5 | 23.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures, it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.6.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

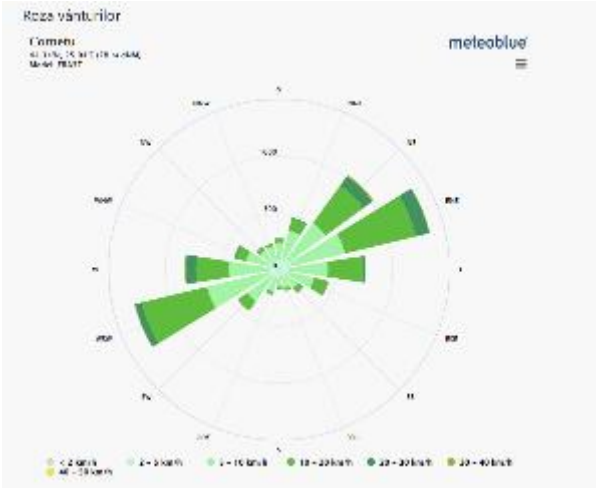



*Figure No. 37- Wind rose*

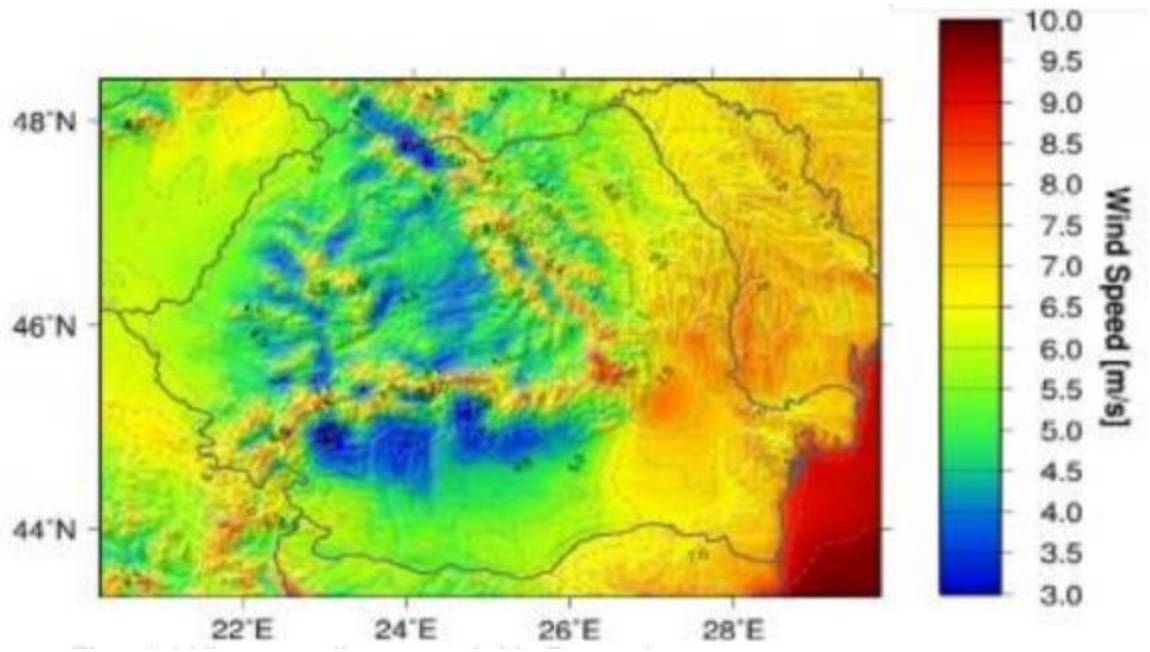



*Figure No. 38- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

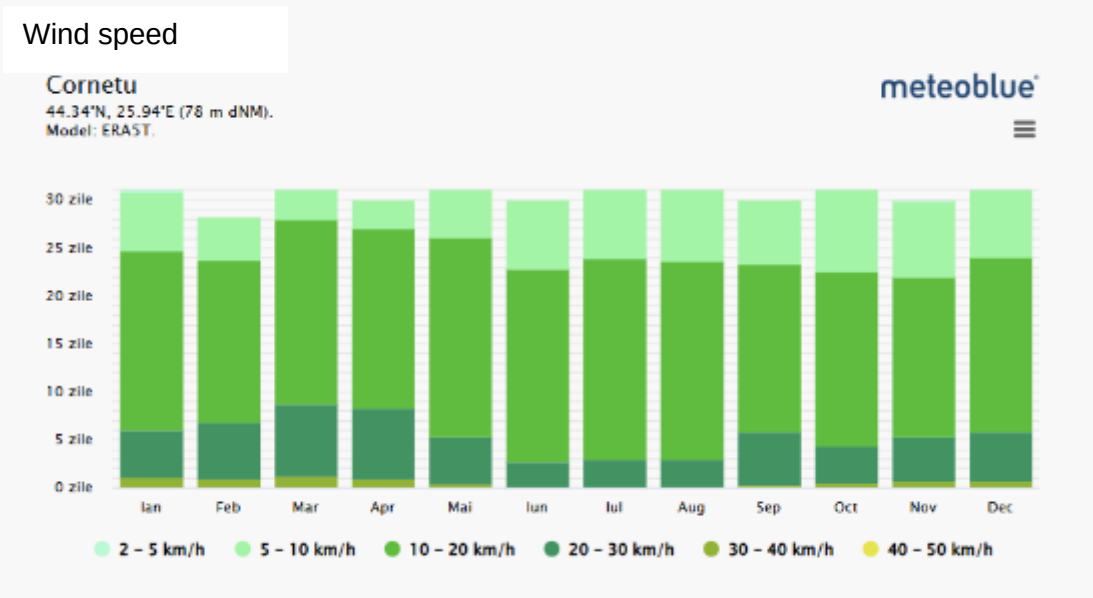



*Figure No. 39- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.1 m/s, and 3.1 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Cornetu - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.1 | 2.8 | 4.1 | 2071 | 0.3 | 0.7 | 0.6 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Cornetu - Ilfov - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.1 | 2.7 | 4.5 | 2100 | -0.3 | 1.1 | -0.7 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area, there is a low risk of exposure of the project to this climatic factor.

## *3.7 Cernica*

### 3.7.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

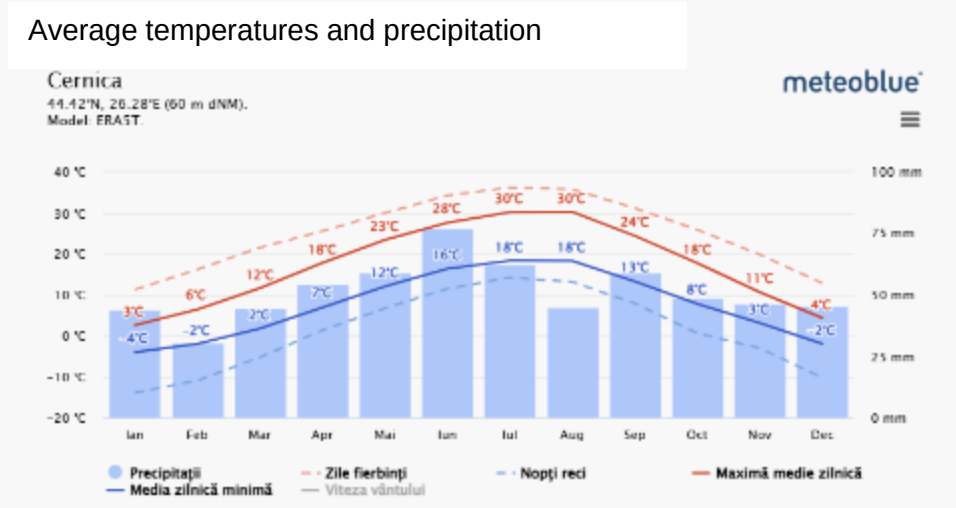



*Figure No. 40* ***- Average value of extreme temperatures over the last 30 years at the weather station***[7]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

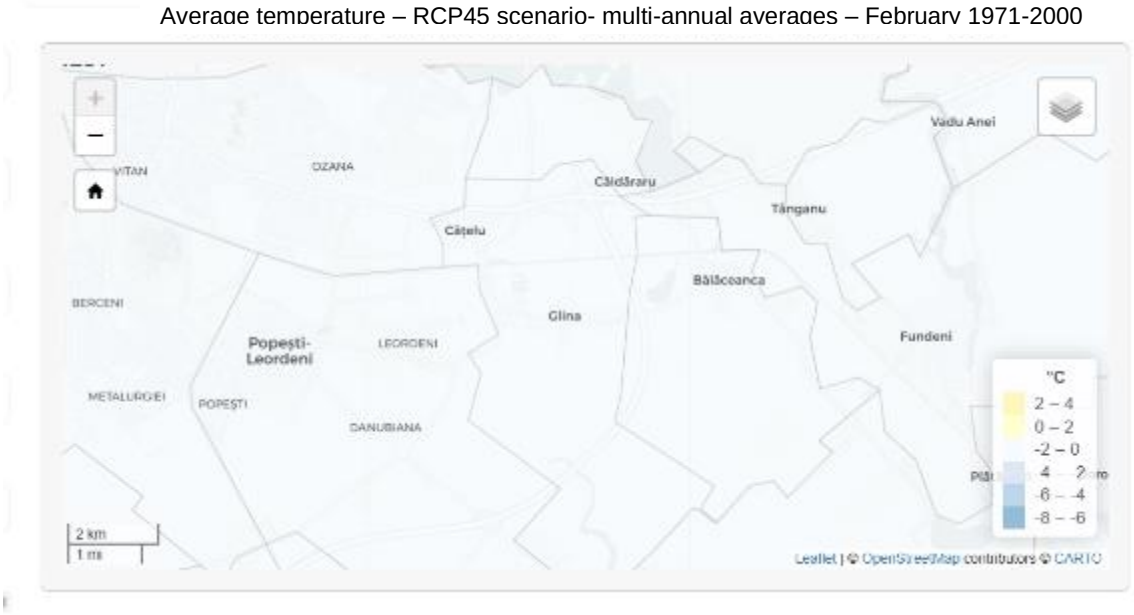
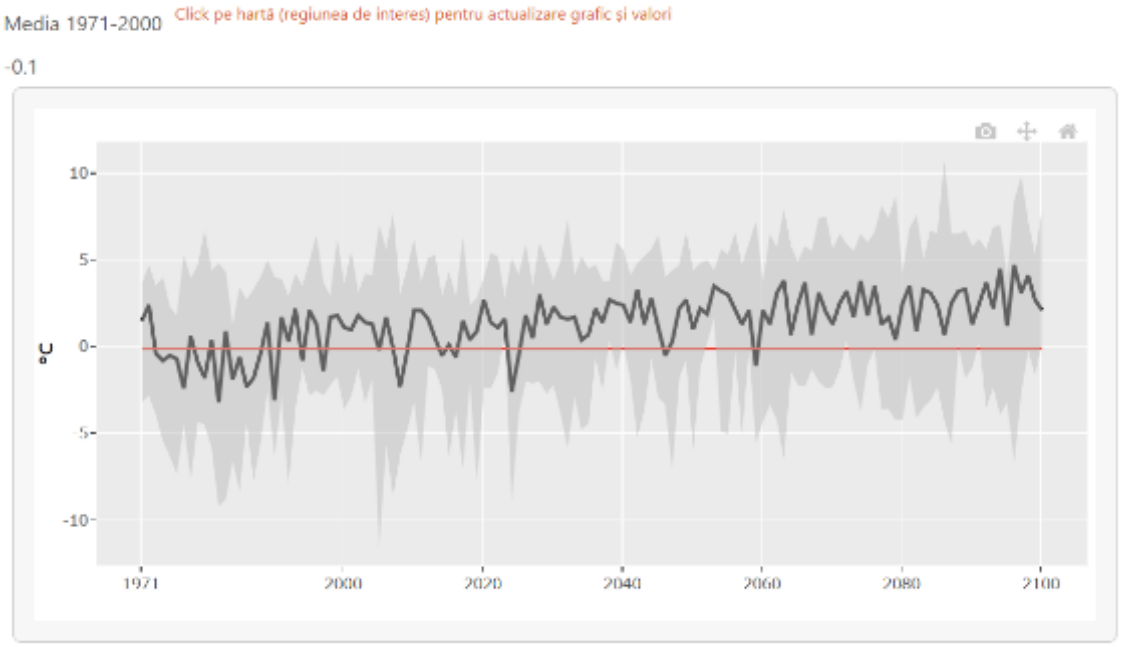



*Figure No. 41 - Average temperature at TAU level (period 1971 -2000)*

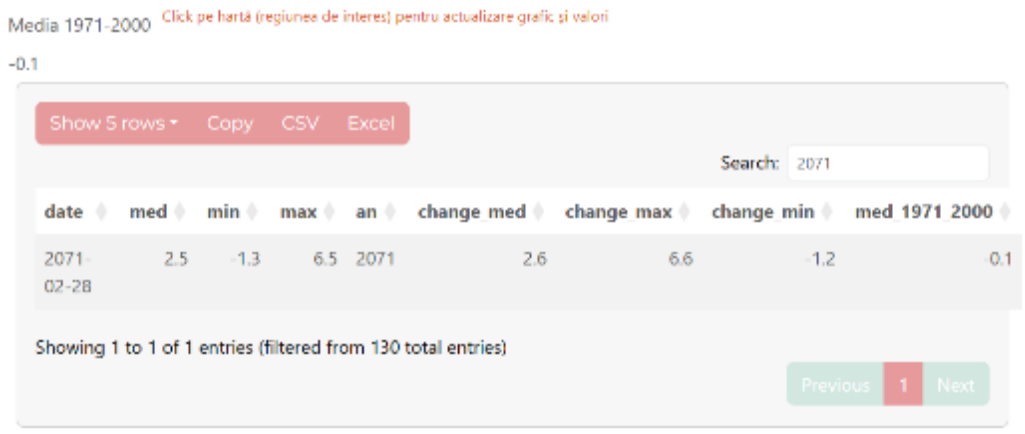
[7] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000




In 2071 and 2100, respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000




Average temperature in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above-mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.7.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or who may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect, it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.2 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.2

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93.2 | 68.5 | 128.5 | 2071 | -10 | 25.3 | -34.7 | 103.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.6 | 59.7 | 135.5 | 2100 | 4.4 | 32.3 | -43.5 | 103.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.2 W/mp, and at the level of year 2100 it is estimated at 107.6 W/mp, which is higher than the multiannual average value of 103.2 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.7.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 31.6 m, and by 2100 it will reach 9.2 mm. A decreasing trend in precipitation can be observed for the period 2000-2071, but also for the period 2071-2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

21.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 31.6 | 4.2 | 81.2 | 2071 | 50.1 | 285.7 | 80.1 | 21.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

21.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 9.2 | 2.9 | 53.2 | 2100 | 56.3 | 152.7 | 86.2 | 21.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures, it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.7.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

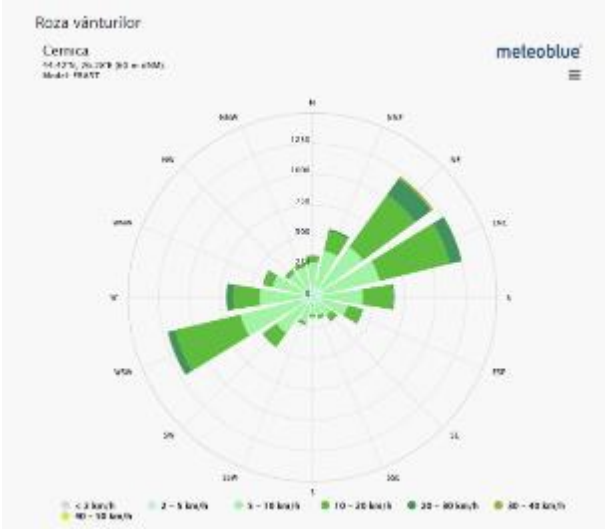



*Figure No. 42- Wind rose*

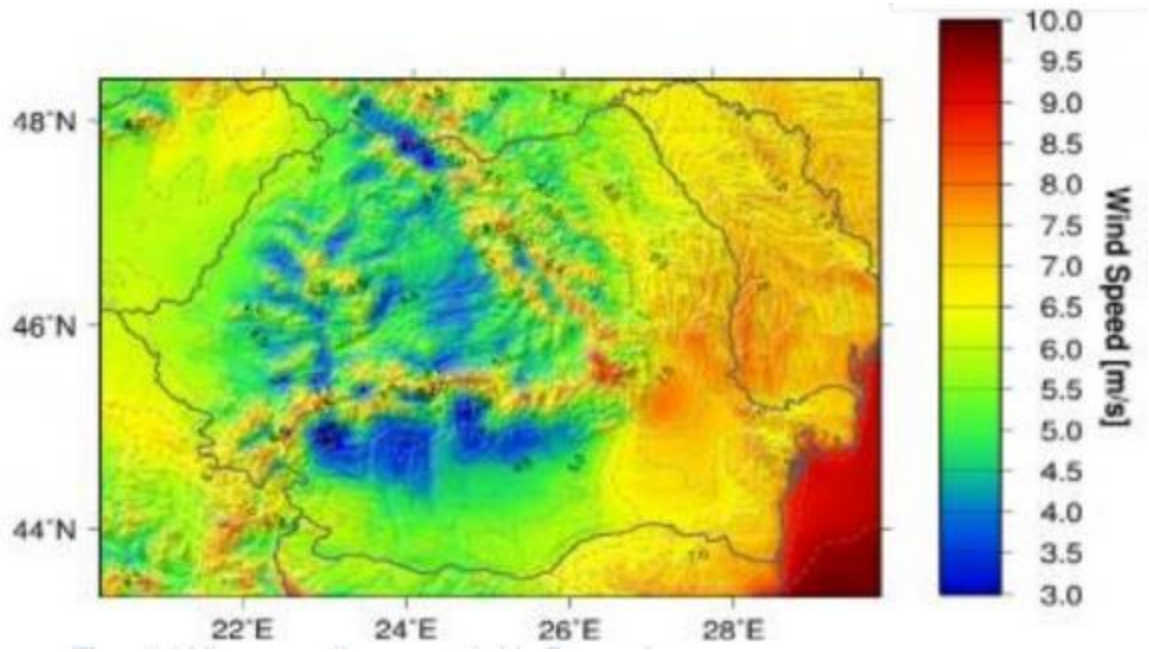



*Figure No. 43- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

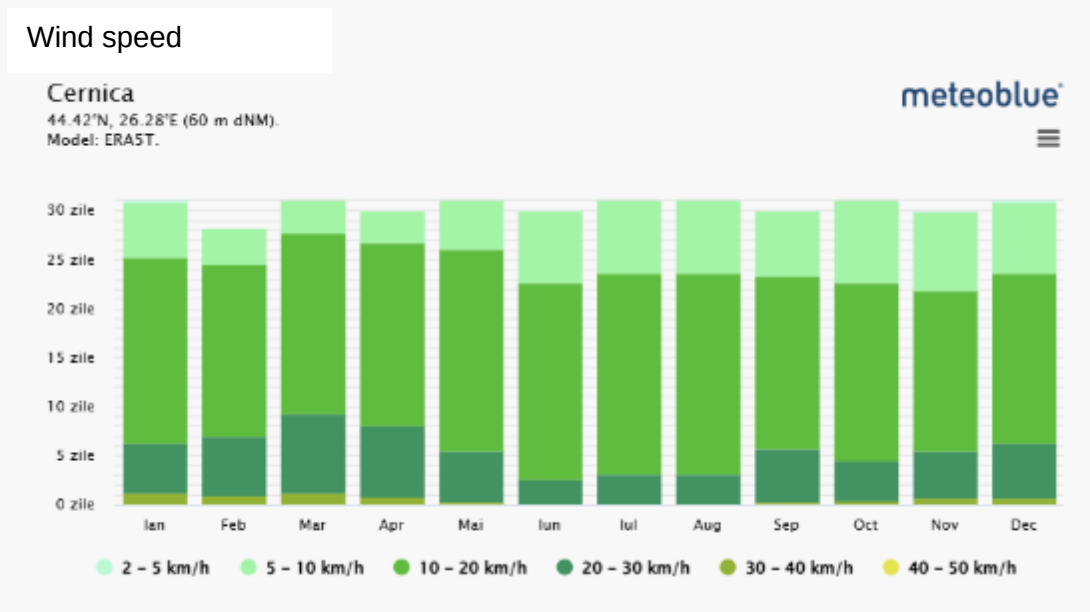



*Figure No. 44- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.4 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.1 m/s, and 3.2 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.1 | 2.9 | 4.2 | 2071 | -0.3 | 0.8 | -0.5 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Cernica - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.2 | 2.5 | 4.6 | 2100 | -0.2 | 1.2 | -0.9 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area, there is a low risk of exposure of the project to this climatic factor.

## *3.8 Glina*

### 3.8.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

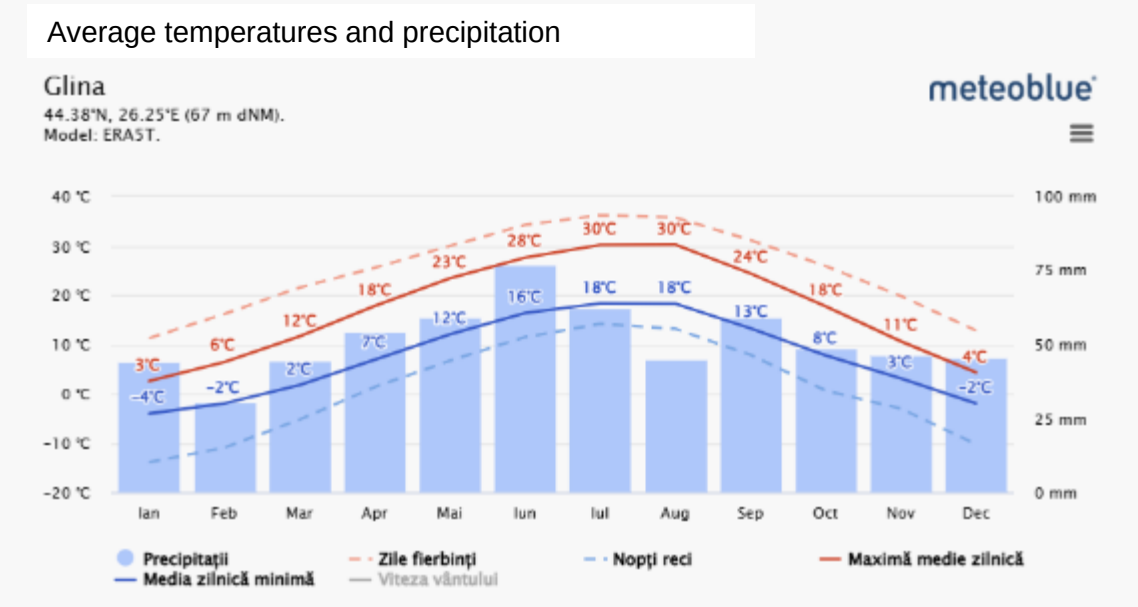



*Figure No. 45* ***- Average value of extreme temperatures over the last 30 years at the weather station[8]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

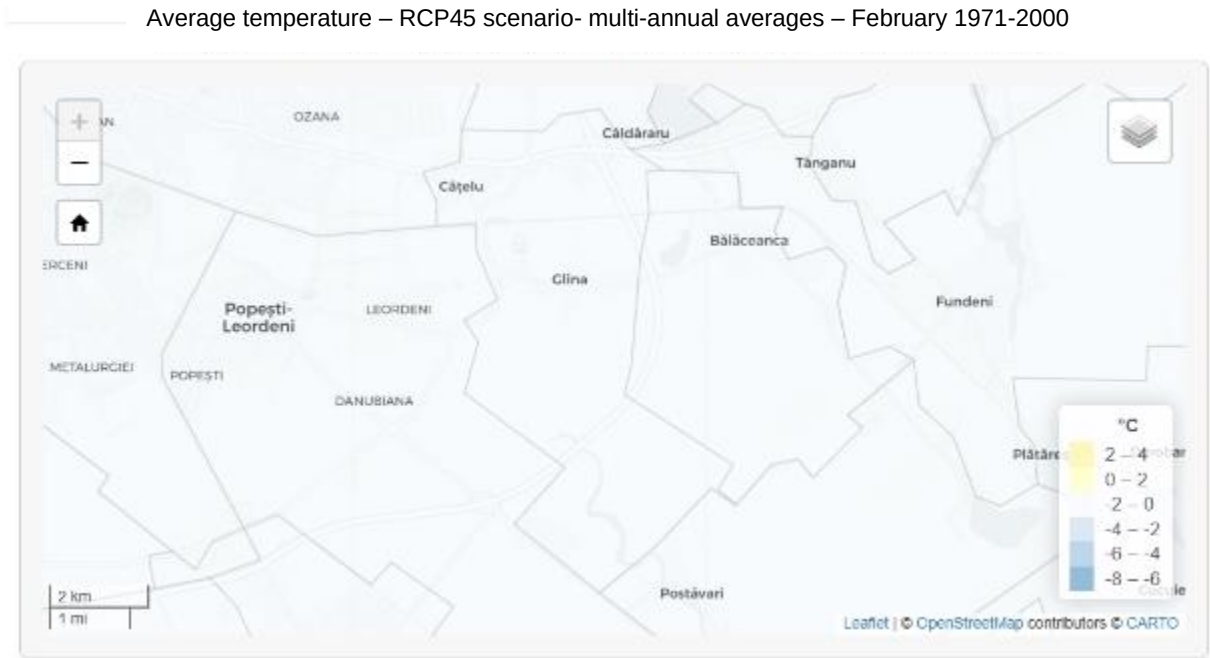
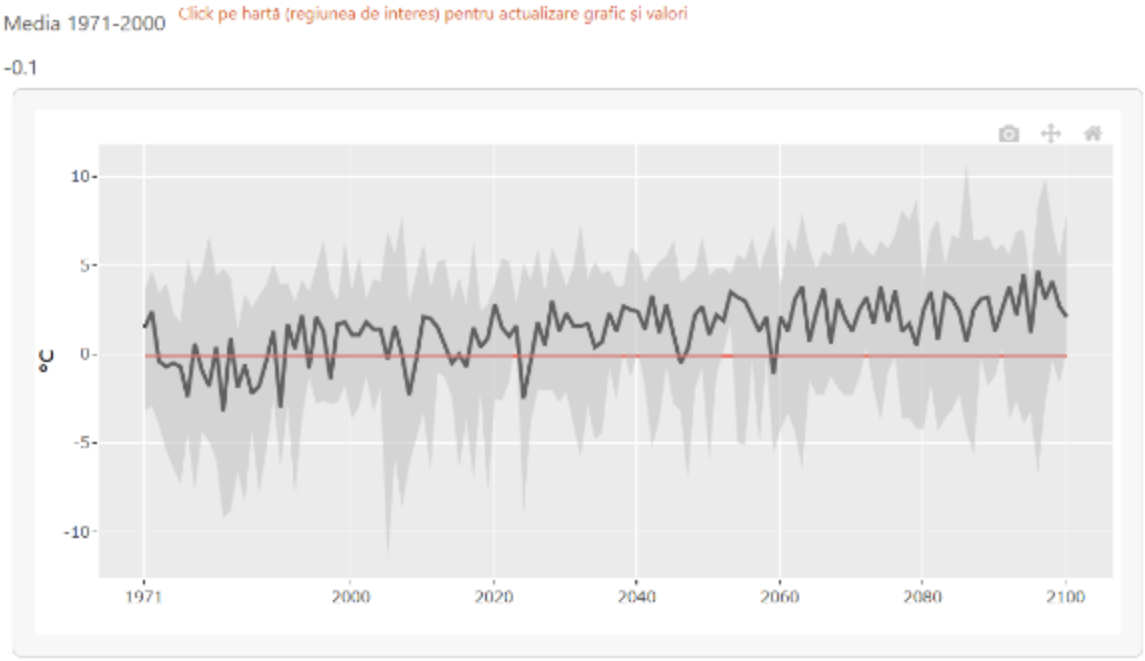



*Figure No. 46 - Average temperature at TAU level (period 1971 -2000)*

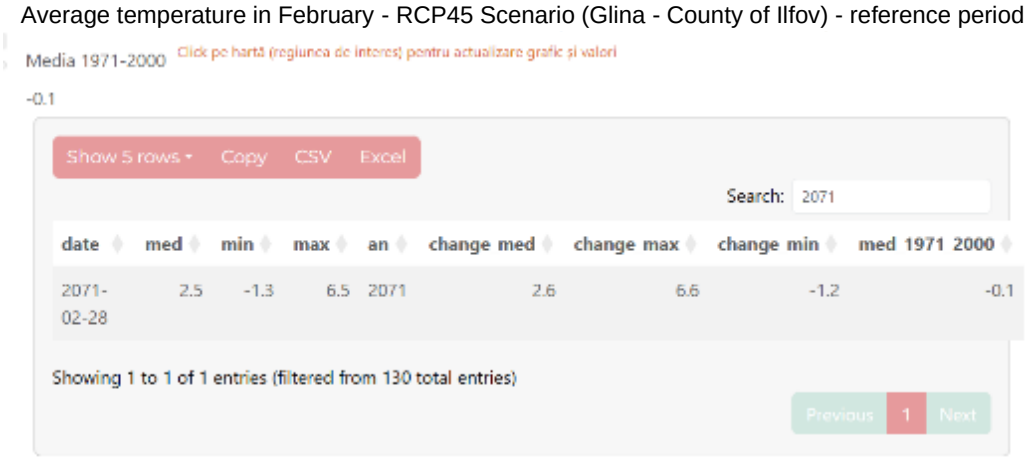
[8] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000




In 2071 and 2100, respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000




| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.5 | -1.3 | 6.5 | 2071 | 2.6 | 6.6 | -1.2 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000


| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.1 | 0.3 | 7.9 | 2100 | 2.2 | 8 | 0.4 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above-mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 3.8.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces, or who may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect, it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.2 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.2

Show 5 rows ▾ Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93.1 | 68.3 | 128.7 | 2071 | -10.1 | 25.5 | -34.9 | 103.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe harta (regiunea de interes) pentru actualizare grafic și valori

103.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.5 | 59.5 | 135.5 | 2100 | 4.3 | 32.3 | -43.7 | 103.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.1 W/mp, and at the level of year 2100 it is estimated at 107.5 W/mp, which is higher than the multiannual average value of 103.2 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 3.8.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.6 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 34.3 m, and by 2100 it will reach 9.3 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

21.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 34.3 | 3.9 | 80.9 | 2071 | 58.6 | 274.2 | 82 | 21.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

21.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 9.3 | 3.1 | 54.3 | 2100 | -57 | 151.2 | -85.7 | 21.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 3.8.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

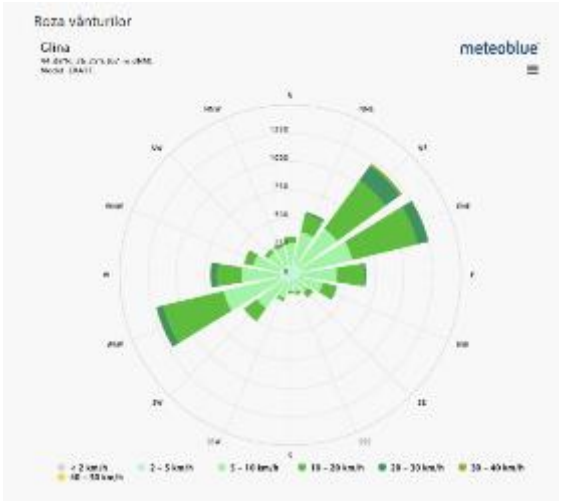



*Figure No. 47- Wind rose*

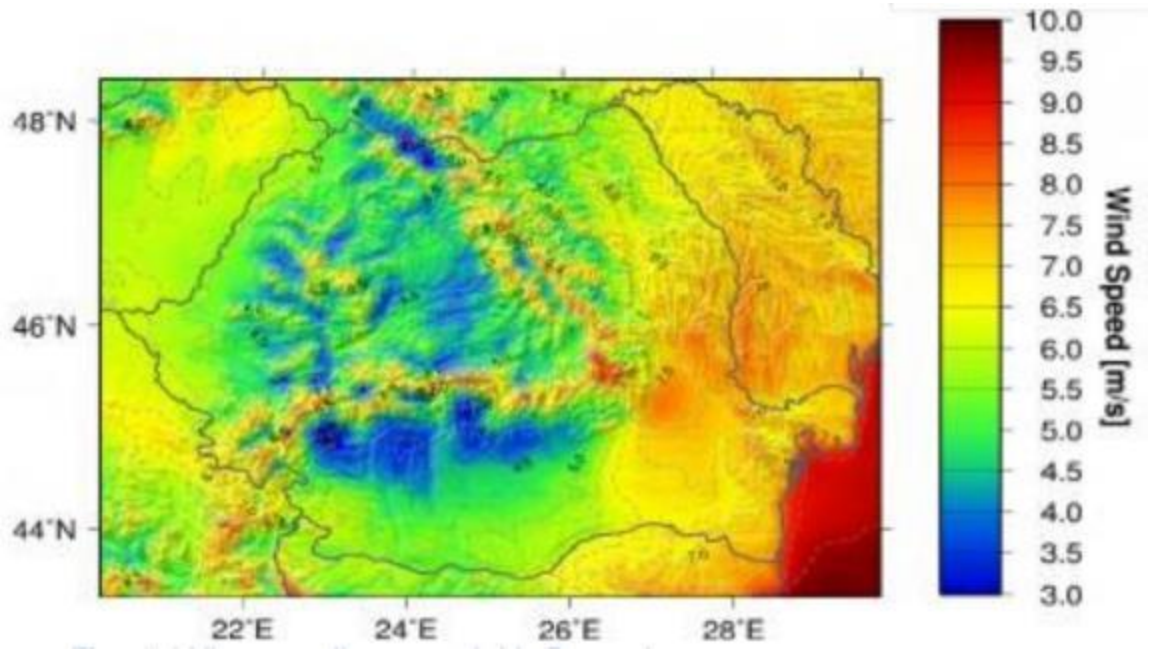



*Figure No. 48- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

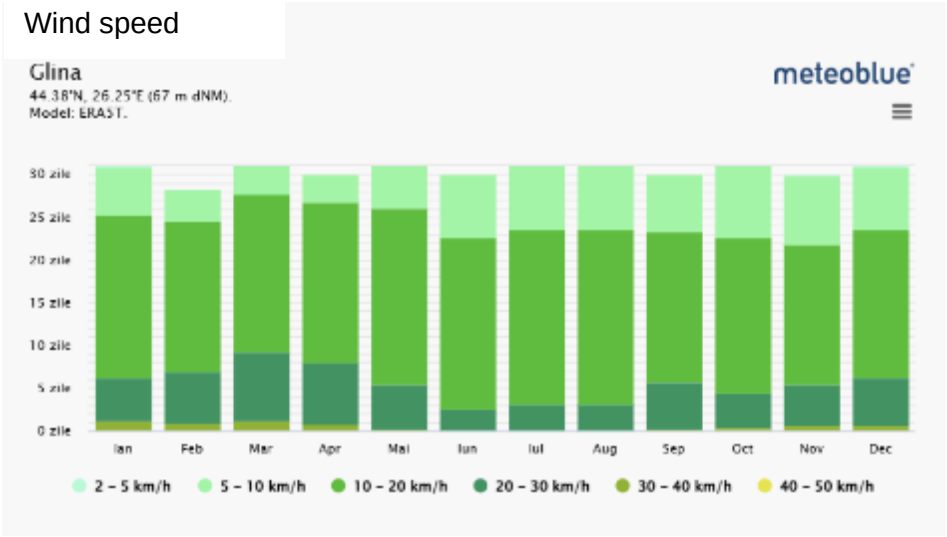



*Figure No. 49- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.1 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Glina - County of Ilfov) - reference period

Media 1971 2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.1 | 2.8 | 4.1 | 2071 | 0.3 | 0.7 | 0.6 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Glina - County of Ilfov) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.2 | 2.5 | 4.6 | 2100 | -0.2 | 1.2 | -0.9 | 3.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

# 4 Călărași County

## *4.1 Budești*

### 4.1.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

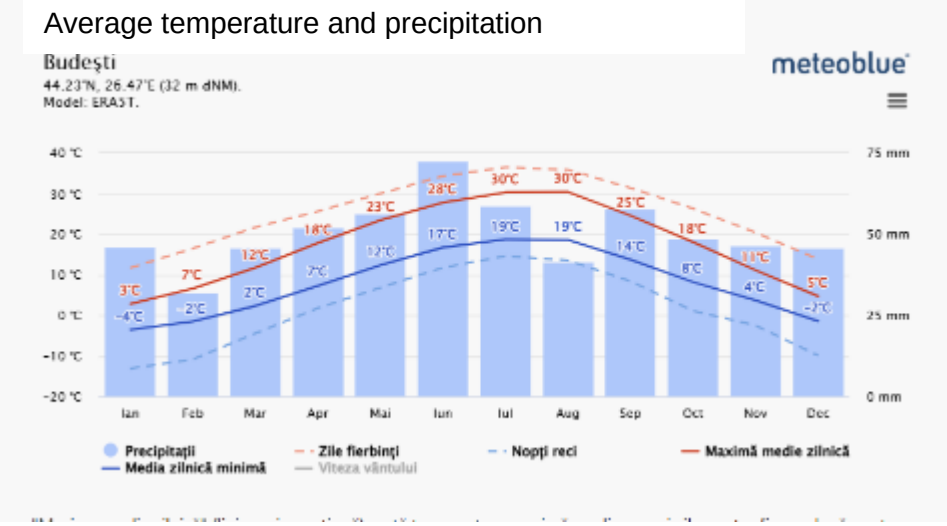



*Figure No. 50* ***- Average value of extreme temperatures over the last 30 years at the weather station***[9]

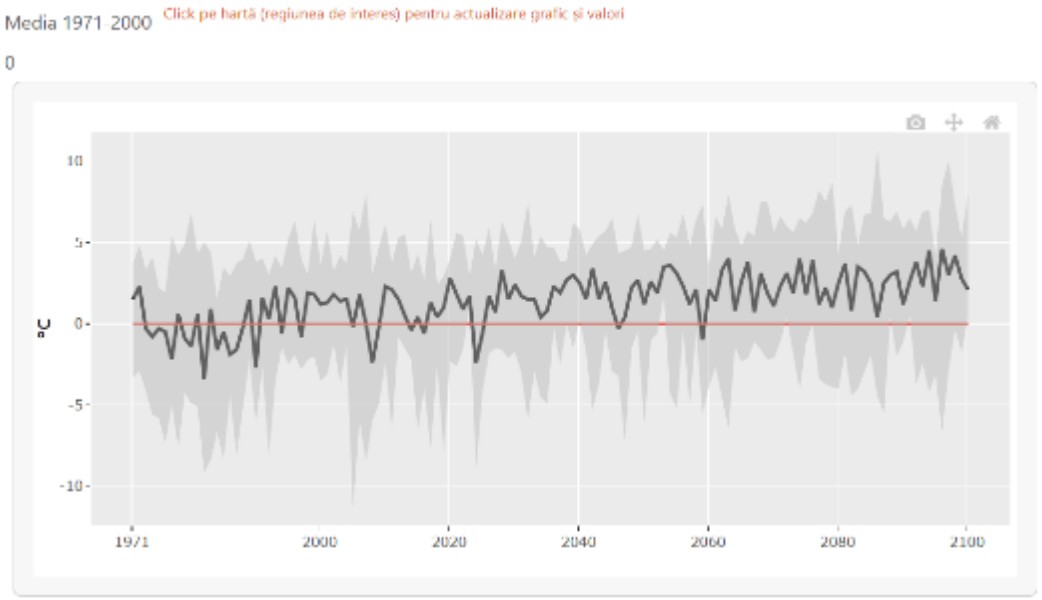
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 51 - Average temperature at TAU level (period 1971 -2000)*

[9] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.1.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.4 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.9 | 67.8 | 129.2 | 2071 | -10.5 | 25.8 | -35.6 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.1 | 59.6 | 135.9 | 2100 | 4.7 | 32.5 | -43.8 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

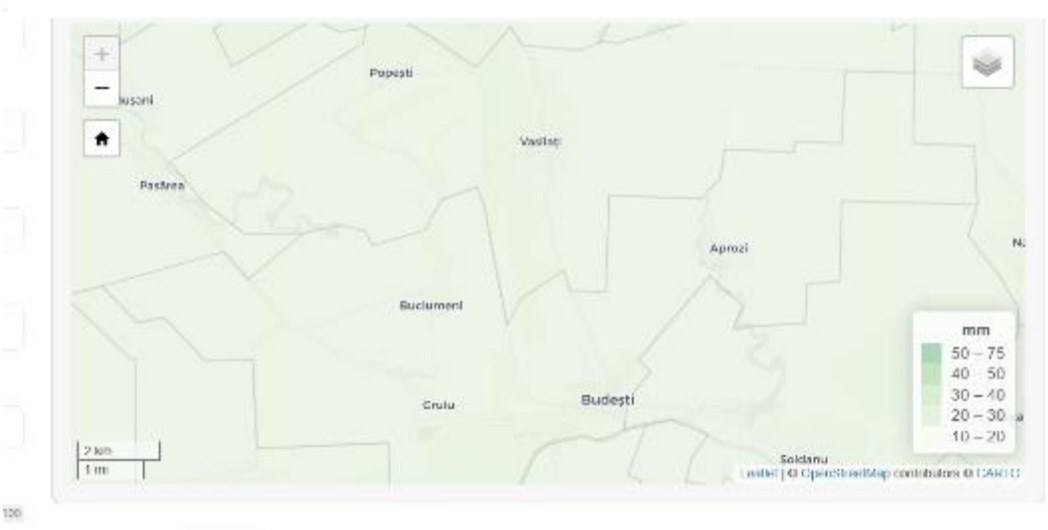
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.9 W/mp, and at the level of year 2100 it is estimated at 108.1 W/mp, which is higher than the multiannual average value of 103.4 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.1.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 29.1 m, and by 2100 it will reach 10.3 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

22

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 29.1 | 6 | 72.3 | 2071 | 32.4 | 228.9 | -72.7 | 22 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

22

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 10.3 | 3.4 | 52.1 | 2100 | -53.1 | 137 | -84.5 | 22 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.1.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

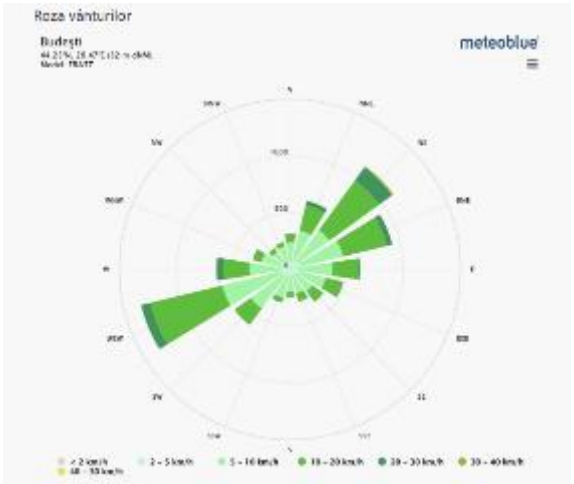



*Figure No. 52- Wind rose*

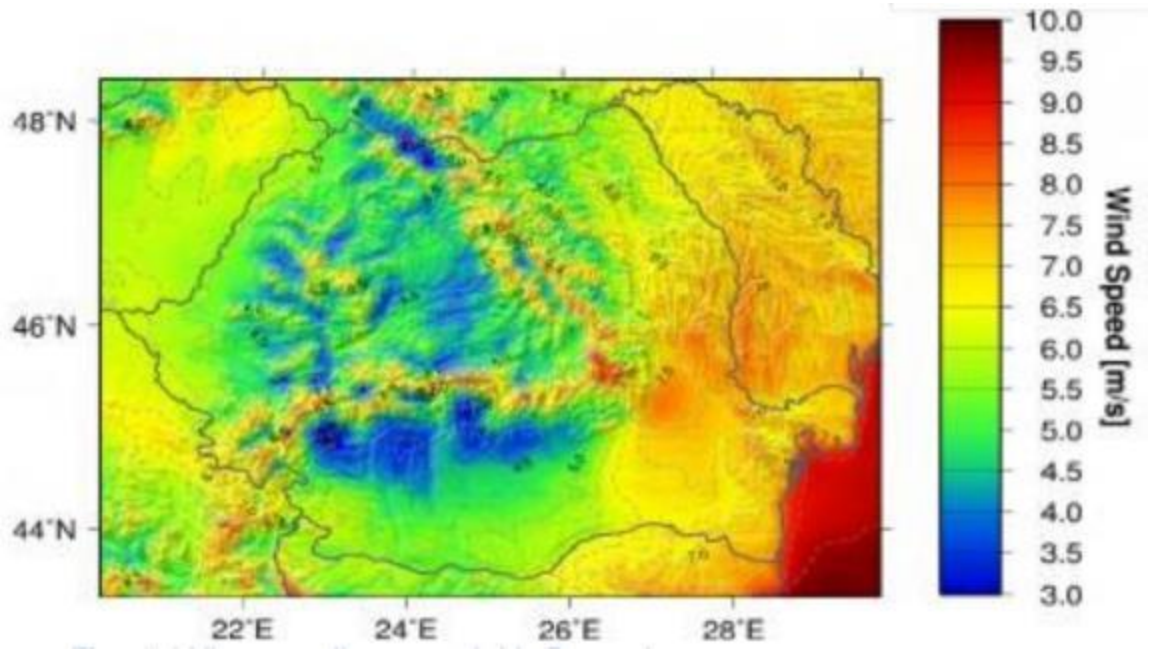



*Figure No. 53- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

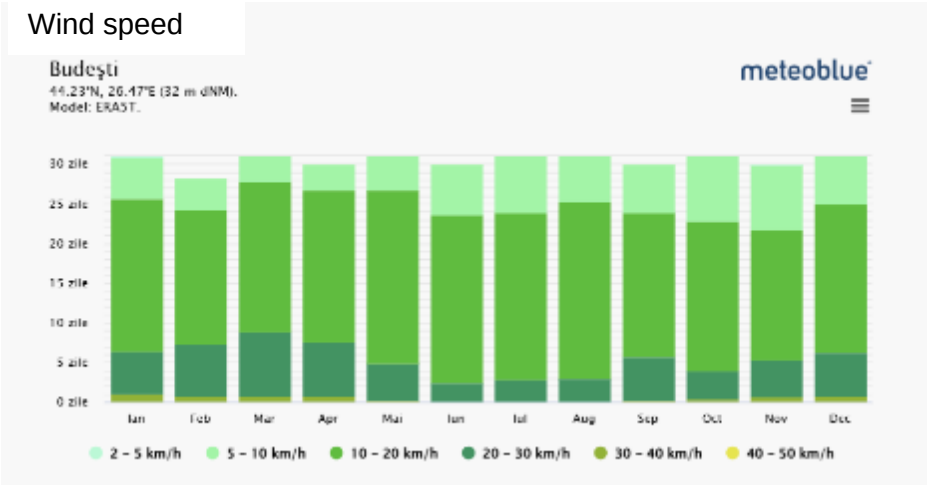



*Figure No. 54- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000

Media 1971 2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.3 | 3.1 | 4.4 | 2071 | -0.3 | 0.8 | -0.5 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Budești - County of Călărași) - reference period 1971-2000

Media 1971 2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.4 | 2.5 | 4.9 | 2100 | -0.2 | 1.3 | -1.1 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.2 Chirnogi*

### 4.2.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

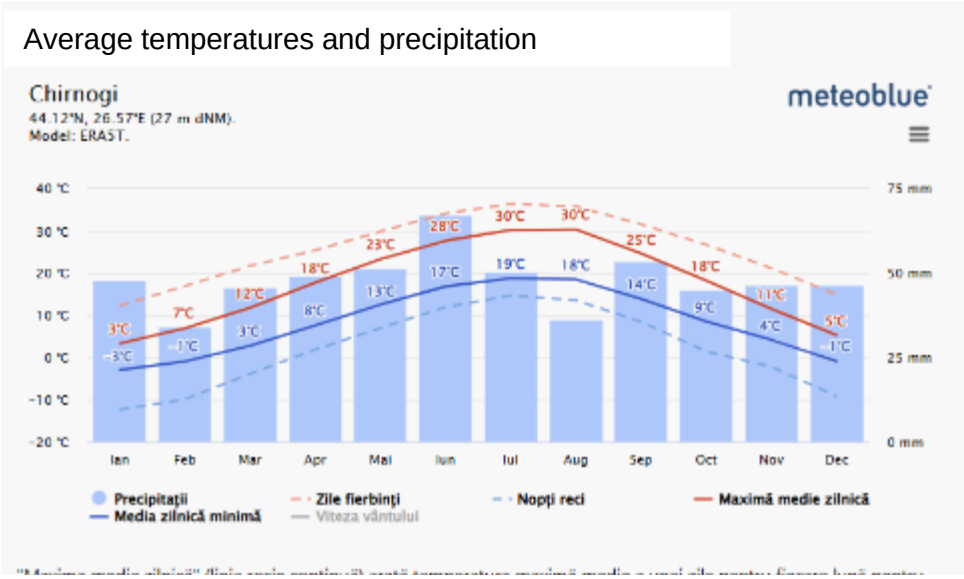



*Figure No. 55* ***- Average value of extreme temperatures over the last 30 years at the weather station[10]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.2 ºC:

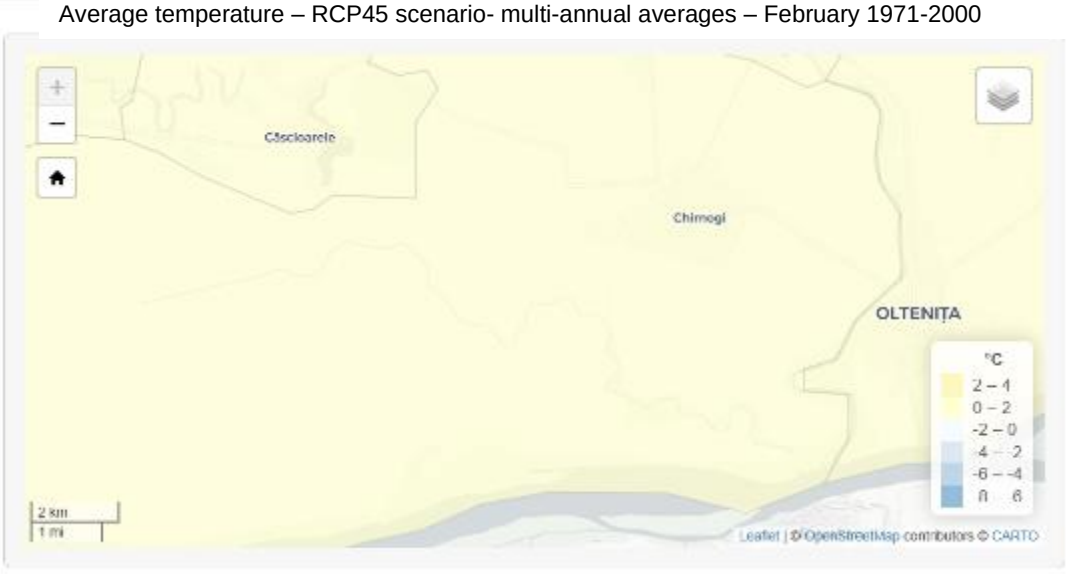
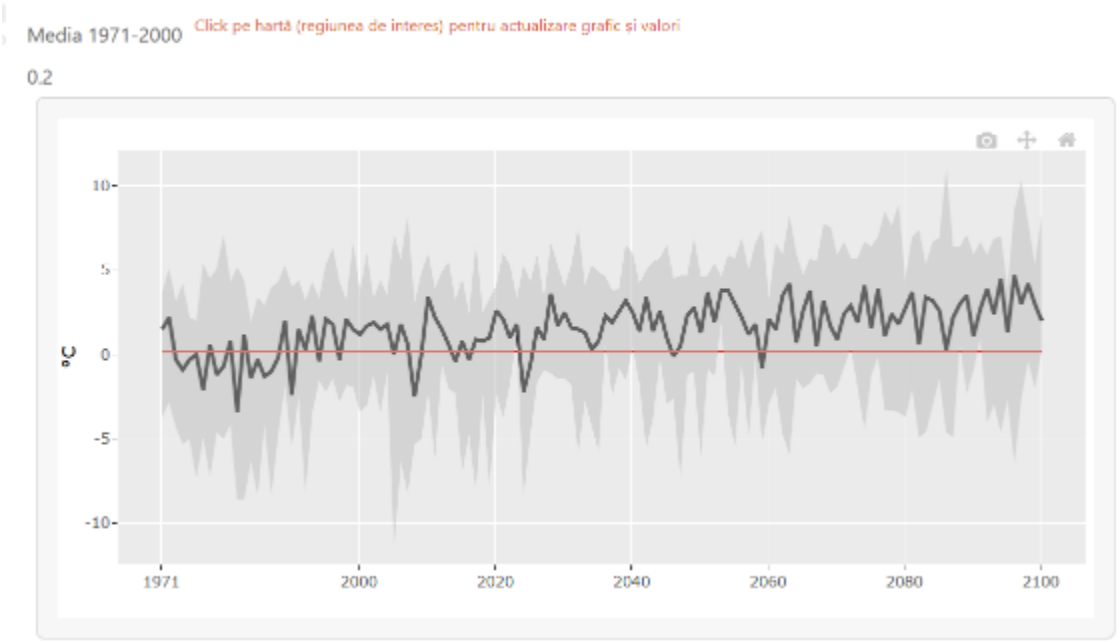



*Figure No. 56 - Average temperature at TAU level (period 1971 -2000)*

[10] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

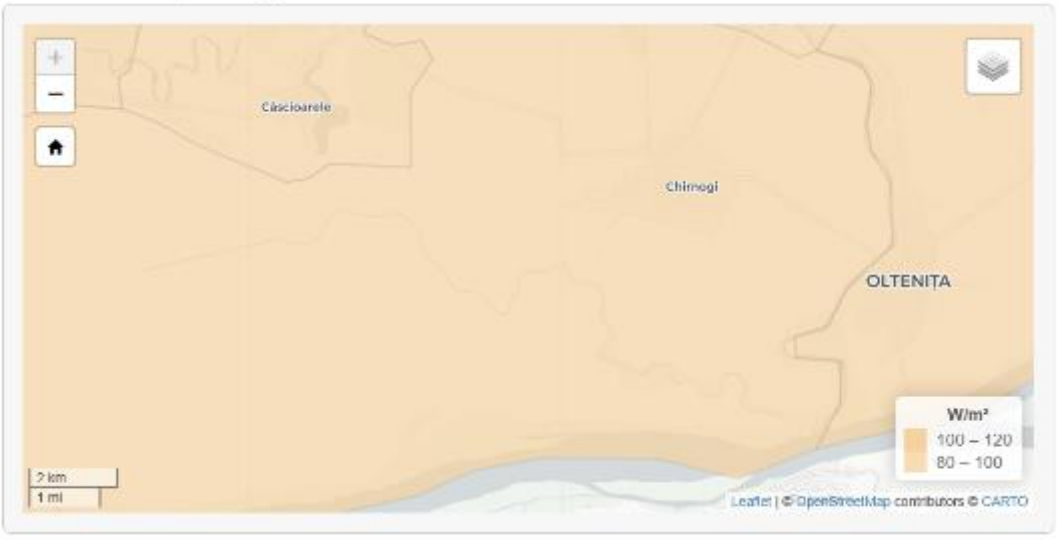
### 4.2.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.6 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000




Global solar radiation in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000

Media 1971 2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92 | 67.6 | 131.8 | 2071 | -11.5 | 28.3 | -36 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.6 | 57.6 | 136.3 | 2100 | 5 | 32.8 | -45.9 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.0 W/mp, and at the level of year 2100 it is estimated at 108.6 W/mp, which is higher than the multiannual average value of 103.6 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.2.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 22.7 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 28.6 mm, and by 2100 it will reach 13.4 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.2.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

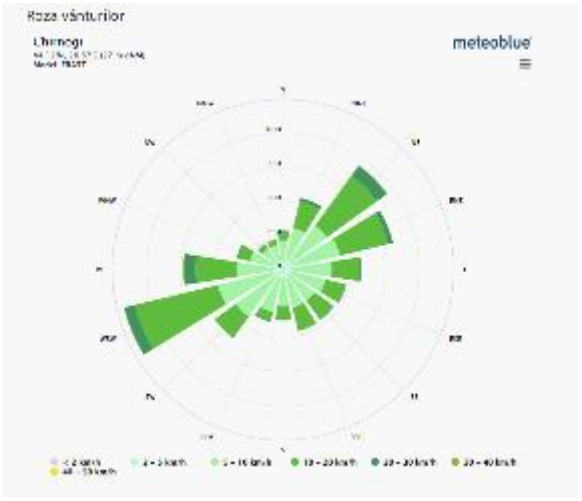



*Figure No. 57- Wind rose*

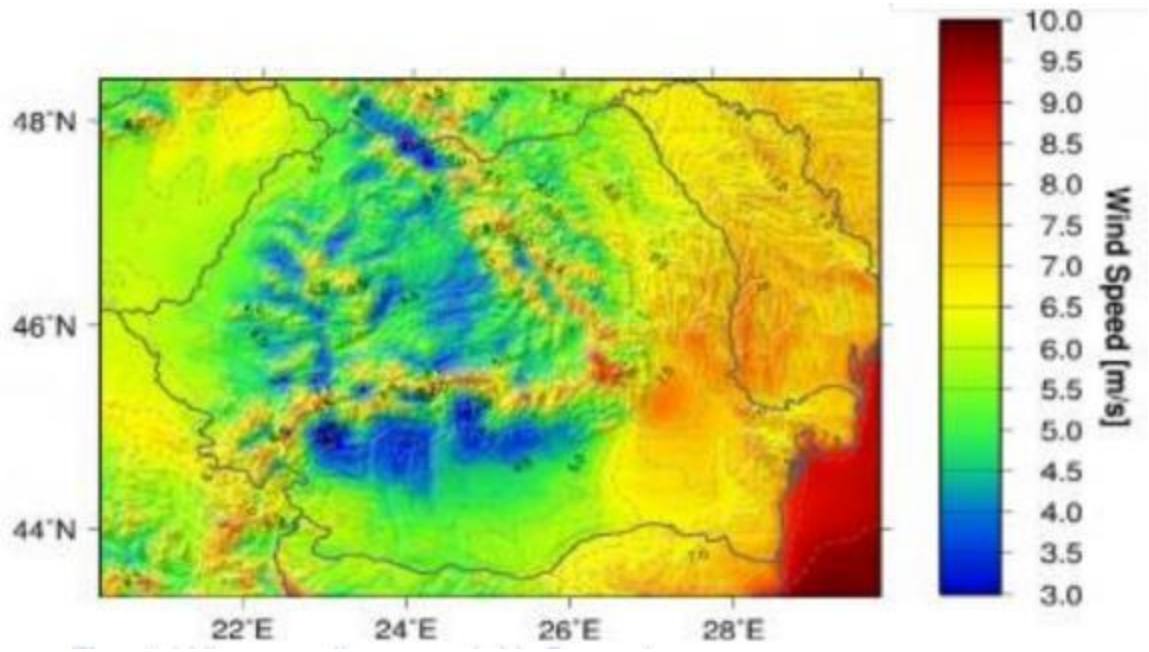



*Figure No. 58* - *Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

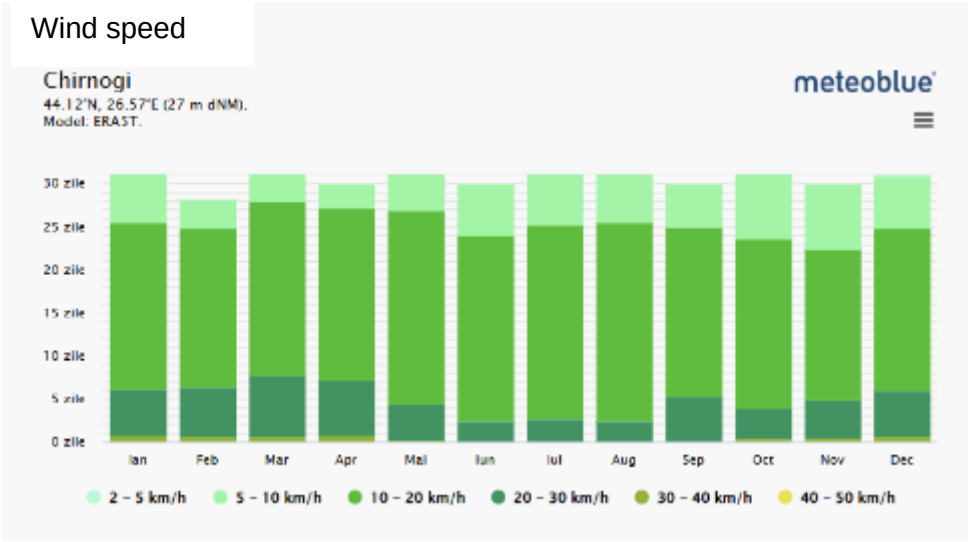
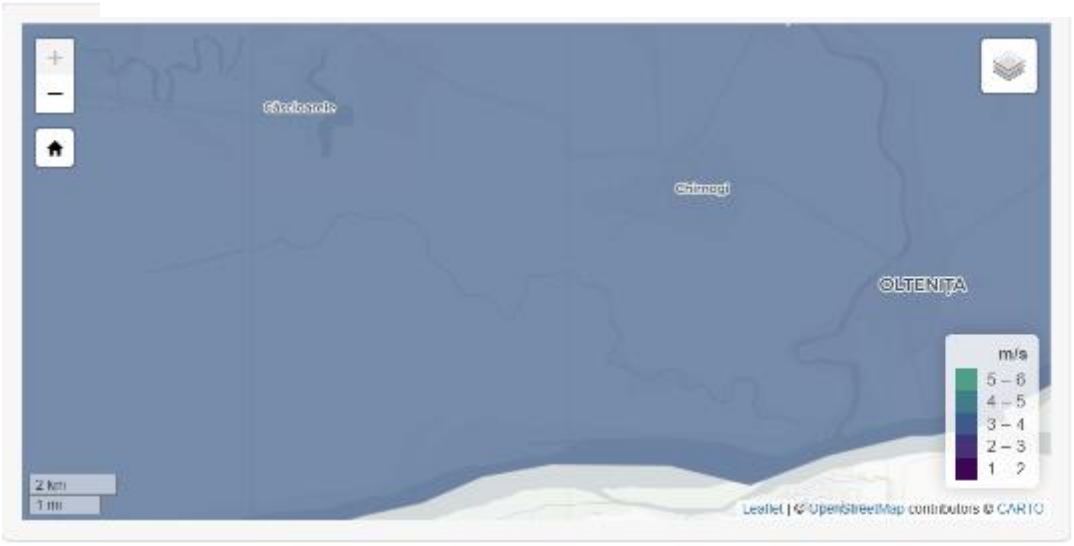



*Figure No. 59*- *The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.4 m/s, and 3.6 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.4 | 3.1 | 4.5 | 2071 | -0.3 | 0.8 | -0.6 | 3.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Chirnogi - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.6 | 2.4 | 5.1 | 2100 | -0.1 | 1.4 | -1.3 | 3.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.3 Crivăț*

### 4.3.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

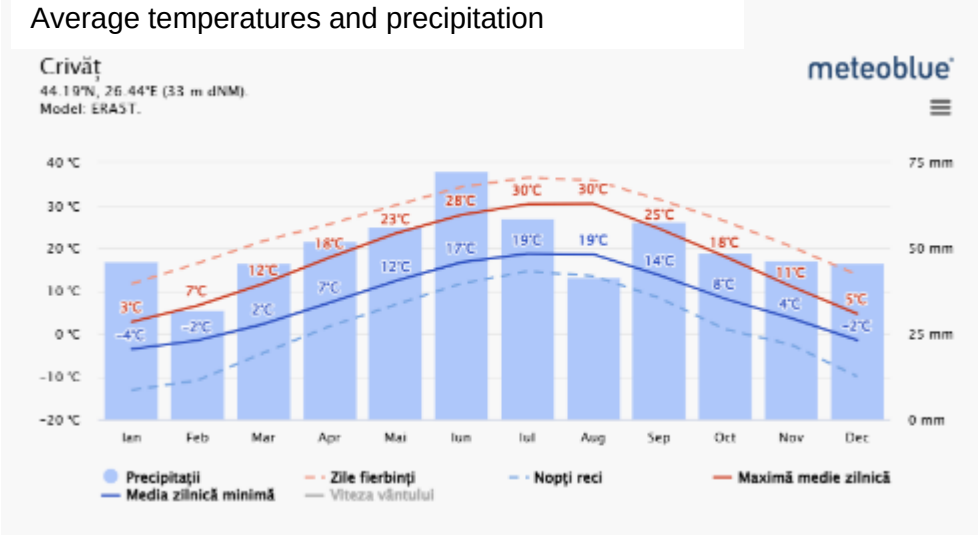



*Figure No. 60* ***- Average value of extreme temperatures over the last 30 years at the weather station***[11]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.2 ºC:

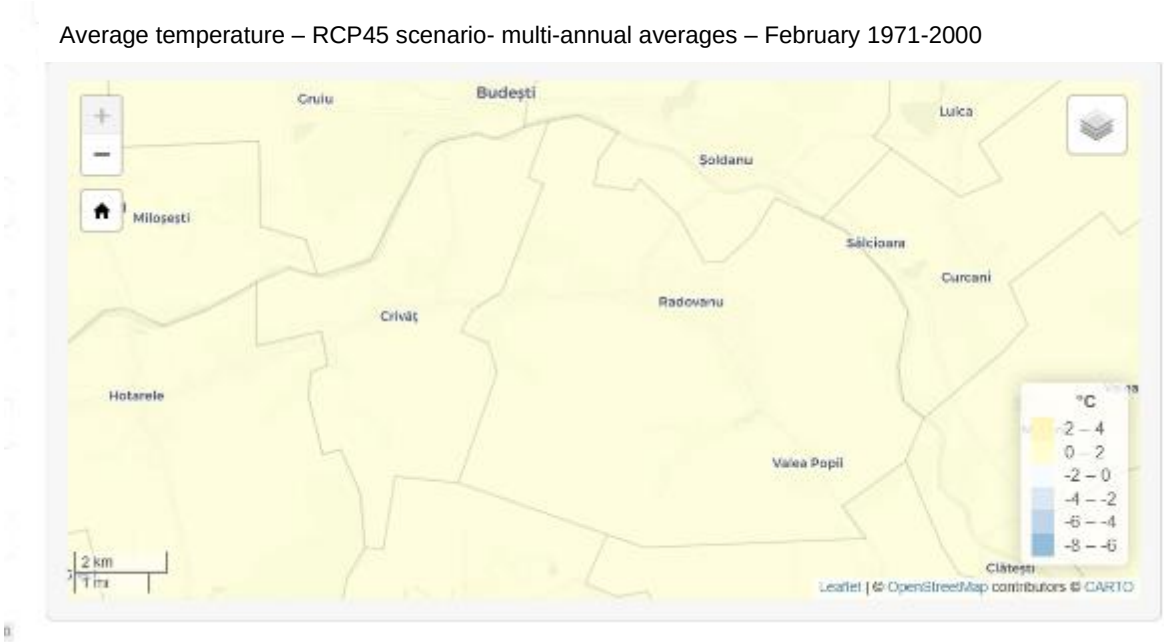


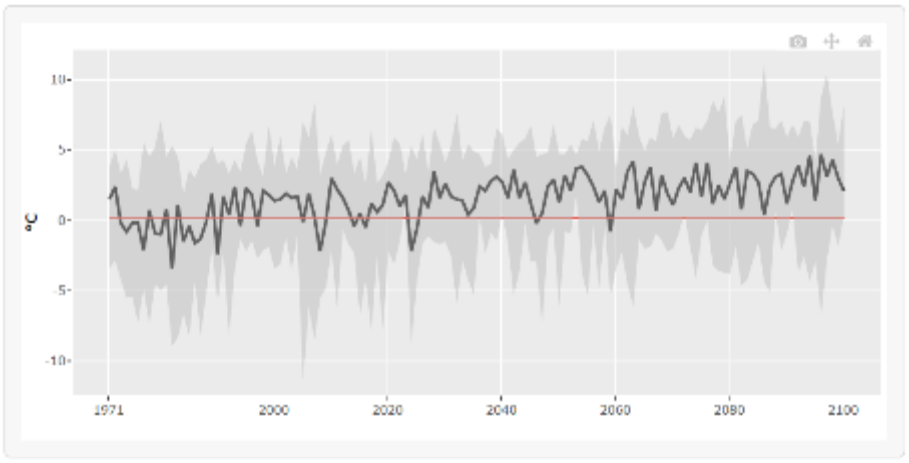

*Figure No. 61 - Average temperature at TAU level (period 1971 -2000)*

[11] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.2




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.2

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.3 | -0.9 | 6.8 | 2071 | 2.1 | 6.6 | -1.1 | 0.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.1 | 0.4 | 8.1 | 2100 | 1.9 | 7.9 | 0.2 | 0.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.3.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.6 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.5 | 66.8 | 130.4 | 2071 | -11 | 26.9 | -36.8 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.5 | 59.4 | 136.1 | 2100 | 5 | 32.5 | -44.1 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.6 W/mp, and at the level of year 2100 it is estimated at 108.4 W/mp, which is higher than the multiannual average value of 103.9 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

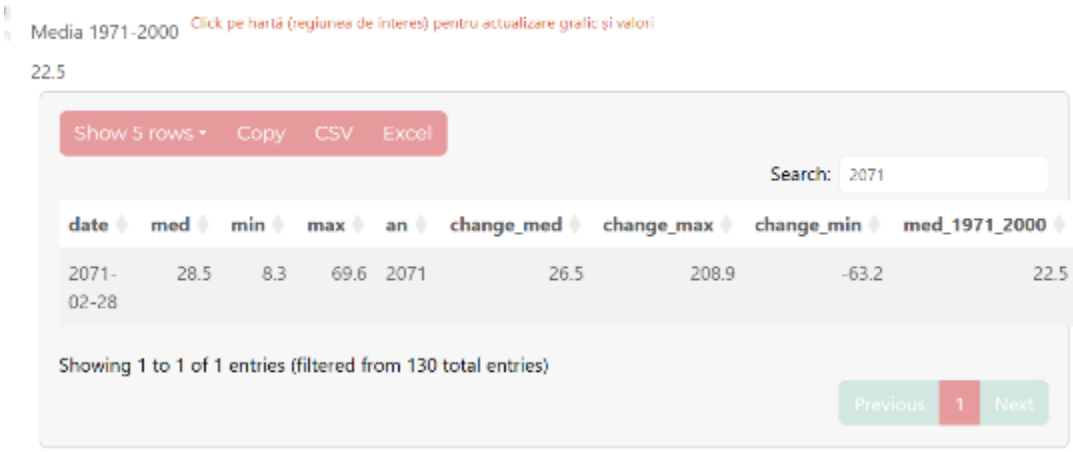
### 4.3.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 28.5 m, and by 2100 it will reach 11.6 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000




Rainfall in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.3.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

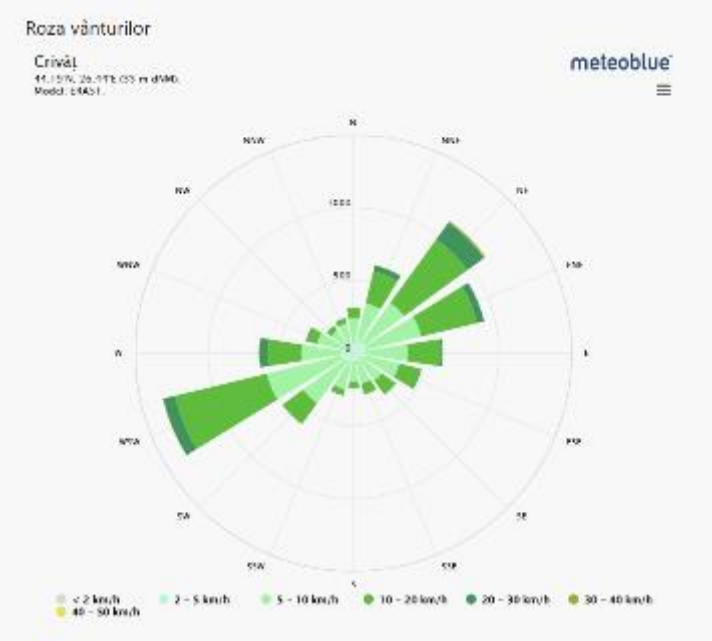



*Figure No. 62- Wind rose*

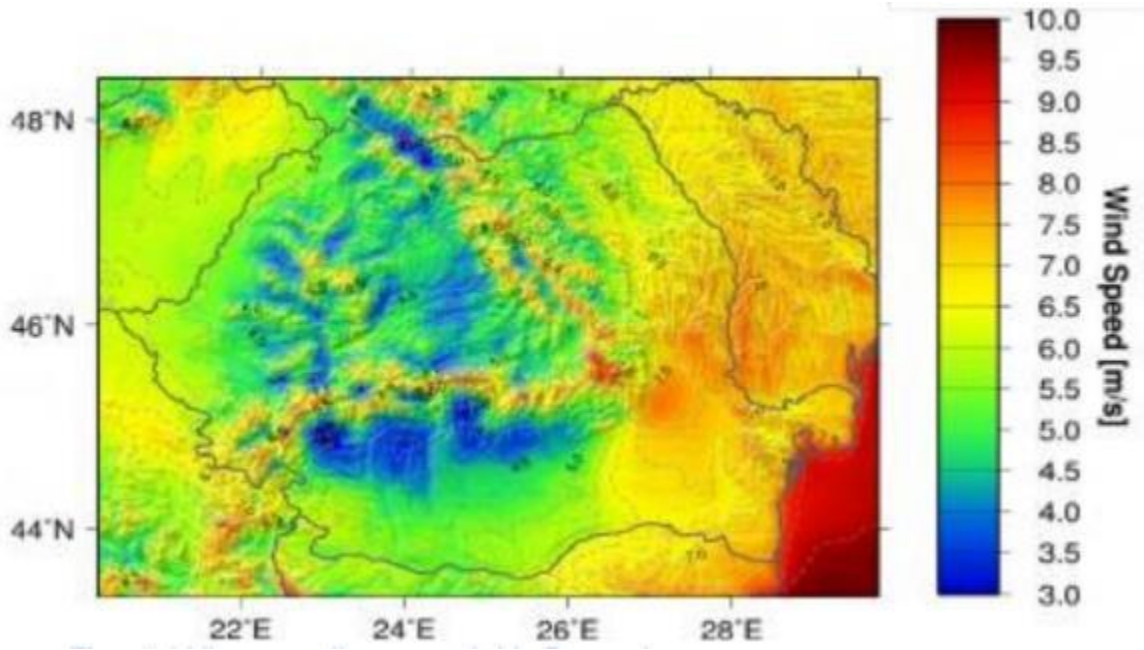



*Figure No. 63- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

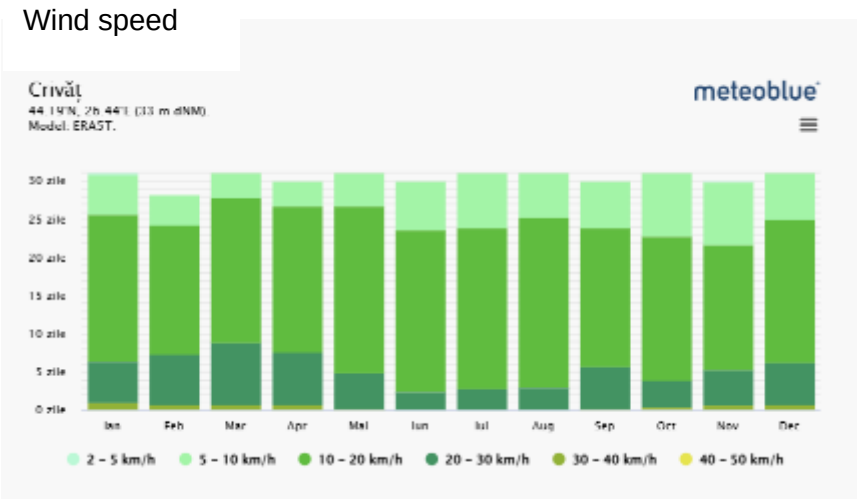



*Figure No. 64- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.6 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.4 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3.1 | 4.4 | 2071 | -0.4 | 0.8 | -0.5 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Crivăț - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.4 | 2.4 | 4.9 | 2100 | -0.2 | 1.3 | -1.2 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.4 Curcani*

### 4.4.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

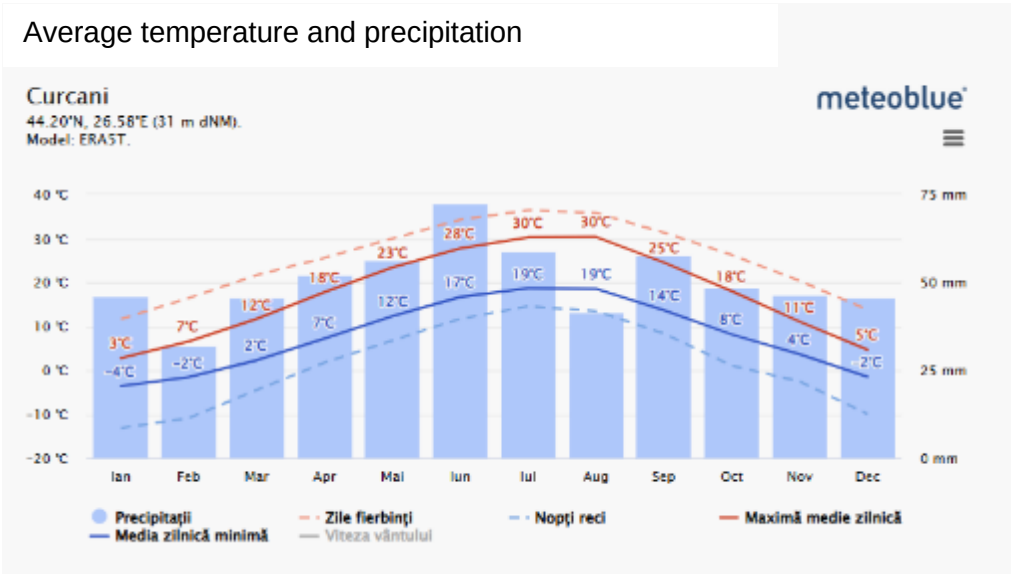



*Figure No. 65* ***- Average value of extreme temperatures over the last 30 years at the weather station***[12]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.1ºC:

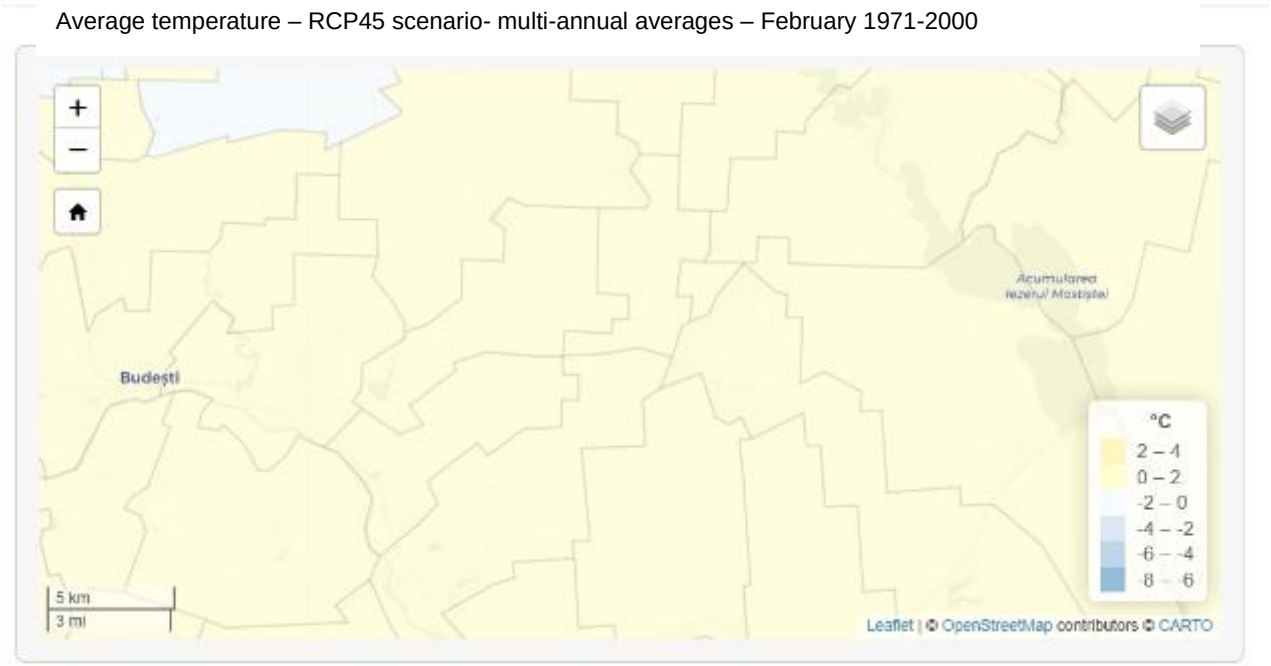


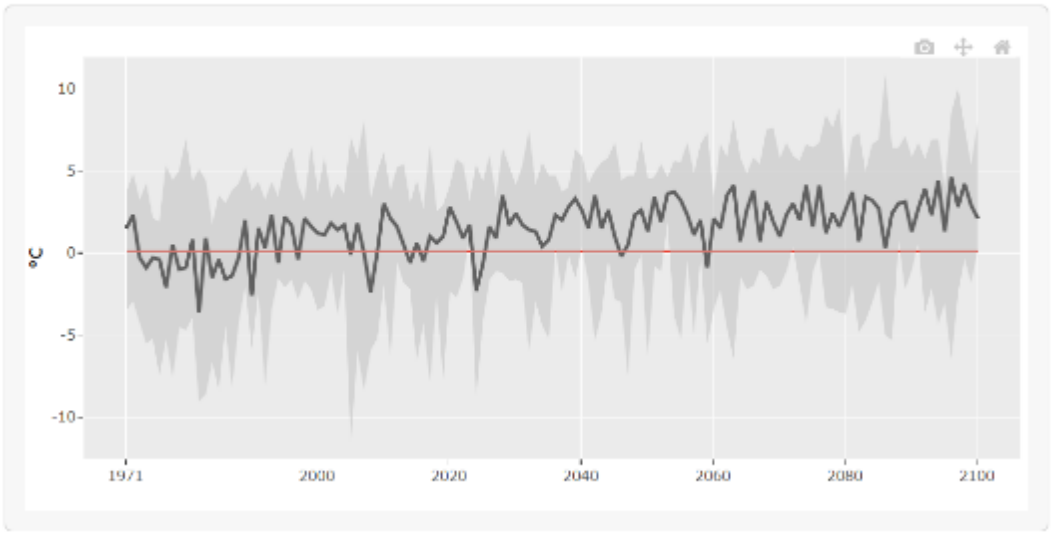

*Figure No. 66 - Average temperature at TAU level (period 1971 -2000)*

[12] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.1




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.3 | -1.1 | 6.7 | 2071 | 2.2 | 6.6 | -1.2 | 0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.1 | 0.3 | 7.9 | 2100 | 2 | 7.8 | 0.2 | 0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.4.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.2 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.2

Show 5 rows ▾ Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.9 | 67.4 | 128.6 | 2071 | -10.2 | 25.4 | -35.8 | 103.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.1 | 58.9 | 135.7 | 2100 | 4.9 | 32.5 | -44.3 | 103.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

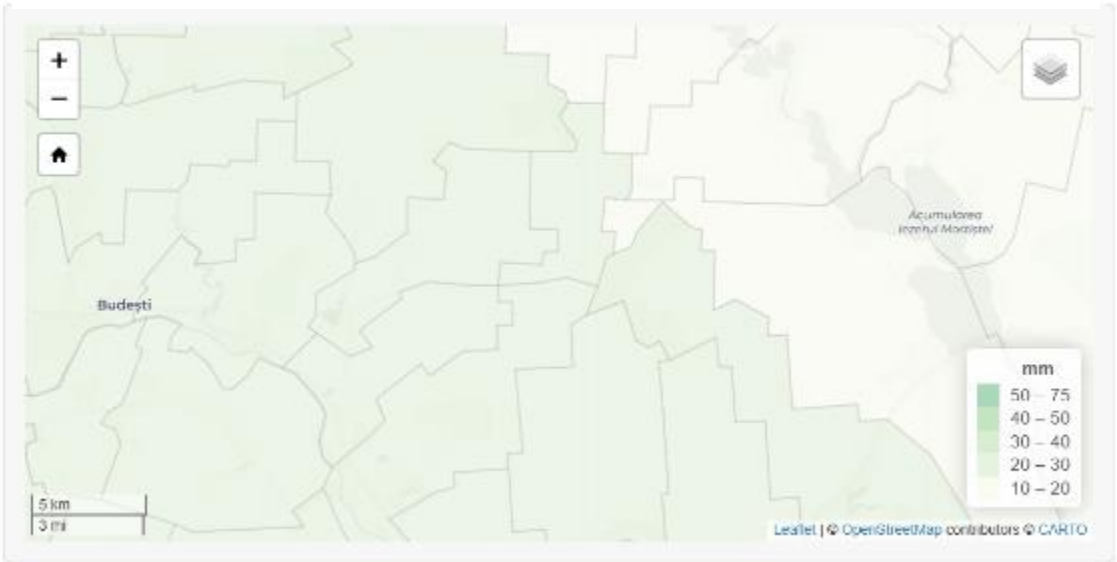
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.9 W/mp, and at the level of year 2100 it is estimated at 108.1 W/mp, which is higher than the multiannual average value of 103.2 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.4.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.2 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 25.0 m, and by 2100 it will reach 12.7 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.4.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

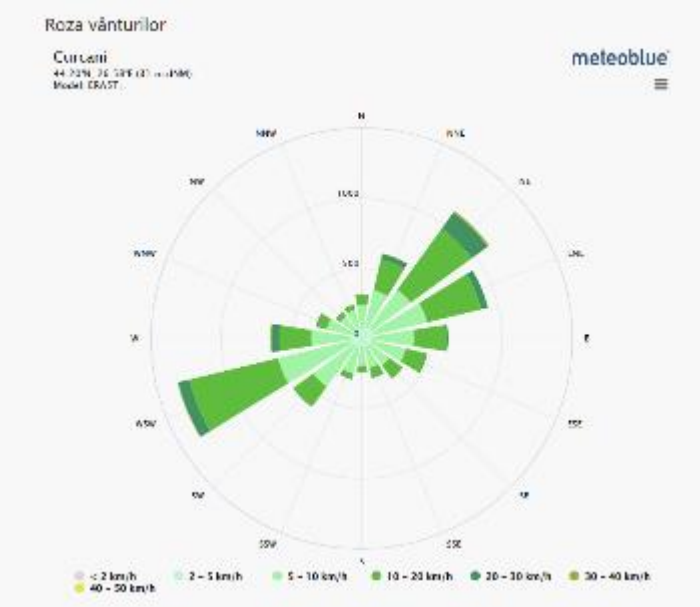



*Figure No. 67- Wind rose*

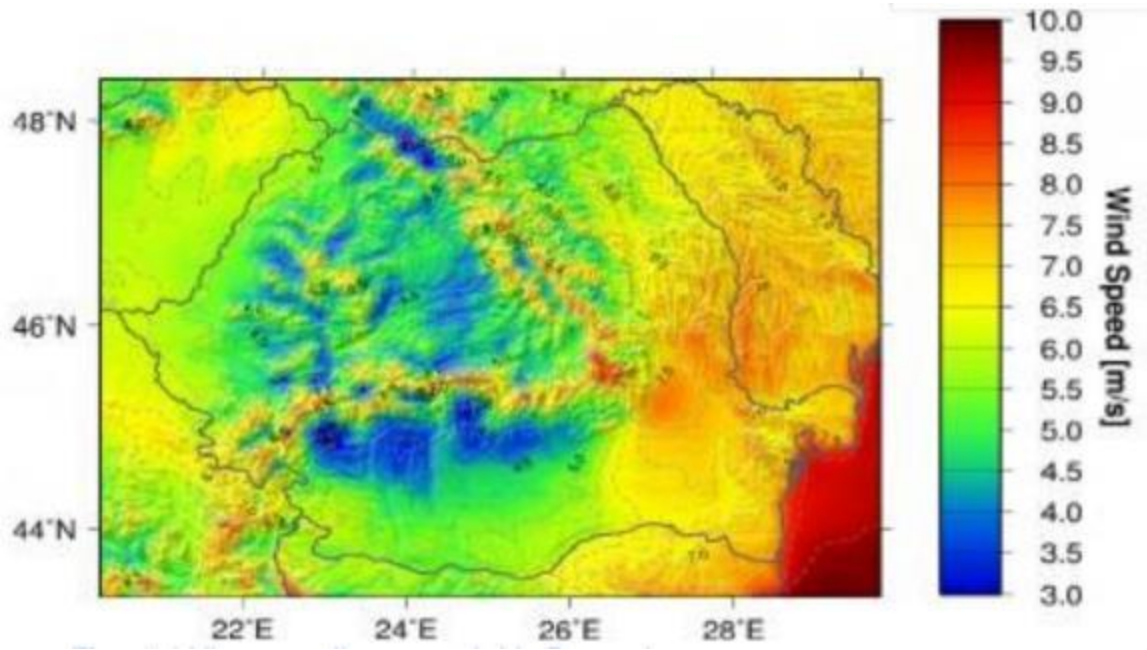



*Figure No. 68- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

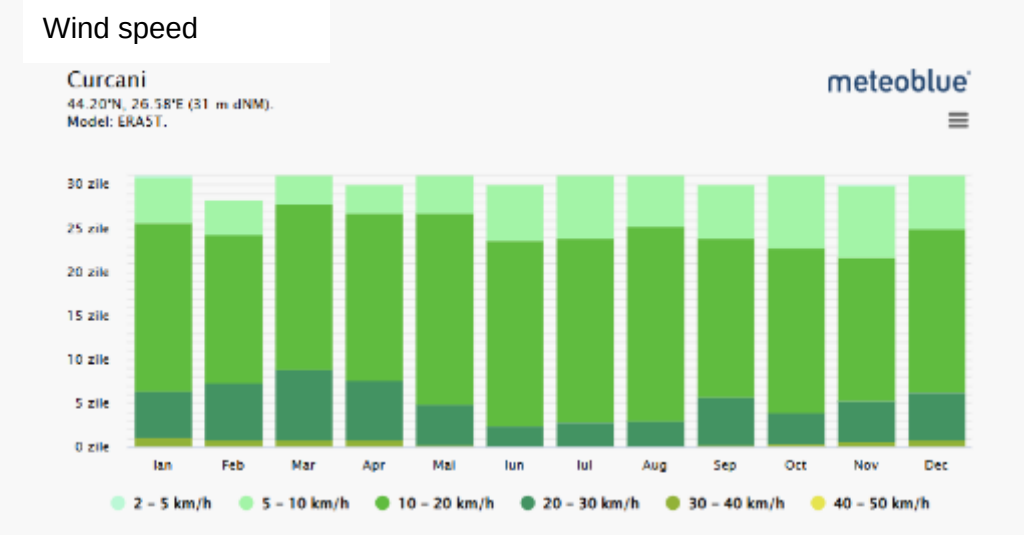



*Figure No. 69- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.3 m/s, and 3.6 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000


Average wind speed in February - RCP45 Scenario (Curcani - County of Călărași) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.5 Frumușani*

### 4.5.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

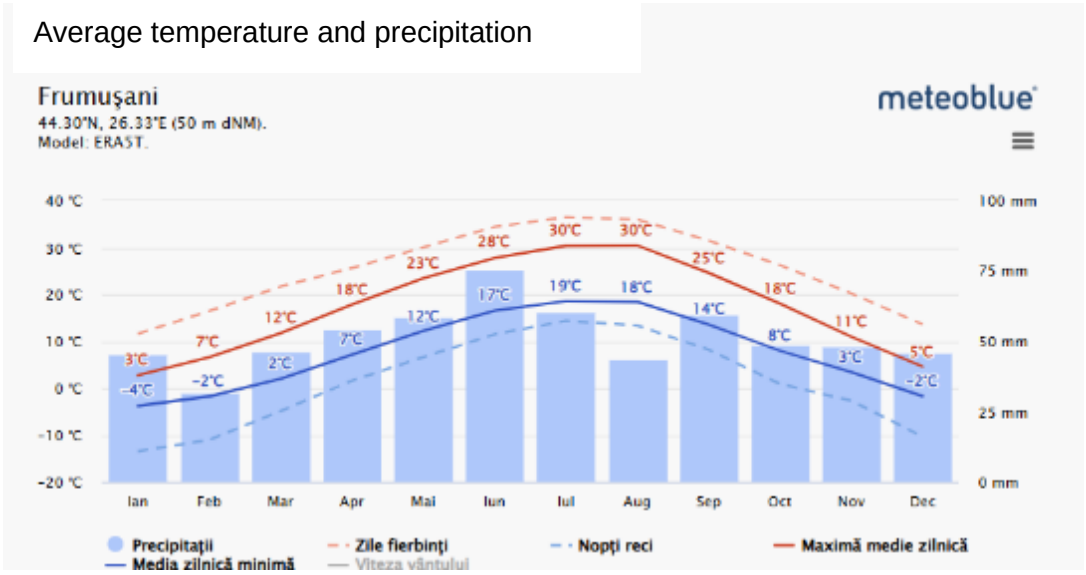



*Figure No. 70* ***- Average value of extreme temperatures over the last 30 years at the weather station[13]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

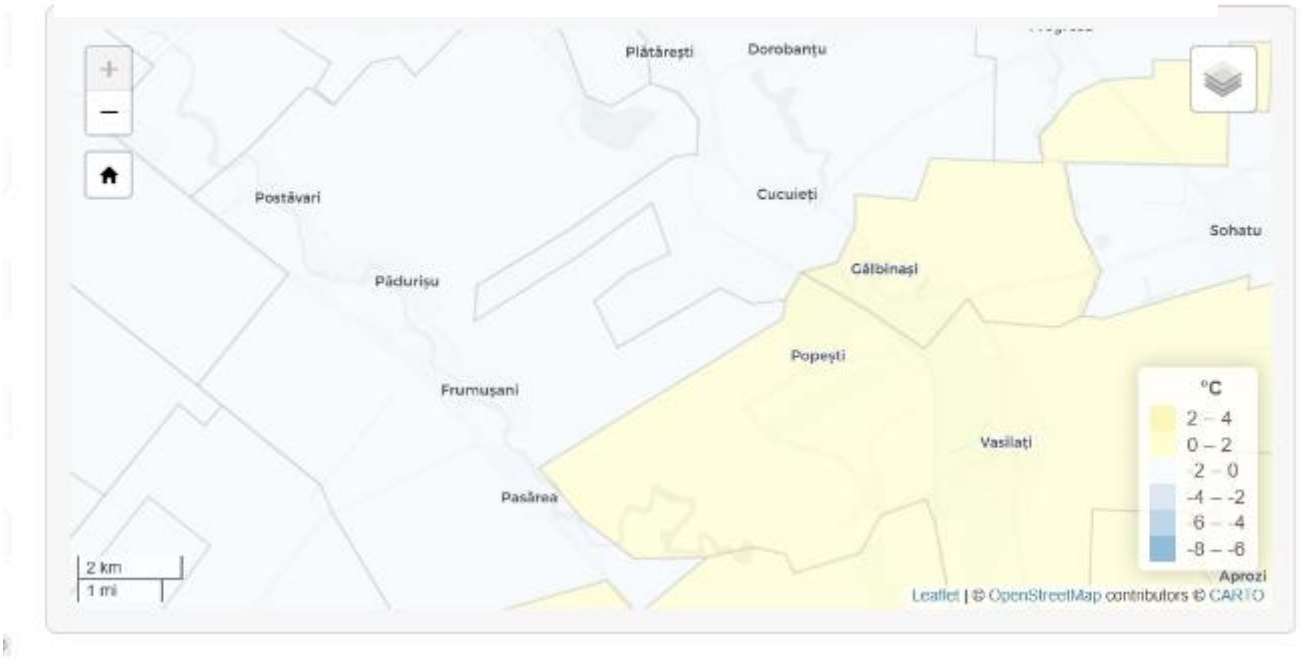
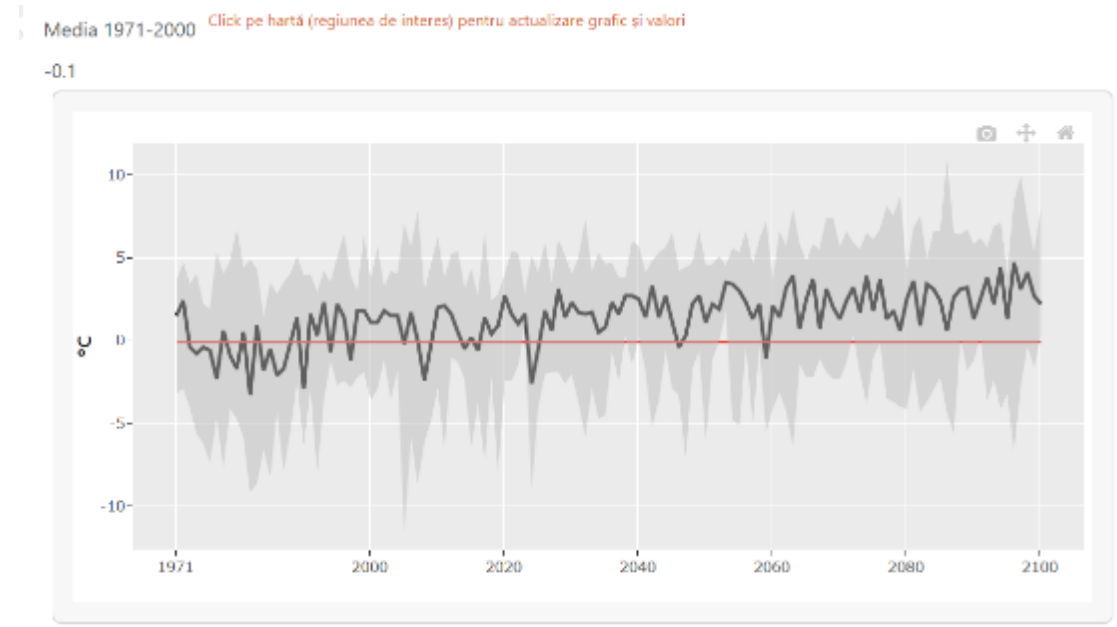



*Figure No. 71 - Average temperature at TAU level (period 1971 -2000)*

[13] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

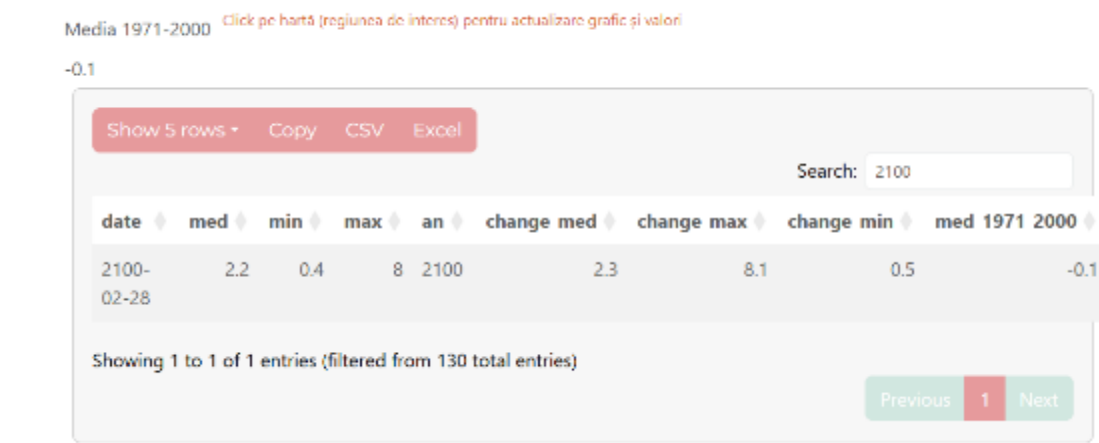
Average temperature in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000


| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.4 | -1.3 | 6.6 | 2071 | 2.5 | 6.7 | -1.2 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000




| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.2 | 0.4 | 8 | 2100 | 2.3 | 8.1 | 0.5 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.5.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.9 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93.2 | 68.5 | 128.6 | 2071 | -10.1 | 25.3 | -34.8 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Radiația solară globală Februarie RCP45 (Frumușani - județul Călărași) - perioada de referință 1971 - 2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.7 | 59.6 | 135.6 | 2100 | 4.4 | 32.3 | -43.7 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

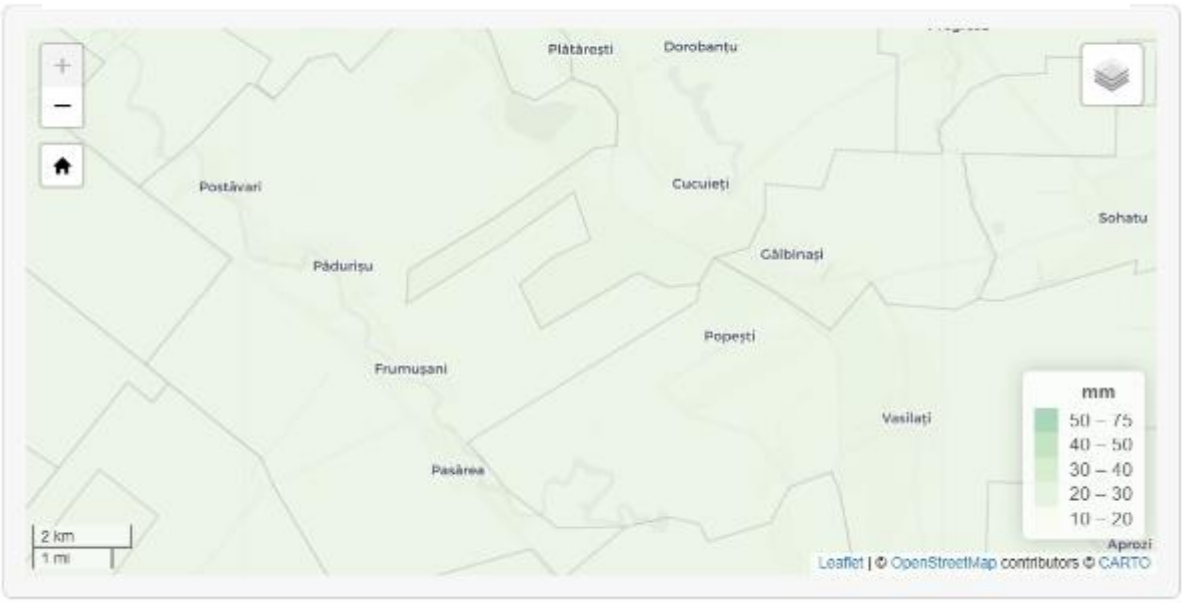
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.2 W/mp, and at the level of year 2100 it is estimated at 107.7 W/mp, which is higher than the multiannual average value of 103.3 W/mp. We can observe an increasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.5.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.2 mm, as shown in the figure below.

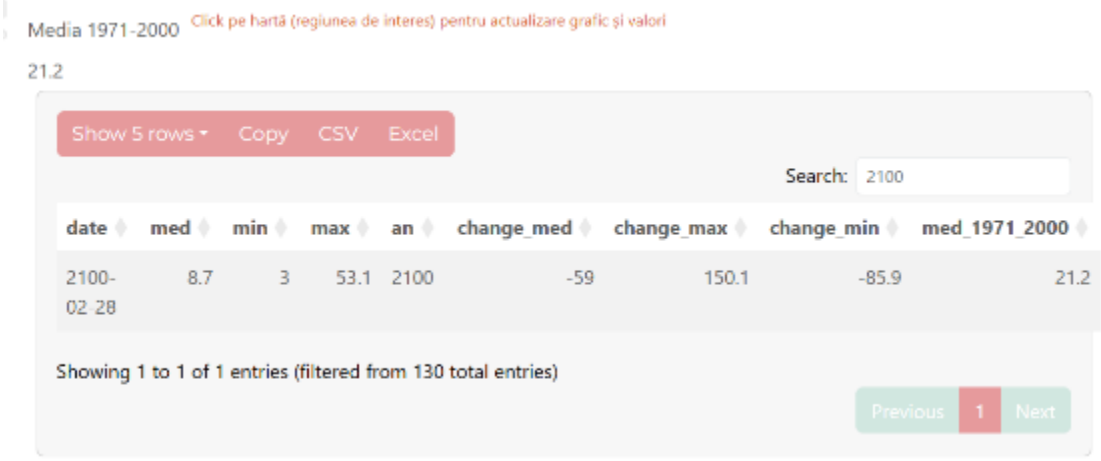
According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 30.7 m, and by 2100 it will reach 8.7 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.5.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

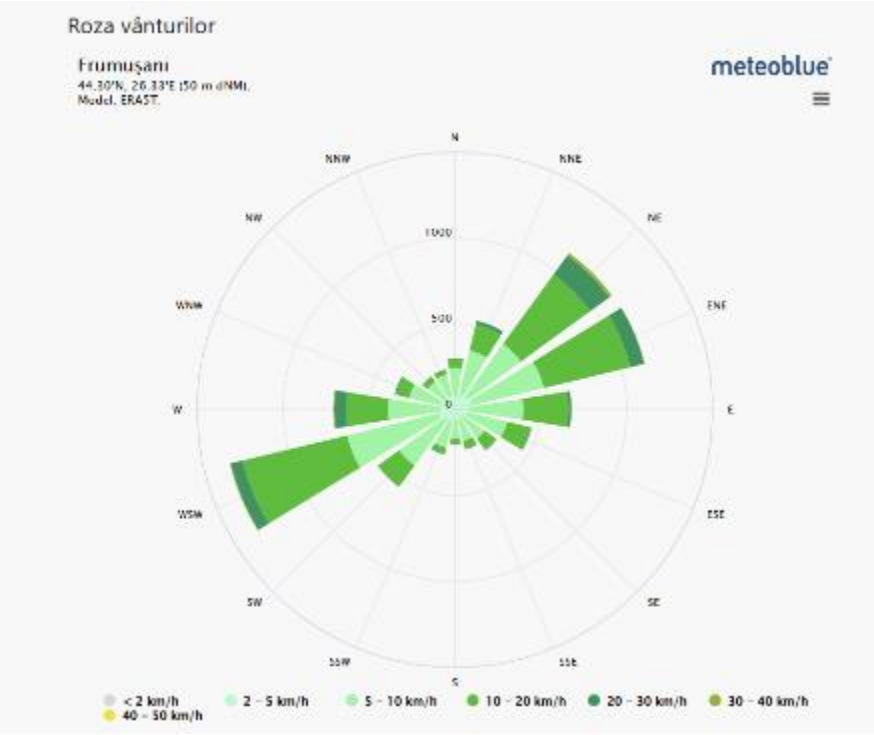



*Figure No. 72- Wind rose*

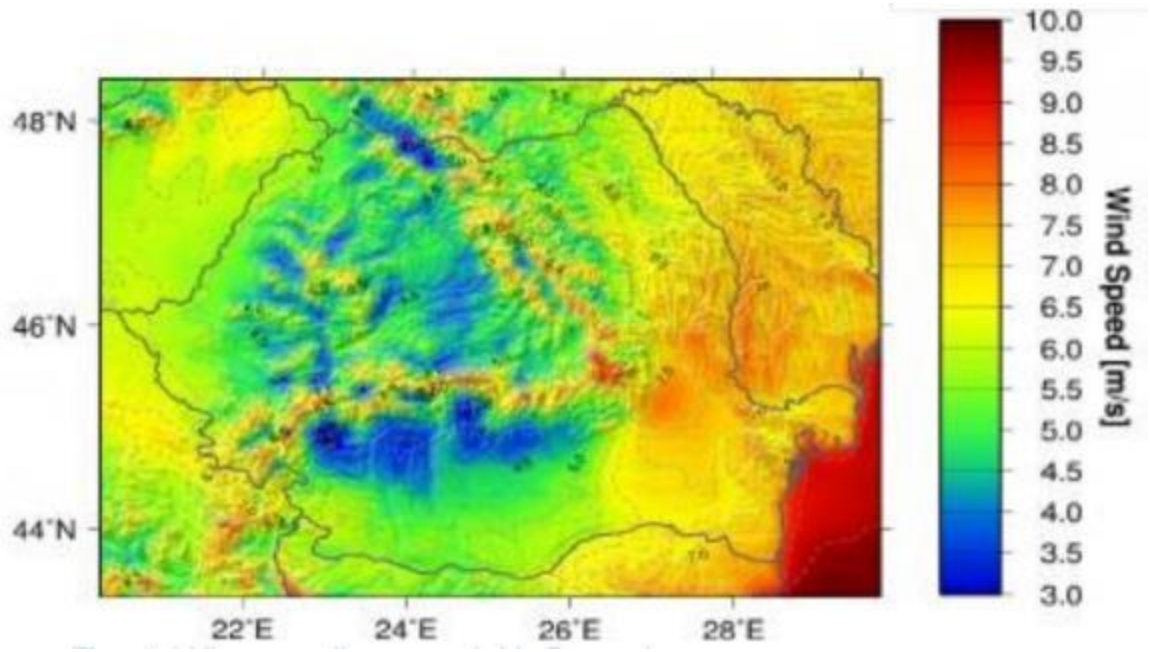



*Figure No. 73- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

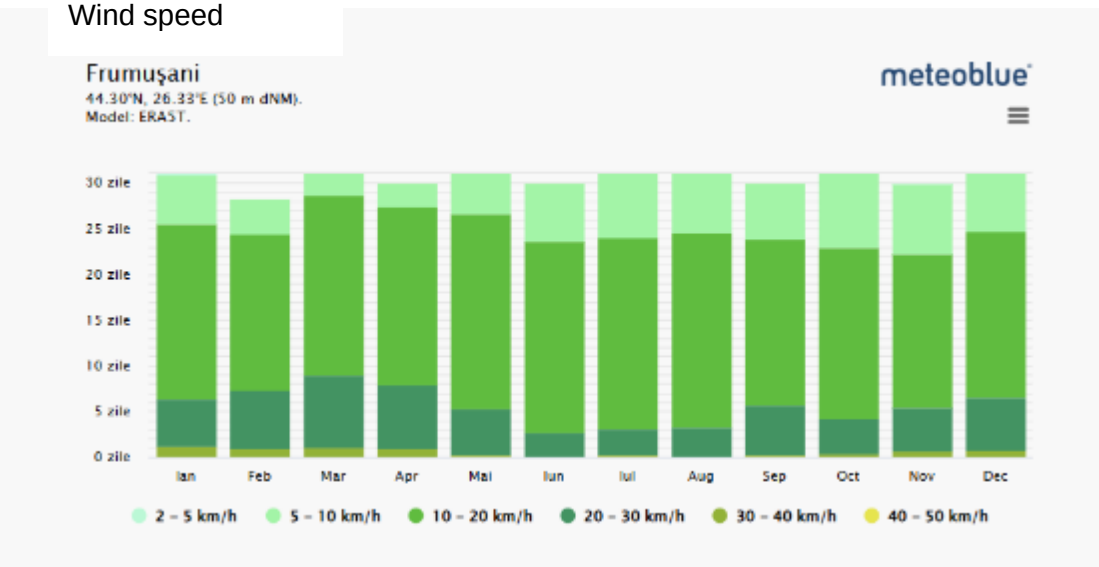
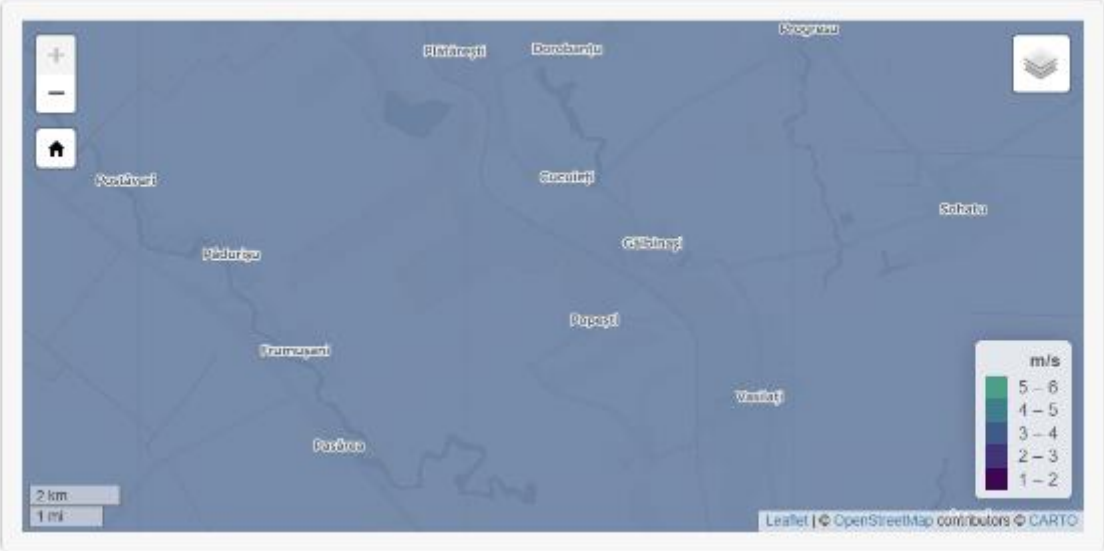



*Figure No. 74- The chart shows the variation in a month when the wind reaches a certain speed*

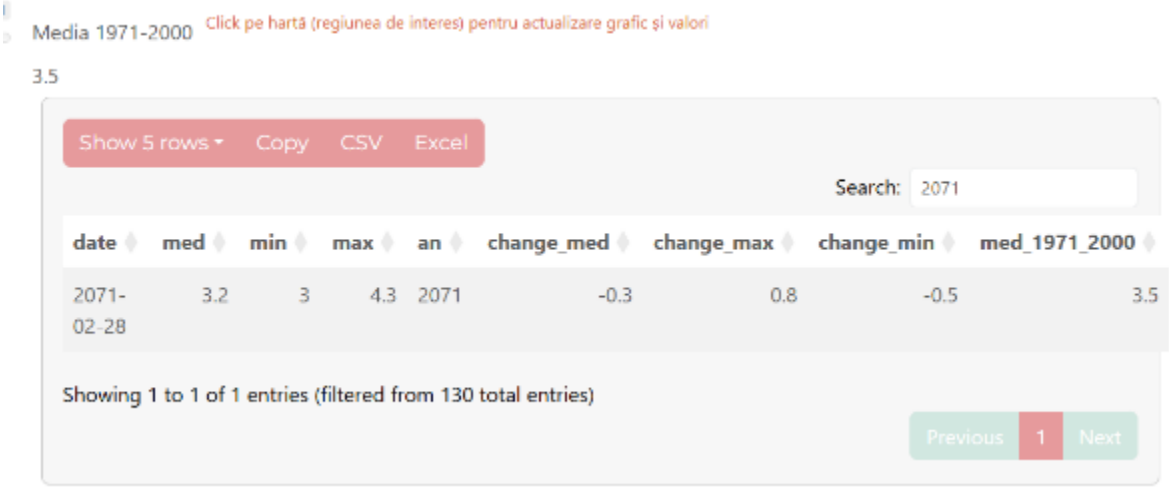
According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000

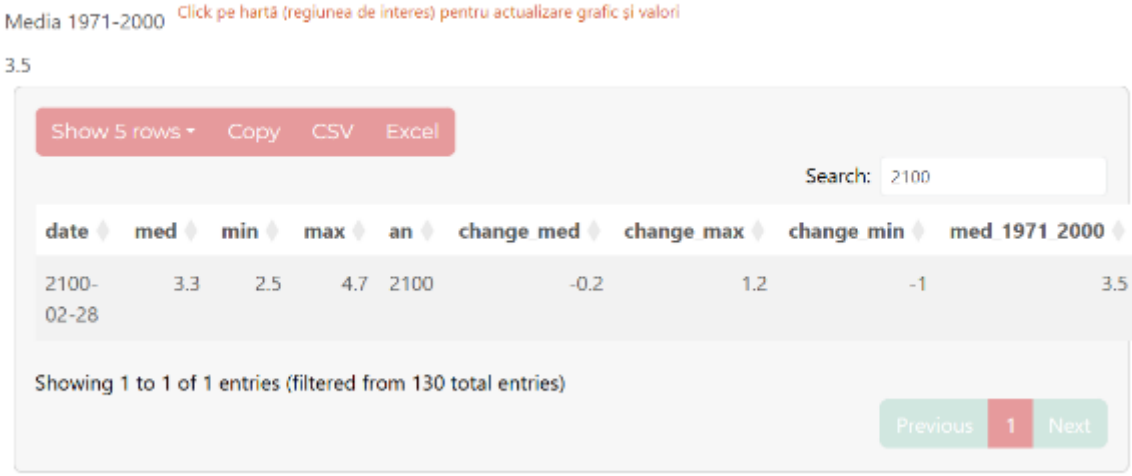



In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000




Average wind speed in February - RCP45 Scenario (Frumușani - County of Călărași) - reference period 1971-2000




In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.6 Fundeni*

### 4.6.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

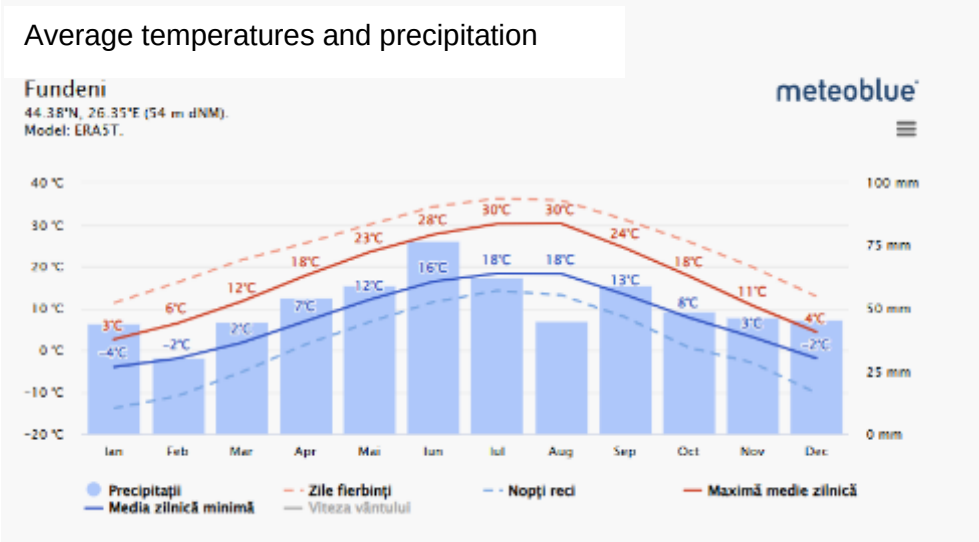



*Figure No. 75* ***- Average value of extreme temperatures over the last 30 years at the weather station[14]***

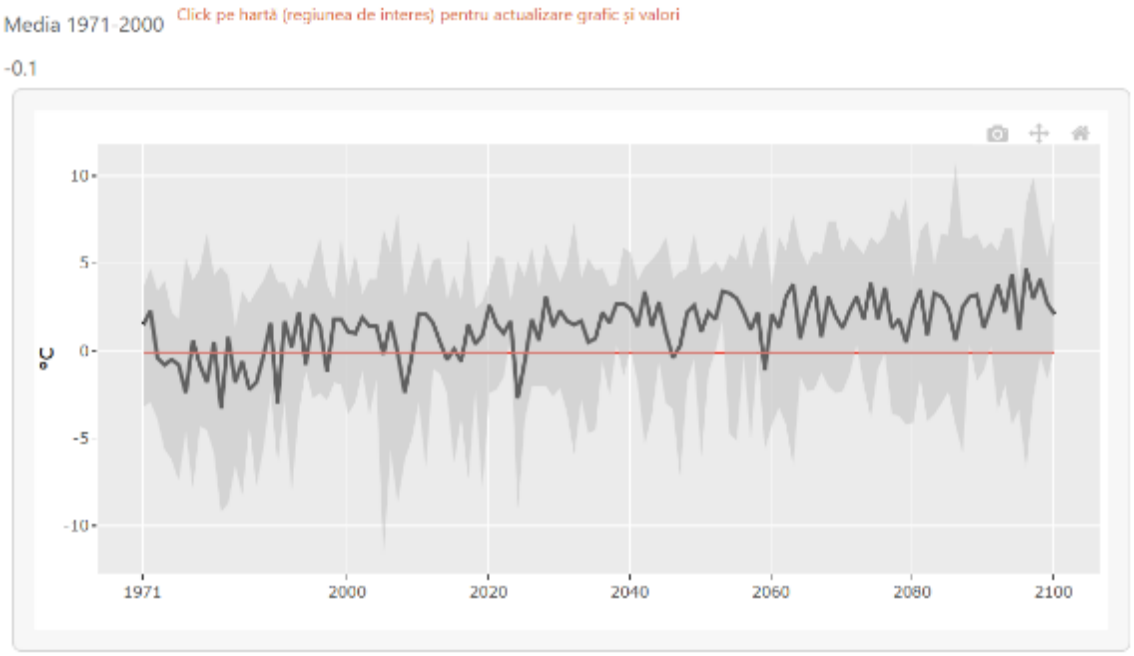
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 76 - Average temperature at TAU level (period 1971 -2000)*

[14] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.6.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.1 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93.5 | 68.9 | 128.1 | 2071 | -9.6 | 25 | -34.2 | 103.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.5 | 60.1 | 135.3 | 2100 | 4.4 | 32.2 | -43 | 103.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.5 W/mp, and at the level of year 2100 it is estimated at 107.5 W/mp, which is higher than the multiannual average value of 103.1 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.6.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 28.7 m, and by 2100 it will reach 8.9 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.6.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

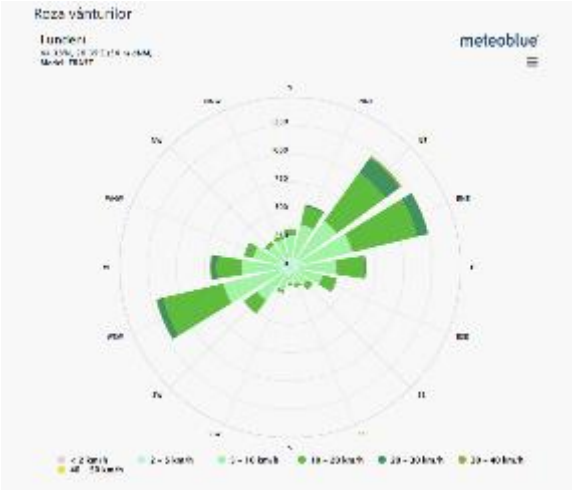



*Figure No. 77- Wind rose*

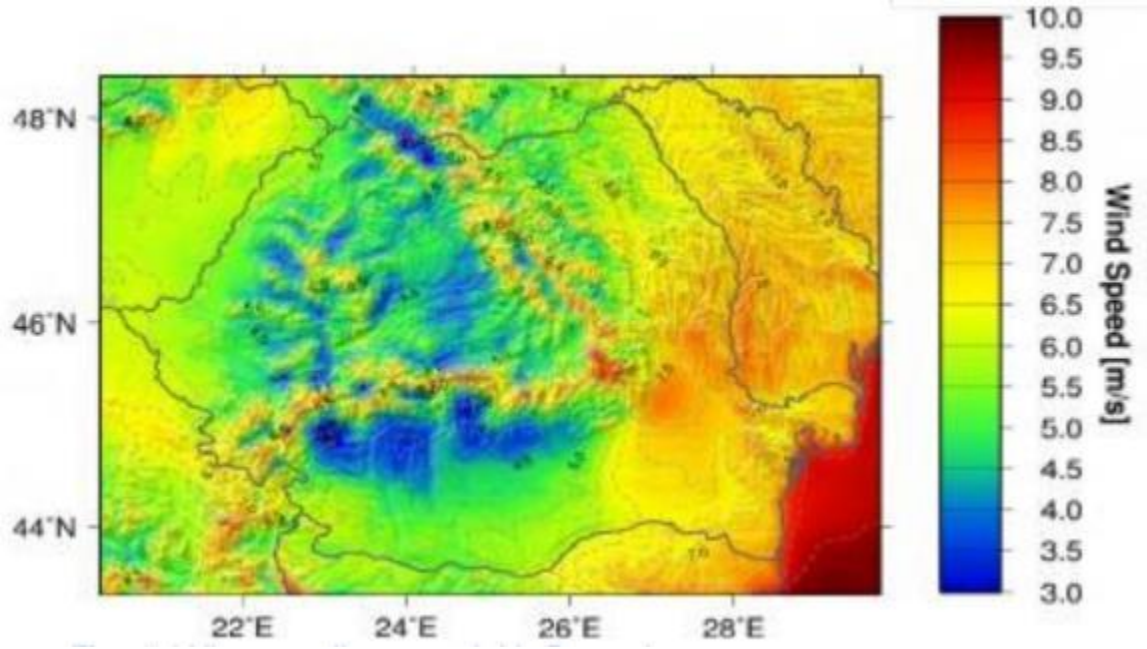



*Figure No. 78- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

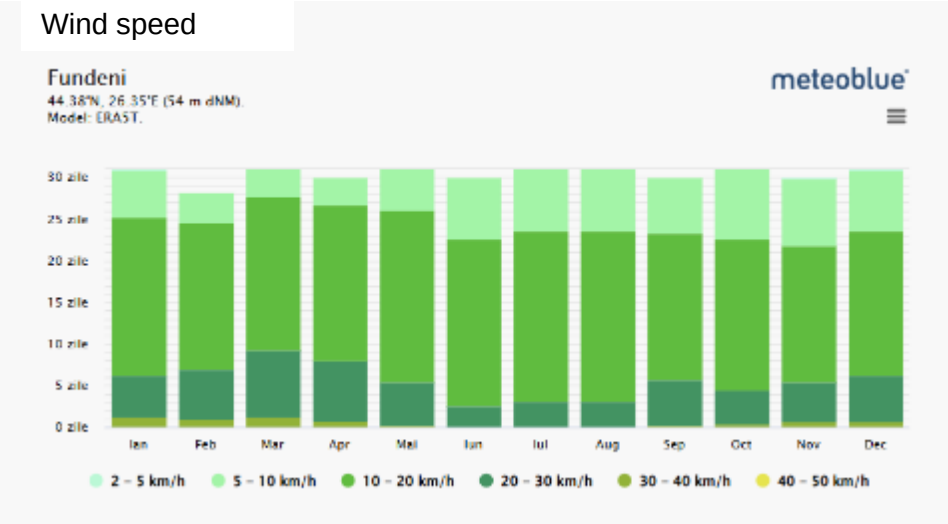
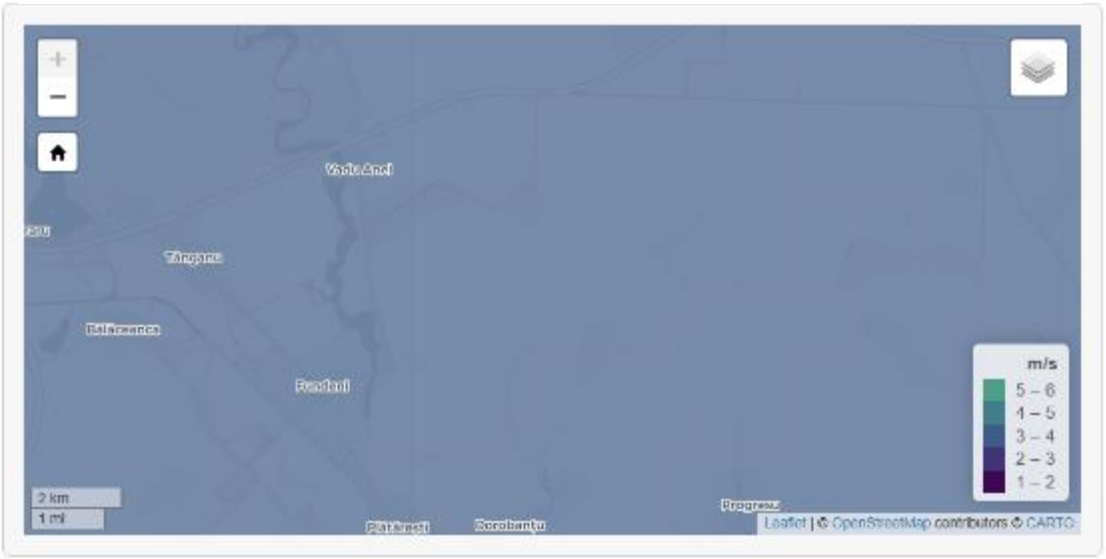



*Figure No. 79- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000


Average wind speed in February - RCP45 Scenario (Fundeni - County of Călărași) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.7 Gălbinași*

### 4.7.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

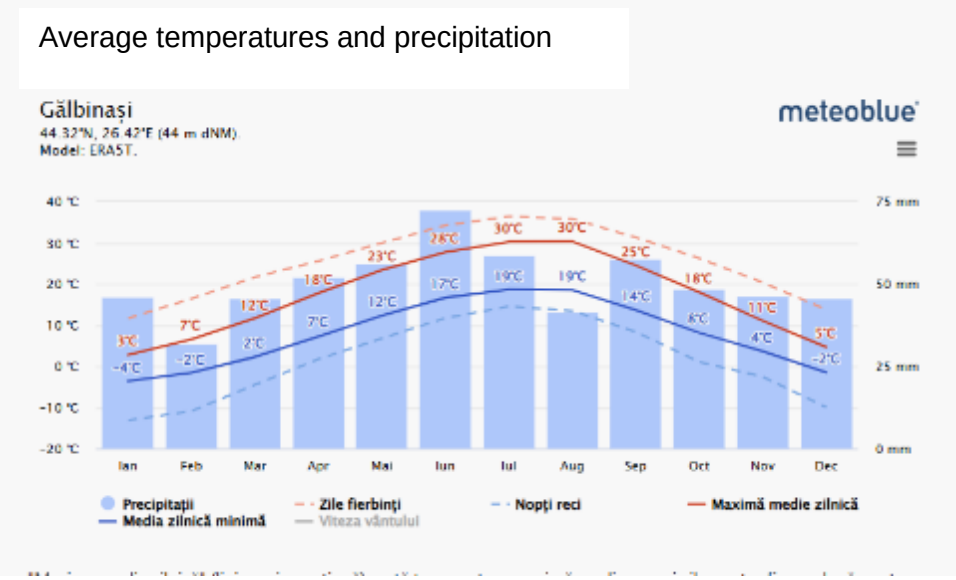



*Figure No. 80* ***- Average value of extreme temperatures over the last 30 years at the weather station[15]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

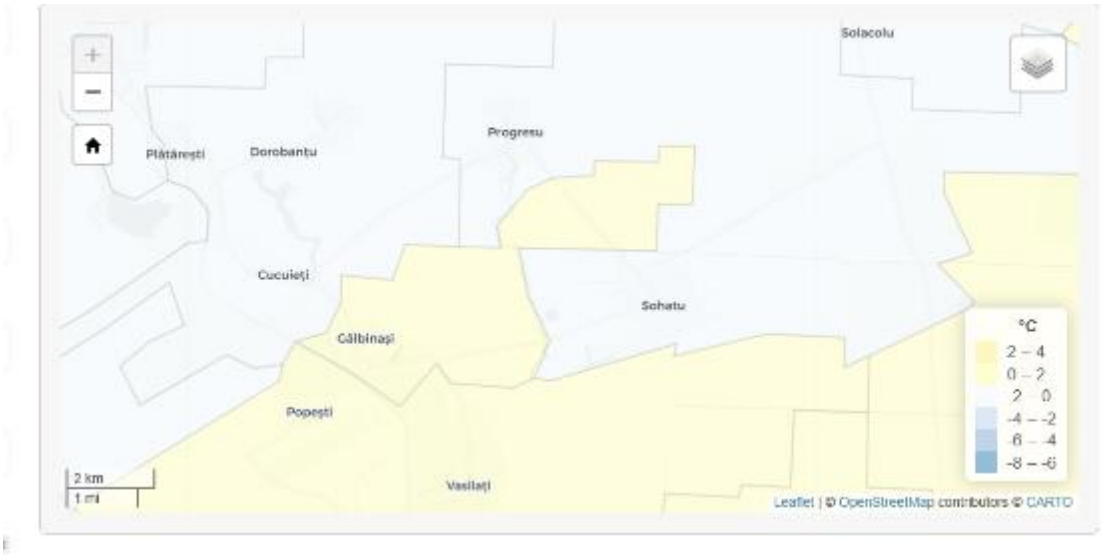
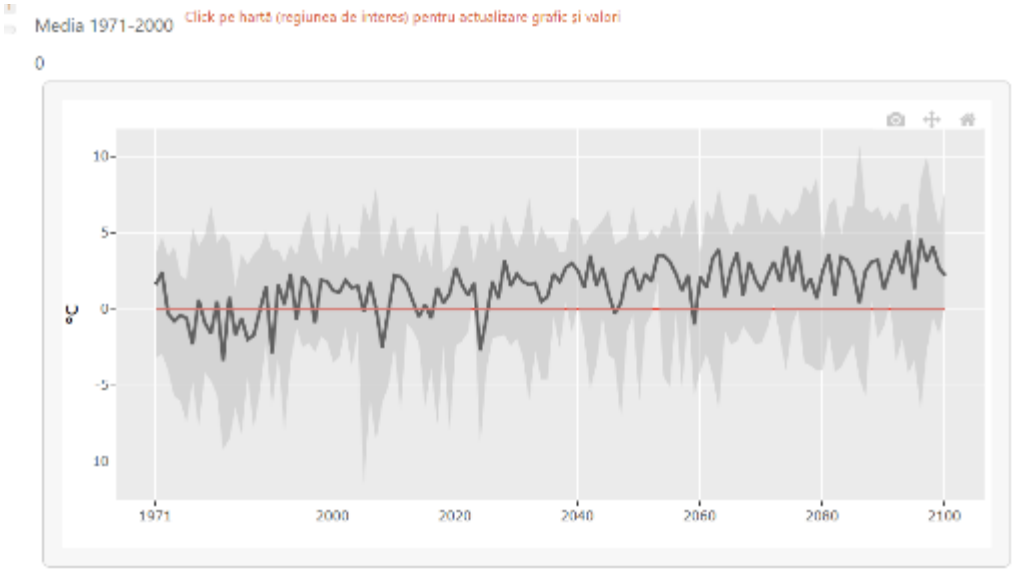



*Figure No. 81 - Average temperature at TAU level (period 1971 -2000)*

[15] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.2 | -1.2 | 6.6 | 2071 | 2.2 | 6.6 | -1.2 | 0 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.2 | 0.3 | 7.9 | 2100 | 2.2 | 7.9 | 0.3 | 0 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.7.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.4 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows ▾ Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93 | 68.4 | 128.6 | 2071 | -10.4 | 25.2 | -35 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000

Media 1971 2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.9 | 59.5 | 135.8 | 2100 | 4.5 | 32.4 | -43.9 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

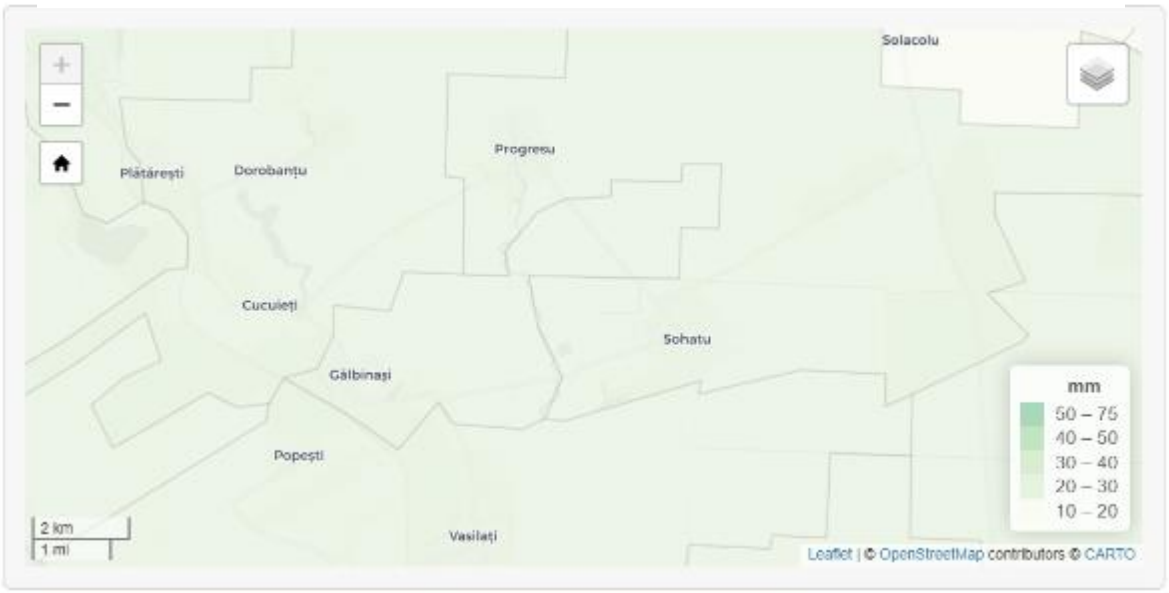
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93 W/mp, and at the level of year 2100 it is estimated at 107.9 W/mp, which is higher than the multiannual average value of 103.4 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.7.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.1 mm, as shown in the figure below.

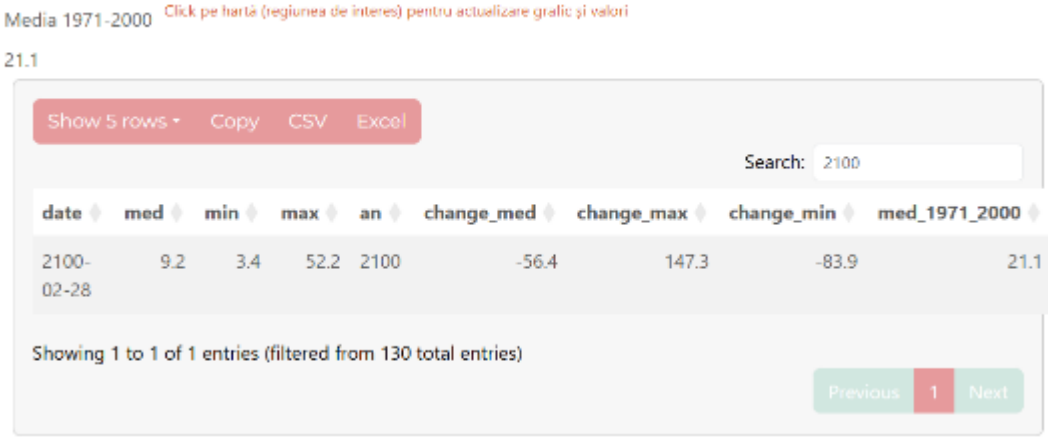
According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 28 mm, and by 2100 it will reach 9.2 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.7.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

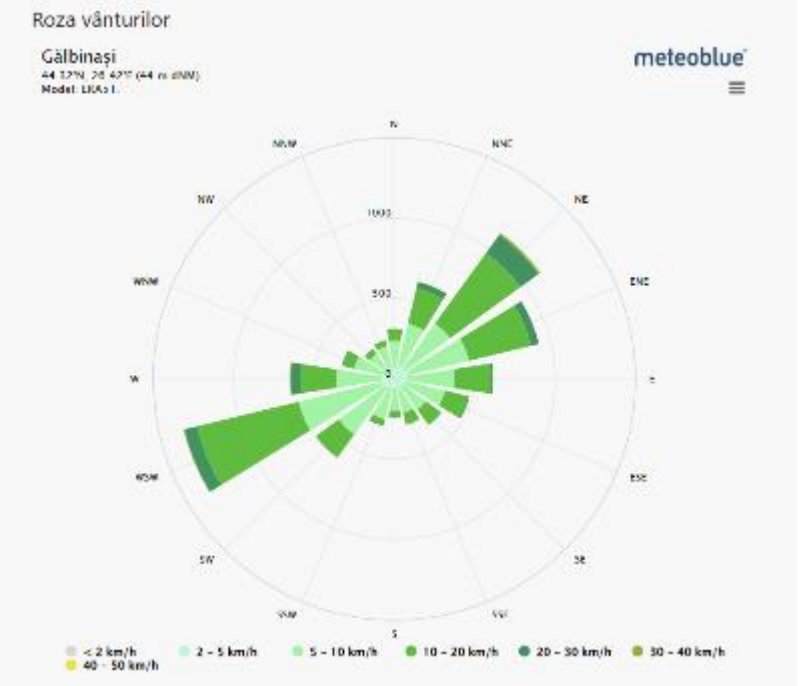



*Figure No. 82- Wind rose*

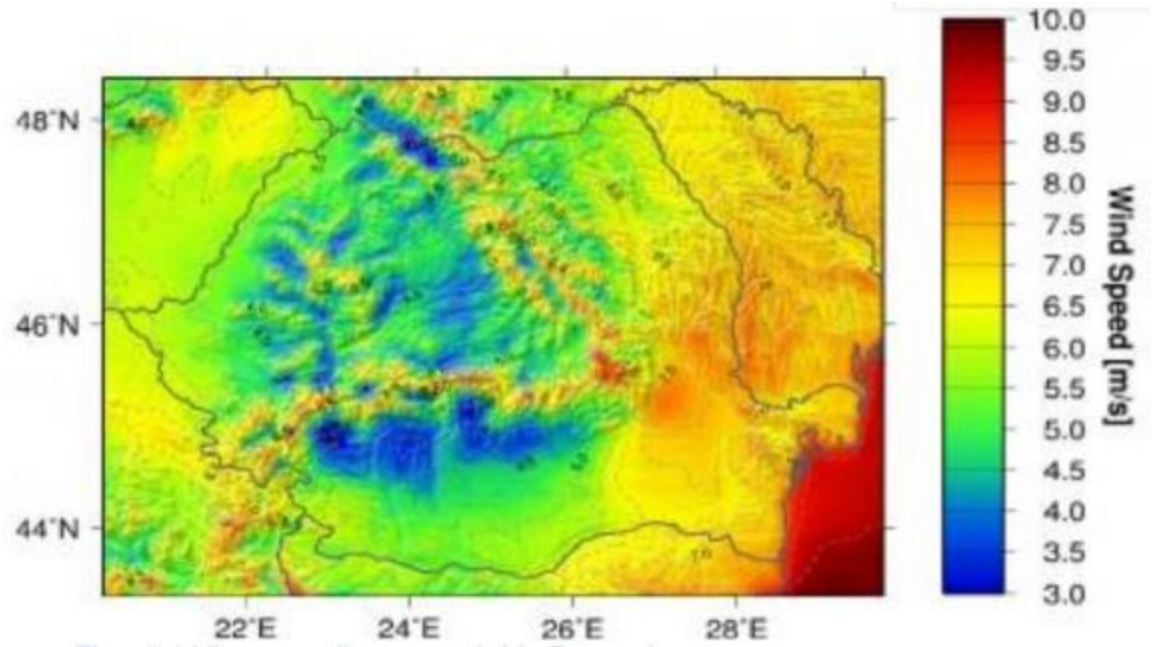



*Figure No. 83- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

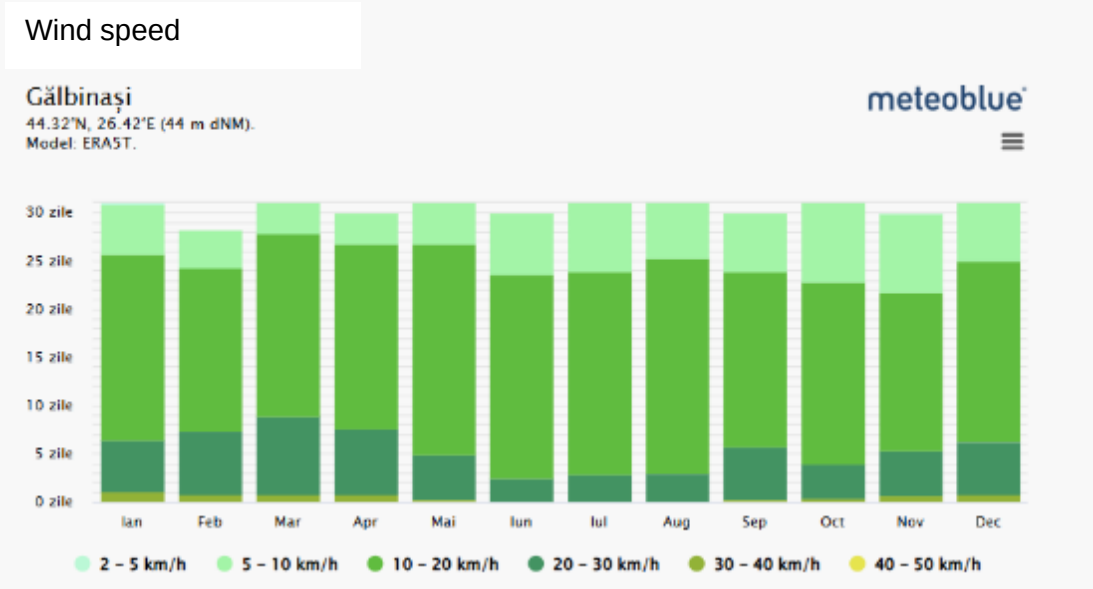
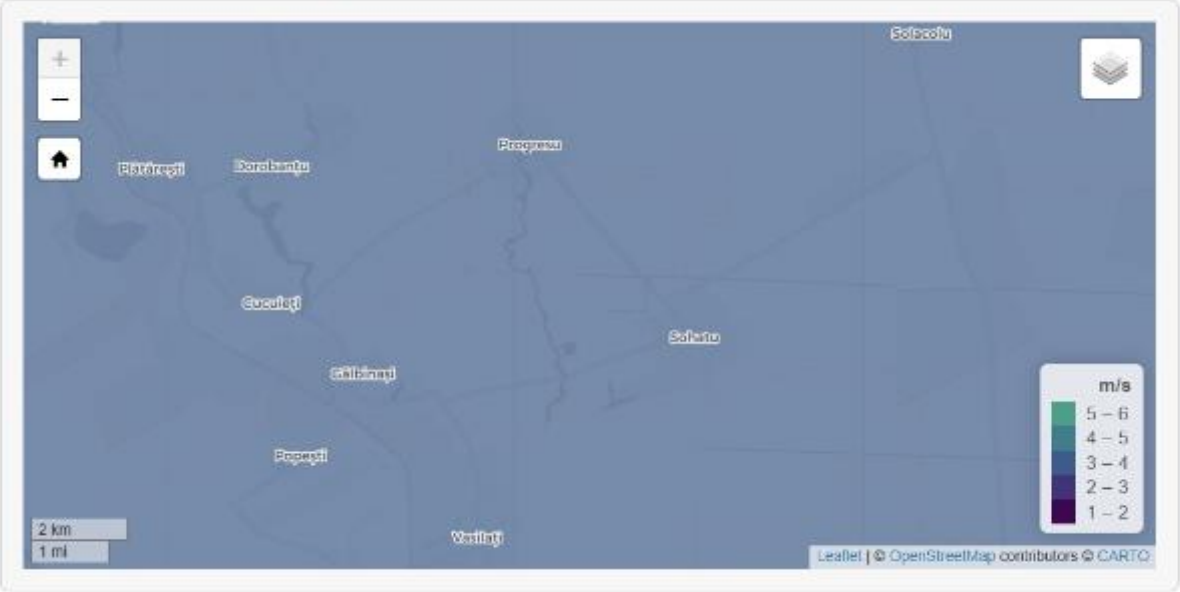



*Figure No. 84- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.6 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.3 m/s, and 3.4 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.3 | 3 | 4.3 | 2071 | -0.3 | 0.7 | -0.6 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Gălbinași - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.4 | 2.5 | 4.8 | 2100 | -0.2 | 1.2 | -1.1 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.8 Mitreni*

### 4.8.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

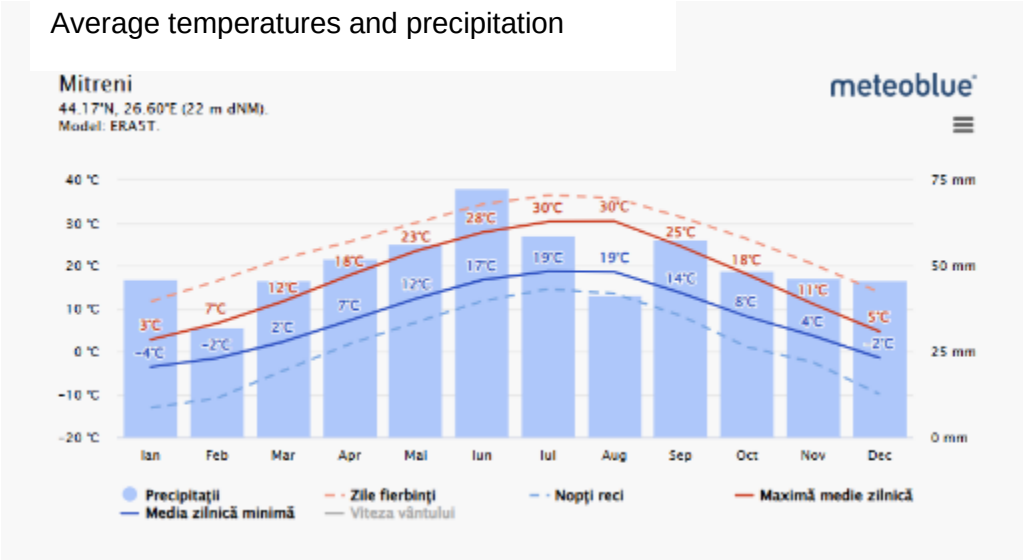



*Figure No. 85* ***- Average value of extreme temperatures over the last 30 years at the weather station[16]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.1ºC:

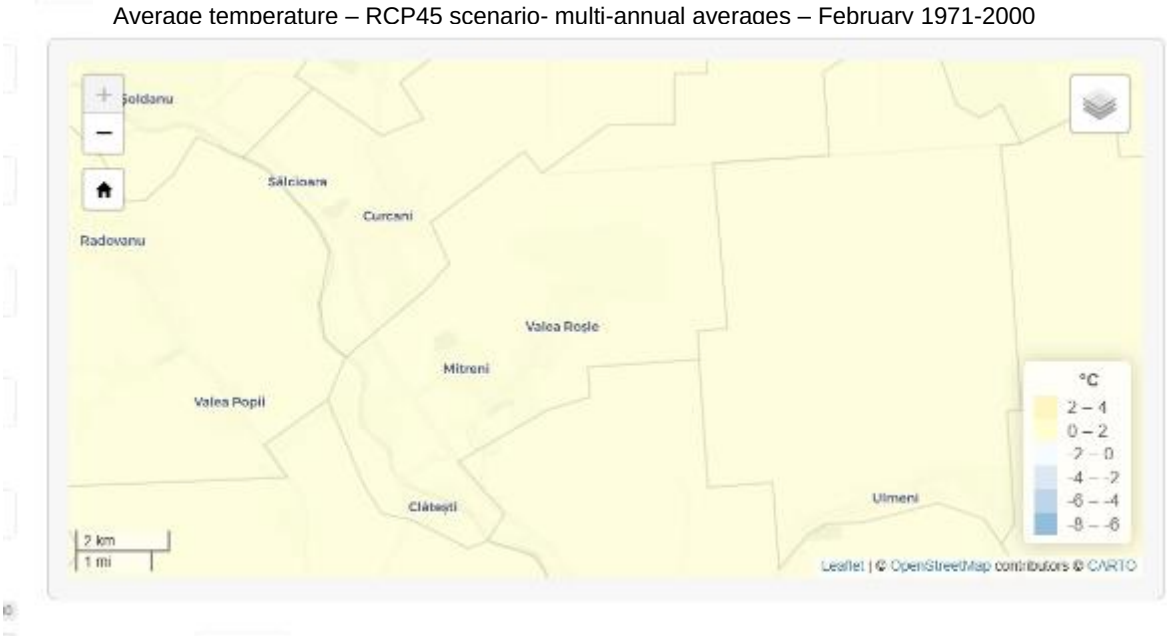
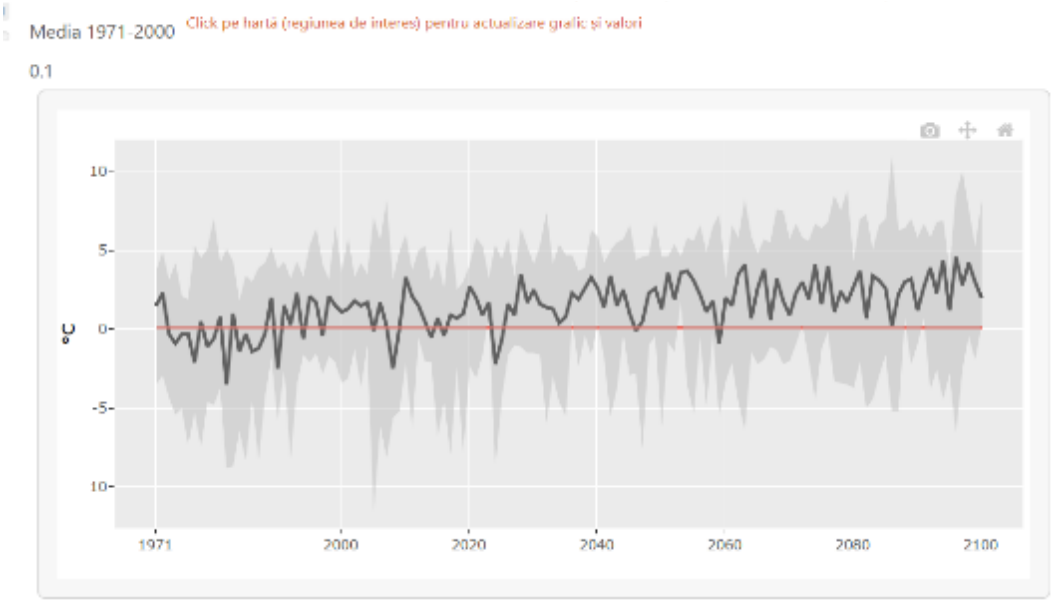



*Figure No. 86 - Average temperature at TAU level (period 1971 -2000)*

[16] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.3 | -0.9 | 6.7 | 2071 | 2.2 | 6.6 | -1 | 0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2 | 0.3 | 8.1 | 2100 | 1.9 | 8 | 0.2 | 0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

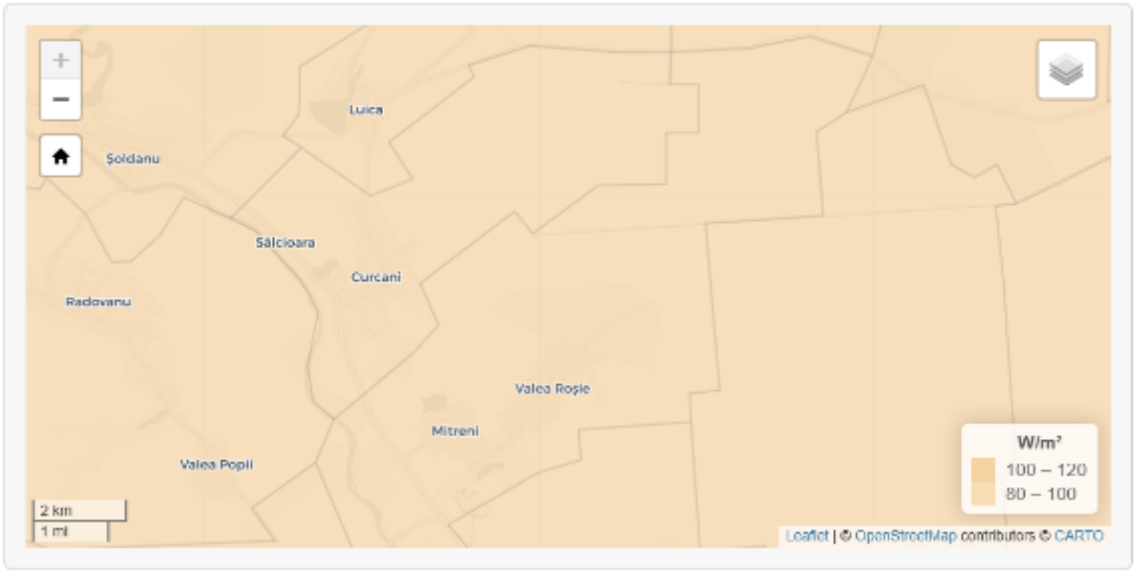
### 4.8.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.3 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000




Global solar radiation in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows ▾ Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.4 | 67.3 | 130.1 | 2071 | -10.9 | 26.8 | -36 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.3 | 57.7 | 135.9 | 2100 | 5 | 32.6 | -45.6 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.4 W/mp, and at the level of year 2100 it is estimated at 108.3 W/mp, which is higher than the multiannual average value of 103.3 W/mp. We can observe an increasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.8.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 m, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

21.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 25.5 | 9.5 | 66 | 2071 | 18.1 | 205.6 | -56 | 21.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

21.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 13.4 | 3.7 | 44.8 | 2100 | -38 | 107.4 | -82.9 | 21.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.8.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

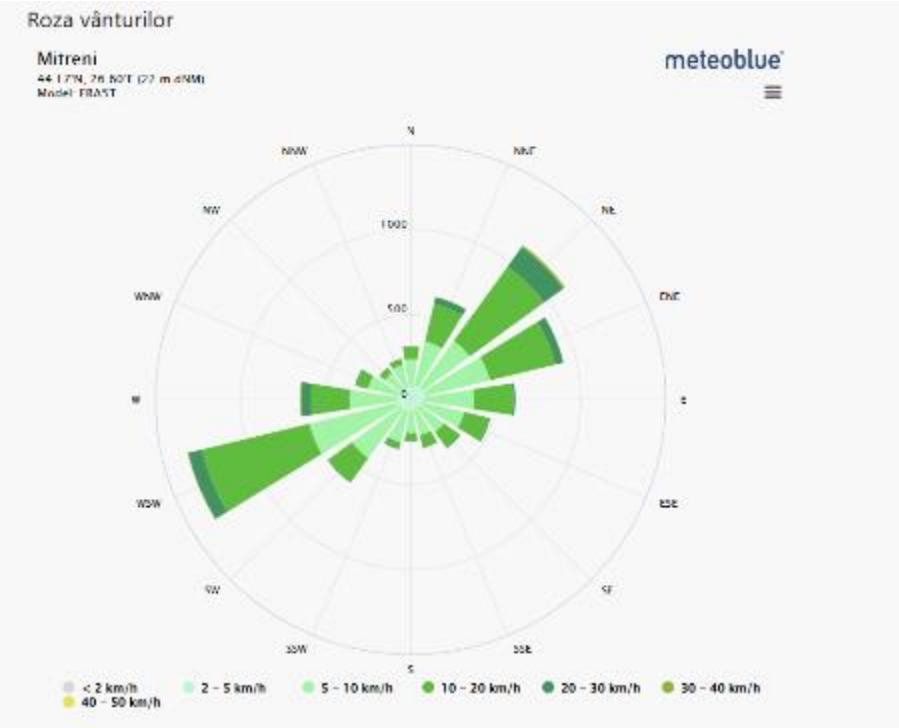



*Figure No. 87- Wind rose*

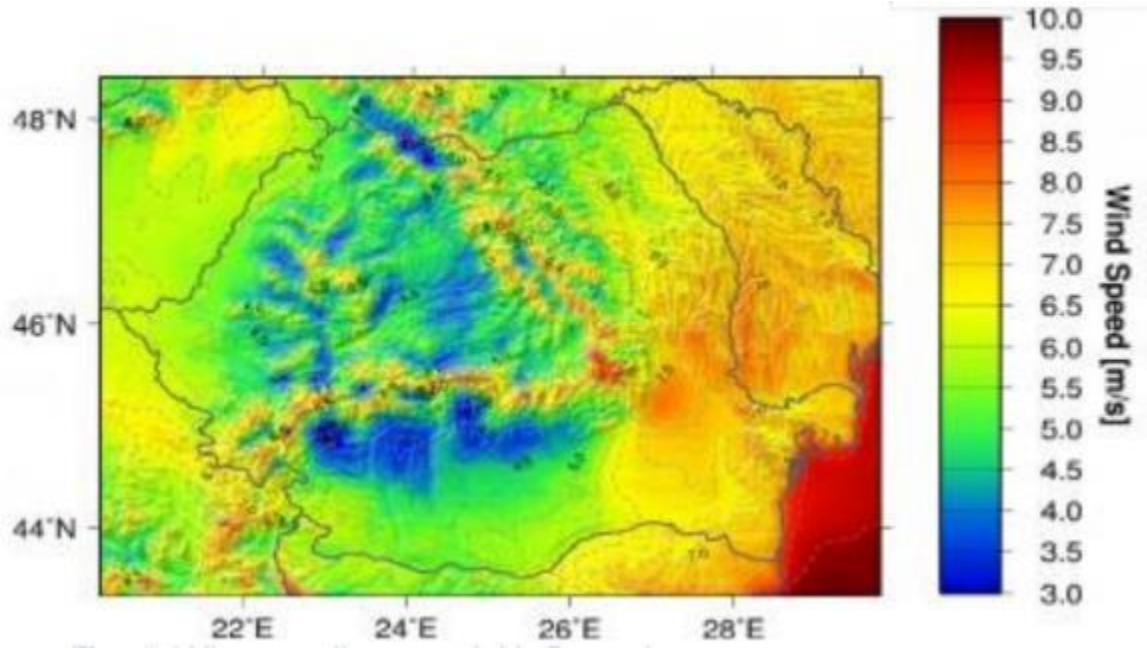



*Figure No. 88- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

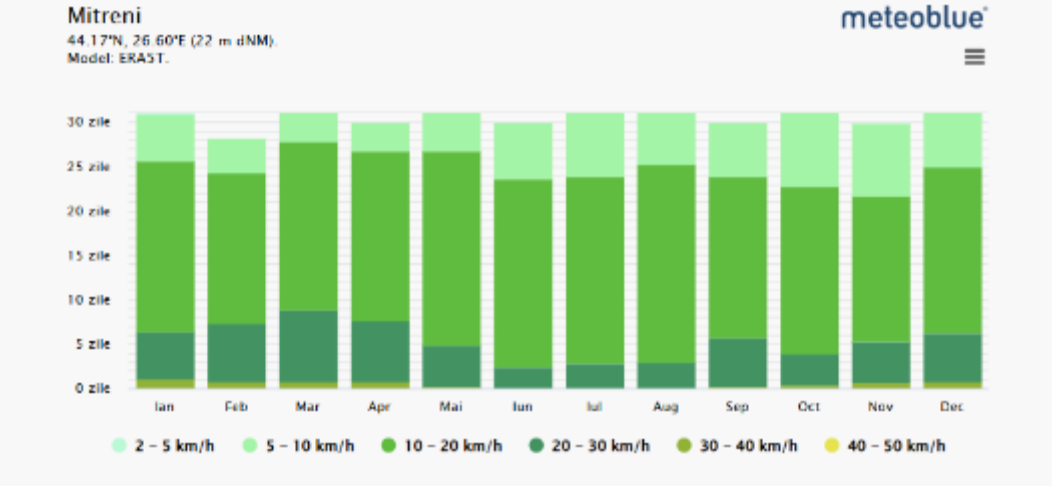
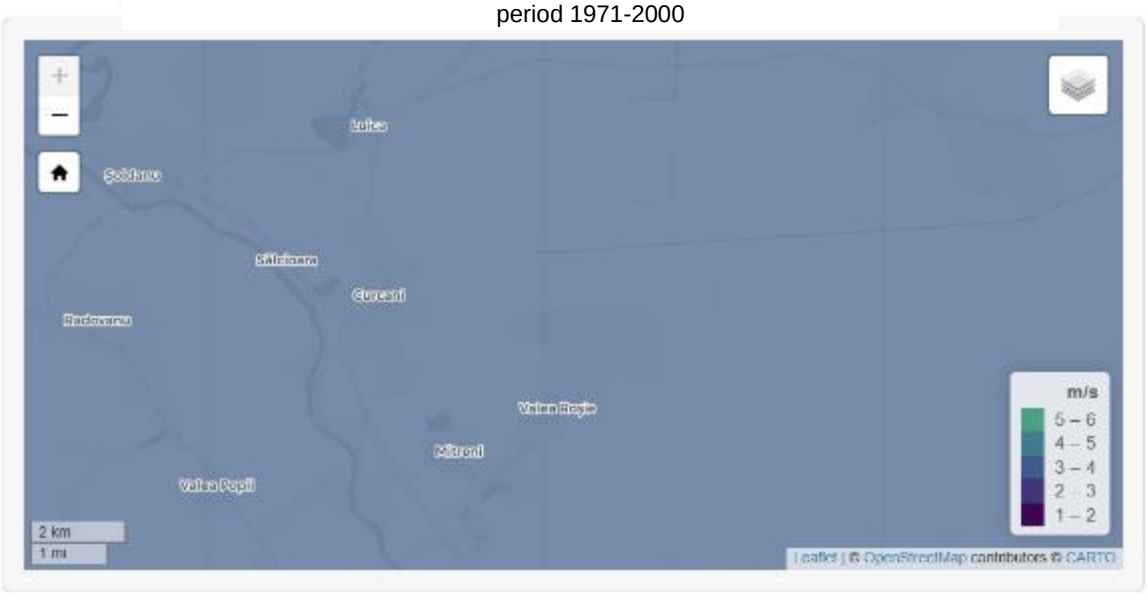



*Figure No. 89- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.7 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.4 m/s, and 3.6 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.4 | 3.2 | 4.5 | 2071 | 0.3 | 0.8 | -0.5 | 3.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Mitreni - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.6 | 2.5 | 5.1 | 2100 | -0.1 | 1.4 | -1.2 | 3.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.9 Oltenița*

### 4.9.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

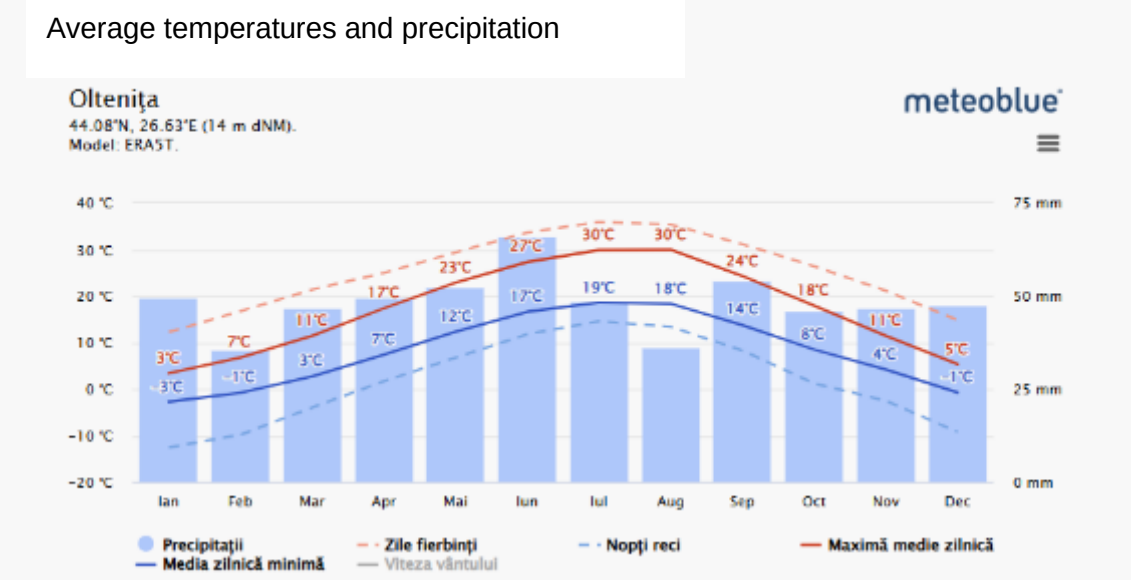



*Figure No. 90* ***- Average value of extreme temperatures over the last 30 years at the weather station***[17]

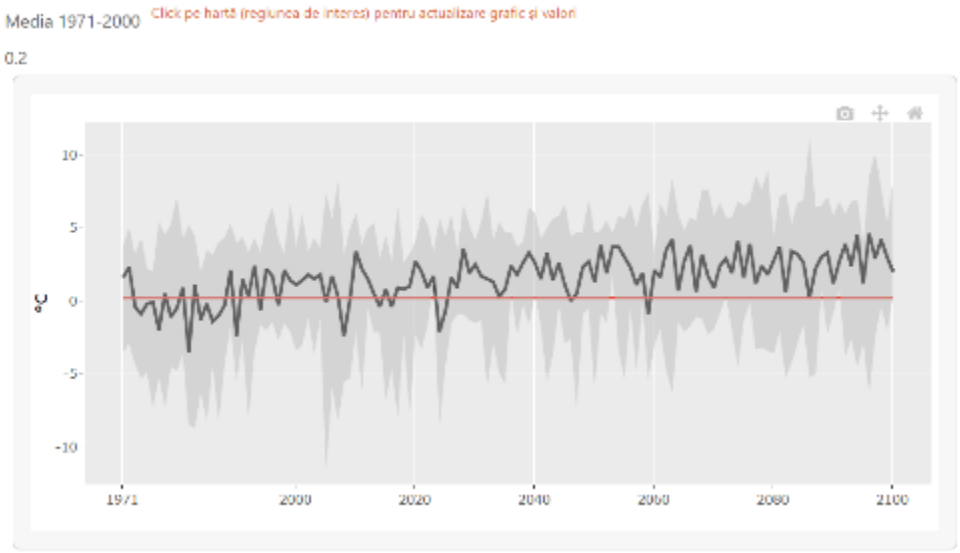
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.2 ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 91 - Average temperature at TAU level (period 1971 -2000)*

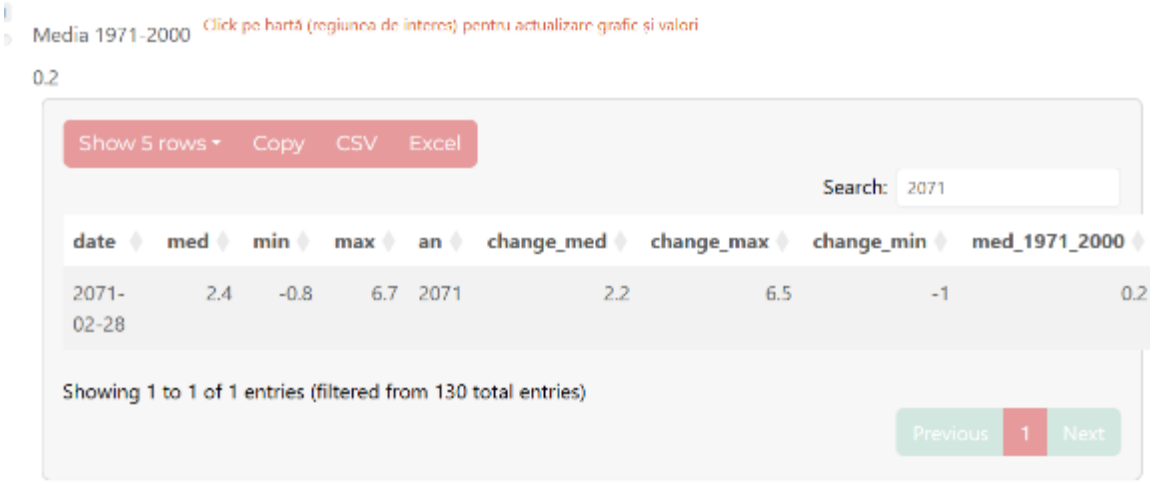
[17] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000




Average temperature in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.9.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.4 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.1 | 67.2 | 130.3 | 2071 | -11.3 | 26.9 | -36.2 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.5 | 57.7 | 136 | 2100 | 5.1 | 32.6 | -45.7 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

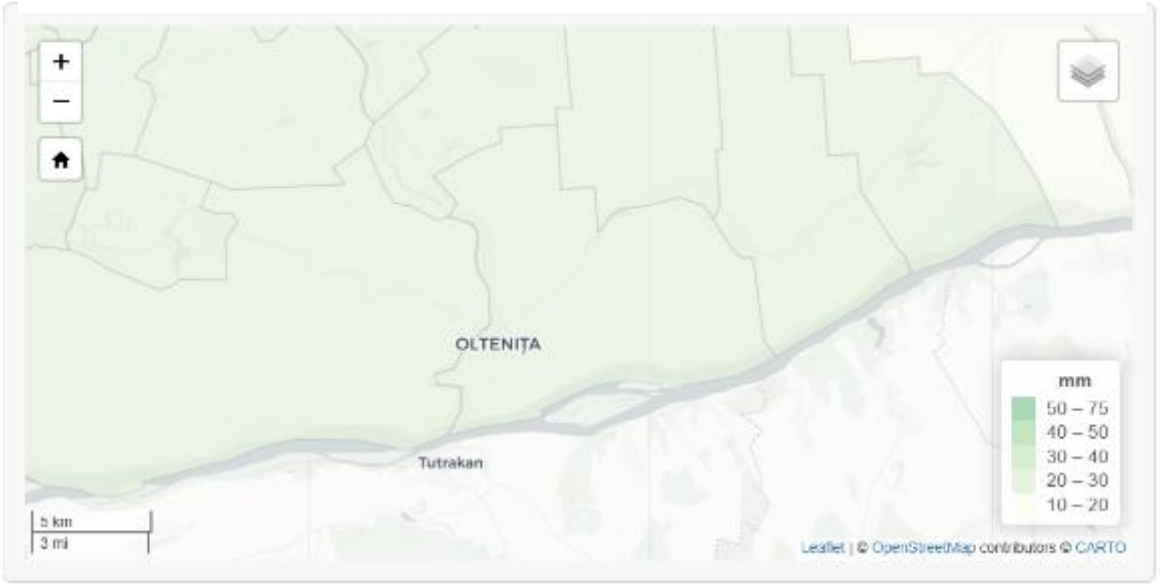
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.1 W/mp, and at the level of year 2100 it is estimated at 108.5 W/mp, which is higher than the multiannual average value of 103.4 W/mp. We can observe an increasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.9.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.7 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 26.1 mm, and by 2100 it will reach 14.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.9.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

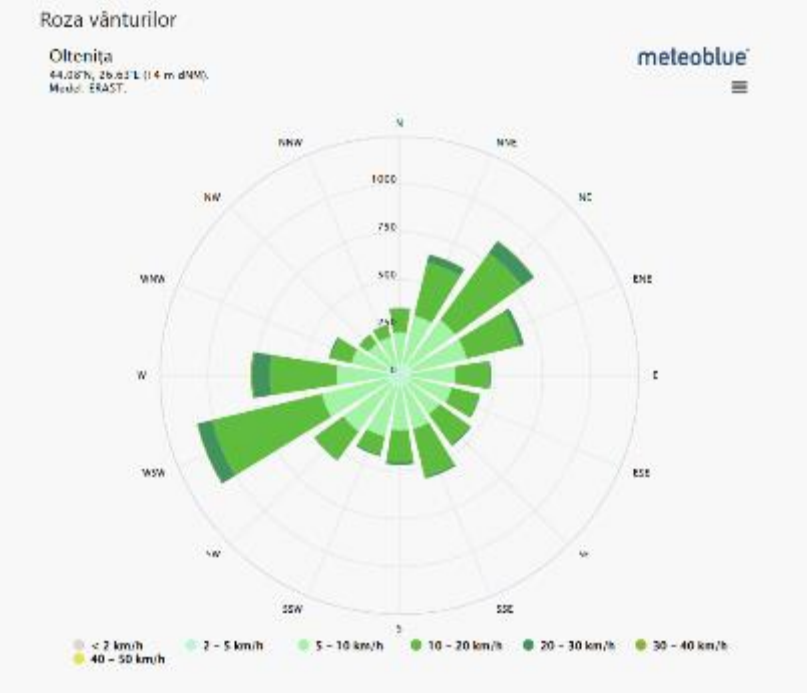



*Figure No. 92- Wind rose*

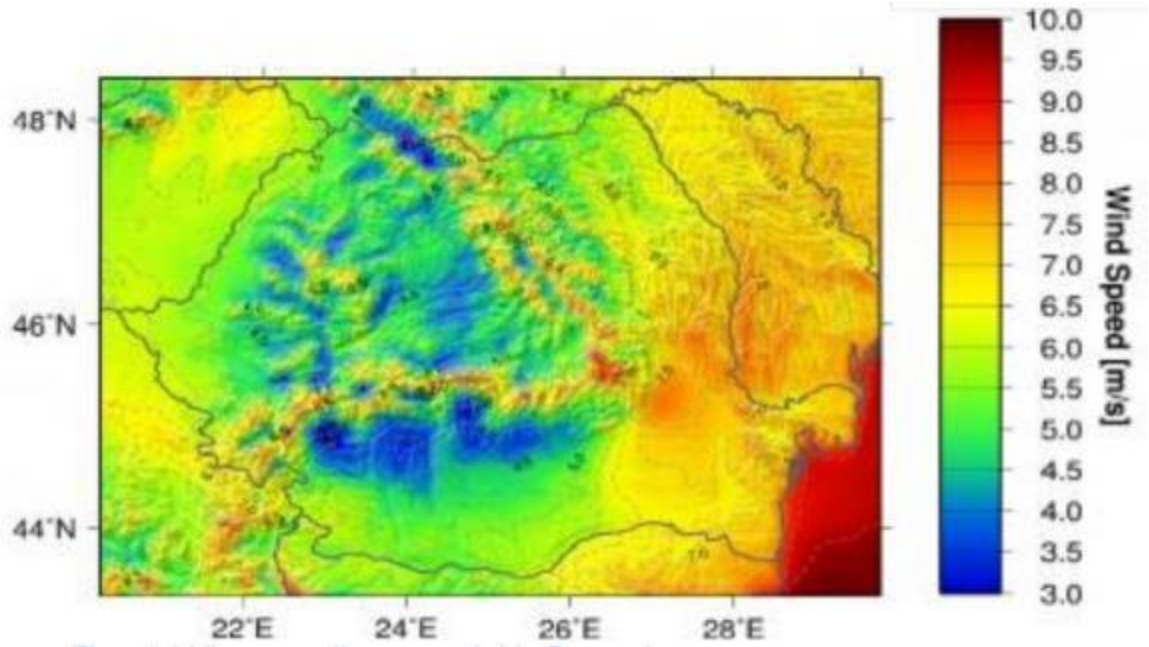



*Figure No. 93- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

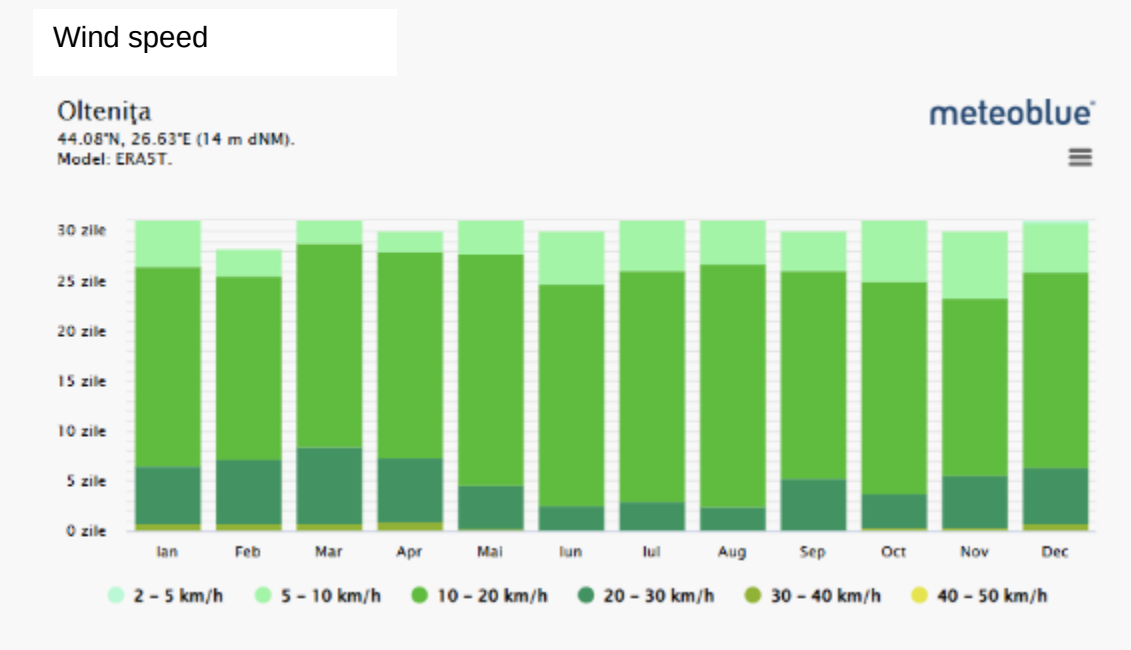


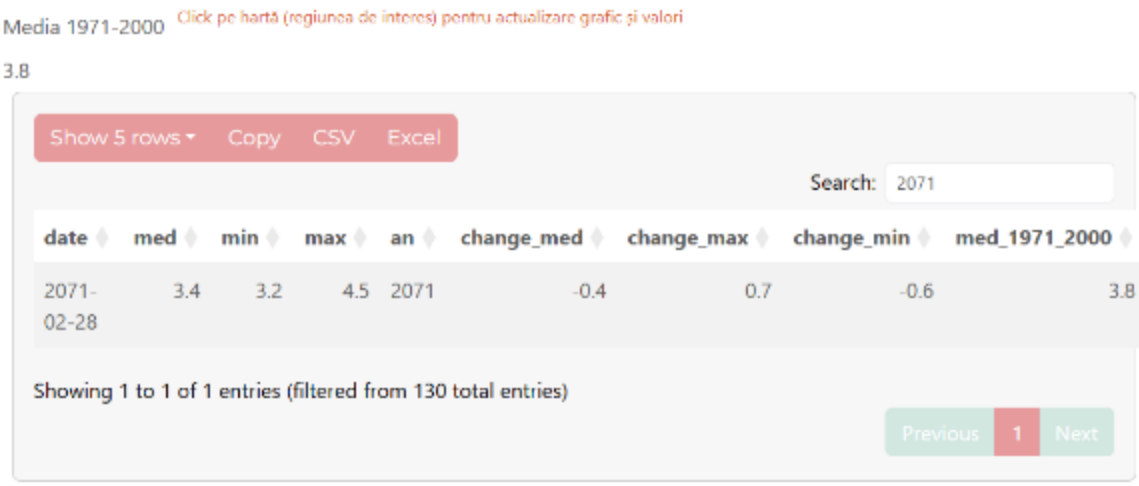

*Figure No. 94- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.8 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.4 m/s, and 3.7 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000




Average wind speed in February - RCP45 Scenario (Oltenița - County of Călărași) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.10 Plătărești*

### 4.10.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

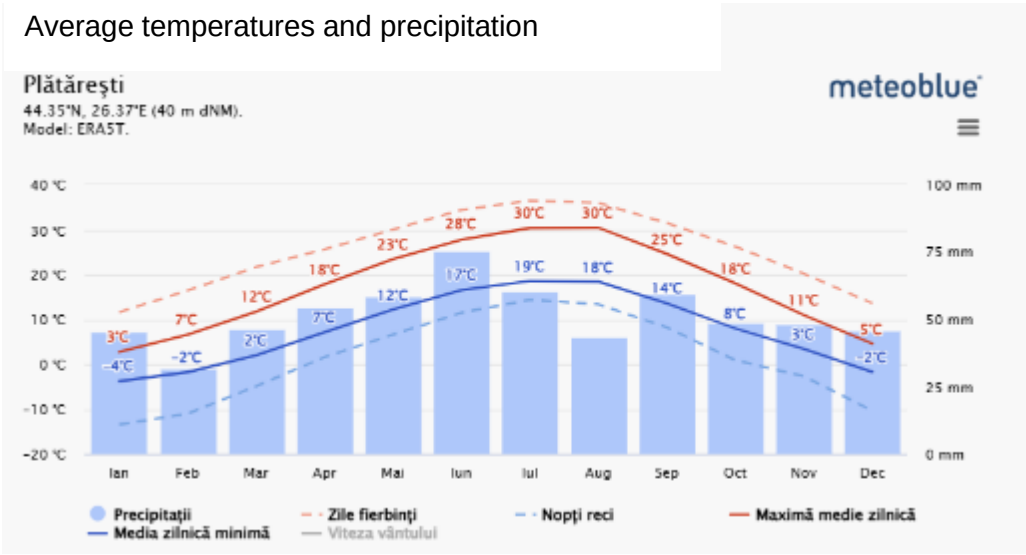



*Figure No. 95* ***- Average value of extreme temperatures over the last 30 years at the weather station***[18]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

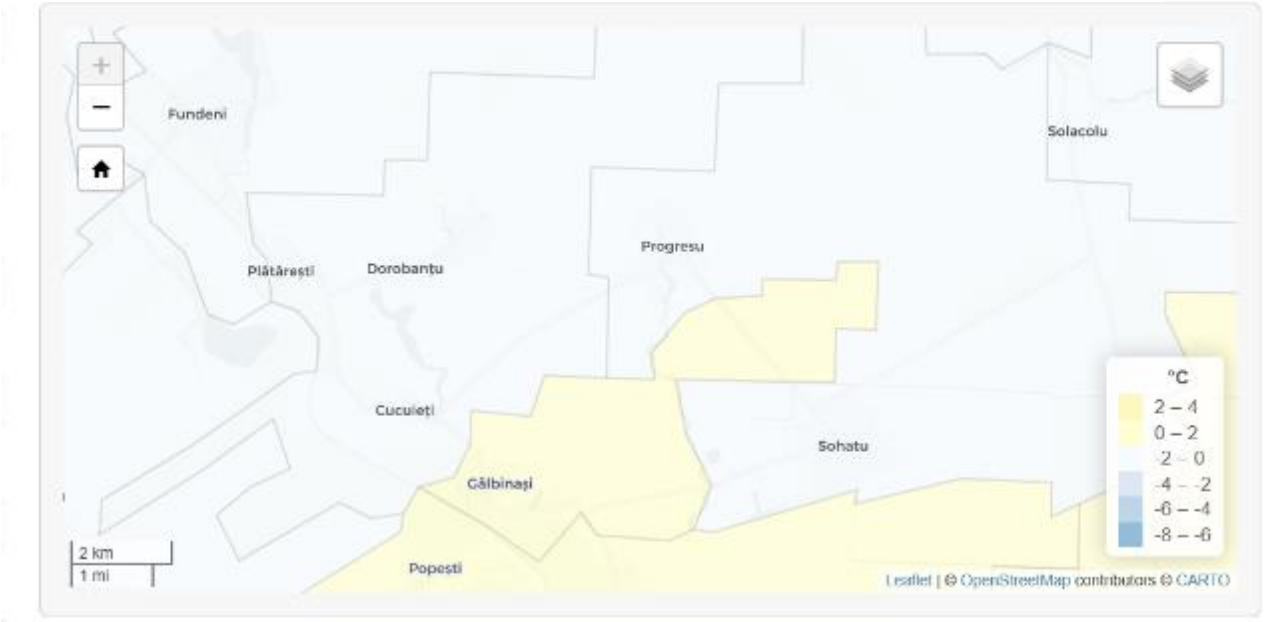
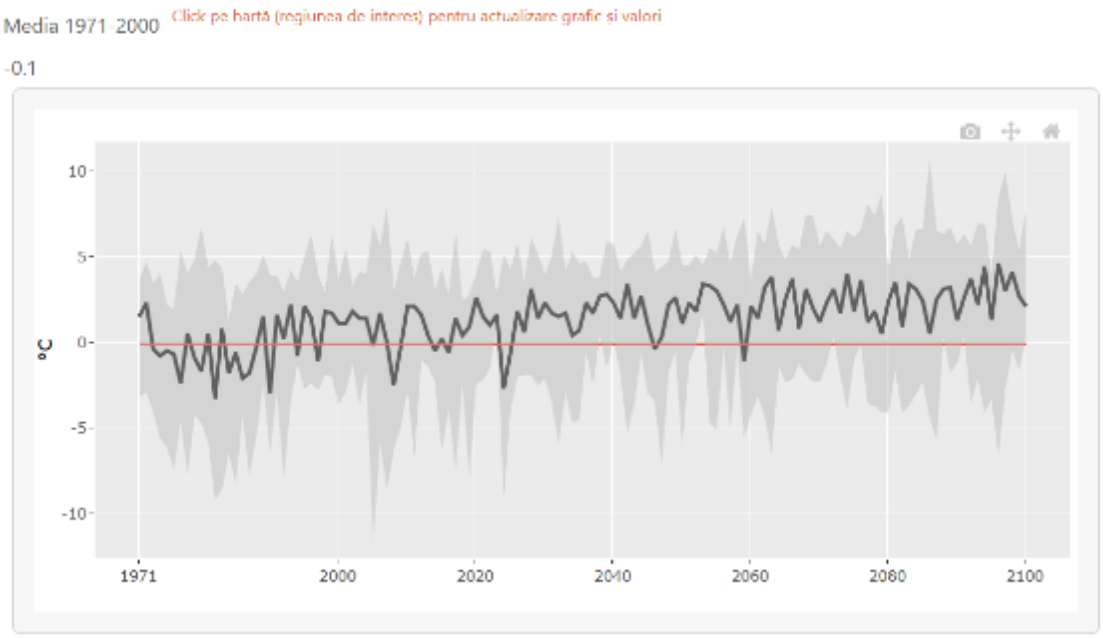



*Figure No. 96 - Average temperature at TAU level (period 1971 -2000)*

[18] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000


| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.3 | 1.2 | 6.5 | 2071 | 2.4 | 6.6 | -1.1 | 0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000


| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.1 | 0.3 | 7.8 | 2100 | 2.2 | 7.9 | 0.4 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.10.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.3 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Grafic Data

Global solar radiation in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93.5 | 68.8 | 128.1 | 2071 | -9.8 | 24.8 | -34.5 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.6 | 60.1 | 135.5 | 2100 | 4.3 | 32.2 | -43.2 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.5 W/mp, and at the level of year 2100 it is estimated at 107.6 W/mp, which is higher than the multiannual average value of 103.3 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

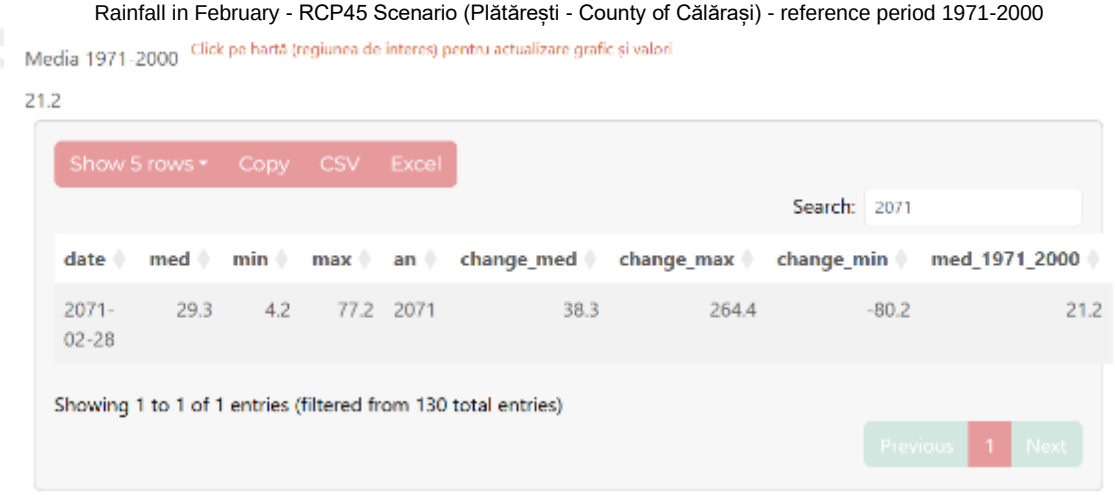
### 4.10.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

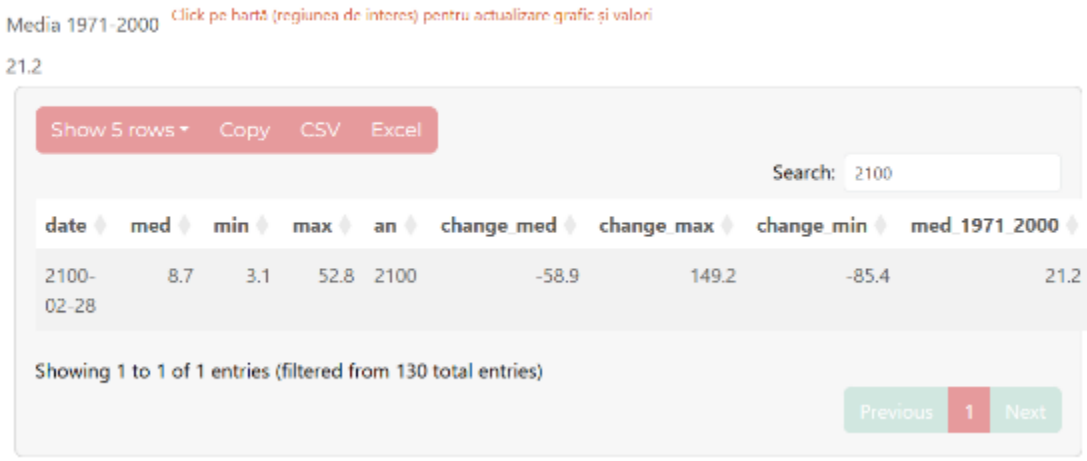
According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 m, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000




Rainfall in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.10.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

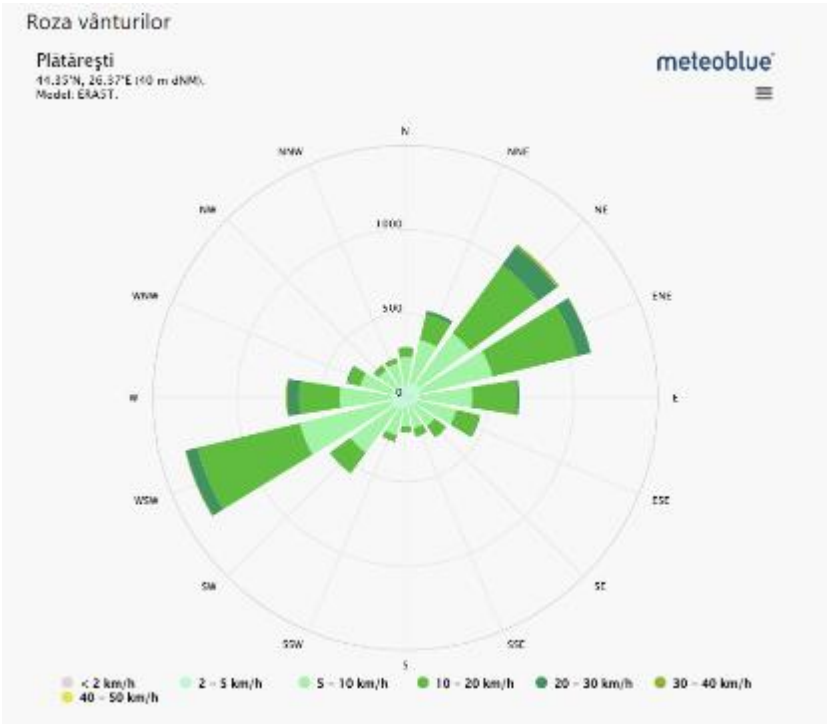



*Figure No. 97- Wind rose*

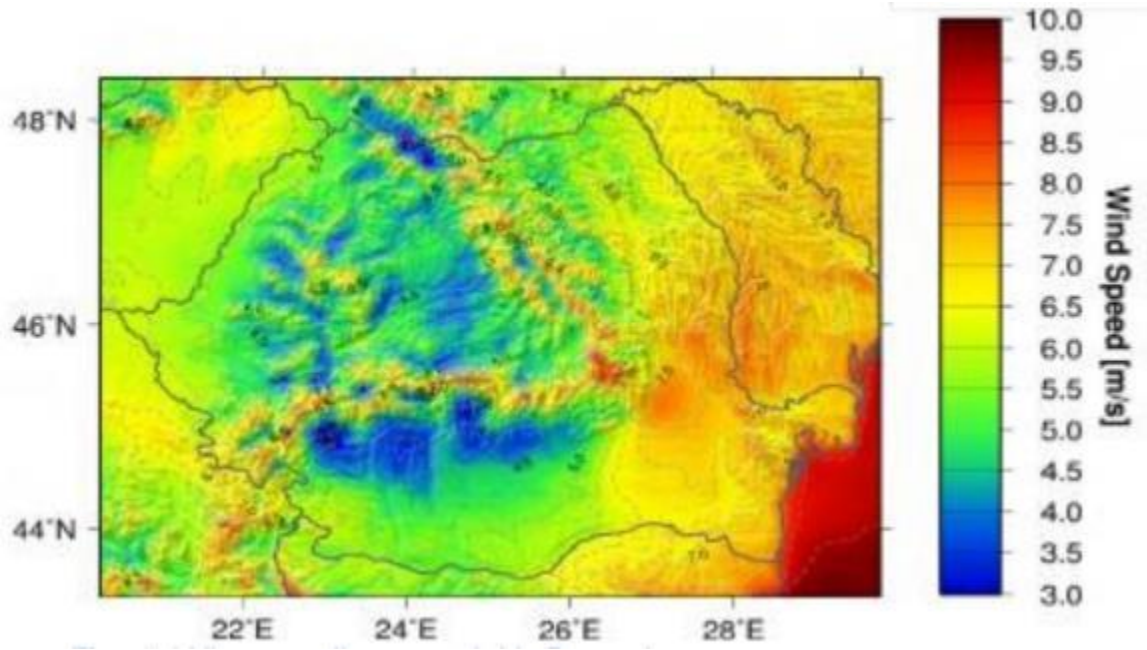



*Figure No. 9813 - Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

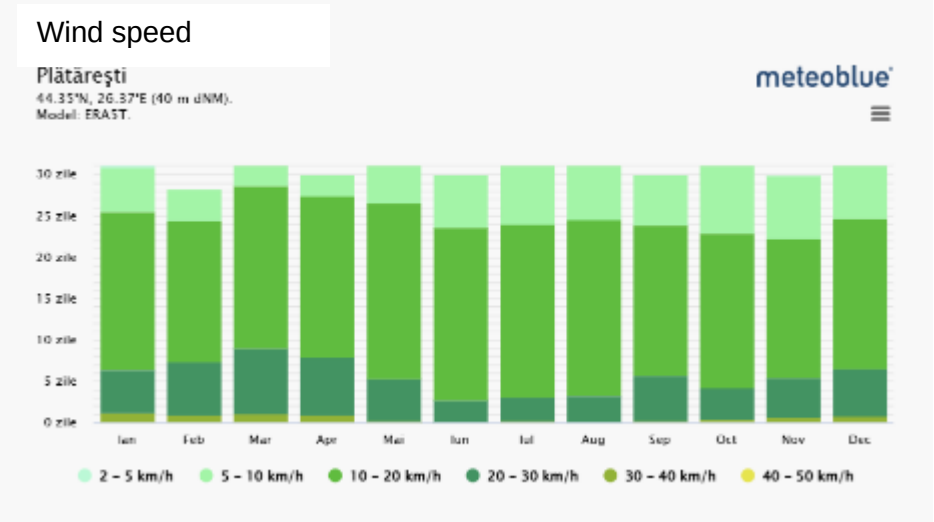
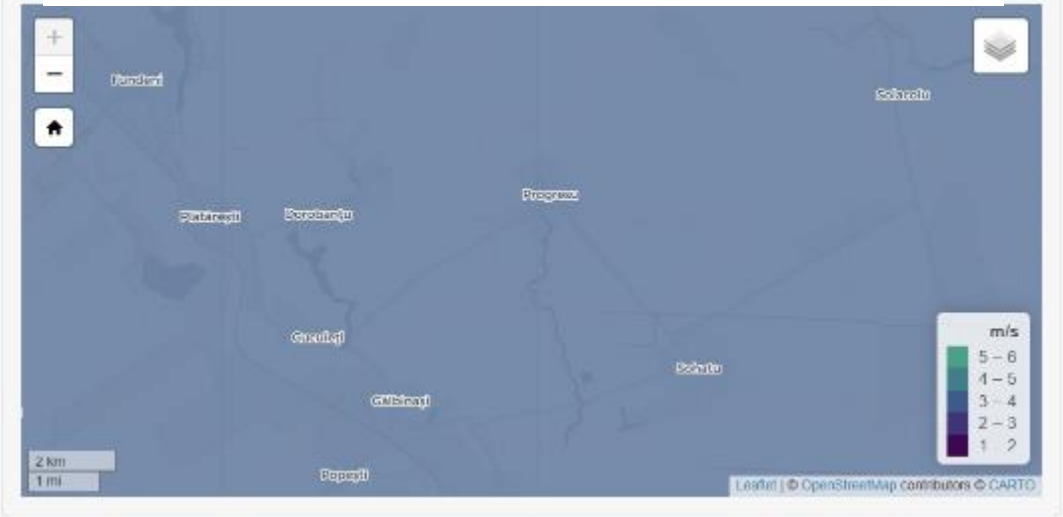



*Figure No. 99- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.6 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.3 m/s, and 3.4 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000


Average wind speed in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

### *4.11 Radovanu*

#### 4.11.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

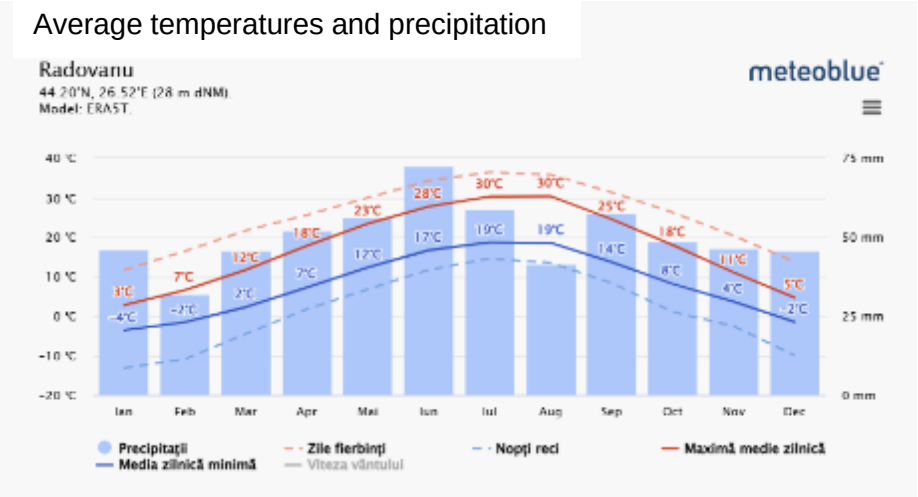



*Figure No. 100* ***- Average value of extreme temperatures over the last 30 years at the weather station[19]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.2 ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

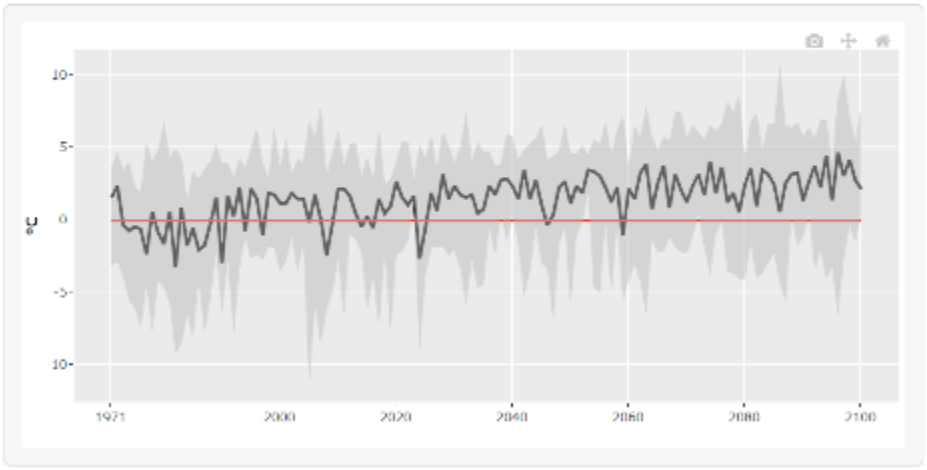

*Figure No. 101 - Average temperature at TAU level (period 1971 -2000)*

[19] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.3 | -1.2 | 6.5 | 2071 | 2.4 | 6.6 | -1.1 | -0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Plătărești - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

0.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2.1 | 0.3 | 7.8 | 2100 | 2.2 | 7.9 | 0.4 | 0.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 4.11.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.4 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Radovanu - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.7 | 66.9 | 130 | 2071 | -10.7 | 26.6 | -36.5 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Radovanu - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.4

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.3 | 58.8 | 135.9 | 2100 | 4.9 | 32.5 | -44.6 | 103.4 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.7 W/mp, and at the level of year 2100 it is estimated at 108.3 W/mp, which is higher than the multiannual average value of 103.4 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.11.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 mm, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Radovanu - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Radovanu - County of Călărași) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.11.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

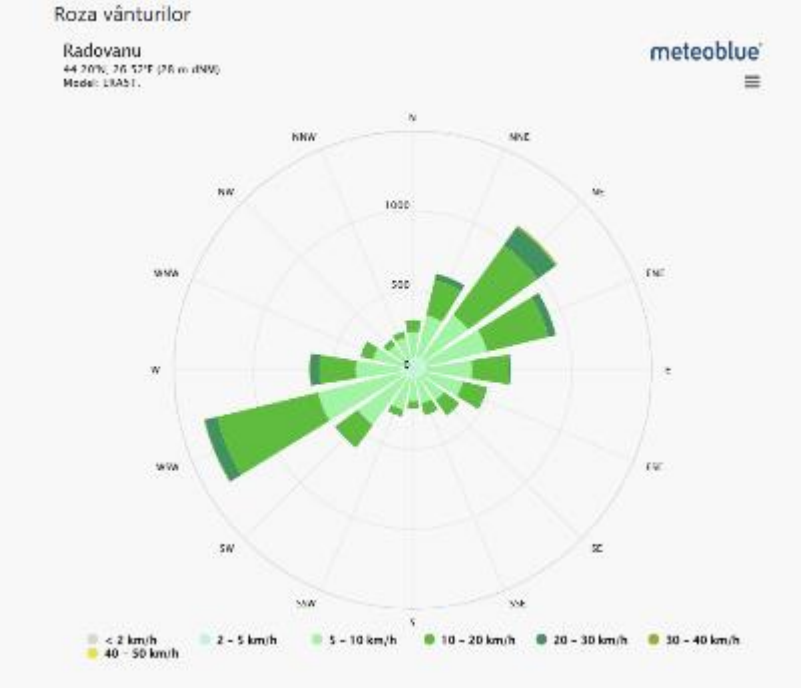



*Figure No. 102- Wind rose*

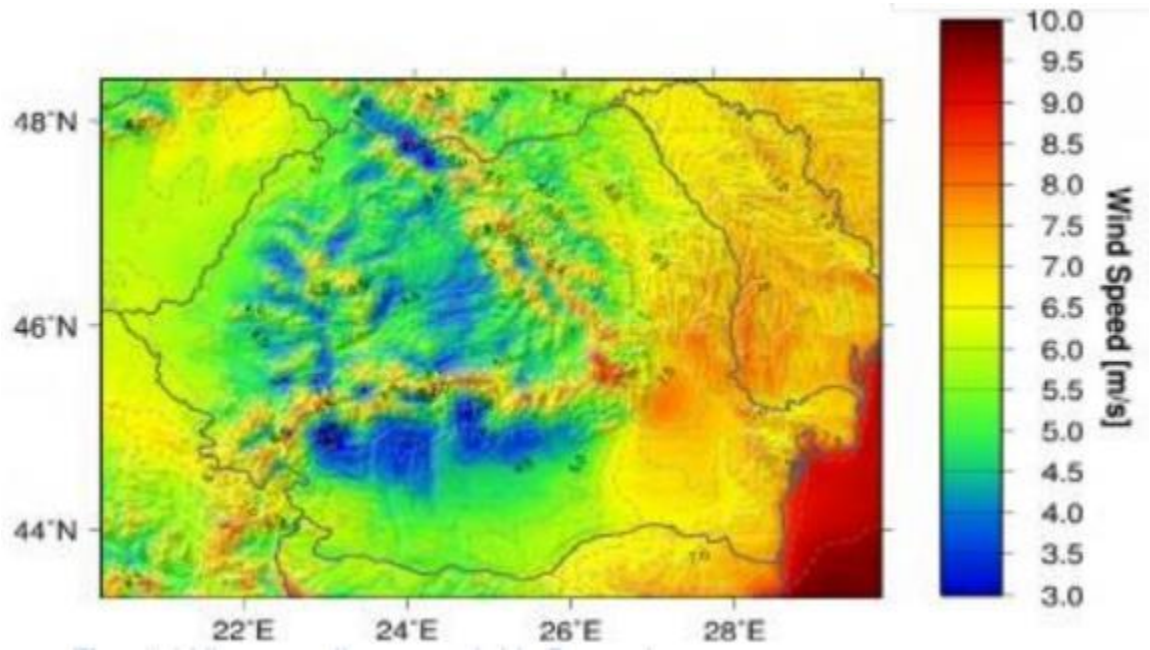



*Figure No. 103- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

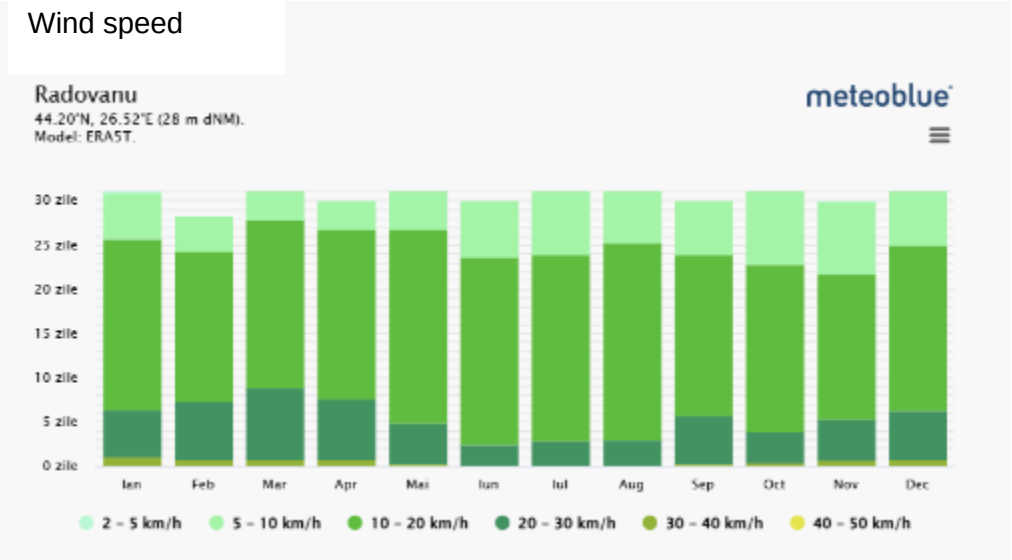
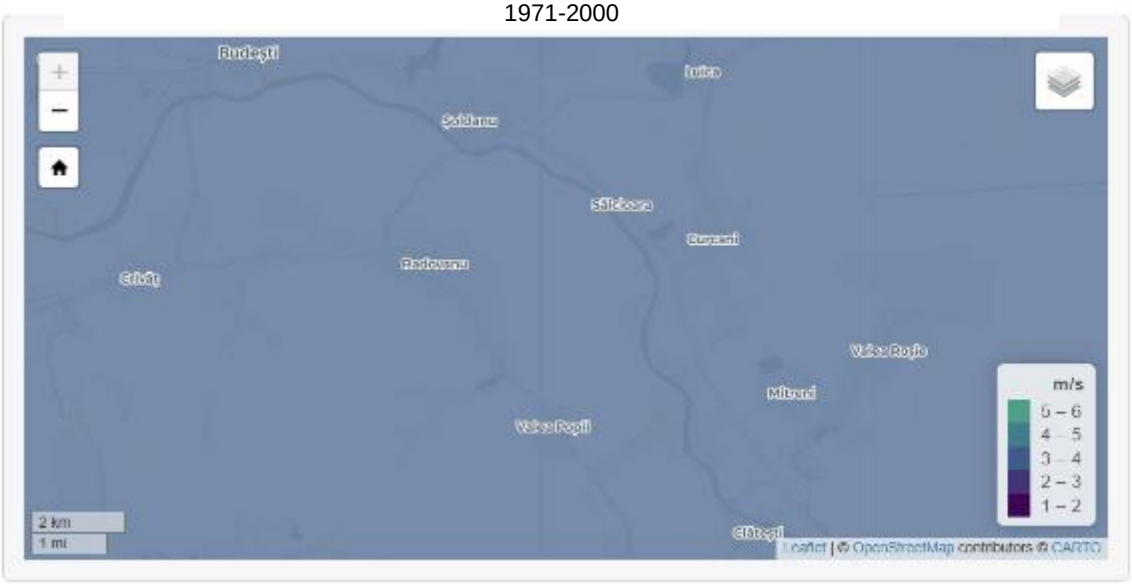



*Figure No. 104- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.7 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.3 m/s, and 3.5 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Radovanu - County of Călărași) - reference period 1971-2000


Average wind speed in February - RCP45 Scenario (Radovanu - County of Călărași) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *4.12 Soldanu*

### 4.12.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

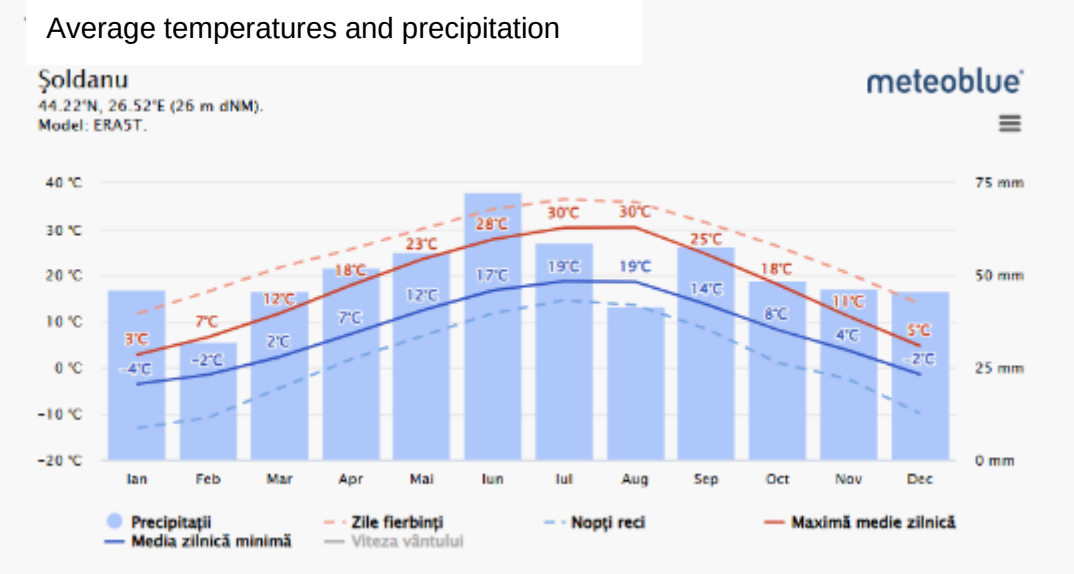



*Figure No. 105* ***- Average value of extreme temperatures over the last 30 years at the weather station***[20]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0.1ºC:

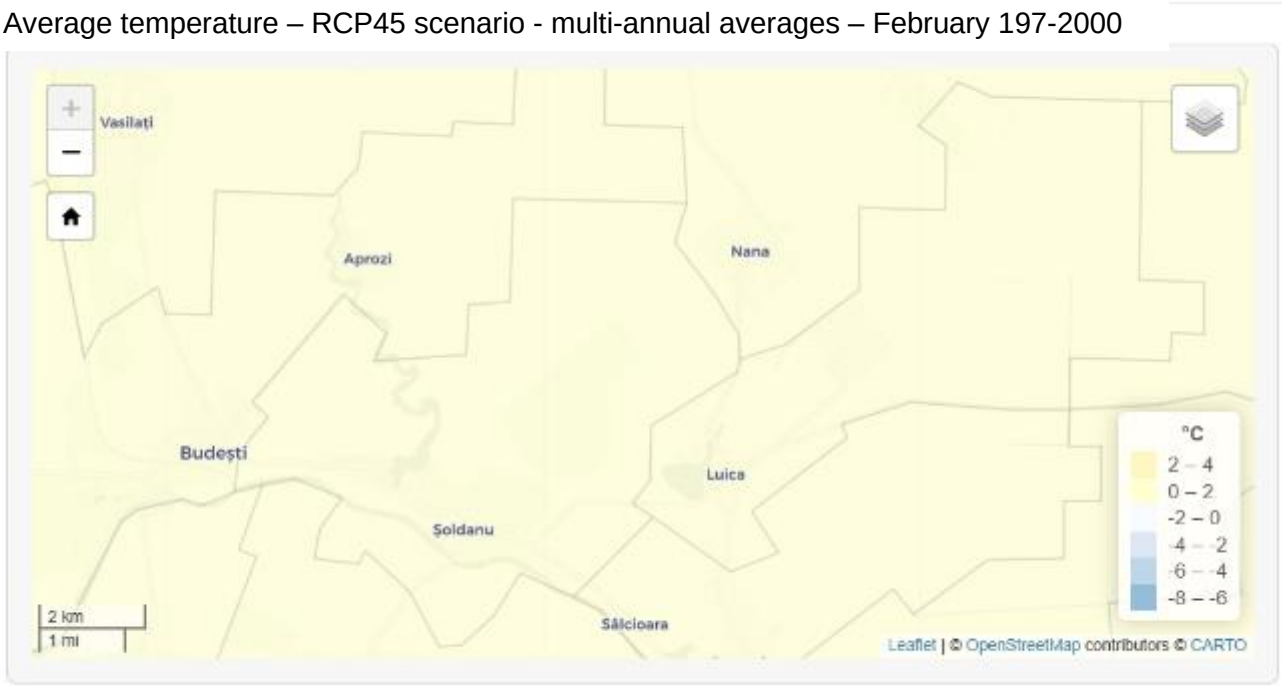
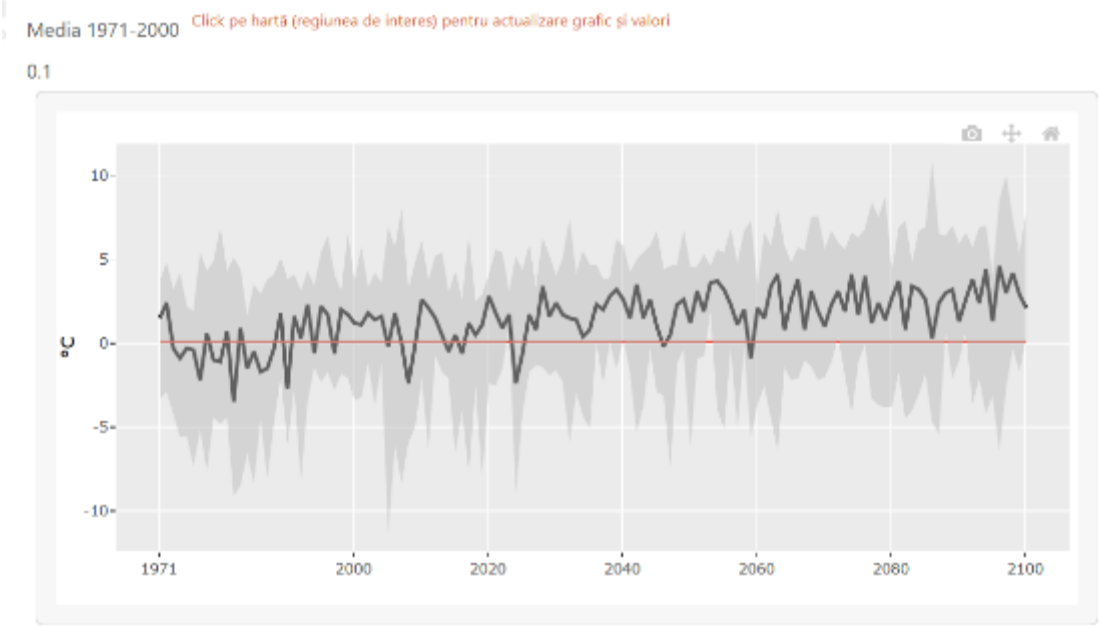



*Figure No. 106 - Average temperature at TAU level (period 1971 -2000)*

[20] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

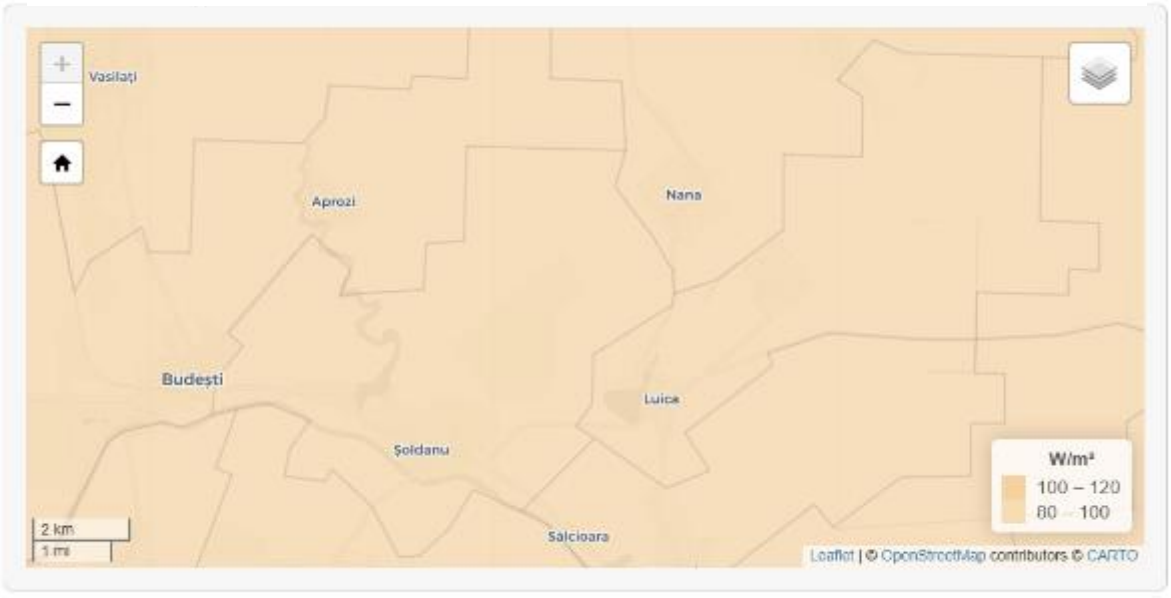
### 4.12.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.3 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000




Global solar radiation in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 93 | 67.7 | 129 | 2071 | -10.3 | 25.7 | -35.6 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.3

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108 | 59.4 | 135.8 | 2100 | 4.7 | 32.5 | -43.9 | 103.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 93.0 W/mp, and at the level of year 2100 it is estimated at 108.0 W/mp, which is higher than the multiannual average value of 103.3 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 4.12.3 Heavy rainfall

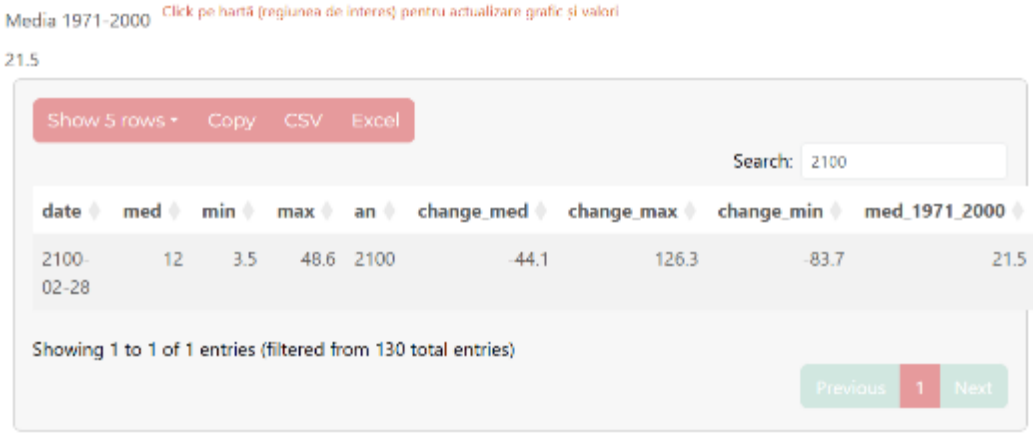
Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 21.5 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 25.7 mm, and by 2100 it will reach 12 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 4.12.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

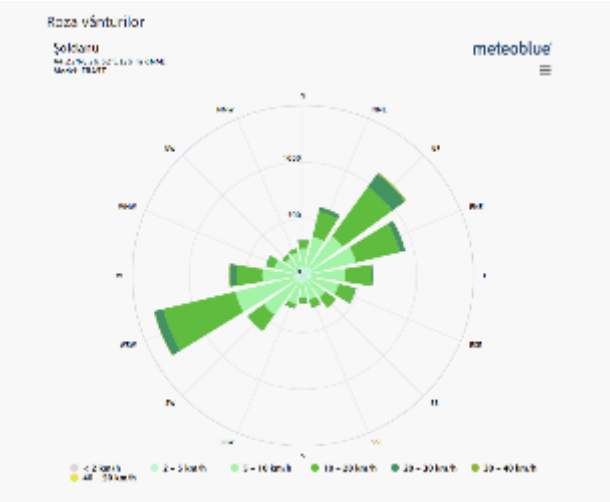



*Figure No. 107- Wind rose*

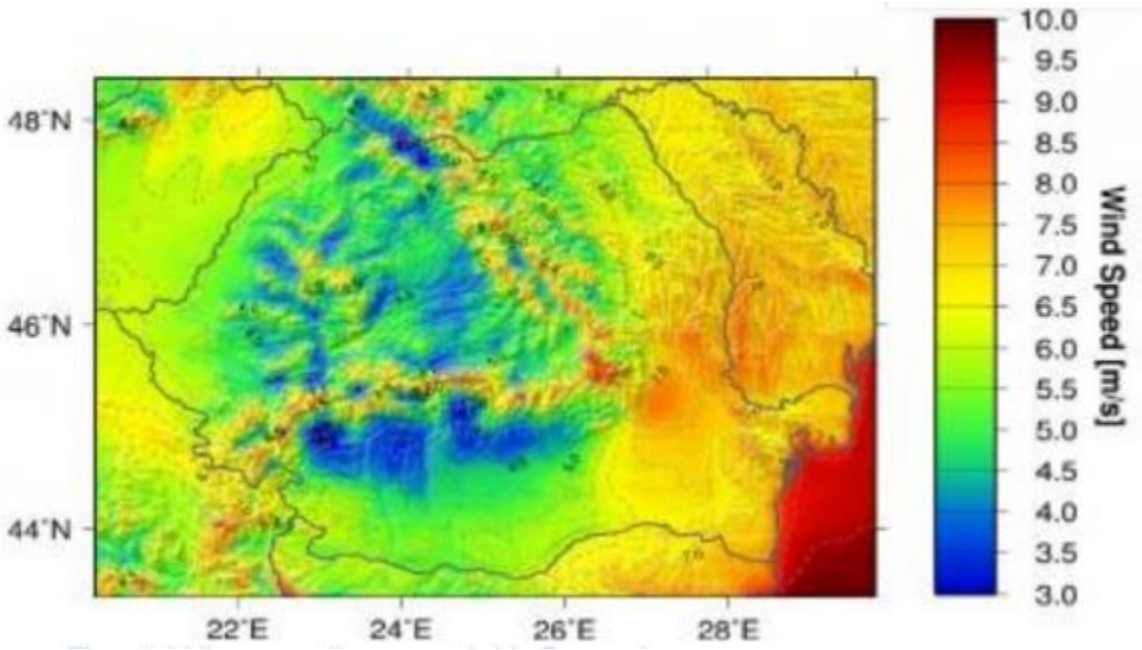



*Figure No. 108- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

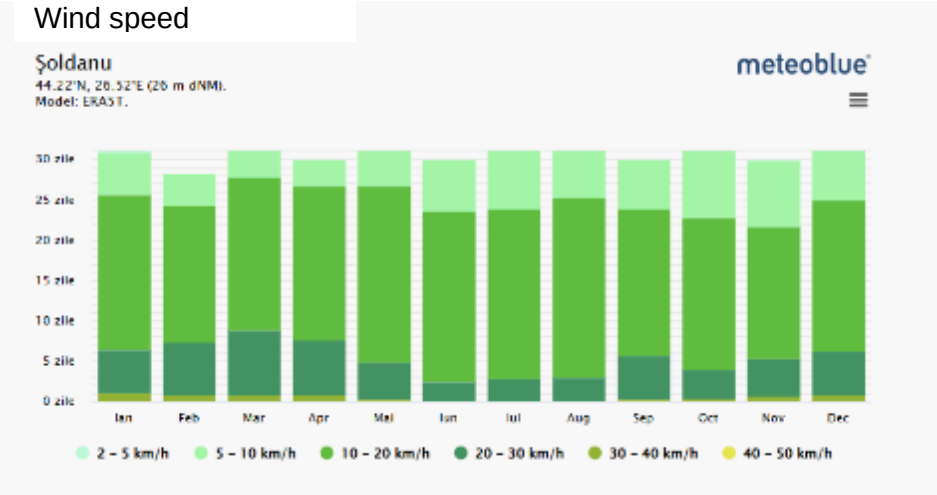
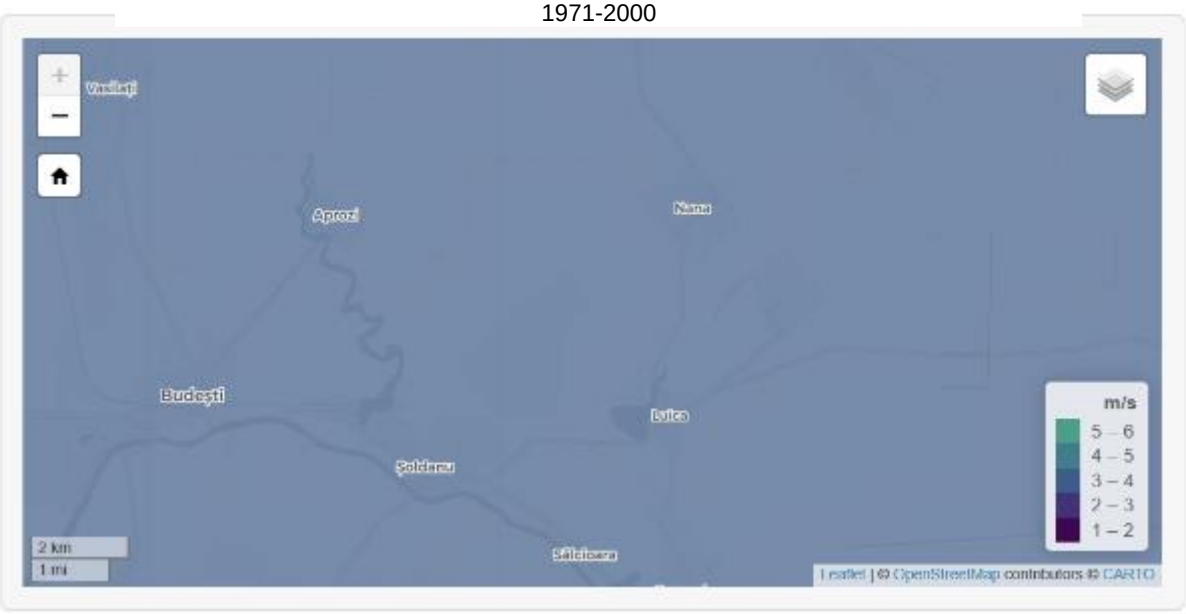



*Figure No. 109- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.7 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000




In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.3 | 3.2 | 4.4 | 2071 | -0.4 | 0.7 | -0.5 | 3.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Șoldanu - County of Călărași) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.5 | 2.5 | 4.9 | 2100 | -0.2 | 1.2 | -1.2 | 3.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

# 5 Giurgiu County

## *5.1 Adunații Copăceni*

### 5.1.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

Average temperature and precipitation

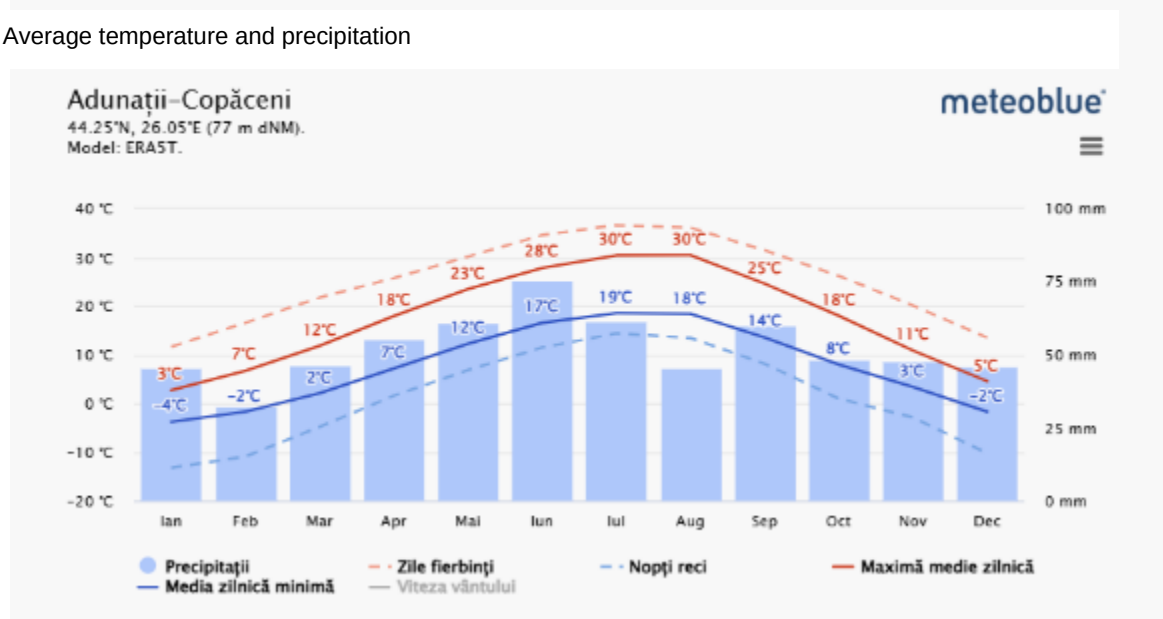



*Figure No. 110* ***- Average value of extreme temperatures over the last 30 years at the weather station***[21]

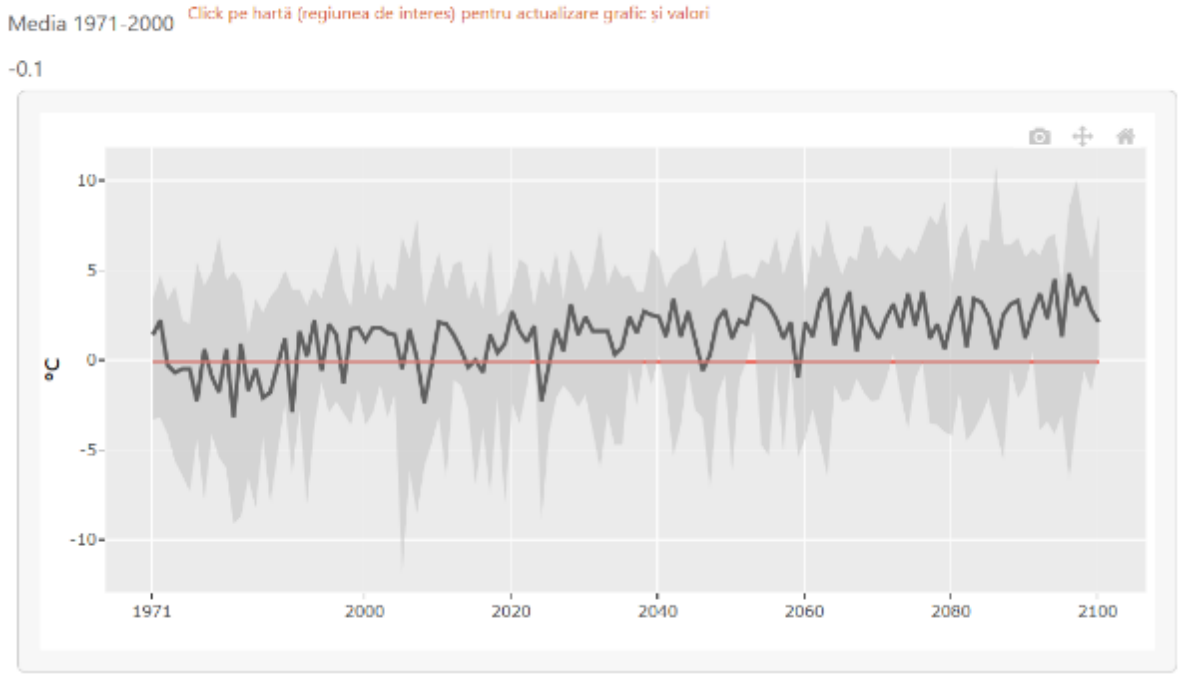
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 111 - Average temperature at TAU level (period 1971 -2000)*

[21] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.1.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 104.1 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.1

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.8 | 67.6 | 128.1 | 2071 | -11.3 | 24 | -36.5 | 104.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.1

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.3 | 59.1 | 136.2 | 2100 | 4.2 | 32.1 | 45 | 104.1 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.8 W/mp, and at the level of year 2100 it is estimated at 108.3 W/mp, which is higher than the multiannual average value of 104.1 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.1.3 Heavy rainfall

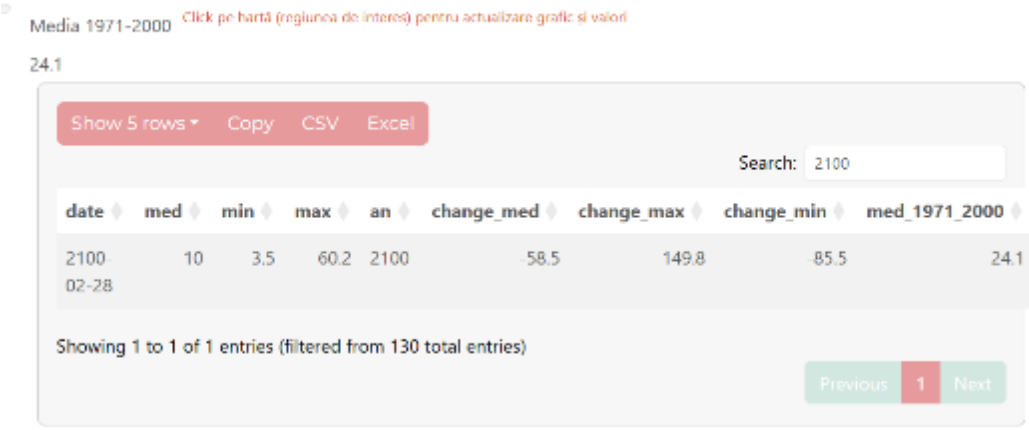
Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 42 mm, and by 2100 it will reach 10.0 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.1.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

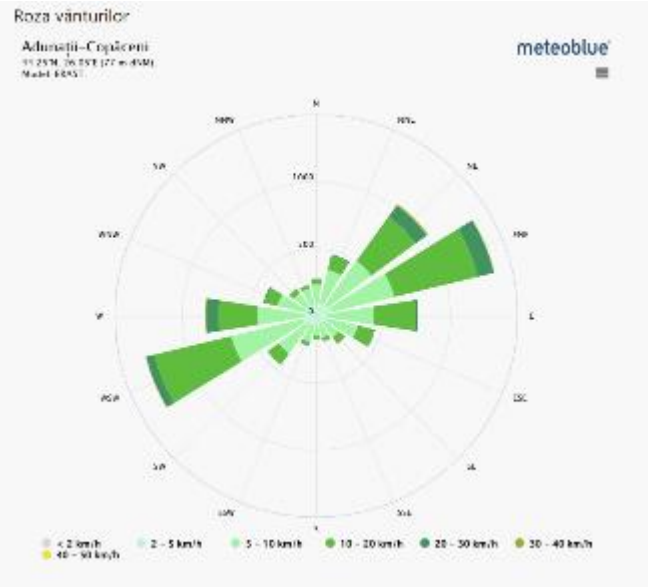



*Figure No. 112- Wind rose*

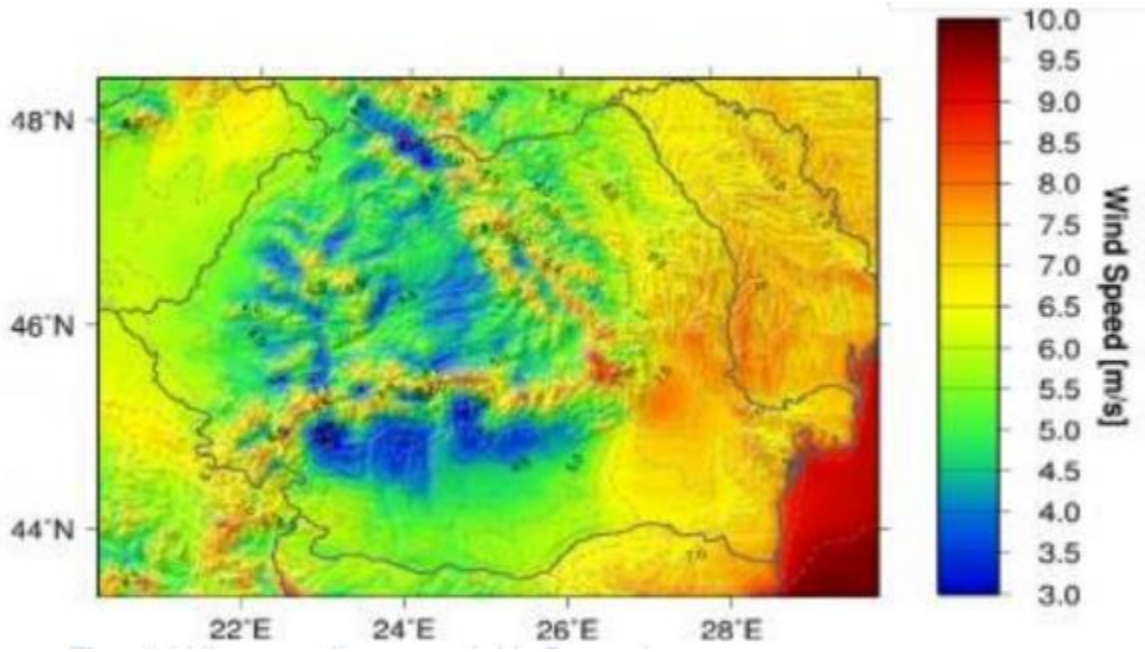



*Figure No. 113- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

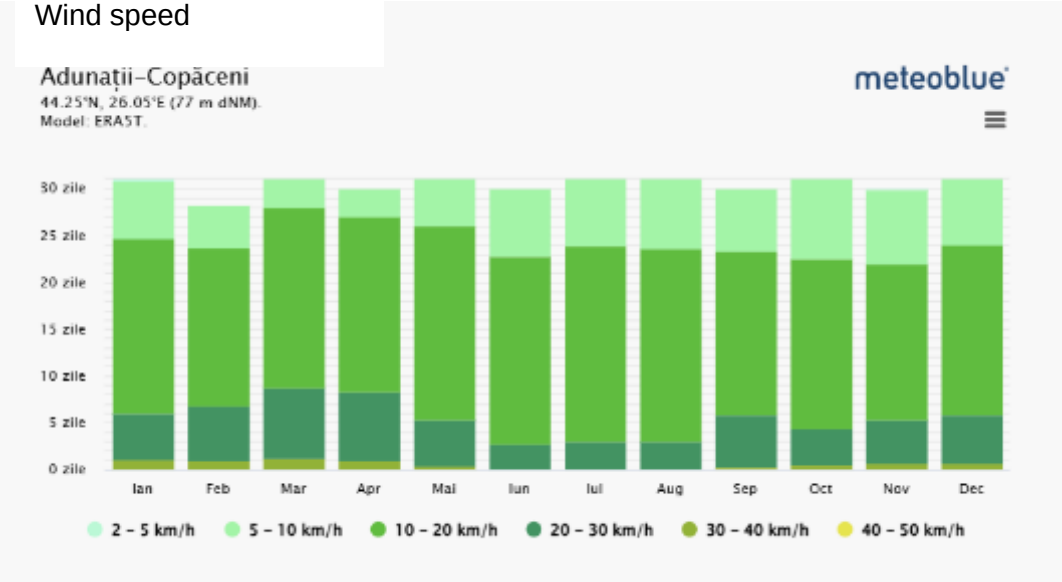



*Figure No. 114- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000


Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3 | 4.3 | 2071 | -0.3 | 0.8 | -0.5 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Adunați-Copăceni - County of Giurgiu) - reference period 1971-2000


Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.3 | 2.6 | 4.8 | 2100 | -0.2 | 1.3 | -0.9 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.2 Colibași*

### 5.2.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

Average temperatures and precipitation

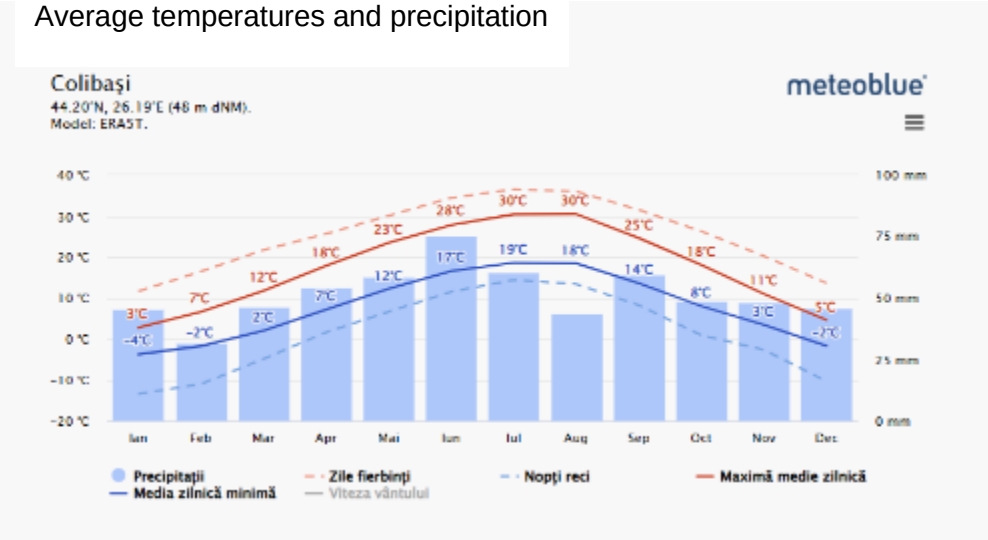



*Figure No. 115* ***- Average value of extreme temperatures over the last 30 years at the weather station[22]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

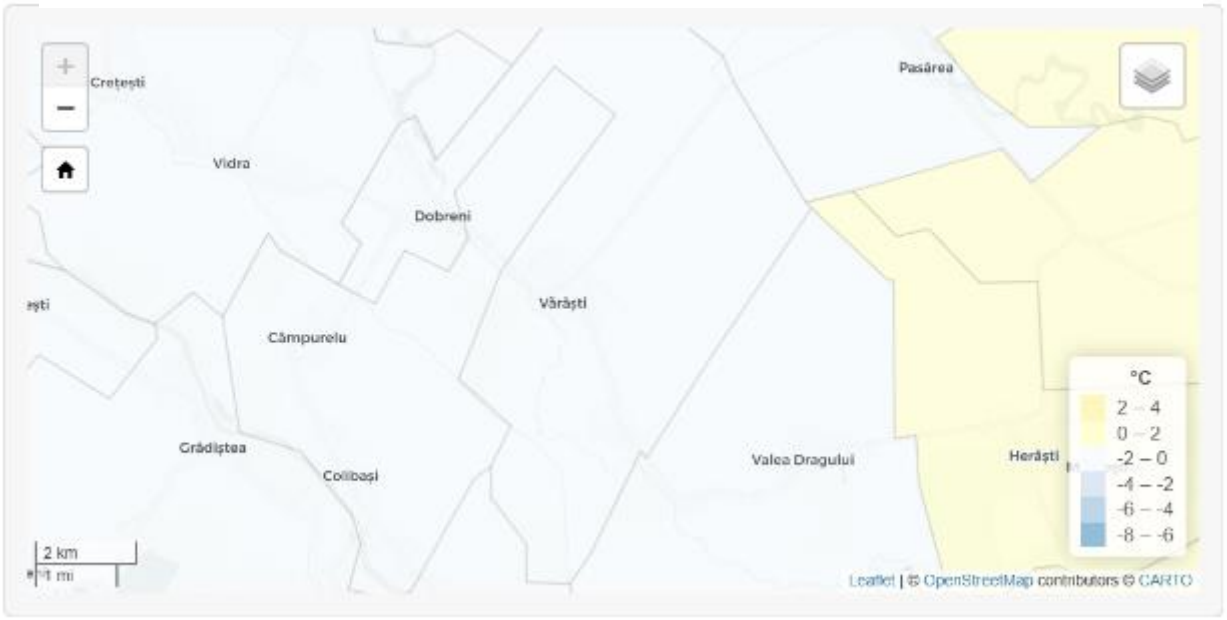
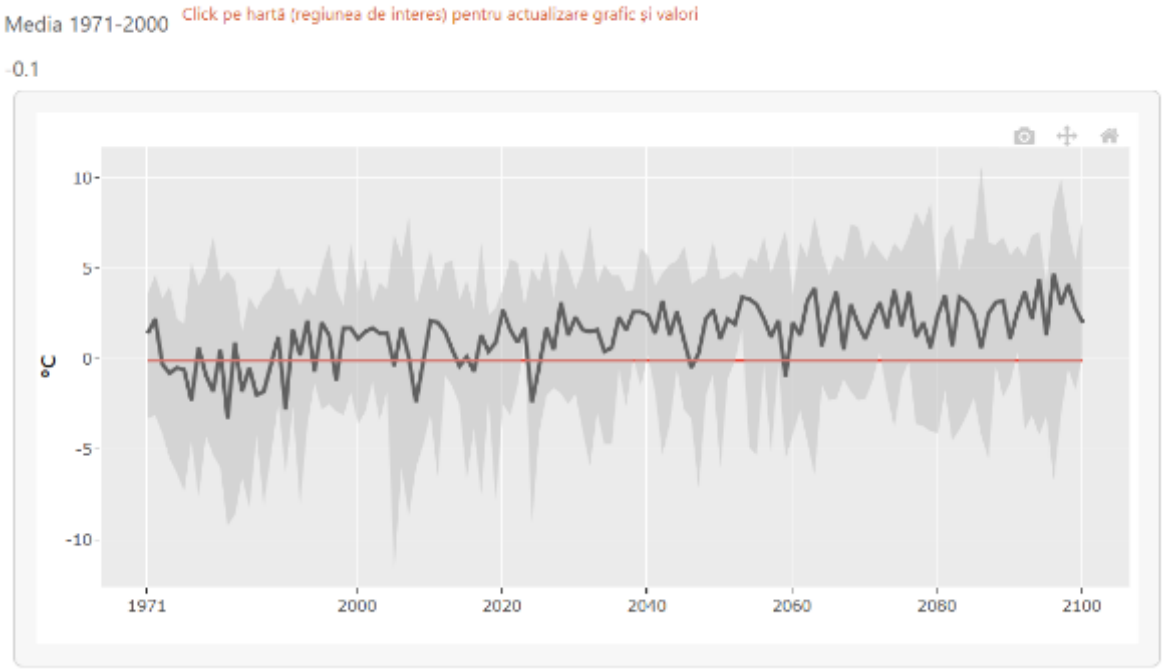



*Figure No. 116 - Average temperature at TAU level (period 1971 -2000)*

[22] Source: *www.meteoblue.com*

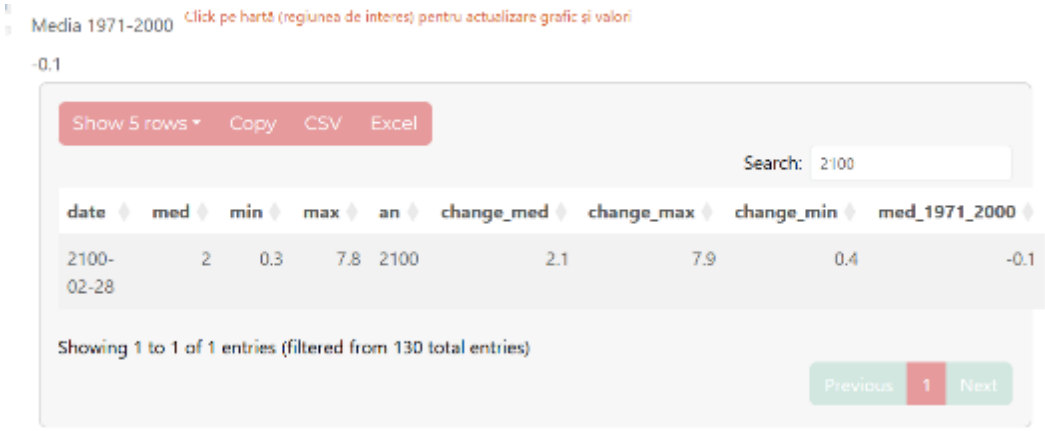
Average temperature in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000



According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.2.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.7 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic si valori

103.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 91.9 | 67.4 | 129.7 | 2071 | -11.8 | 26 | 36.3 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.6 | 58.7 | 136.2 | 2100 | 4.9 | 32.5 | -45 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 91.9 W/mp, and at the level of year 2100 it is estimated at 108.6 W/mp, which is higher than the multiannual average value of 103.7 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.2.3 Heavy rainfall

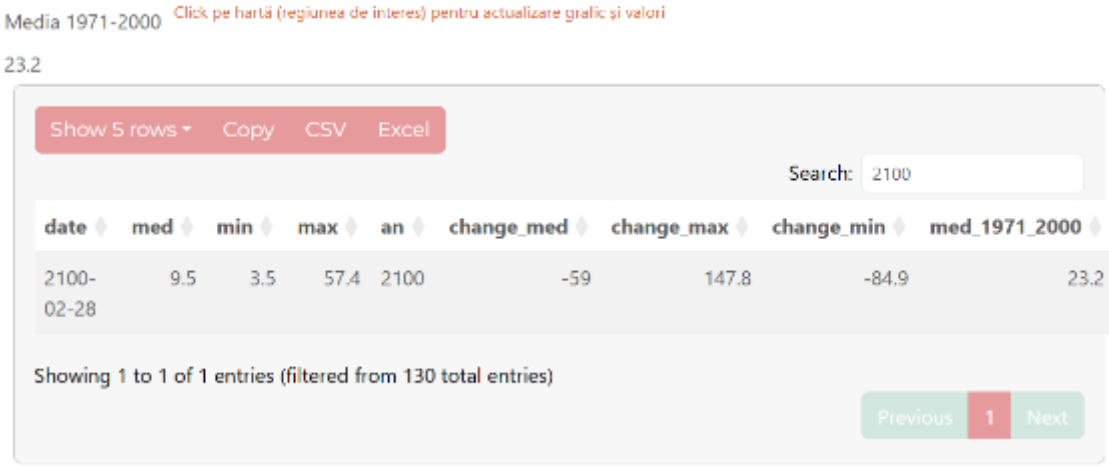
Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.2 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 37.5 mm, and by 2100 it will reach 9.5 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.2.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

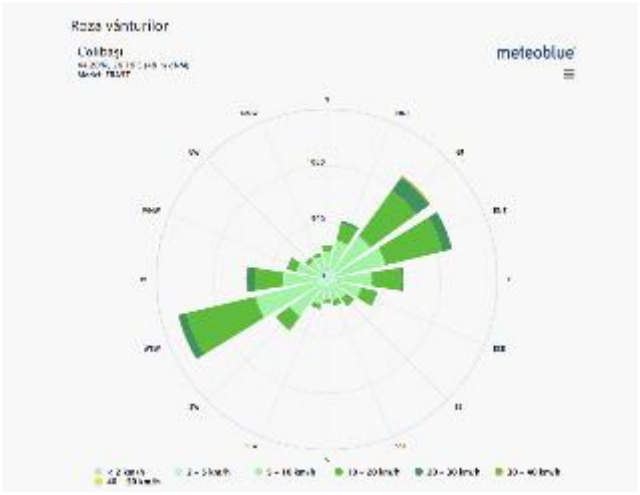



*Figure No. 117- Wind rose*

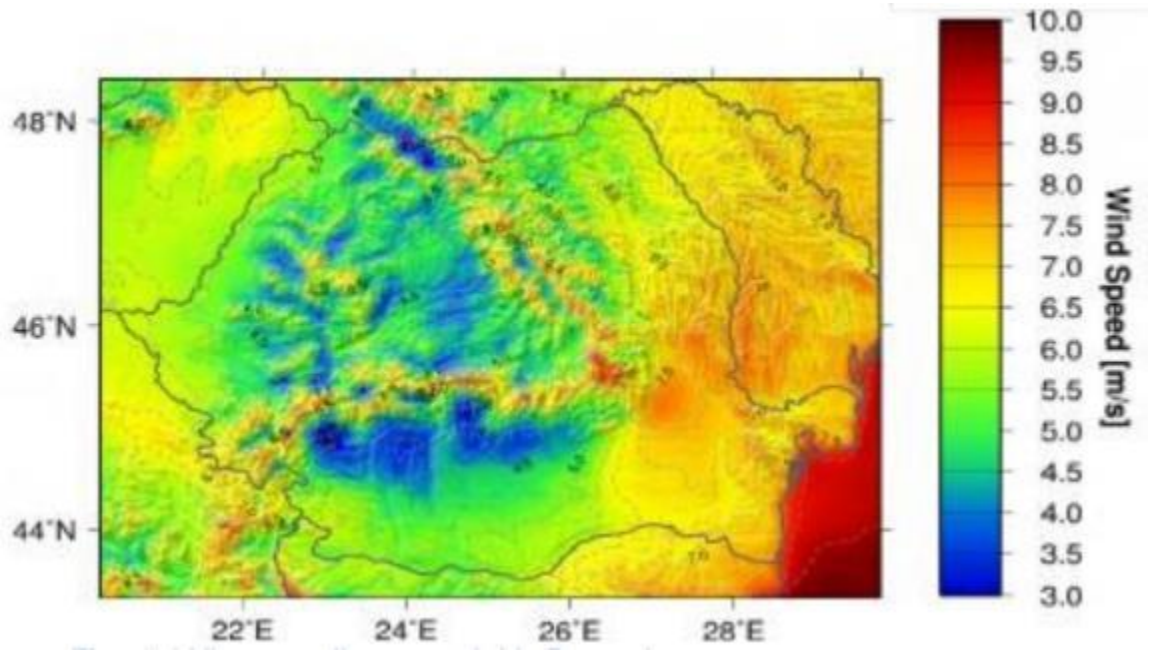



*Figure No. 118- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

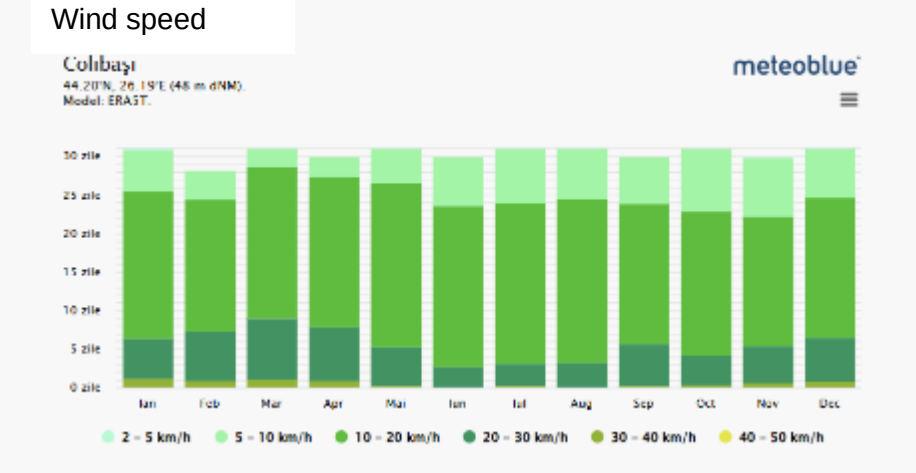



*Figure No. 119- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


Average wind speed in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.3 Comana*

### 5.3.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

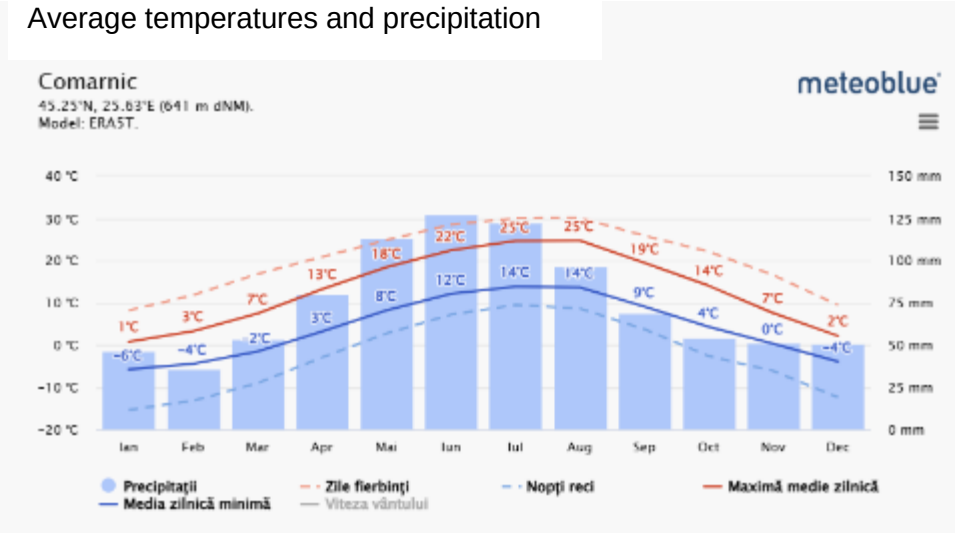



*Figure No. 120* ***- Average value of extreme temperatures over the last 30 years at the weather station***[23]

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

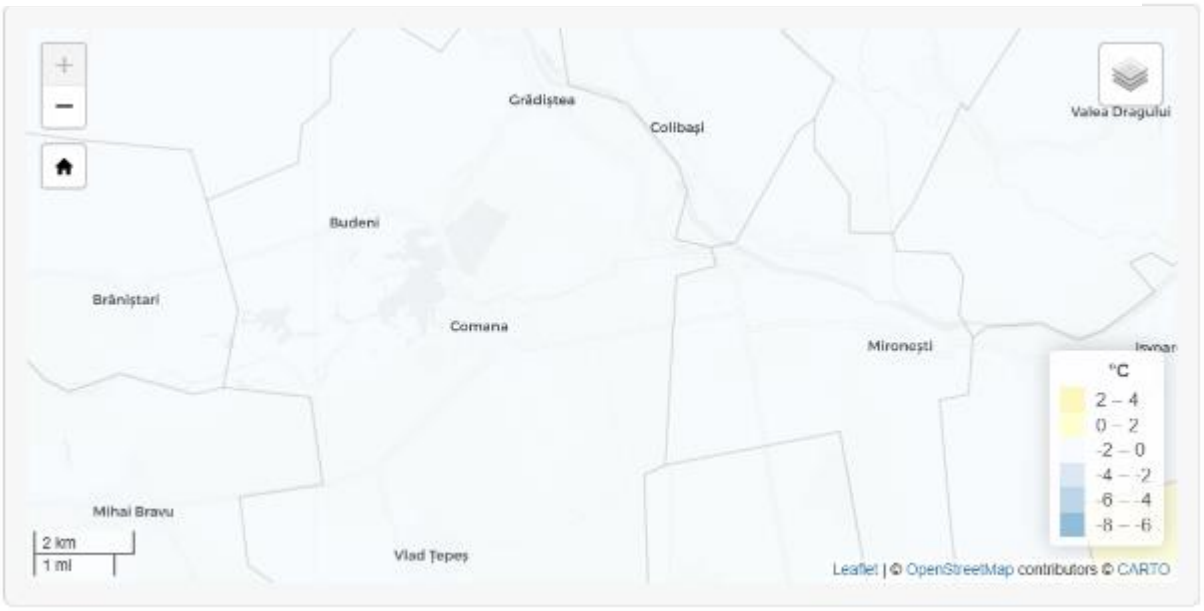
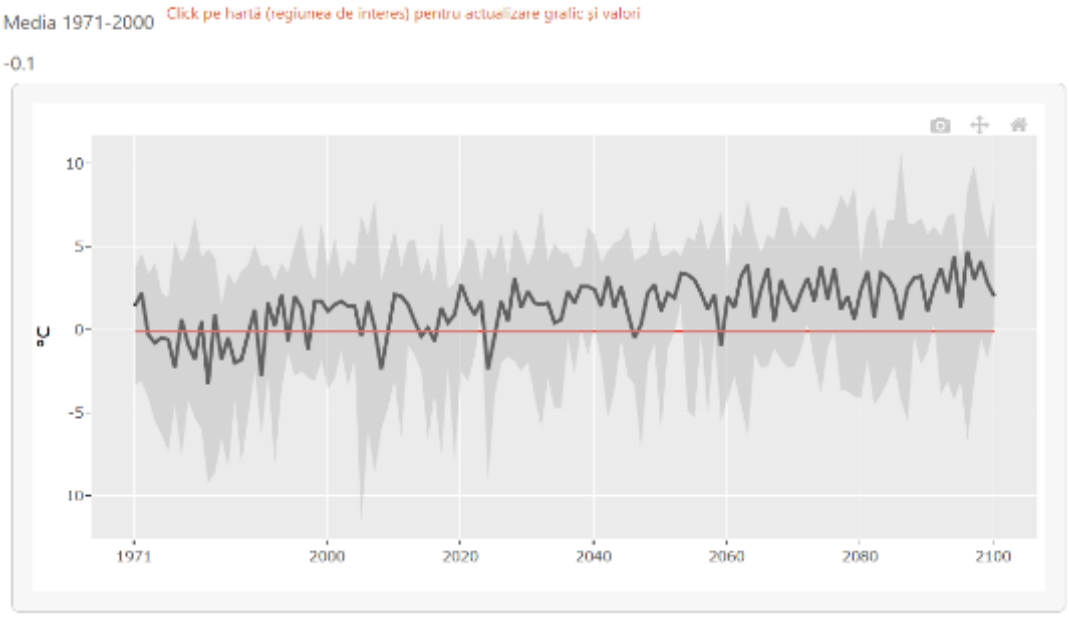



*Figure No. 121 - Average temperature at TAU level (period 1971 -2000)*

[23] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.3.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.7 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000

Media 1971 2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 91.9 | 67.4 | 129.7 | 2071 | -11.8 | 26 | -36.3 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.6 | 58.7 | 136.2 | 2100 | 4.9 | 32.5 | -45 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 91.9 W/mp, and at the level of year 2100 it is estimated at 108.6 W/mp, which is higher than the multiannual average value of 103.7 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.3.3 Heavy rainfall

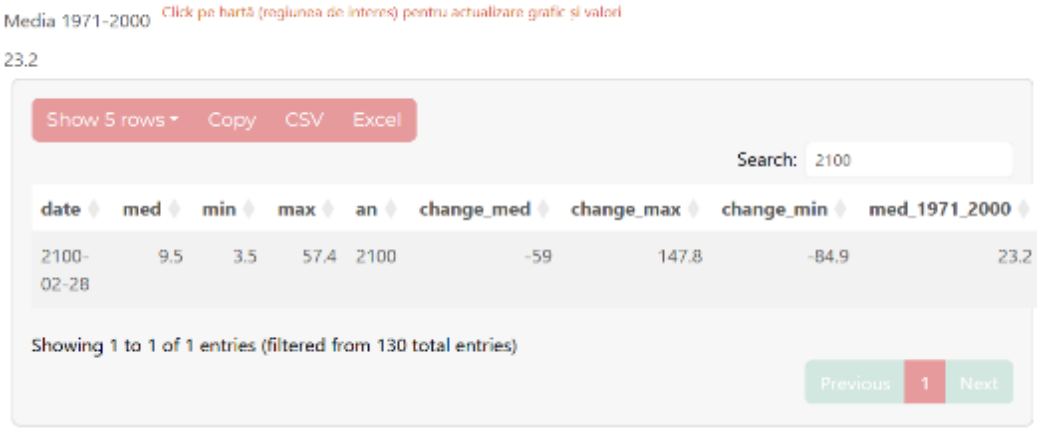
Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.2 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 37.5 mm, and by 2100 it will reach 9.5 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.3.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

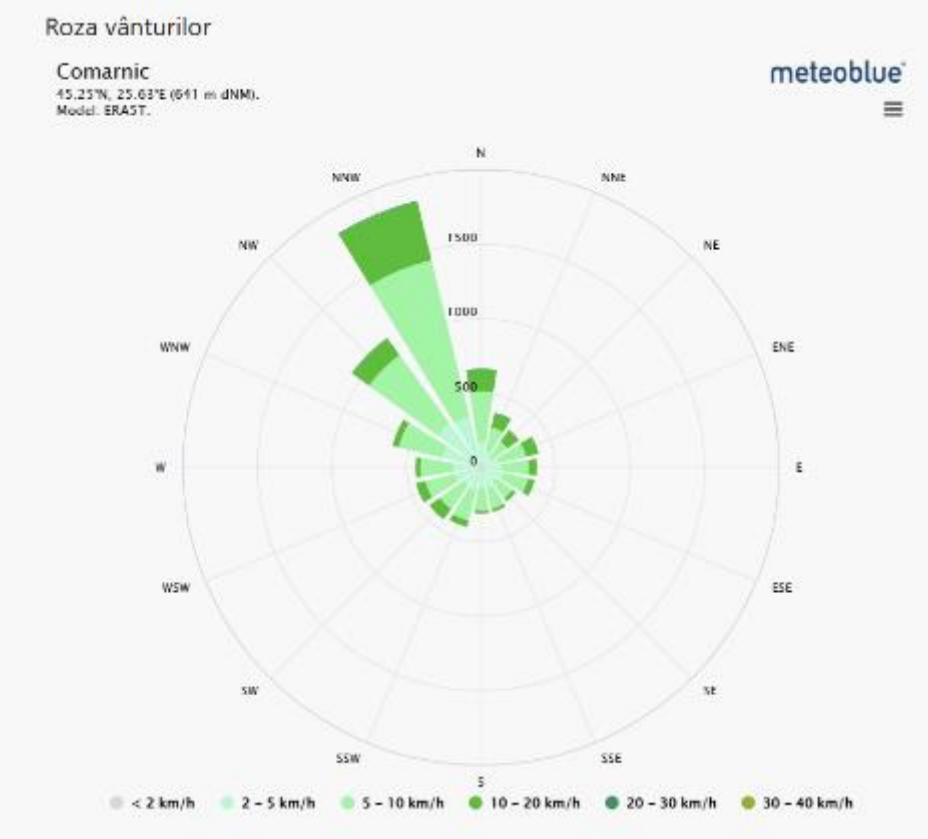



*Figure No. 122- Wind rose*

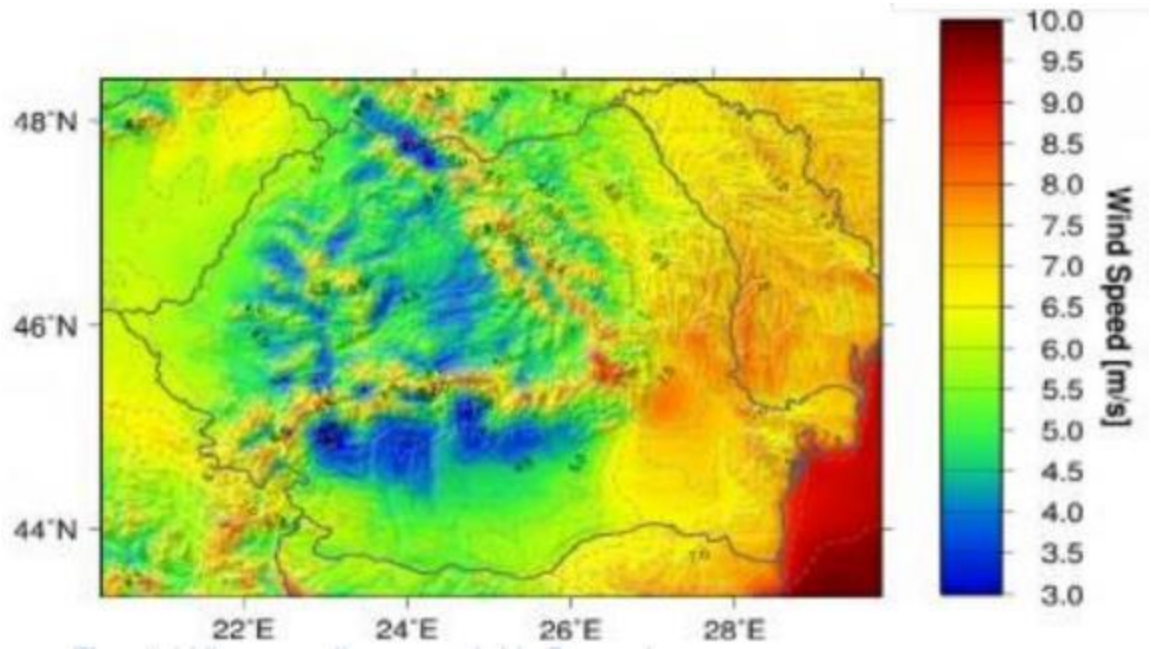



*Figure No. 123- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

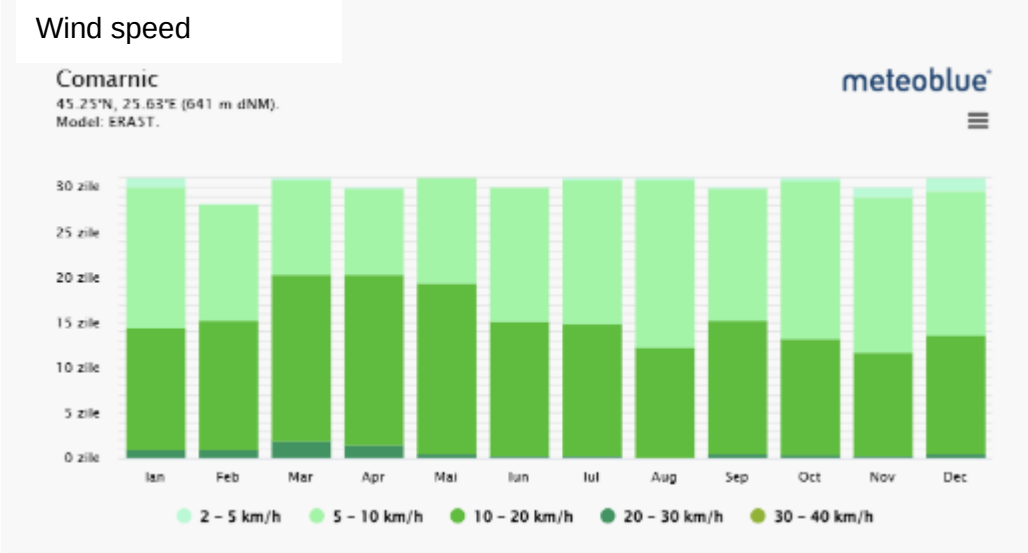



*Figure No. 124- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


Average wind speed in February - RCP45 Scenario (Colibași - County of Giurgiu) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.4 Goștinari*

### 5.4.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

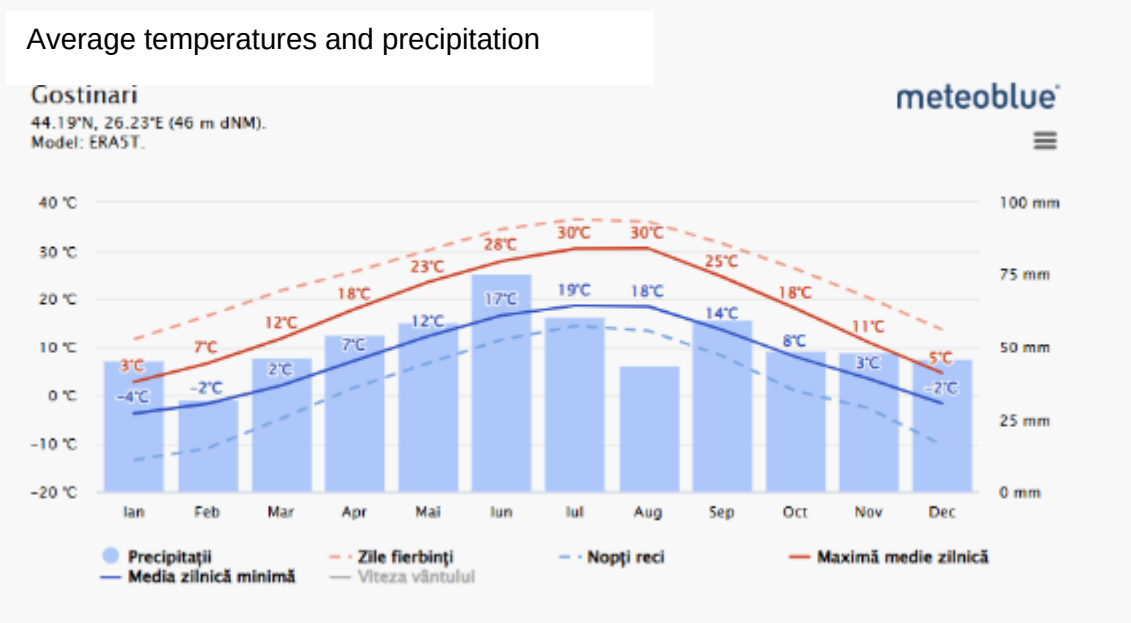



*Figure No. 125* ***- Average value of extreme temperatures over the last 30 years at the weather station[24]***

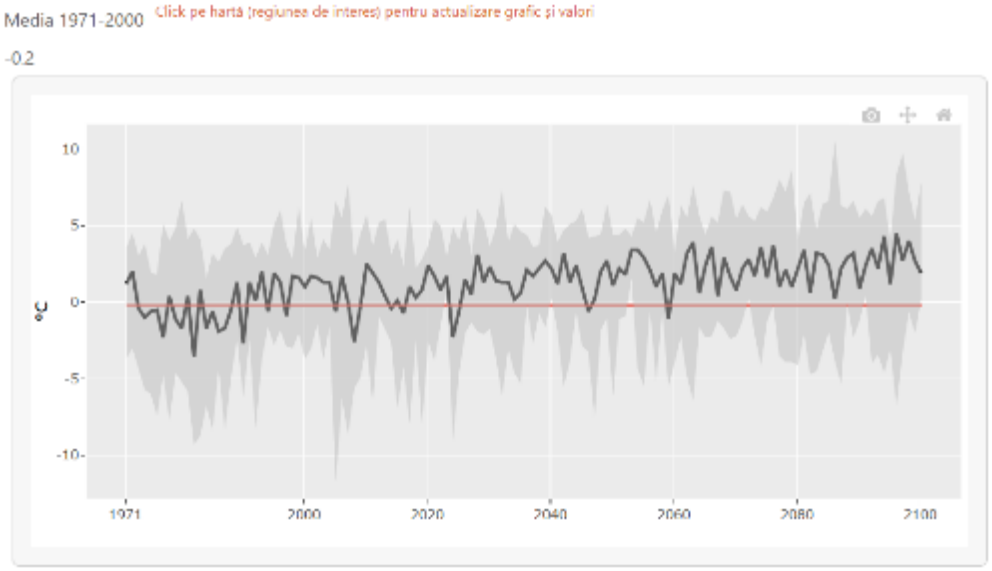
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.2 ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 126 - Average temperature at TAU level (period 1971 -2000)*

[24] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Gostinari - County of Giurgiu) -


Average temperature in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.4.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.7 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000

Media 1971-2000

103.7

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 91 | 66.8 | 130.7 | 2071 | -12.7 | 27 | -36.9 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000

103.7

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 109.1 | 58.5 | 136.4 | 2100 | 5.4 | 32.7 | -45.2 | 103.7 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

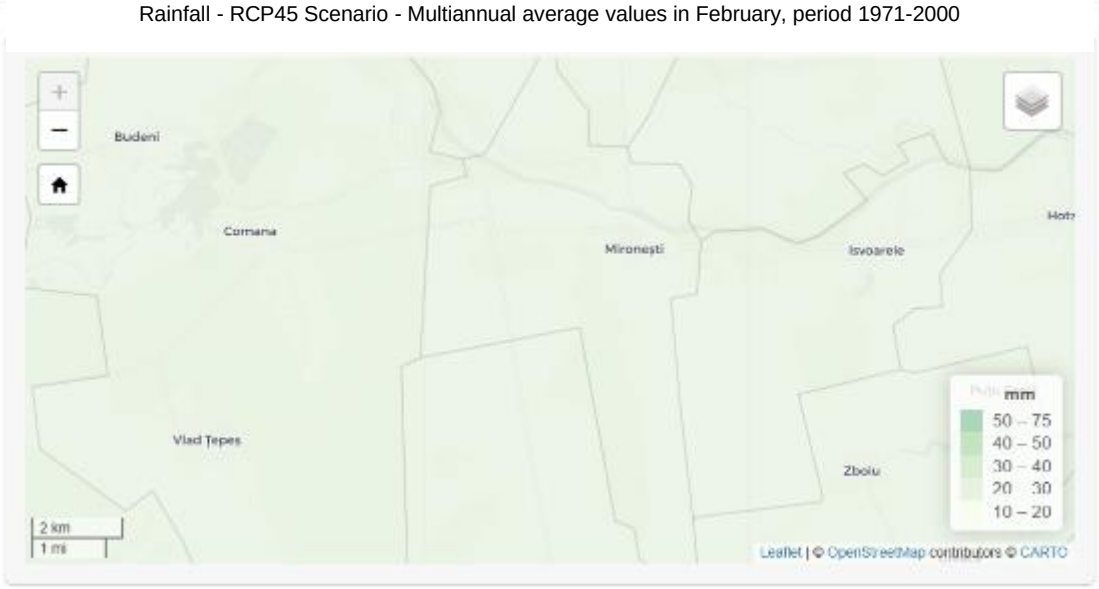
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 91 W/mp, and at the level of year 2100 it is estimated at 109.1 W/mp, which is higher than the multiannual average value of 103.7 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.4.3 Heavy rainfall

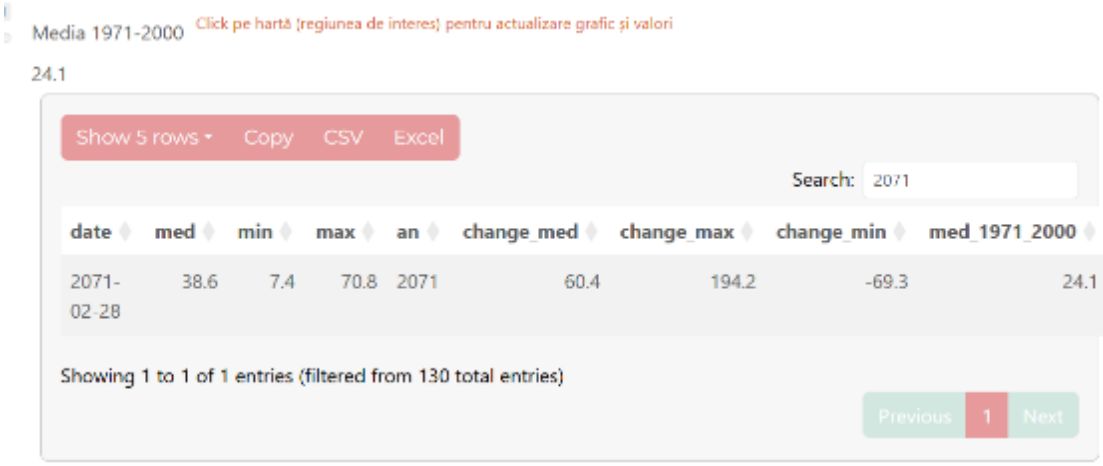
Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 38.6 mm, and by 2100 it will reach 12.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

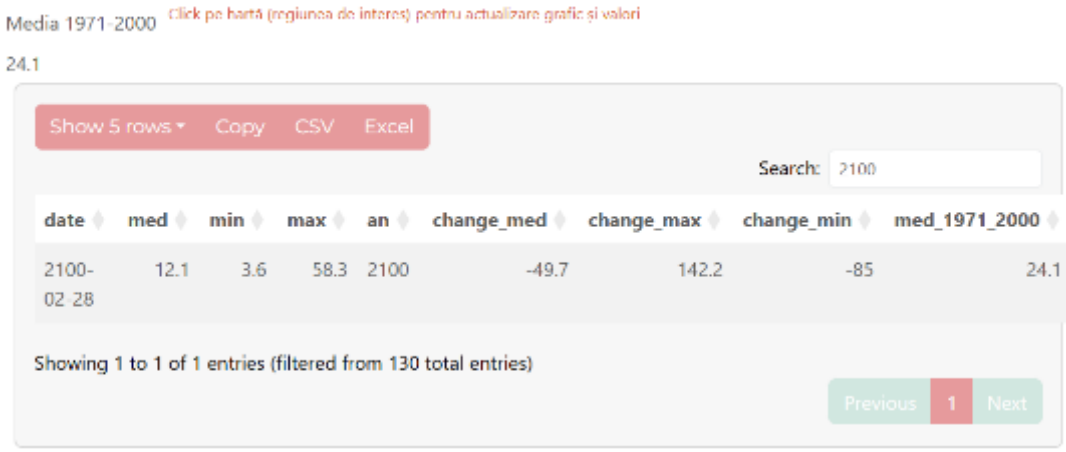
Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000




Rainfall in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.4.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

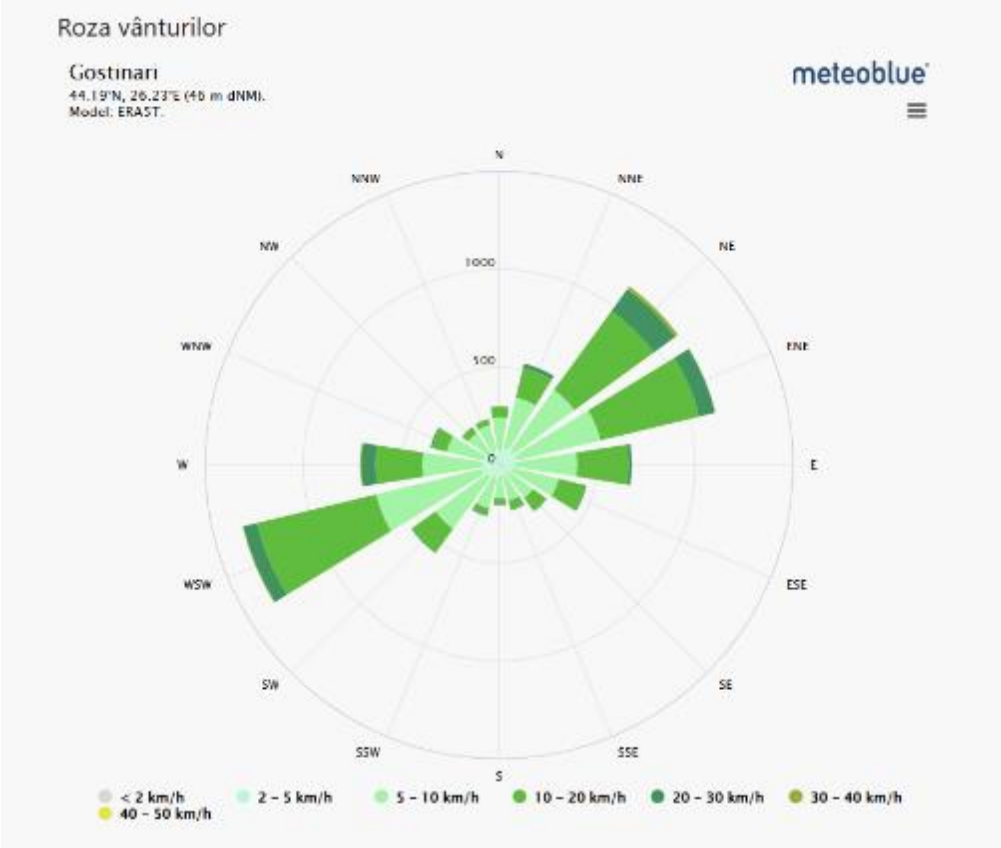



*Figure No. 127- Wind rose*

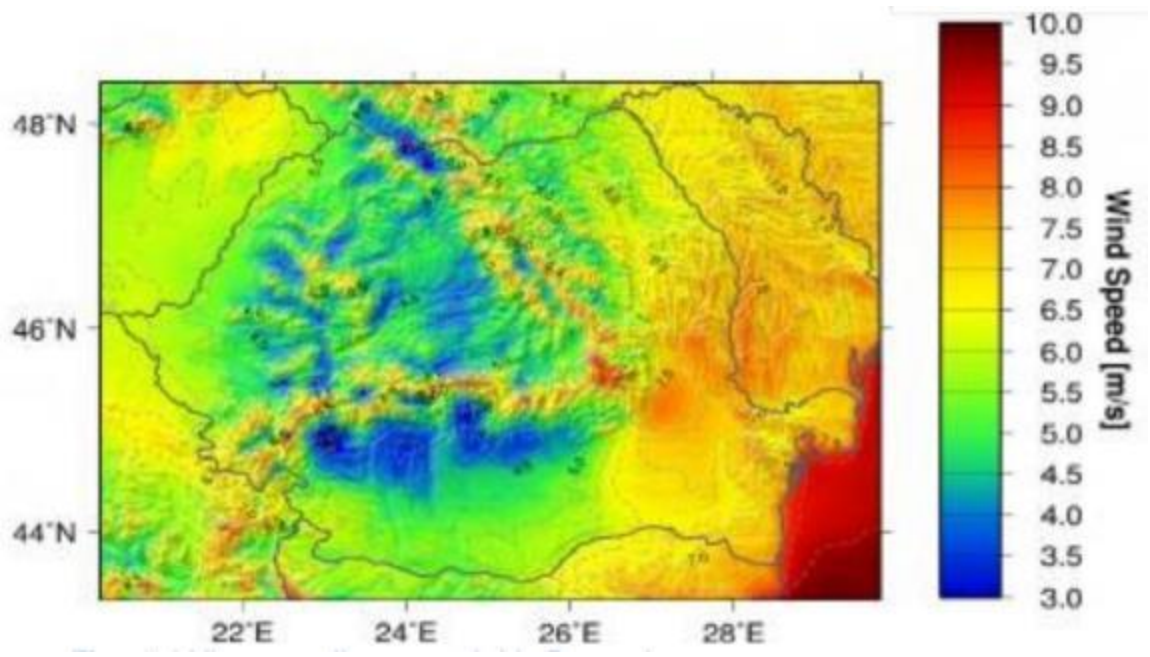



*Figure No. 128- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

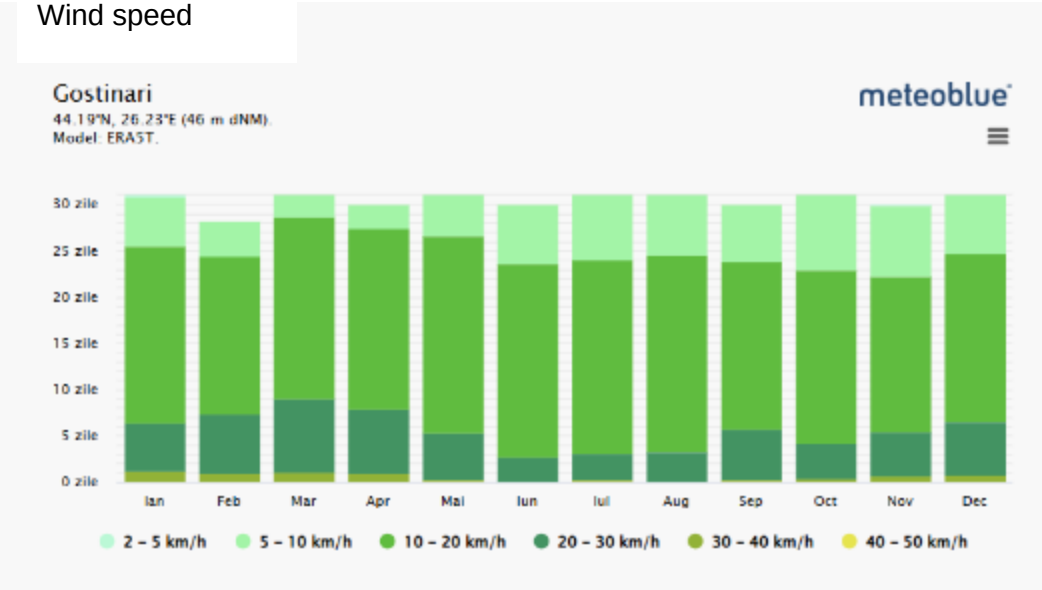


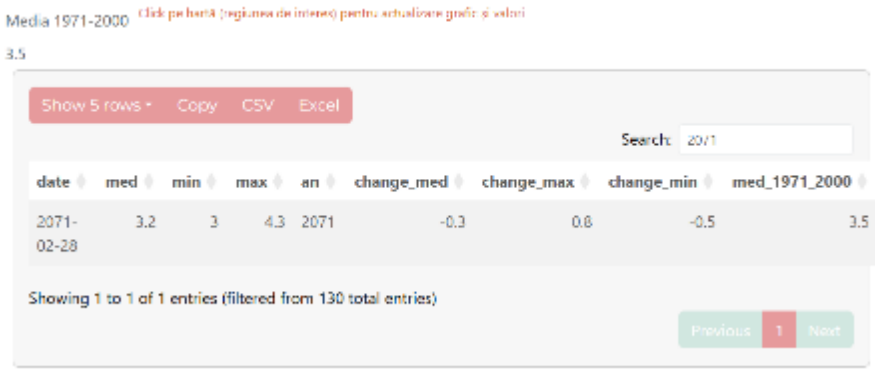

*Figure No. 129- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000




Average wind speed in February - RCP45 Scenario (Gostinari - County of Giurgiu) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.5 Isvoarele*

### 5.5.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

Average temperatures and precipitation

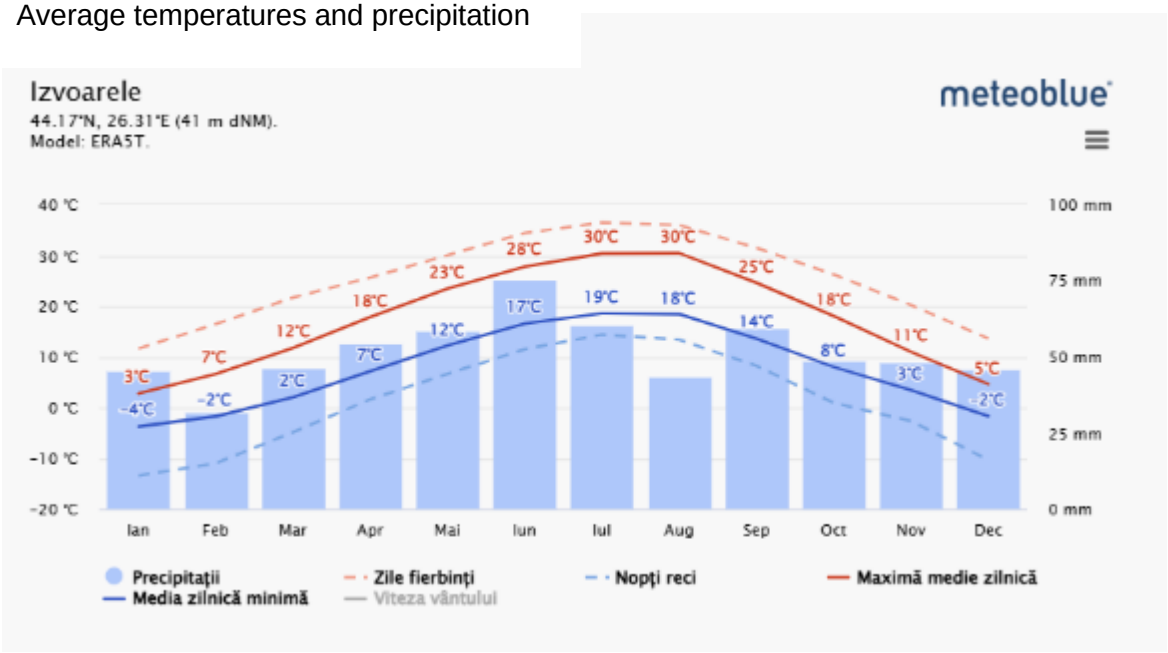



*Figure No. 130* ***- Average value of extreme temperatures over the last 30 years at the weather station***[25]

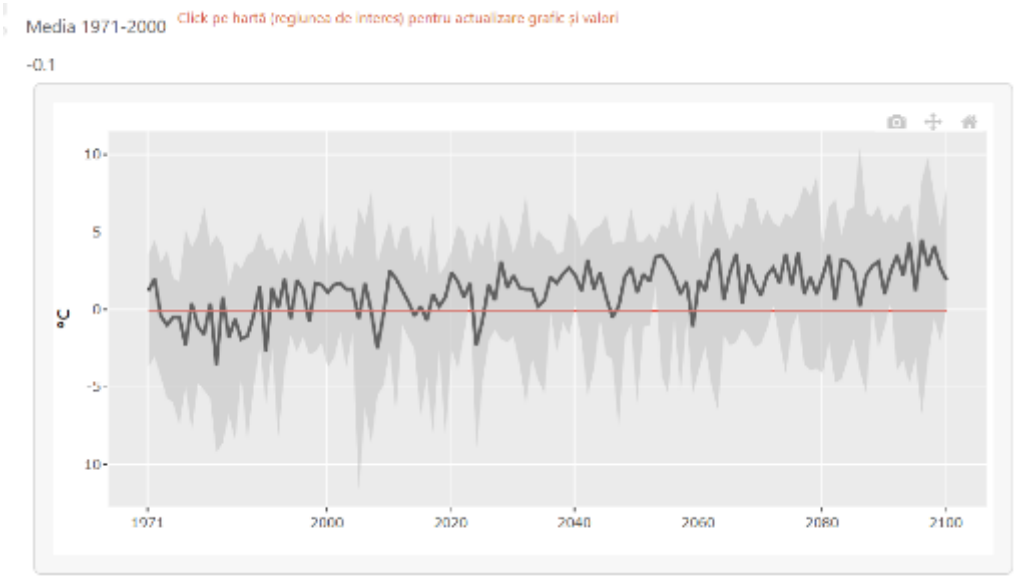
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 131 - Average temperature at TAU level (period 1971 -2000)*

[25] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.5.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.6 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 91.5 | 66.8 | 131.4 | 2071 | -12.1 | 27.8 | -36.8 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 109 | 58.5 | 136.3 | 2100 | 5.4 | 32.7 | -45.1 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 91.5 W/mp, and at the level of year 2100 it is estimated at 109.0 W/mp, which is higher than the multiannual average value of 103.6 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.5.3 Heavy rainfall

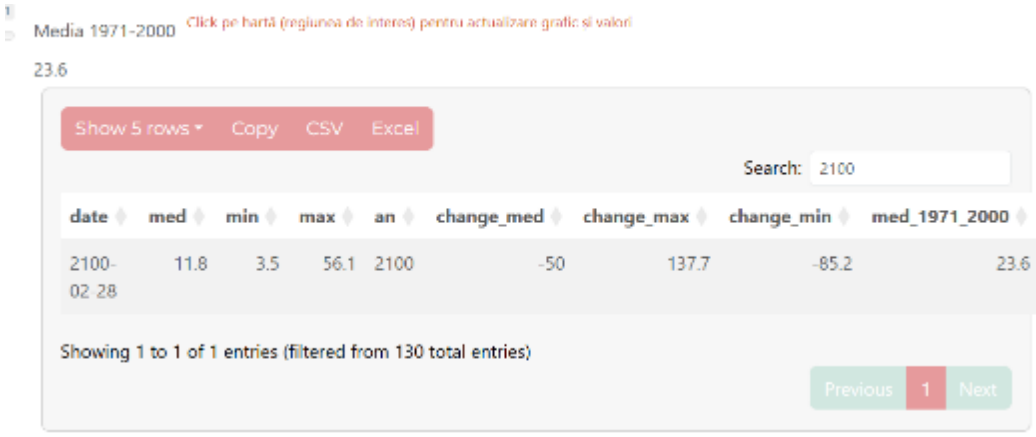
Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.6 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 m, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.5.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

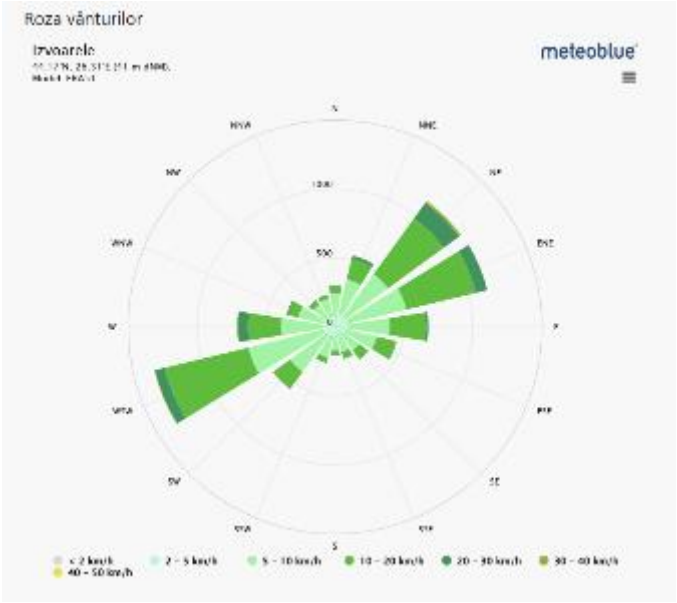



*Figure No. 132- Wind rose*

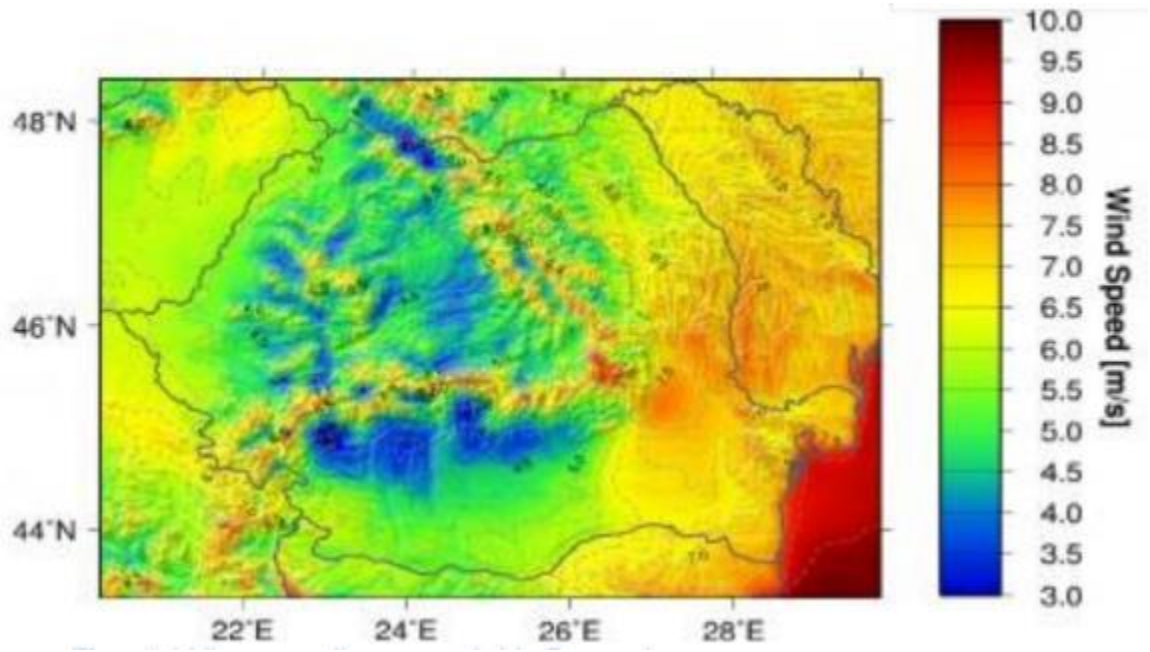



*Figure No. 133- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

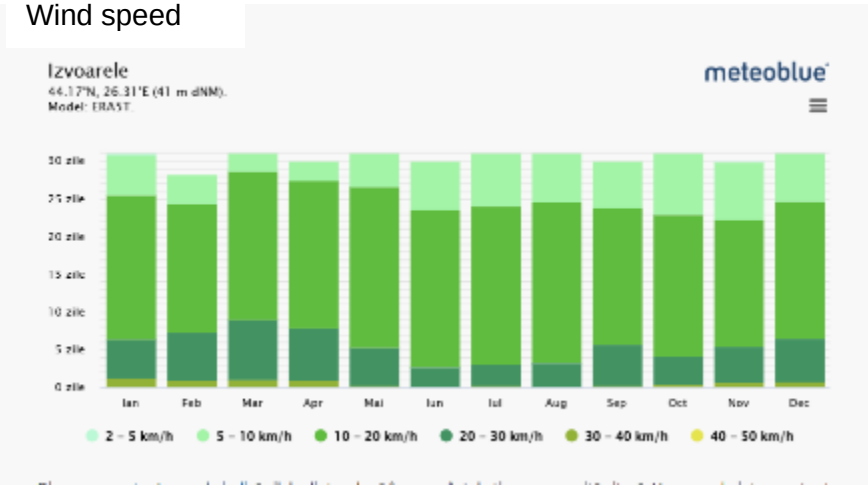



*Figure No. 134- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.4 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3 | 4.4 | 2071 | -0.3 | 0.9 | 0.5 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Isvoarele - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.4 | 2.4 | 4.9 | 2100 | -0.1 | 1.4 | -1.1 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.6 Herăști*

### 5.6.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

Average temperatures and precipitation

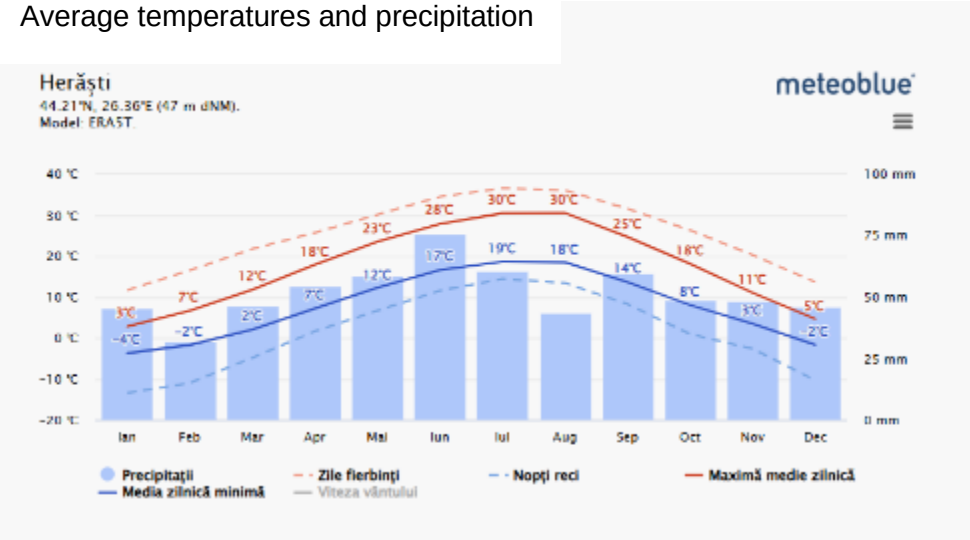



*Figure No. 135* ***- Average value of extreme temperatures over the last 30 years at the weather station[26]***

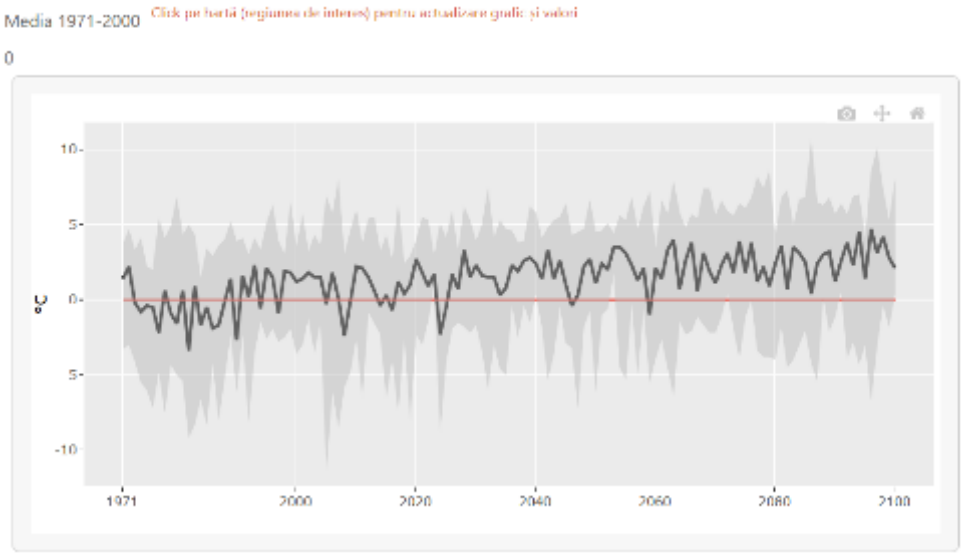
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 136 - Average temperature at TAU level (period 1971 -2000)*

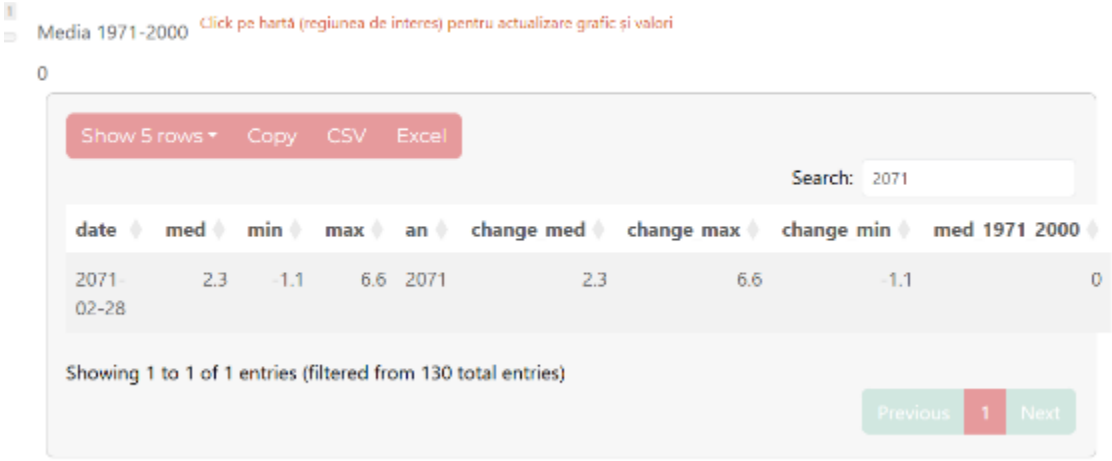
[26] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000




Average temperature in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.6.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.6 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.4 | 67.5 | 129.7 | 2071 | -11.2 | 26.1 | -36.1 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.4 | 59.2 | 136.1 | 2100 | 4.8 | 32.5 | -44.4 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.4 W/mp, and at the level of year 2100 it is estimated at 108.4 W/mp, which is higher than the multiannual average value of 103.6 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

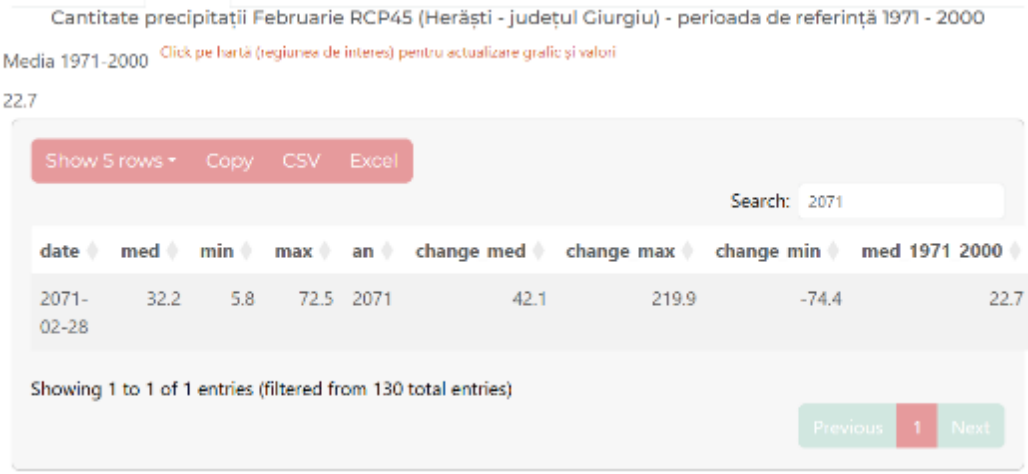
### 5.6.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 22.7 mm, as shown in the figure below.

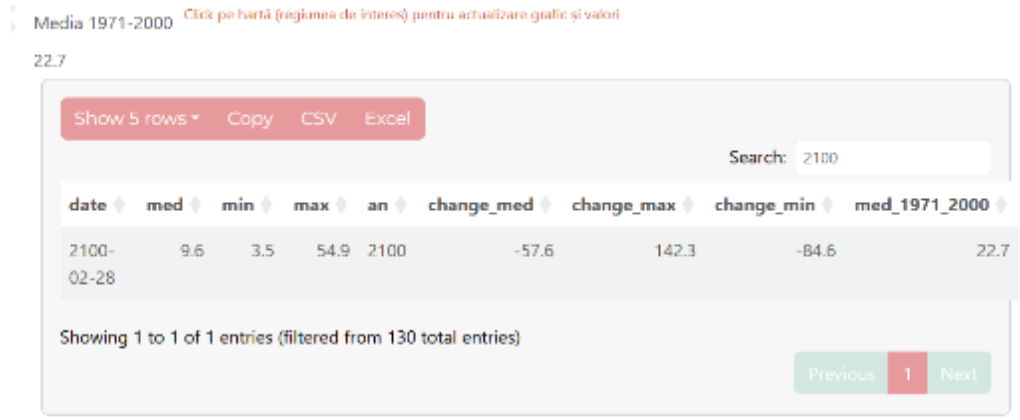
According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 32.2 mm, and by 2100 it will reach 9.6 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000


Rainfall in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000




Rainfall in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000




From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.6.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

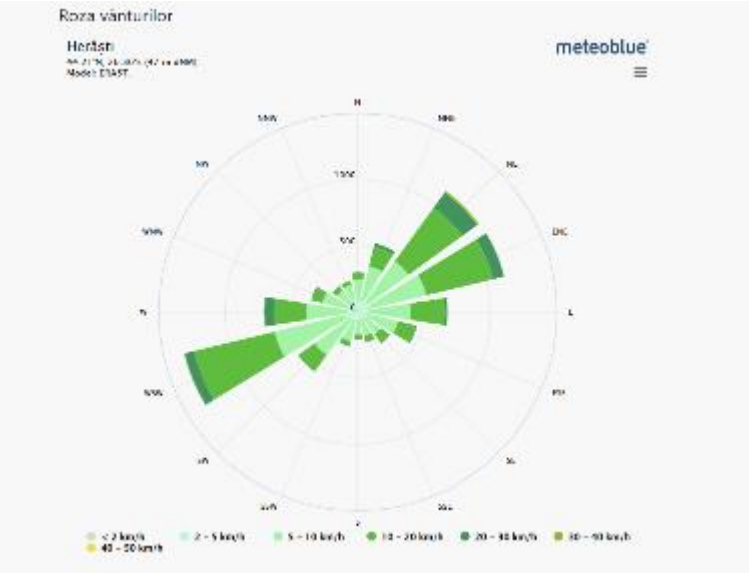



*Figure No. 137- Wind rose*

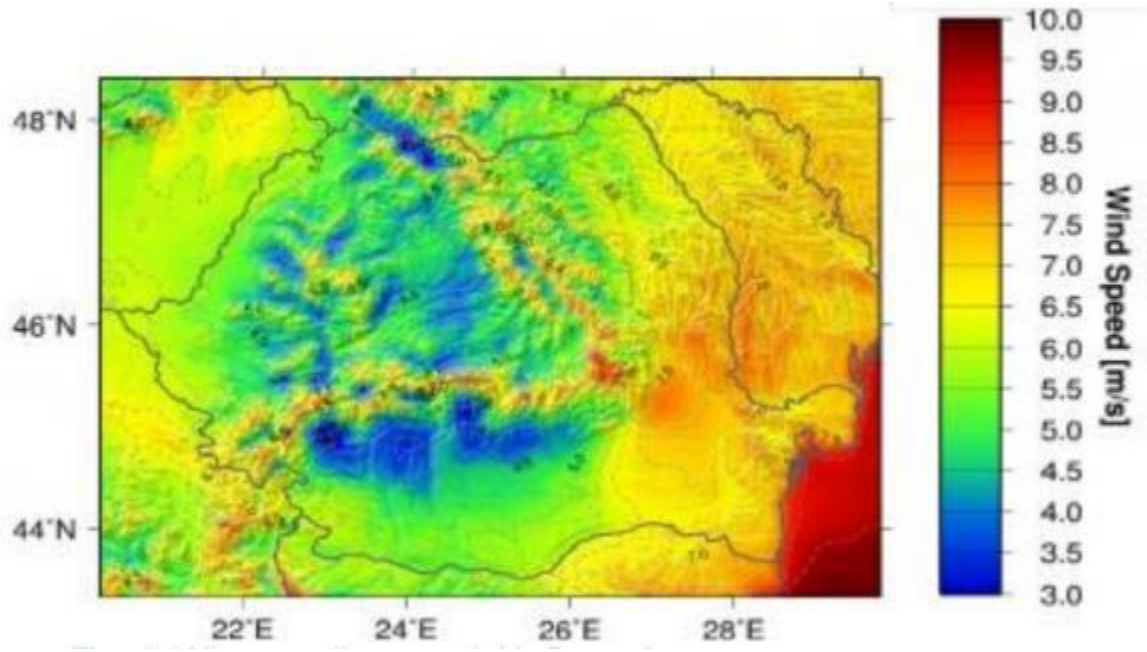



*Figure No. 138- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

Wind speed

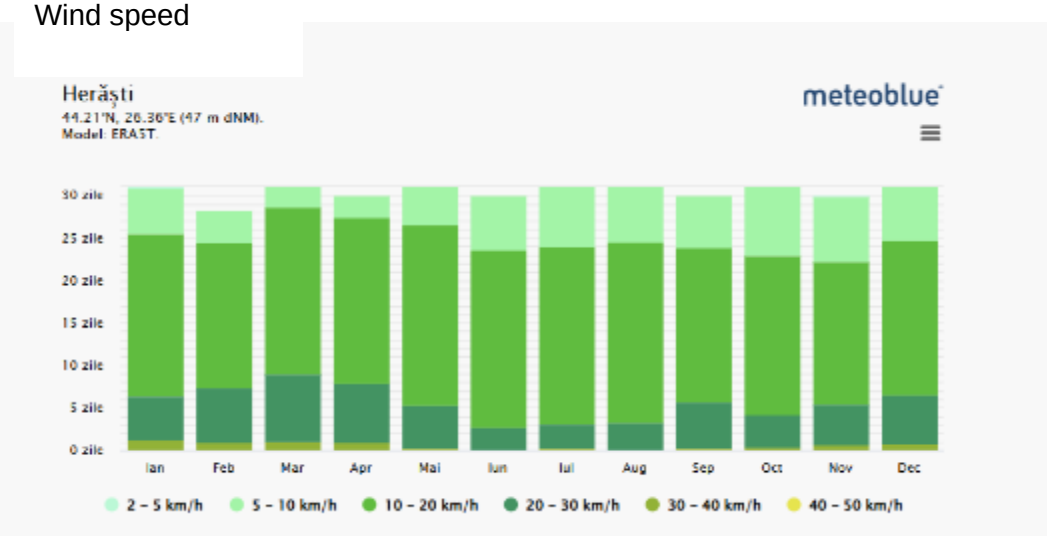



*Figure No. 139- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe harta (regiunea de interes) pentru actualizare grafic si valori

3.5

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3 | 4.3 | 2071 | -0.3 | 0.8 | -0.5 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Herăști - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.3 | 2.5 | 4.8 | 2100 | 0.2 | 1.3 | 1 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.7 Hotarele*

### 5.7.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

Average temperatures and precipitation

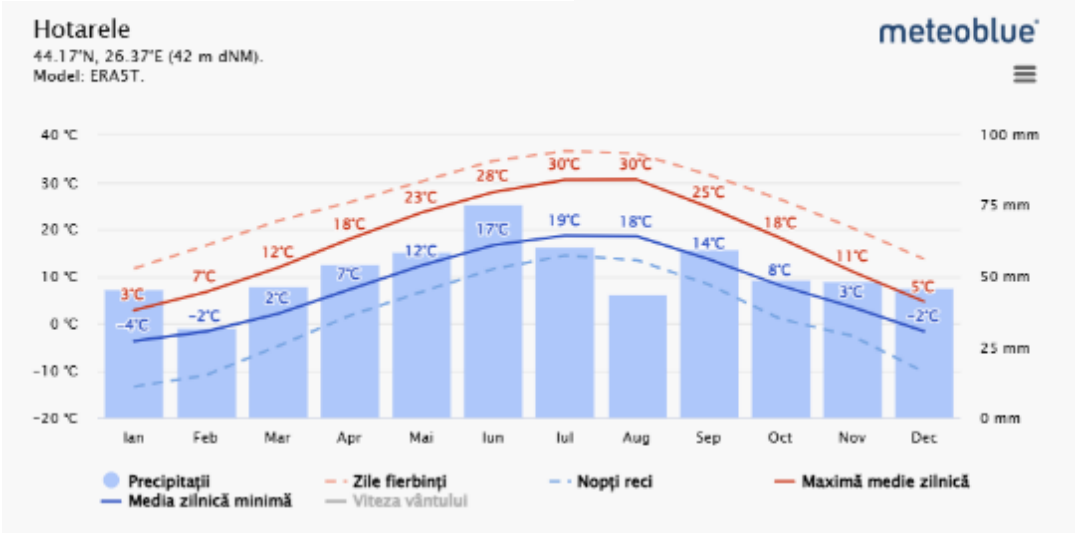



*Figure No. 140* ***- Average value of extreme temperatures over the last 30 years at the weather station[27]***

Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is 0ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000

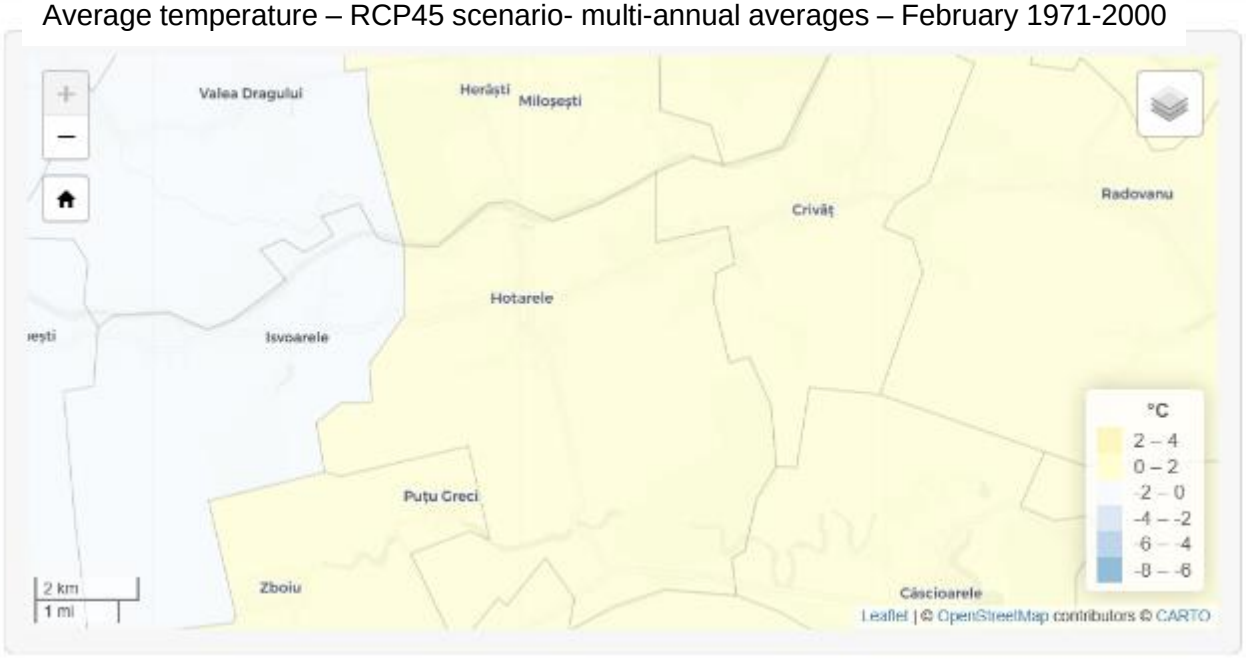
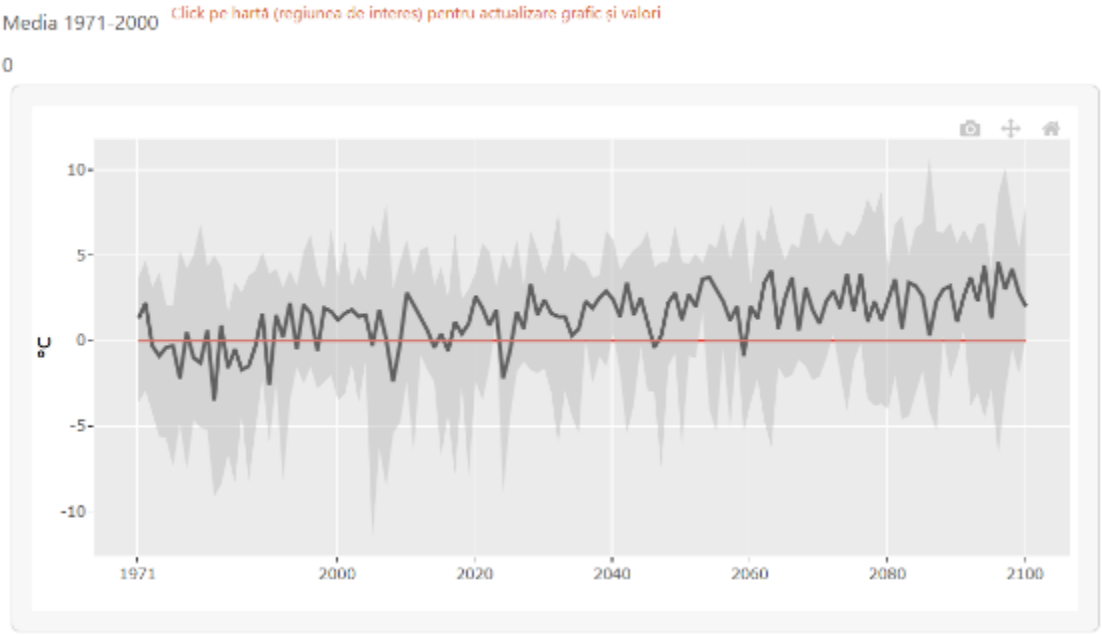



*Figure No. 141 - Average temperature at TAU level (period 1971 -2000)*

[27] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000


According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

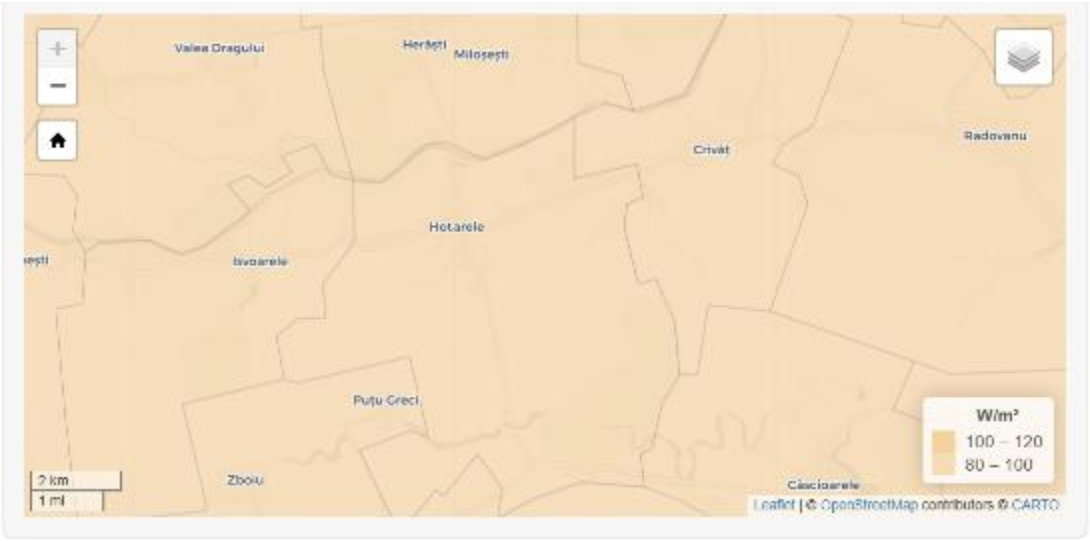
### 5.7.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.5 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000




Global solar radiation in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.5

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 92.1 | 67.2 | 131.5 | 2071 | -11.4 | 28 | -36.3 | 103.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.7 | 58.1 | 136.2 | 2100 | 5.2 | 32.7 | -45.4 | 103.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

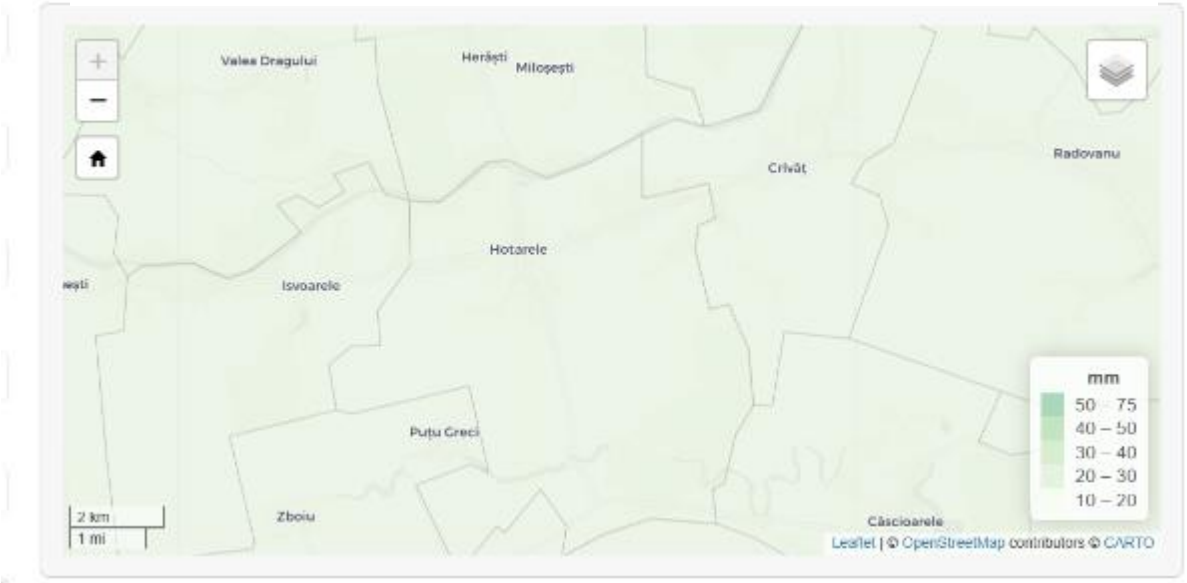
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 92.1 W/mp, and at the level of year 2100 it is estimated at 108.7 W/mp, which is higher than the multiannual average value of 103.5 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.7.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 mm, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000


Rainfall in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000


From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.7.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

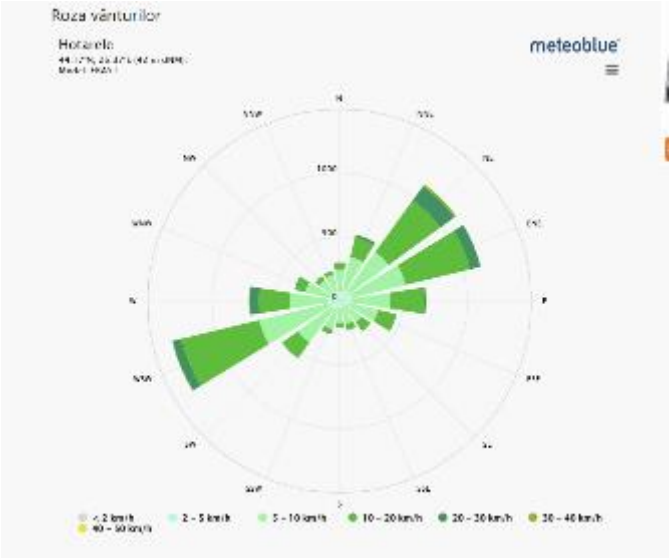



*Figure No. 142- Wind rose*

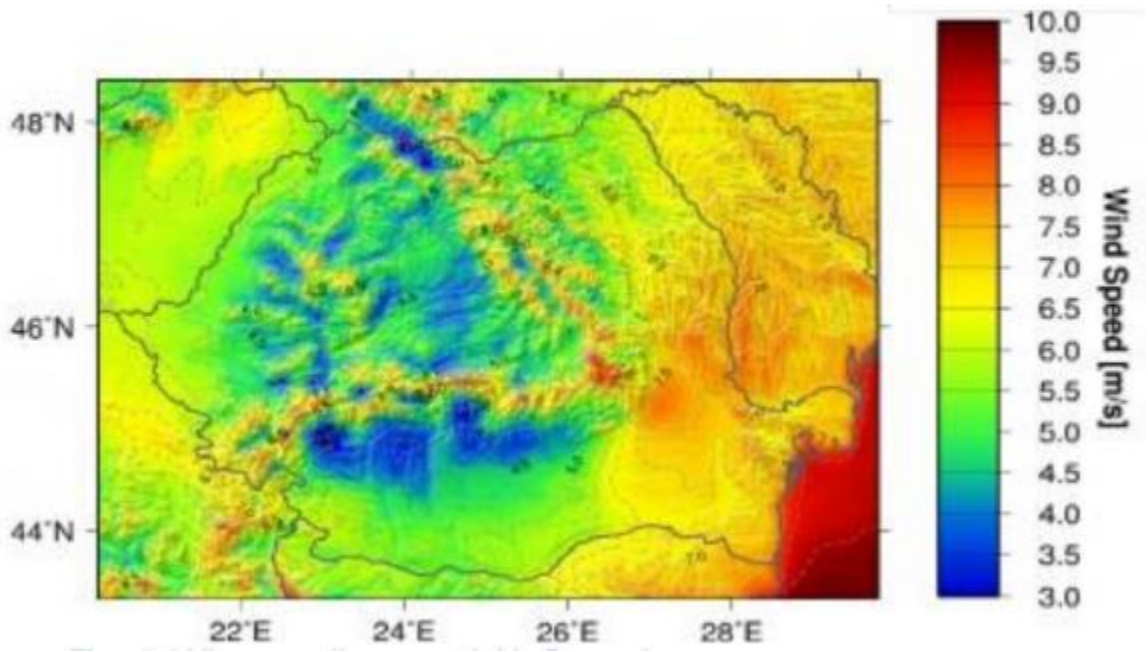



*Figure No. 143- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

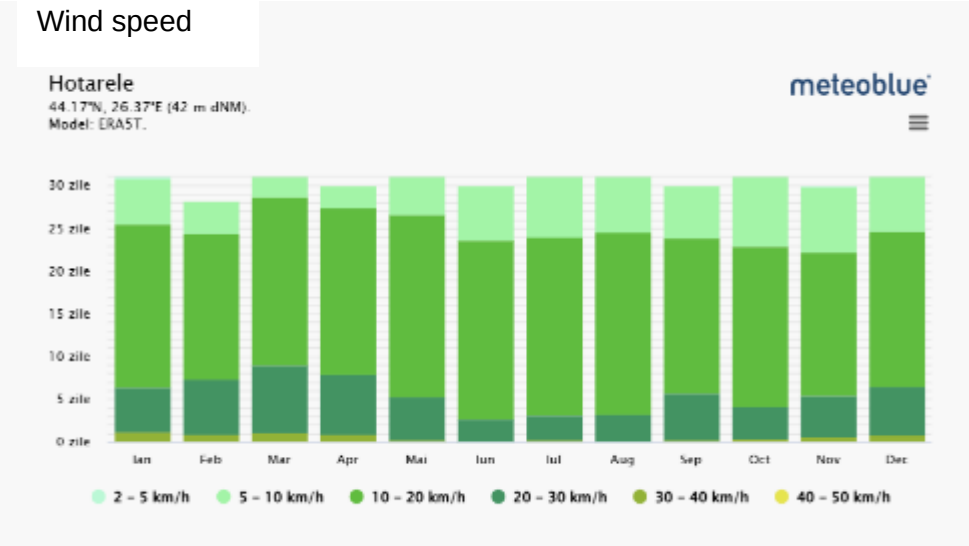


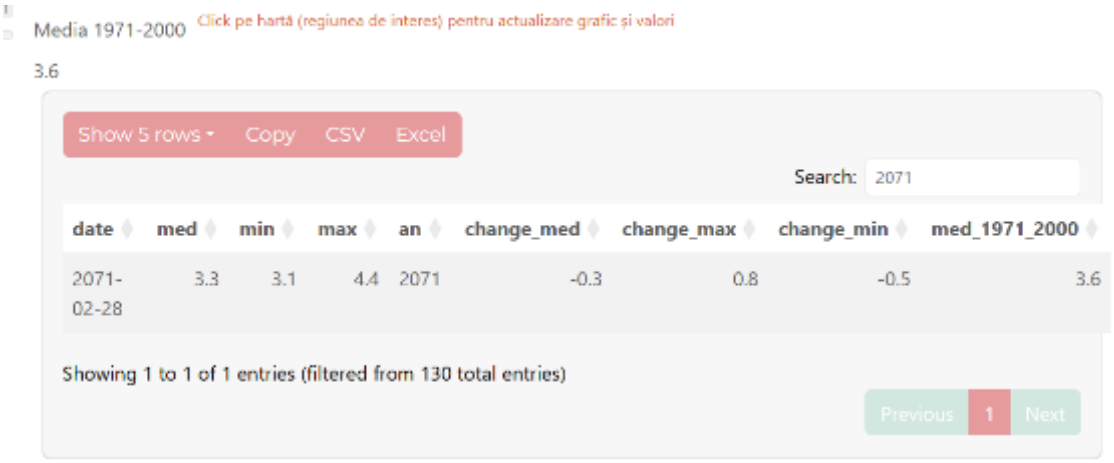

*Figure No. 144- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.6 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000




Average wind speed in February - RCP45 Scenario (Hotarele - County of Giurgiu) - reference period 1971-2000


In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.8 Mihăileşti*

### 5.8.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

Average temperatures and precipitation

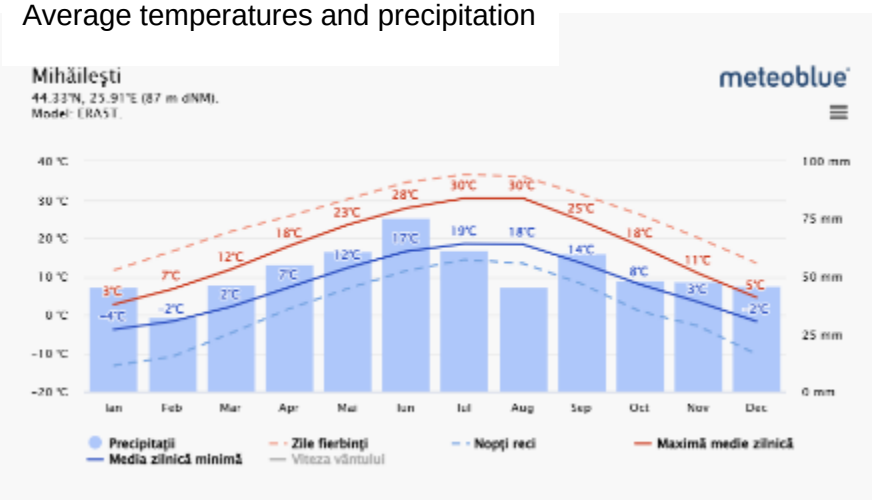



*Figure No. 145* ***- Average value of extreme temperatures over the last 30 years at the weather station***[28]

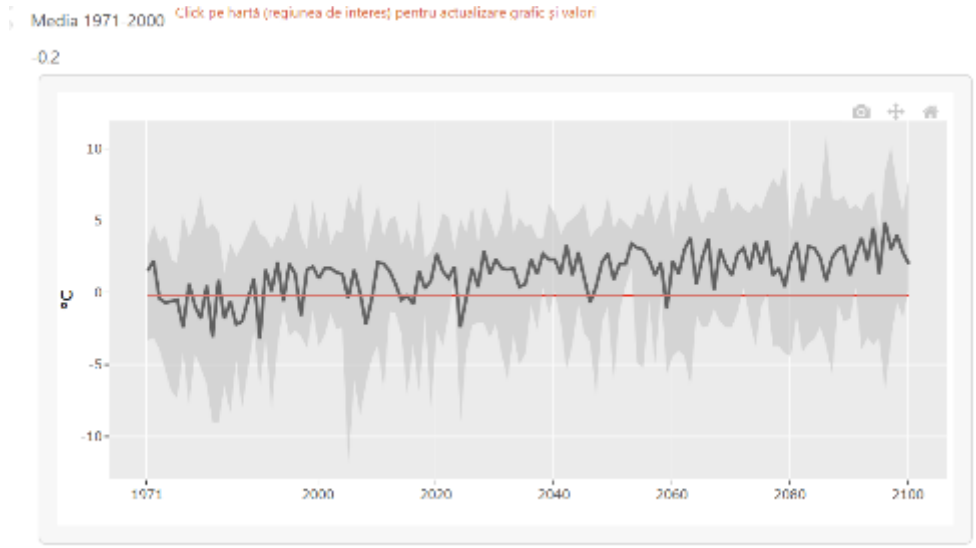
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.2 ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 146 - Average temperature at TAU level (period 1971 -2000)*

[28] Source: *www.meteoblue.com*

Average temperature in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.2

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 2.7 | -1.3 | 6.3 | 2071 | 2.9 | 6.5 | -1.1 | 0.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average temperature in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

-0.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 2 | 0.3 | 8 | 2100 | 2.2 | 8.2 | 0.5 | -0.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.8.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 104.2 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizarea graficului și valorii

104.2

Show 5 rows ▾ Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 94.4 | 68.2 | 126.7 | 2071 | 9.8 | 22.5 | 36 | 104.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

104.2

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 107.8 | 59.6 | 135.8 | 2100 | 3.6 | 31.6 | -44.6 | 104.2 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

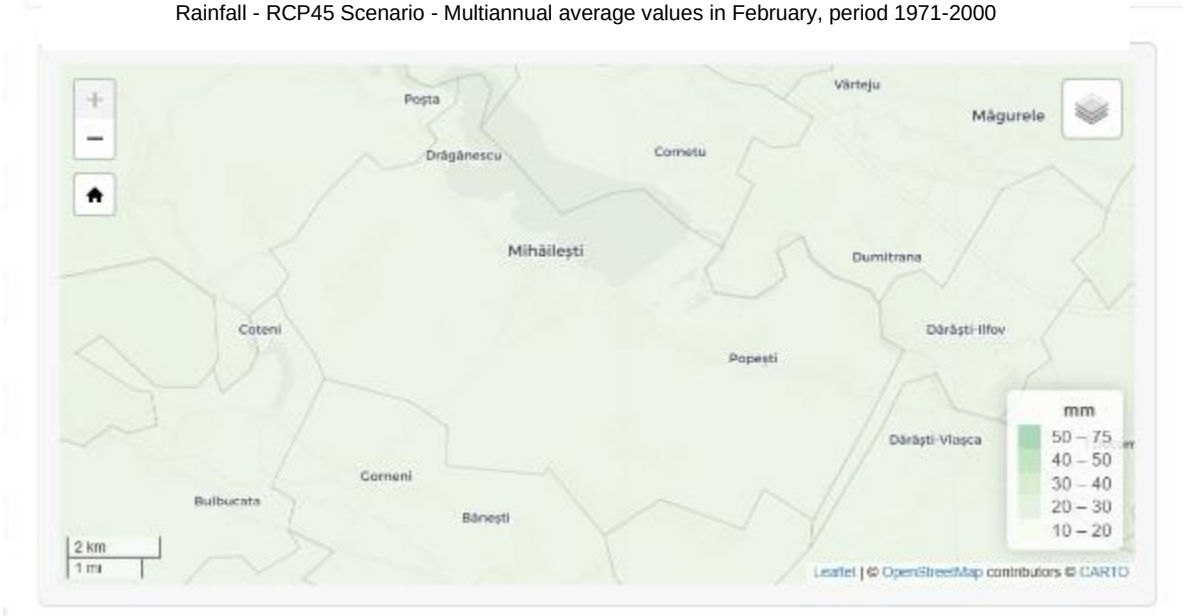
According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 94.4 W/mp, and at the level of year 2100 it is estimated at 107.8 W/mp, which is higher than the multiannual average value of 104.2 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.8.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 23.6 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 40.1 mm, and by 2100 it will reach 11.7 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000



Rainfall in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 40.1 | 4.2 | 81.1 | 2071 | 69.6 | 243 | -82.2 | 23.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 11.7 | 3.6 | 63.3 | 2100 | -50.5 | 167.7 | -84.8 | 23.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.8.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

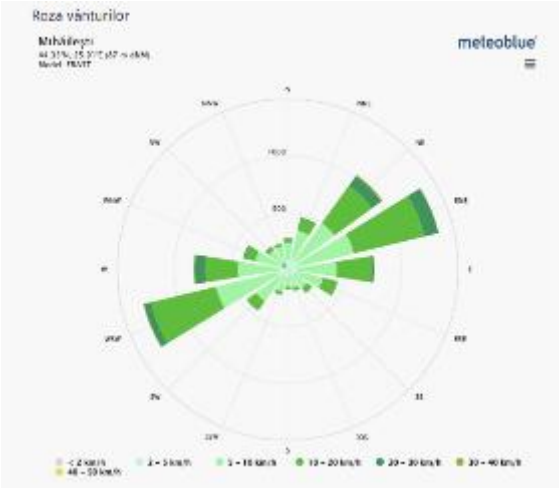



*Figure No. 147- Wind rose*

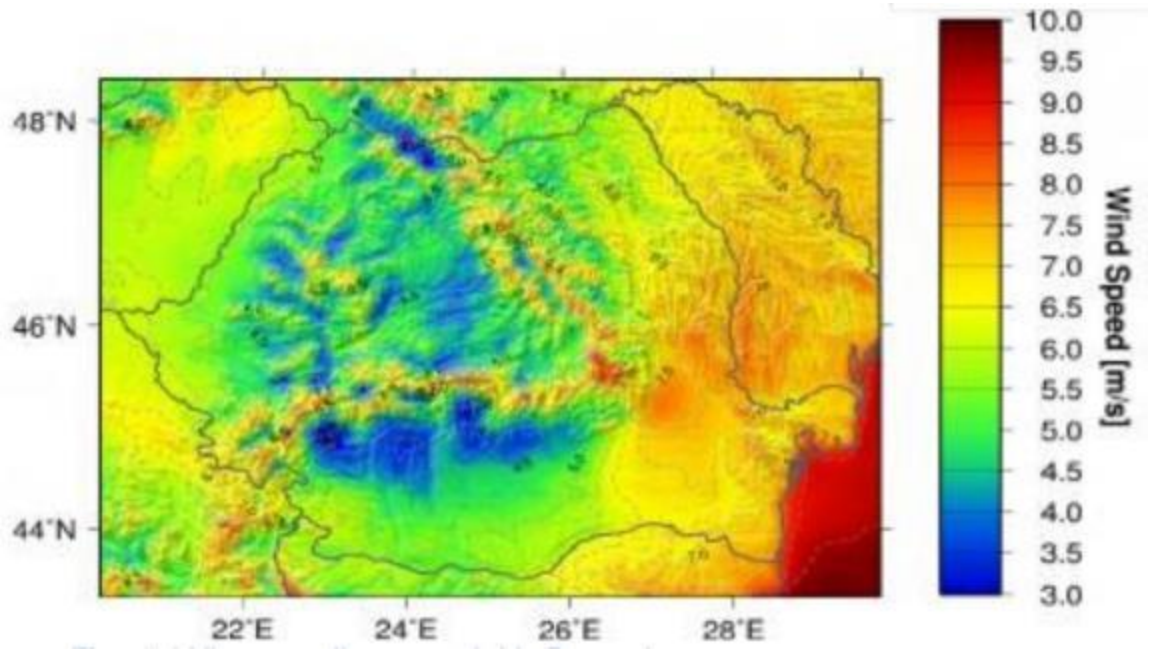



*Figure No. 148- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

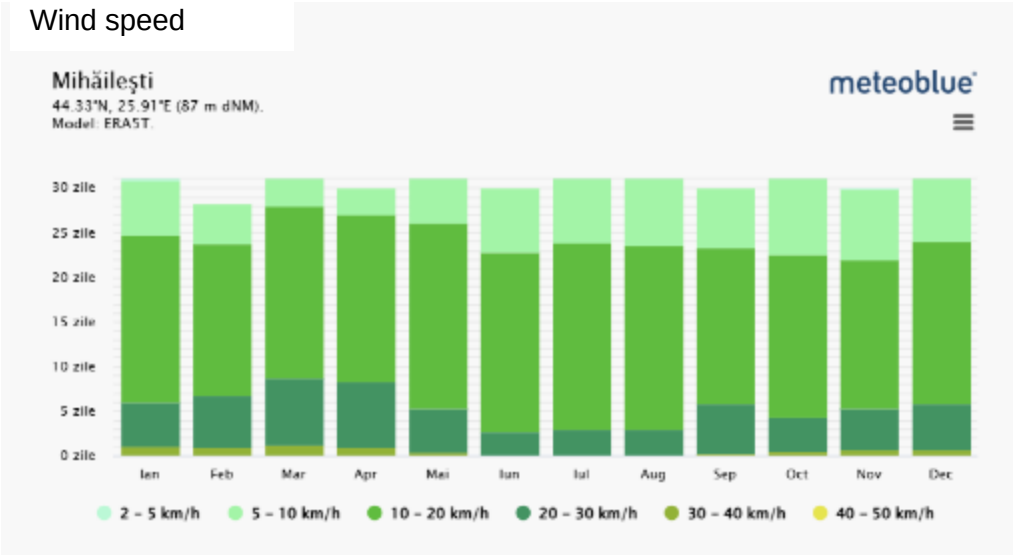


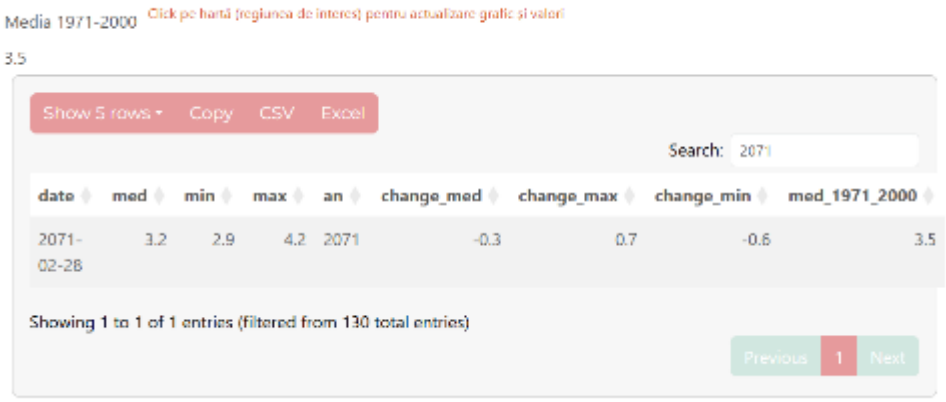

*Figure No. 149 The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.5 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000


Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

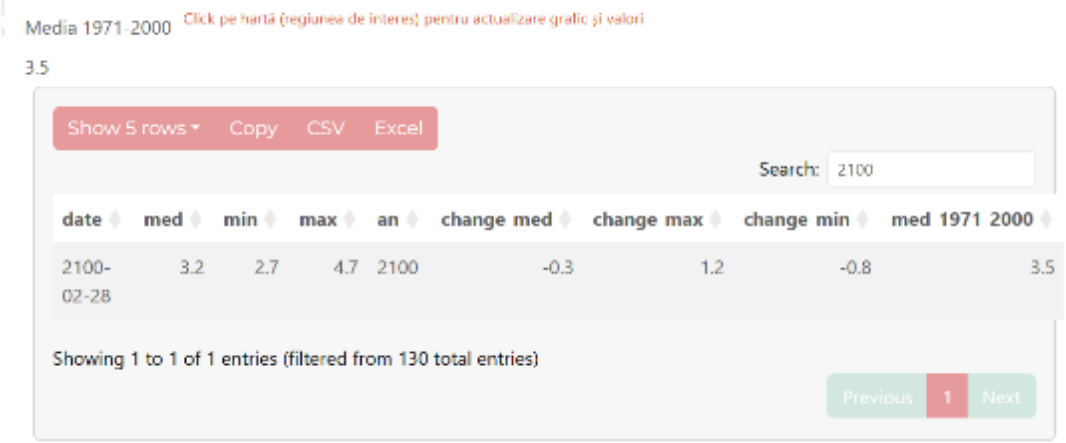
Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 2.9 | 4.2 | 2071 | -0.3 | 0.7 | -0.6 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Mihăilești - County of Giurgiu) - reference period 1971-2000


Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

3.5

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.2 | 2.7 | 4.7 | 2100 | -0.3 | 1.2 | -0.8 | 3.5 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

## *5.9 Valea Dragului*

### 5.9.1 Temperature variability

As for the temperature evolution at the weather station (according to data from the meteoblue.ro website), the average of the monthly minimum and maximum temperatures recorded in the last 30 years is shown in the graph below.

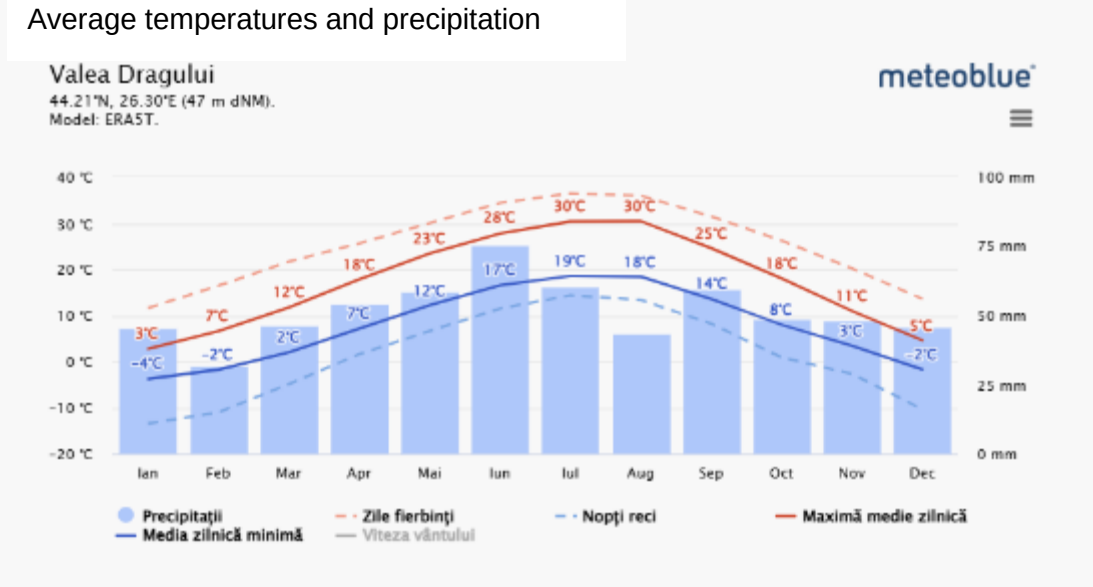



*Figure No. 150* ***- Average value of extreme temperatures over the last 30 years at the weather station[29]***

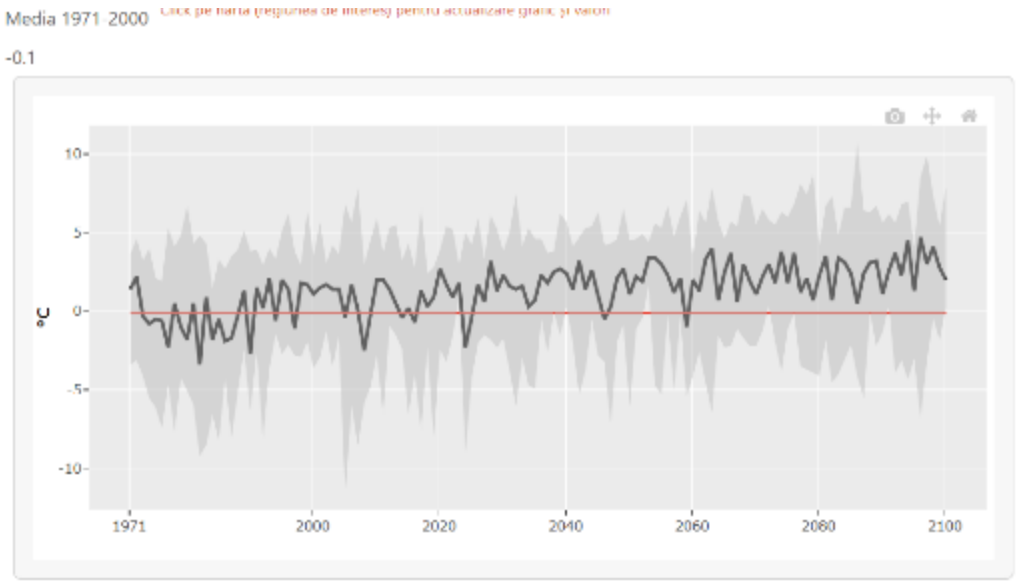
Also, according to the data found on the RO-ADAPT platform, during the period 1971-2000, the average temperature in February is -0.1ºC:

Average temperature – RCP45 scenario- multi-annual averages – February 1971-2000


*Figure No. 151 - Average temperature at TAU level (period 1971 -2000)*

[29] Source: *www.meteoblue.com*

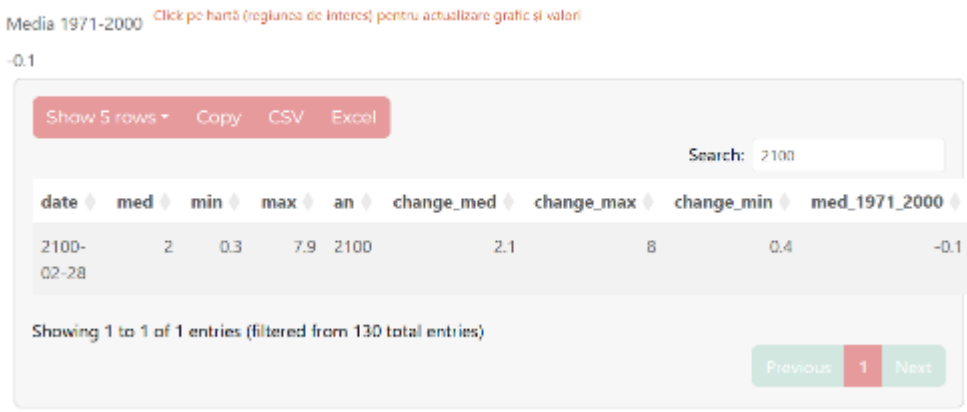
Average temperature in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000




In 2071 and 2100 respectively, February is expected to have the following average temperature values:

Average temperature in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000


Average temperature in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000




According to the above, an increasing trend of the average temperature can be observed in the next period, compared to the multiannual average over the period 1971-2000.

Taking into account the above mentioned temperature variation and its increasing trend in the next period, it can be concluded that the risk of the project being affected by the positive temperature variation in the next period is medium.

### 5.9.2 Heat stress

Heat stress is one of the factors experienced by people working inside buildings/enclosed spaces or that may be affected by changes due to the impact of heat stress on buildings/facilities, etc.

Along with the impact that climate change may have on infrastructure in particular, this factor may have negative effects on the population. In this respect it is recommended to use materials that help minimising this stress for road/maritime infrastructure projects.

At locality level, based on the data provided by the RO-ADAPT Platform related to the global solar radiation, for the period 2071-2100 (compared to the reference period 1971-2000), it is 103.6 W/m$^2$.

Global solar radiation - RCP45 Scenario - Multi-annual average values in February, period 1971-2000


Global solar radiation in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-15 | 91.9 | 66.8 | 130.5 | 2071 | -11.7 | 26.9 | -36.8 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Global solar radiation in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

103.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-15 | 108.7 | 59.1 | 136.3 | 2100 | 5.1 | 32.7 | 44.5 | 103.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

According to the above (data from the RO-ADAPT Platform), the average value of the index at the level of year 2071 is 91.9 W/mp, and at the level of year 2100 it is estimated at 108.7 W/mp, which is higher than the multiannual average value of 103.6 W/mp. We can observe a decreasing trend of solar radiation at ATU level in the next period, so that the risk of exposure of this project to this factor is medium.

### 5.9.3 Heavy rainfall

Based on the information provided by the RO-ADAPT Platform, for the period 1971-2000, the average multiannual precipitation value is 24.1 mm, as shown in the figure below.

According to the same RO-ADAPT data platform, for the next period 2071 - 2100, the amount of precipitation in February 2071 is estimated to be 41.0 m, and by 2100 it will reach 10.1 mm. A decreasing trend in precipitation can be observed for the period 2000 -2071 but also for the period 2071 -2100.

Rainfall - RCP45 Scenario - Multiannual average values in February, period 1971-2000

Rainfall in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.3

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 36.3 | 5.1 | 73.9 | 2071 | 55.6 | 216.8 | -78.1 | 23.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Rainfall in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic și valori

23.3

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change med | change max | change min | med 1971 2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 10 | 3.5 | 57.6 | 2100 | -57.1 | 146.9 | -85 | 23.3 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

From the above figures it can be seen that the exposure of the project under review to this variable is an average exposure.

### 5.9.4 Wind speed

Wind is the climate element that best reflects the influence of the general atmospheric circulation. The site area is predominantly influenced by north-easterly and south-westerly winds. On average, there are 3 days a year with wind speeds above 38 km/h.

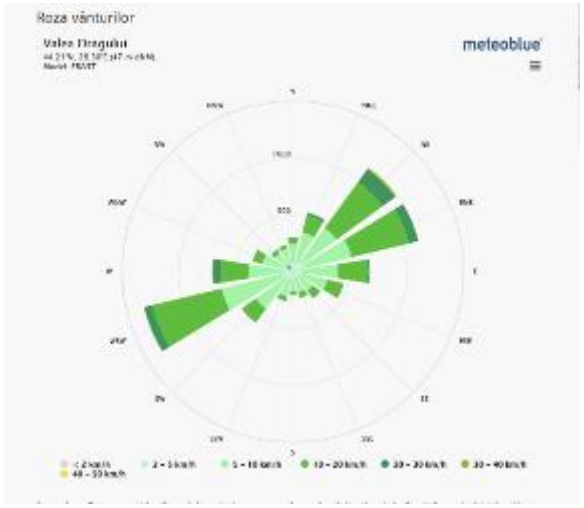



*Figure No. 152- Wind rose*

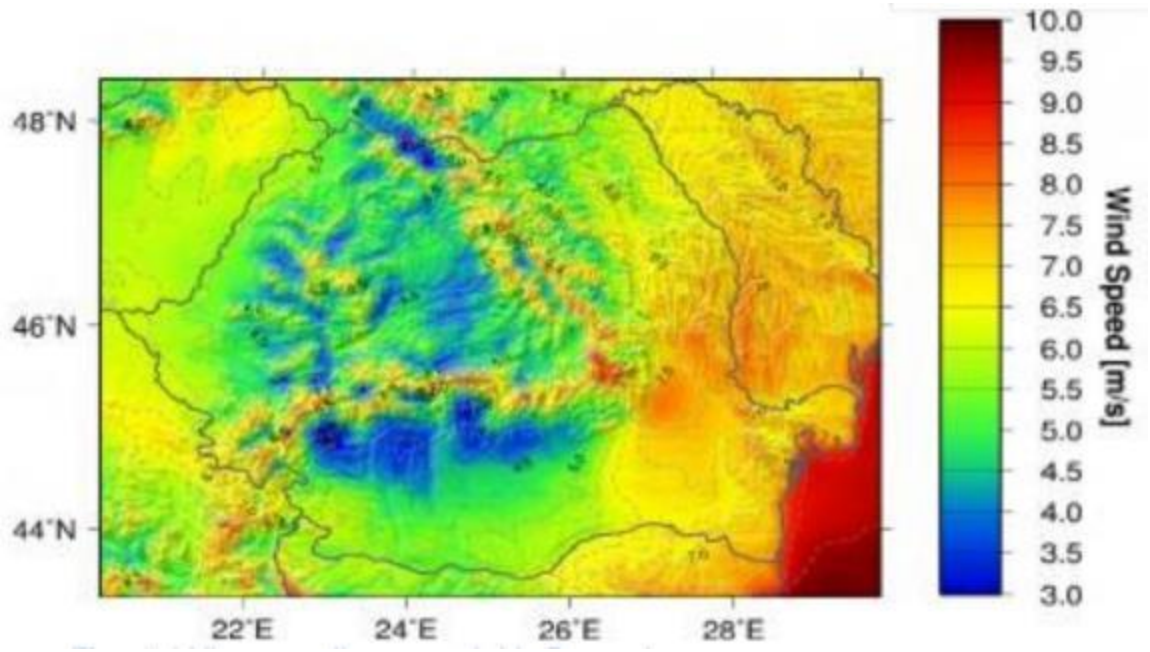



*Figure No. 153- Average wind speed in Romania*

According to the Report of the National Meteorological Administration (2015): *"Climate Change - From the Physical Basis to Risks and Adaptation*", wind speed shows major changes in terms of its long-term evolution.

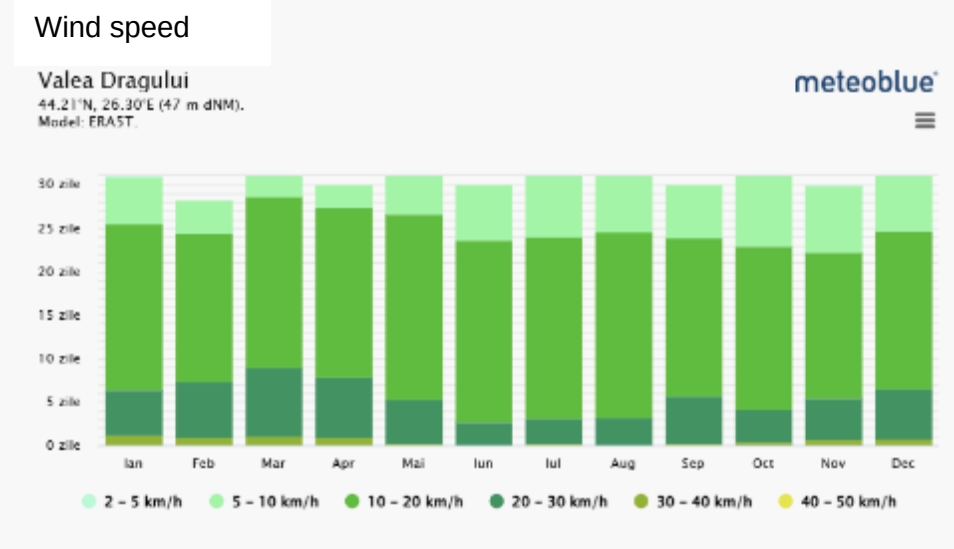



*Figure No. 154- The chart shows the variation in a month when the wind reaches a certain speed*

According to the data found on the RO-ADAPT Platform, in the period 1971-2000, the multiannual average in the area of the locality is 3.6 m/s - in February (as shown in the graph below).

Average wind speed - RCP45 Scenario - Multiannual average values in February, period 1971-2000


In the following period, 2000 - 2071, 2071 - 2100, the estimated wind intensity in the locality area is 3.2 m/s, and 3.3 m/s in 2100, respectively.

Average wind speed in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic si valori

3.6

Show 5 rows Copy CSV Excel

Search: 2071

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2071-02-28 | 3.2 | 3 | 4.3 | 2071 | -0.4 | 0.7 | -0.6 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

Average wind speed in February - RCP45 Scenario (Valea Dragului - County of Giurgiu) - reference period 1971-2000

Media 1971-2000 Click pe hartă (regiunea de interes) pentru actualizare grafic si valori

3.6

Show 5 rows Copy CSV Excel

Search: 2100

| date | med | min | max | an | change_med | change_max | change_min | med_1971_2000 |
|---|---|---|---|---|---|---|---|---|
| 2100-02-28 | 3.3 | 2.4 | 4.9 | 2100 | -0.3 | 1.3 | -1.2 | 3.6 |

Showing 1 to 1 of 1 entries (filtered from 130 total entries)

Previous 1 Next

In conclusion, in the project area there is a low risk of exposure of the project to this climatic factor.

Subsemnata VERDES ALINA traducator autorizat de Ministerul Justitiei cu nr. 24515/19.12.2008, certific exactitatea traducerii cu textul inscrisului original din limba romana in limba engleza.

I, the undersigned VERDES ALINA, authorized tra nslator of the Romanian Ministry of Justice accreditation no.24515/19.12.2008 do hereby certify that this is a true and accurate translation of the original document, from Romanian into English language.