

# **BOTSWANA ENVIRONMENT STATISTICS CLIMATE DIGEST**

**SEPTEMBER 2022**



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**STATISTICS BOTSWANA**

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Published by

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## PREFACE

This report is the second edition of the biannual climate statistics digest for the year 2022/23. The report represents Statistics Botswana's continued progress towards the focused monitoring of climate statistics, and the availing of data for climate trends analysis. The indicators covered in this report are guided in part by the United Nations Framework for the Development of Environment Statistics (UNFDES).

Climate statistics are useful for trends analysis and review of climate related performances in human livelihoods, health, social and economic activities. All aspects of life are affected directly by climate, which is the core determining factor of how people and other organisms live and interact on planet earth. Climate determines food availability and the habitability of regions and environments. Extreme climate events are recorded and monitored for better understanding and planning to ensure minimum casualties and disturbances to lives, as well as for adaptation strategies to climate change phenomena. Statistics Botswana strives to facilitate informed planning and decision making through trends analysis and climate statistics reporting in these submissions.

I would like to extend my gratitude and appreciation to stakeholders and data providers, particularly the Department of Meteorological Services and Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) whose contributions were invaluable in the production of this Digest.

For more information and further enquiries, contact the Directorate of Stakeholder Relations at 3671300. All Statistics Botswana outputs/publications are available on the website at [www.statsbots.org.bw](http://www.statsbots.org.bw) and at the Statistics Botswana Resource Centre (Head-Office, Gaborone).



Dr. Burton S. Mguni  
Statistician General  
January 2024

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## EXECUTIVE SUMMARY

The period under review was the cold and dry season of April to September 2022.

In April 2022, Sir Seretse Khama International Airport (SSKIA) received the highest total rainfall in a month at 225.5 mm followed by Jwaneng at 186.9 mm and Goodhope at 154.3 mm. Over the six months period, the wettest area was SSKIA, recording a total of 236.5 mm followed by Jwaneng at 219.6 mm and Goodhope at 191.1 mm.

The lowest mean monthly minimum air temperature was that for Tsabong at 3.3 °C, followed by Werda at 4.0 °C and Goodhope at 5.0 °C all recorded in June 2022. The lowest minimum temperature for the period was recorded at -2.7 °C for Werda in August 2022 followed by -2.3 °C for Tsabong, in June 2022 and 1.4 °C for Sowa in May 2022.

The highest mean monthly maximum temperature recorded during the period April to September 2022 was for Tubu at 37.9 °C followed by Mababe at 35.7 °C in September 2022 and Tubu at 34.6 °C in August 2022. The highest maximum temperatures for the period were all recorded for Tubu at 41.3 °C followed by 41.1 °C and 41.0 °C in September 2022.

Winds were strongest in Goodhope, with the highest mean monthly maximum wind speed of 6.6 m/s in August 2022 and 6.4 m/s in September 2022, followed by Tsabong at 6.3 m/s in September 2022. Sowa had the lowest mean monthly maximum wind speed at 0.3 m/s in April 2022 followed by Baines Drift at 1.2 m/s in May and July 2022 respectively.

The highest wind speed recorded was 12.3 m/s in June 2022 followed by 12.1 m/s in April 2022 both recorded for Goodhope and 12.0 m/s in August 2022 recorded for Ghanzi.

The highest wind direction predominance was that for Baines Drift where 47.5 percent of the days the winds were from the east north east, followed by Pandamatenga where 33.9 percent of the days the winds were from the east north east and Sowa where 32.8 percent of the days the winds were from the east south east.

Nationally, winds were predominantly from the east north east 20.1 percent of the days in June 2022, followed by predominance of 18.3 percent from the east north east in July 2022, and 17.7 percent from the east north east in August 2022.

The highest predominance by maximum wind speed was that for Baines Drift with 35.8 percent of the days recording strongest winds blowing from the east north east followed by Pandamatenga, where 31.7 percent of the days the strongest winds blew from the east north east direction, followed by Mahalapye and Tubu, where 26.8 percent of the days the strongest winds blew from the north east and east, respectively.

The strongest winds for each month for the country blew mainly from the north east at 22.4 percent of the days in September 2022, followed by the north east and the east north east at 20.1 percent of the days in June 2022.

Overall, the strongest winds blew from the north east at 16.9 percent of the days, followed by the east north east at 15.8 percent, and the east at 13.2 percent of the days.

The highest mean monthly relative humidity was recorded for Goodhope at 80.7 percent followed by Mababe at 80.1 percent and Pandamatenga at 77.4 percent all in April 2022. The lowest mean monthly relative humidity was recorded for Ghanzi at 24.8 percent and Tshane at 25.4 percent in September 2022 followed by Ghanzi at 26.6 percent in August 2022.

April 2022 recorded the highest average relative humidity extremes for the period. September recorded the lowest monthly average relative humidity extremes for the period.

## 1. INTRODUCTION

Climate is important to human livelihoods because it influences human life directly through well being and health and indirectly through human activities such as economic or agricultural practices. This report covers the period from April to September 2022.

Botswana is climatically classified as arid to semi-arid, and is drought prone, with highly erratic rainfall that ranges from 250mm in the southwest to around 650mm in the north.

## 2. RAINFALL

The period under study is the dry season and is characterised by cold temperatures.

### 2.1. Monthly Rainfall

Table 1 shows the total monthly rainfall in millimetres (mm).

**Table 1: Total monthly Precipitation for April to September 2022 (mm)**

|              | April | May  | June | July | August | September |
|--------------|-------|------|------|------|--------|-----------|
| Ghanzi       | 129.1 | 0.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| Goodhope     | 154.3 | 12.5 | 20.7 | 3.0  | 0.6    | 0.0       |
| Mahalapye    | 72.9  | 0.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| Panda        | 48.8  | 0.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| SuaPan       | 5.1   | 1.5  | 0.0  | 0.0  | 0.0    | 0.0       |
| Tsabong      | 65.3  | 30.0 | 36.5 | 0.0  | 0.0    | 0.0       |
| Tshane       | 53.9  | 10.8 | 15.2 | 0.0  | 0.0    | 0.0       |
| Werda        | 79.2  | 0.6  | 3.8  | 0.0  | 9.2    | 0.0       |
| Shakawe      | 0.0   | 0.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| SSKIA        | 225.5 | 11.0 | 0.0  | 0.0  | 0.0    | 0.0       |
| S/phikwe     | 42.3  | 8.8  | 0.7  | 0.0  | 0.0    | 0.0       |
| Leflhakane   | 90.6  | 3.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| Kasane       | 0.0   | 0.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| Lephepe      | 67.9  | 0.0  | 0.0  | 4.3  | 0.0    | 0.0       |
| Jwaneng      | 186.9 | 10.5 | 22.2 | 0.0  | 0.0    | 0.0       |
| Maun         | 8.7   | 0.0  | 0.0  | 0.0  | 0.0    | 0.0       |
| Francistown  | 18.5  | 0.0  | 2.0  | 0.0  | 0.0    | 0.0       |
| Tubu         | -     | -    | -    | -    | -      | -         |
| Baines drift | -     | -    | -    | -    | -      | -         |
| Mababe       | -     | -    | -    | -    | -      | -         |

Source: Department of Meteorological Services

\*SSKIA- Sir Seretse Khama International Airport

Dashes (-) show no data

Sir Seretse Khama International Airport (SSKI) received the highest total rainfall in a month at 225.5 mm followed by Jwaneng which recorded 186.9 mm and Goodhope at 154.3 mm in April 2022.

## 2.2. Total Rainfall

**Table 2** shows the total rainfall by the station during the dry season from April to September 2022. The wettest area was Sir Seretse Khama International Airport (SSKIA), recording a total of 236.5 mm followed by Jwaneng at 219.6 mm and Goodhope at 191.1 mm, over the six months period.

**Table 2: Total rainfall by the station for April to September 2022 (mm)**

| Station       | Total Rainfall (mm) |
|---------------|---------------------|
| SSKIA         | 236.5               |
| Jwaneng       | 219.6               |
| Goodhope      | 191.1               |
| Tsabong       | 131.8               |
| Ghanzi        | 129.1               |
| Letlhakane    | 93.6                |
| Werda         | 92.8                |
| Tshane        | 79.9                |
| Mahalapye     | 72.9                |
| Lephepe       | 72.2                |
| Panda         | 48.8                |
| Selibe Phikwe | 43.0                |
| Francistown   | 20.5                |
| Maun          | 8.7                 |
| SuaPan        | 6.6                 |
| Shakawe       | 0.0                 |
| Kasane        | 0.0                 |

Source: Department of Meteorological Services  
\*SSKIA- Sir Seretse Khama International Airport

## 3. TEMPERATURES

Botswana's diurnal temperature range is high, and this is normal for semi-arid and arid climates. The temperatures also vary spatially, with extremes common in the north-eastern and the south-western regions of the country.

### 3.1. Minimum Air Temperatures

**Table 3** shows the mean monthly minimum air temperatures in degrees Celsius (°C).

The coolest mean monthly minimum air temperature during April to September 2022 was recorded in the south-western parts of the country where diurnal temperature range is relatively high.



**Table 3: Mean monthly minimum air temperatures for April to September 2022 (degrees Celsius)**

|              | April | May  | June | July | August | September |
|--------------|-------|------|------|------|--------|-----------|
| Baines Drift | 16.7  | 11.9 | 8.2  | 9.5  | 11.8   | 15.8      |
| Ghanzi       | 14.0  | 7.6  | 5.2  | 7.6  | 9.0    | 12.8      |
| Goodhope     | 11.6  | 7.8  | 5.0  | 7.3  | 7.7    | 12.4      |
| Mababe       | 13.9  | 8.6  | 7.7  | 9.6  | 10.2   | 14.9      |
| Mahalapye    | -     | 8.5  | 5.9  | 7.9  | 10.0   | 13.5      |
| Pandamatenga | 15.9  | 11.1 | 8.2  | 10.3 | 11.8   | 15.9      |
| Shakawe      | 15.4  | 7.9  | 7.1  | 7.6  | 8.1    | 12.3      |
| Sowa         | 16.0  | 10.6 | 8.0  | 10.7 | 12.0   | 15.9      |
| Tsabong      | 12.1  | 6.5  | 3.3  | 5.0  | 5.7    | 11.7      |
| Tshane       | 13.8  | 7.9  | 5.1  | 8.3  | 8.1    | 12.8      |
| Tubu         | 20.0  | 13.4 | 13.2 | 15.0 | 15.7   | 19.0      |
| Werda        | 12.1  | 6.0  | 4.0  | 5.8  | 5.7    | 9.4       |

Source: Department of Meteorological Services and SASSCAL  
 (-) Dash shows no data

The lowest mean monthly minimum air temperature was that for Tsabong at 3.3 °C, followed by Werda at 4.0 °C and Goodhope at 5.0 °C all recorded in June 2022, and Tsabong at 5.0 °C in July 2022.

### 3.2. Minimum Temperature Extremes

Table 4 shows the lowest minimum air temperatures recorded in a 24 hour period for the stations, during the period April to September 2022. The lowest minimum temperature for the period was recorded at -2.7 °C for Werda in August 2022 followed by -2.3 °C for Tsabong, in June 2022 and 1.4 °C for Sowa in May 2022.

**Table 4: Lowest minimum temperatures recorded between April & September 2022 (degrees Celsius).**

| Temperature (°C) | Month  | Station |
|------------------|--------|---------|
| -2.7             | August | Werda   |
| -2.3             | June   | Werda   |
| -1.4             | May    | Sowa    |

Source: Department of Meteorological Services and SASSCAL

### 3.3. Maximum Air Temperatures

Table 5 shows the mean monthly maximum air temperatures for the period April to September 2022.

**Table 5: Mean monthly maximum air temperatures for April to September 2022 (degrees Celsius)**

| Station      | April | May  | June | July | August | September |
|--------------|-------|------|------|------|--------|-----------|
| Baines Drift | 28.0  | 26.7 | 23.0 | 24.7 | 27.7   | 31.0      |
| Ghanzi       | 27.8  | 26.0 | 22.7 | 25.0 | 28.9   | 32.3      |
| Goodhope     | 23.2  | 22.5 | 19.3 | 21.2 | 24.2   | 28.8      |
| Lephephe     | -     | -    | -    | -    | -      | -         |
| Mababe       | 31.0  | 29.5 | 27.1 | 28.4 | 32.6   | 35.7      |
| Mahalapye    | 26.0  | 25.0 | 21.7 | 23.7 | 26.9   | 30.3      |
| Pandamatenga | 28.8  | 27.2 | 24.1 | 25.0 | 29.4   | 32.1      |
| Shakawe      | 30.1  | 27.8 | 25.6 | 27.0 | 31.0   | 34.2      |
| Sowa         | 29.7  | 27.4 | 24.6 | 26.1 | 29.8   | 33.4      |
| Tsabong      | 27.1  | 25.4 | 22.1 | 24.4 | 26.5   | 31.4      |
| Tshane       | 26.8  | 24.7 | 21.4 | 24.0 | 27.0   | 31.3      |
| Tubu         | 34.5  | 32.5 | 29.3 | 30.9 | 34.6   | 37.9      |
| Werda        | 26.7  | 25.4 | 21.7 | 24.4 | 27.0   | 31.0      |

Source: Department of Meteorological Services and SASSCAL  
Dash (-) shows no data

The highest mean monthly maximum temperature recorded during the period April to September 2022 was for Tubu at 37.9 °C followed by Mababe at 35.7 °C in September 2022 and Tubu at 34.6 °C in August 2022.

### 3.4. Maximum Temperature Extremes

Table 6 shows the highest maximum air temperatures recorded for the stations, during the period April to September 2022. The highest maximum temperatures for the period were all recorded for Tubu at 41.3 °C followed by 41.1 °C and 41.0 °C in September 2022.

**Table 6: Highest maximum temperatures recorded between April & September 2022 (degrees Celsius)**

| Temperature (°C) | Month     | Station |
|------------------|-----------|---------|
| 41.3             | September | Tubu    |
| 41.1             | September | Tubu    |
| 41.0             | September | Tubu    |

Source: Department of Meteorological Services and SASSCAL

## 4. WIND SPEED AND DIRECTION

Wind speed is measured in metres per second (m/s) while wind direction is expressed in degrees. Wind direction is expressed in terms of the direction that the wind is blowing from. For example, northerly winds blow from the north to the south.

### 4.1. Monthly Maximum Wind Speed

Table 7 shows the mean monthly maximum wind speed for the period April to September 2022.

**Table 7: Mean monthly maximum wind speed for April to September 2022 (m/s)**

| Stations     | April | May | June | July | August | September |
|--------------|-------|-----|------|------|--------|-----------|
| Baines Drift | 1.4   | 1.2 | 2.2  | 1.2  | 2.7    | 2.2       |
| Ghanzi       | 5.5   | 4.9 | 5.9  | 5.0  | 5.7    | 6.1       |
| Goodhope     | 6.0   | 4.9 | 5.8  | 5.2  | 6.6    | 6.4       |
| Lephephe     | -     | -   | -    | -    | -      | -         |
| Mababe       | 4.3   | 4.4 | 5.8  | 4.9  | 5.4    | 5.7       |
| Mahalapye    | 4.7   | 4.3 | 5.3  | 4.7  | 5.5    | 5.8       |
| Pandamatenga | 4.4   | 4.3 | 5.2  | 4.7  | 5.1    | 5.5       |
| Shakawe      | 3.8   | 3.7 | 4.1  | 3.8  | 4.0    | 4.4       |
| Sowa         | 0.3   | 3.2 | 5.2  | 4.5  | 5.1    | 5.7       |
| Tsabong      | 5.3   | 4.5 | 5.4  | 5.4  | 5.9    | 6.3       |
| Tshane       | 4.8   | 4.5 | 5.6  | 4.6  | 5.3    | 5.3       |
| Tubu         | 3.9   | 4.1 | 5.0  | 4.9  | 5.0    | 5.4       |
| Werda        | 4.5   | 4.2 | 4.9  | 4.8  | 5.3    | 5.4       |

Source: Department of Meteorological Services and SASSCAL  
Dashes (-) show no data

Winds were strongest in Goodhope, with the highest mean monthly maximum wind speed of 6.6 m/s in August 2022 and 6.4 m/s in September 2022, followed by Tsabong at 6.3 m/s in September 2022. Sowa had the lowest mean monthly maximum wind speed at 0.3 m/s in April 2022 followed by Baines Drift at 1.2 m/s in May and July 2022.

### 4.2. Highest Wind Speed Recorded

Table 8 shows the highest wind speed recorded during the period of April to September 2022. The wind speed recordings are the highest recorded in a 24 hour period.

The highest wind speed recorded was 12.3 m/s in June 2022 followed by 12.1 m/s in April 2022 both recorded for Goodhope and 12.0 m/s in August 2022 recorded for Ghanzi. These wind speed recordings fall in the category of Strong Breeze on the Beaufort scale. (See Table 16 in the appendix).

**Table 8: Maximum wind speed for April to September 2022 (m/s)**

| Speed m/s | *Beaufort classification | Month  | Station  |
|-----------|--------------------------|--------|----------|
| 12.3      | Strong Breeze            | June   | Goodhope |
| 12.1      | Strong Breeze            | April  | Goodhope |
| 12.0      | Strong Breeze            | August | Ghanzi   |

\*See table 16 in appendix  
Source: Department of Meteorological Services and SASSCAL

### 4.3. Wind Direction

**Table 9** shows the stations' predominant wind direction as a percentage of the days recorded between April and September 2022. The highest predominance is that of Baines Drift where 47.5 percent of the days the winds were from the east north east, followed by Pandamatenga where 33.9 percent of the days the winds were from the east north east and Sowa where 32.8 percent of the days the winds were from the east south east. **Figure 1** shows this graphically.

**Table 9: Percentage of predominant winds by station for April to September 2022**

|                     | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S   | SSW | SW  | WSW | W   | WNW | NW  | NNW |
|---------------------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Baines Drift</b> | 0.0  | 0.6  | 12.3 | 47.5 | 19.0 | 7.3  | 2.8  | 0.0  | 0.6 | 2.2 | 1.7 | 2.2 | 0.6 | 0.6 | 1.1 | 1.7 |
| <b>Ghanzi</b>       | 1.6  | 6.6  | 9.3  | 12.0 | 10.4 | 16.4 | 14.8 | 6.6  | 6.6 | 2.7 | 7.1 | 1.6 | 1.1 | 1.1 | 0.5 | 1.6 |
| <b>Goodhope</b>     | 9.8  | 29.0 | 23.5 | 8.2  | 2.7  | 1.6  | 1.6  | 4.4  | 2.7 | 6.6 | 1.1 | 1.1 | 2.2 | 1.1 | 1.6 | 2.7 |
| <b>Lephephe</b>     | -    | -    | -    | -    | -    | -    | -    | -    | -   | -   | -   | -   | -   | -   | -   | -   |
| <b>Mababe</b>       | 1.6  | 6.6  | 11.5 | 10.4 | 15.9 | 22.5 | 8.8  | 8.2  | 3.8 | 3.8 | 0.5 | 1.6 | 0.5 | 1.1 | 1.1 | 1.6 |
| <b>Mahalapye</b>    | 12.6 | 16.9 | 25.7 | 15.3 | 2.2  | 1.6  | 0.5  | 1.1  | 1.1 | 2.2 | 3.3 | 1.1 | 2.7 | 3.8 | 5.5 | 4.4 |
| <b>Pandamatenga</b> | 1.1  | 1.1  | 4.4  | 33.9 | 31.1 | 13.1 | 3.8  | 3.8  | 2.2 | 2.7 | 0.5 | 0.0 | 0.5 | 0.5 | 0.0 | 1.1 |
| <b>Shakawe</b>      | 0.0  | 1.6  | 3.3  | 8.7  | 5.5  | 14.2 | 28.4 | 30.1 | 4.9 | 0.5 | 0.0 | 0.5 | 0.0 | 0.5 | 0.5 | 1.1 |
| <b>Sowa</b>         | 1.1  | 3.8  | 9.3  | 9.8  | 18.0 | 32.8 | 12.6 | 3.3  | 1.6 | 2.7 | 2.7 | 1.6 | 0.5 | 0.0 | 0.0 | 0.0 |
| <b>Tsabong</b>      | 9.8  | 18.0 | 15.8 | 9.3  | 2.7  | 1.6  | 2.7  | 1.6  | 3.3 | 7.1 | 9.3 | 4.4 | 3.8 | 1.1 | 2.7 | 6.6 |
| <b>Tshane</b>       | 14.2 | 12.6 | 14.2 | 10.9 | 5.5  | 3.3  | 4.9  | 3.8  | 4.4 | 4.9 | 3.3 | 2.7 | 1.6 | 3.3 | 3.8 | 6.6 |
| <b>Tubu</b>         | 1.1  | 3.3  | 13.1 | 18.6 | 26.8 | 19.1 | 8.2  | 2.2  | 2.7 | 1.1 | 0.5 | 0.0 | 0.5 | 0.0 | 1.1 | 1.6 |
| <b>Werda</b>        | 11.3 | 20.9 | 10.7 | 10.7 | 8.5  | 4.5  | 4.0  | 1.7  | 4.0 | 4.5 | 4.5 | 1.1 | 0.6 | 3.4 | 4.0 | 5.6 |

**Source:** Department of Meteorological Services and SASSCAL  
Dashes (-) show no data



### 4.4. National wind direction

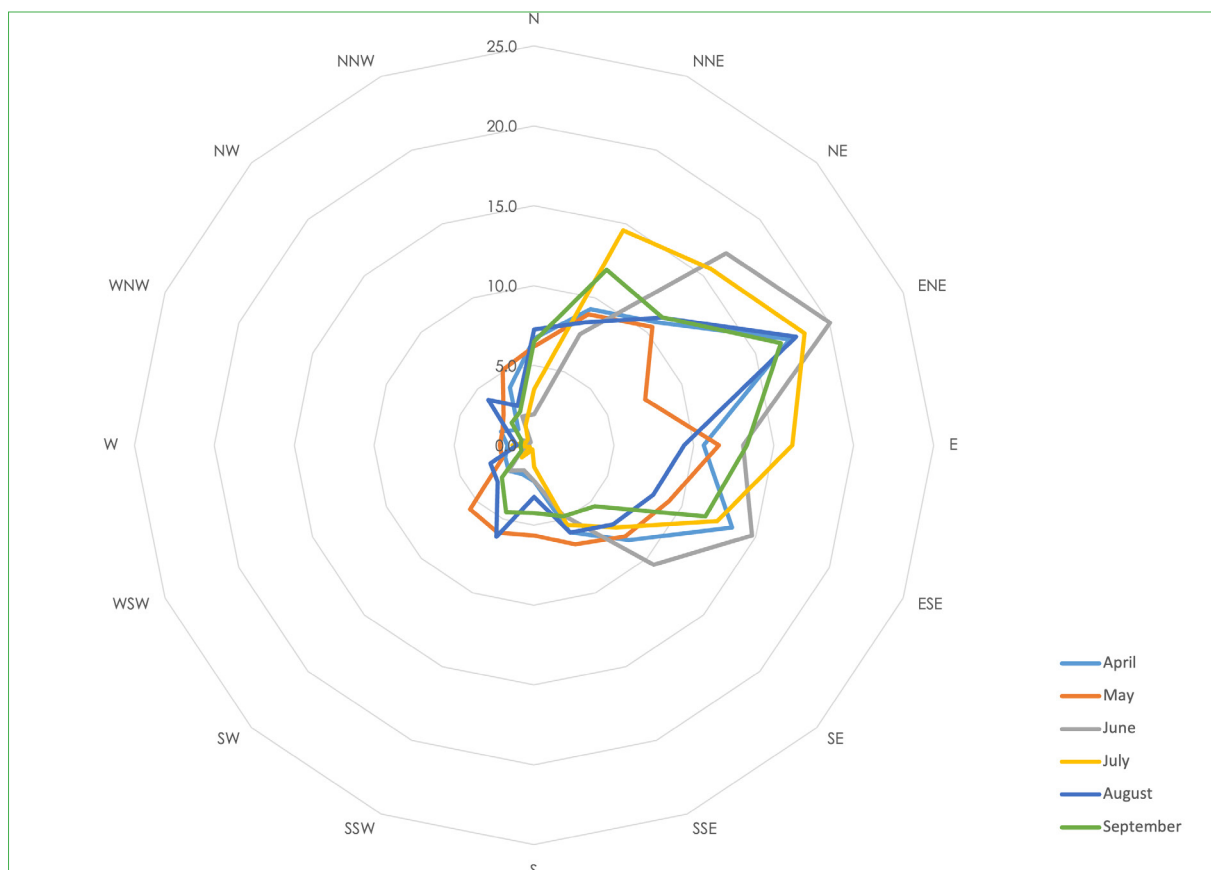
Table 10 shows the country's wind direction for the period of April to September 2022 as a percentage of the total number of days for that period. Nationally, winds were predominantly from the east north east 20.1 percent of the days in June 2022, followed by predominance of 18.3 percent of the days from the east north east in July 2022, and 17.7 percent of the days from the east north east in August 2022. Figure 2 shows the country's predominant winds graphically.

**Table 10: National wind direction by percentage of days for April to September 2022**

|                  | N   | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE | S   | SSW | SW  | WSW | W   | WNW | NW  | NNW | Total |
|------------------|-----|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>April</b>     | 6.7 | 9.2  | 10.9 | 17.3 | 10.6 | 13.4 | 8.4  | 5.9 | 2.2 | 2.0 | 2.2 | 2.0 | 1.7 | 2.2 | 1.4 | 3.9 | 100.0 |
| <b>May</b>       | 6.2 | 8.9  | 10.5 | 7.5  | 11.6 | 9.1  | 8.1  | 6.7 | 5.6 | 5.9 | 5.6 | 2.2 | 2.2 | 2.2 | 2.7 | 5.1 | 100.0 |
| <b>June</b>      | 1.9 | 7.5  | 17.0 | 20.1 | 13.1 | 14.8 | 10.6 | 4.7 | 2.2 | 1.7 | 2.2 | 0.8 | 0.3 | 0.8 | 0.3 | 1.9 | 100.0 |
| <b>July</b>      | 3.5 | 14.6 | 15.6 | 18.3 | 16.2 | 12.4 | 7.3  | 5.4 | 1.3 | 0.3 | 1.1 | 0.3 | 1.3 | 0.5 | 0.5 | 1.3 | 100.0 |
| <b>August</b>    | 7.3 | 8.3  | 11.3 | 17.7 | 9.4  | 8.1  | 7.0  | 5.9 | 3.2 | 6.2 | 3.2 | 3.0 | 1.1 | 1.6 | 4.0 | 2.7 | 100.0 |
| <b>September</b> | 6.5 | 11.9 | 11.3 | 16.7 | 13.3 | 11.6 | 5.4  | 4.8 | 4.2 | 4.5 | 2.8 | 0.8 | 0.8 | 0.8 | 2.0 | 2.3 | 100.0 |
| <b>Overall</b>   | 5.4 | 10.1 | 12.8 | 16.2 | 12.4 | 11.5 | 7.8  | 5.6 | 3.2 | 3.4 | 2.9 | 1.5 | 1.2 | 1.4 | 1.8 | 2.9 | 100.0 |

Source: Department of Meteorological Services and SASSCAL

**Figure 2: National wind direction by percentage of days for April to September 2022**



### 4.5. Maximum wind speed by direction

Maximum wind speed by direction is an indication of the direction of the maximum wind speed recorded. It indicates the direction of the strongest winds for the stations and the country.

Table 11 and Figure 3 show the percentage maximum wind speed directions for the stations, which is, a percentage of the number of days the recordings were taken during the period April to September 2022.

**Table 11: Percentage maximum wind speed directions by station for April to September 2022**

|                     | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S   | SSW | SW  | WSW | W   | WNW | NW   | NNW  | Total        |
|---------------------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|--------------|
| <b>Shakawe</b>      | 0.0  | 1.1  | 9.3  | 14.8 | 18.0 | 21.3 | 15.8 | 11.5 | 3.8 | 2.2 | 0.0 | 1.1 | 0.5 | 0.5 | 0.0  | 0.0  | <b>100.0</b> |
| <b>Mababe</b>       | 4.4  | 12.1 | 21.4 | 17.6 | 14.8 | 4.9  | 9.3  | 4.4  | 2.7 | 2.7 | 1.6 | 0.5 | 1.6 | 0.5 | 0.5  | 0.5  | <b>100.0</b> |
| <b>Mahalapye</b>    | 4.4  | 13.1 | 26.8 | 12.6 | 11.5 | 6.0  | 2.2  | 3.3  | 2.2 | 1.1 | 4.4 | 1.1 | 3.3 | 0.5 | 4.4  | 3.3  | <b>100.0</b> |
| <b>Pandamatenga</b> | 1.1  | 8.7  | 15.8 | 31.7 | 24.0 | 2.2  | 6.0  | 2.7  | 2.2 | 1.6 | 0.0 | 0.5 | 1.1 | 0.5 | 1.1  | 0.5  | <b>100.0</b> |
| <b>Sowa</b>         | 0.5  | 4.9  | 10.4 | 16.4 | 14.8 | 22.4 | 8.2  | 3.8  | 1.6 | 2.7 | 1.6 | 5.5 | 1.6 | 1.6 | 1.6  | 2.2  | <b>100.0</b> |
| <b>Tsabong</b>      | 5.5  | 15.8 | 16.9 | 6.6  | 4.4  | 5.5  | 4.4  | 2.2  | 2.2 | 3.8 | 7.7 | 4.4 | 6.0 | 1.1 | 6.6  | 7.1  | <b>100.0</b> |
| <b>Tshane</b>       | 7.7  | 3.8  | 12.6 | 11.5 | 5.5  | 4.4  | 6.0  | 3.3  | 3.3 | 2.7 | 3.8 | 3.3 | 1.6 | 3.3 | 13.7 | 13.7 | <b>100.0</b> |
| <b>Tubu</b>         | 4.4  | 8.7  | 22.4 | 16.9 | 26.8 | 5.5  | 6.0  | 3.8  | 3.8 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 1.1  | 0.0  | <b>100.0</b> |
| <b>Werda</b>        | 10.7 | 18.1 | 10.2 | 6.2  | 6.8  | 4.0  | 2.3  | 3.4  | 2.3 | 4.5 | 4.0 | 2.3 | 6.2 | 5.6 | 6.8  | 6.8  | <b>100.0</b> |
| <b>Ghanzi</b>       | 2.2  | 3.8  | 8.7  | 11.5 | 18.0 | 18.0 | 8.7  | 6.6  | 6.0 | 4.9 | 3.3 | 0.5 | 2.2 | 1.1 | 2.7  | 1.6  | <b>100.0</b> |
| <b>Baines Drift</b> | 1.7  | 4.5  | 22.3 | 35.8 | 10.6 | 2.2  | 2.2  | 2.2  | 2.8 | 2.8 | 4.5 | 3.9 | 0.6 | 0.6 | 2.2  | 1.1  | <b>100.0</b> |
| <b>Lephephe</b>     | -    | -    | -    | -    | -    | -    | -    | -    | -   | -   | -   | -   | -   | -   | -    | -    | -            |
| <b>Goodhope</b>     | 1.1  | 23.0 | 25.7 | 8.2  | 3.3  | 2.7  | 4.4  | 1.6  | 4.9 | 1.6 | 3.3 | 3.3 | 7.1 | 2.7 | 4.4  | 2.7  | <b>100.0</b> |

Source: Department of Meteorological Services and SASSCAL

The highest predominance by maximum wind speed was that for Baines Drift with 35.8 percent of the days recording strongest winds blowing from the east north east followed by Pandamatenga, where 31.7 percent of the strongest winds blew from the east north east direction and Mahalapye and Tubu, where 26.8 percent of the winds blew from the north east and east, respectively.

**Figure 3: Percentage maximum wind speed directions by station for April to September 2022**

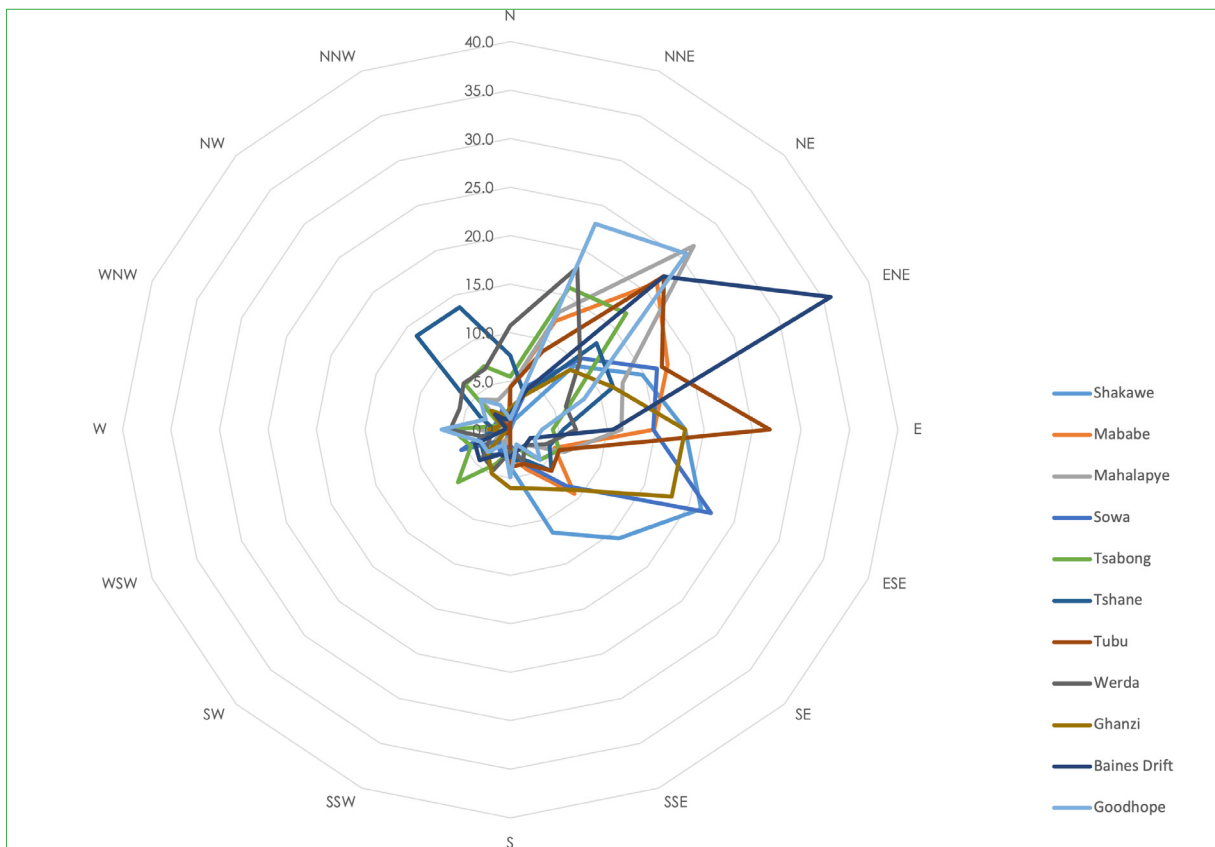


Table 12 and Figure 4 show the maximum wind speed directions for the country as a percentage of the days recordings were taken by month, for the period April to September 2022.

**Table 12: National percentage maximum wind speed directions by month for April to September 2022**

|                  | N   | NNE  | NE   | ENE  | E    | ESE  | SE  | SSE | S   | SSW | SW  | WSW | W   | WNW | NW  | NNW | Total |
|------------------|-----|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>April</b>     | 4.7 | 7.3  | 12.8 | 16.2 | 10.1 | 10.3 | 5.6 | 5.6 | 3.6 | 1.1 | 5.3 | 1.7 | 4.7 | 2.2 | 5.9 | 2.8 | 100.0 |
| <b>May</b>       | 5.1 | 7.5  | 10.8 | 10.2 | 12.4 | 7.0  | 9.7 | 4.3 | 4.6 | 3.5 | 3.5 | 3.8 | 4.8 | 3.0 | 5.1 | 4.8 | 100.0 |
| <b>June</b>      | 1.1 | 7.0  | 20.1 | 20.1 | 17.3 | 12.8 | 6.4 | 3.1 | 1.1 | 2.8 | 1.4 | 1.1 | 0.6 | 0.8 | 2.5 | 1.9 | 100.0 |
| <b>July</b>      | 3.5 | 14.8 | 18.6 | 17.3 | 15.9 | 8.6  | 4.9 | 3.0 | 1.9 | 1.3 | 1.6 | 0.8 | 1.9 | 0.5 | 1.9 | 3.5 | 100.0 |
| <b>August</b>    | 4.3 | 10.2 | 16.9 | 15.3 | 11.0 | 5.1  | 5.9 | 4.0 | 3.0 | 4.6 | 3.5 | 3.5 | 2.7 | 2.2 | 4.0 | 3.8 | 100.0 |
| <b>September</b> | 2.8 | 11.9 | 22.4 | 15.9 | 12.7 | 5.9  | 5.4 | 4.5 | 4.8 | 2.0 | 2.0 | 2.3 | 1.1 | 0.3 | 3.1 | 2.8 | 100.0 |
| <b>Overall</b>   | 3.6 | 9.8  | 16.9 | 15.8 | 13.2 | 8.3  | 6.3 | 4.1 | 3.2 | 2.6 | 2.9 | 2.2 | 2.7 | 1.5 | 3.8 | 3.3 | 100.0 |

Source: Department of Meteorological Services and SASSCAL





## 5. RELATIVE HUMIDITY

Relative humidity is a measure of the amount of water vapour in the air in relation to the maximum amount of vapour or moisture the air can hold at a given temperature, expressed as a percentage. The higher the temperature the higher the amount of vapour or moisture the air can hold. Moisture is added to the air by evaporation and removed from the air by condensation.

Humidity has an effect on human wellbeing through the prevalence of microorganisms that need moisture in the air, such as dust mites, which in turn can lead to allergies and disease such as asthma. Extremely low humidity can cause dryness of the eyes and the skin, exacerbating conditions such as eczema. Humidity also determines how comfortable or uncomfortable the weather feels.

### 5.1 Mean monthly relative humidity

**Table 13: Mean monthly maximum wind speed for April to September 2022 (m/s)**

| Stations               | April | May  | June | July | August | September |
|------------------------|-------|------|------|------|--------|-----------|
| Shakawe                | 69.5  | 57.0 | 55.9 | 52.5 | 40.0   | 33.4      |
| Pandamatenga           | 77.4  | 51.1 | 55.2 | 49.2 | 34.4   | 29.9      |
| Mababe                 | 80.1  | 62.7 | 58.9 | 53.7 | 37.6   | 31.7      |
| Tubu                   | 70.8  | 51.3 | 52.8 | 50.5 | 36.2   | 30.9      |
| Sowa                   | 63.4  | 47.9 | 49.8 | 44.5 | 31.1   | 29.8      |
| Ghanzi                 | 71.7  | 49.6 | 48.3 | 42.5 | 26.6   | 24.8      |
| Baines Driff           | 61.7  | 52.9 | 51.0 | 49.5 | 38.2   | 34.0      |
| Mahalapye              | 70.5  | 61.4 | 58.8 | 54.6 | 37.8   | 36.4      |
| Lephephe               | -     | -    | -    | -    | -      | -         |
| Tshane                 | 65.8  | 52.7 | 52.4 | 41.8 | 31.0   | 25.4      |
| Werda                  | 70.2  | 61.8 | 59.0 | 47.8 | 39.8   | 30.5      |
| Goodhope               | 80.7  | 67.6 | 61.8 | 55.5 | 41.5   | 35.4      |
| <b>Monthly Average</b> | 71.1  | 56.0 | 54.9 | 49.3 | 35.8   | 31.1      |

Source: Department of Meteorological Services and SASSCAL  
Dashes (-) show no data

The highest mean monthly relative humidity was recorded for Goodhope at 80.7 percent followed by Mababe at 80.1 percent and Pandamatenga at 77.4 percent all in April 2022. The lowest mean monthly relative humidity was recorded for Ghanzi at 24.8 percent and Tshane at 25.4 percent in September 2022 followed by Ghanzi at 26.6 percent in August 2022.

### 5.2 Highest relative humidity

Table 14 shows the highest relative humidity recorded for each station by month, during the period April to September 2022.

**Table 14: Highest relative humidity percentage of month by station for April to September 2022**

| Stations               | April | May  | June | July | August | September | Station average |
|------------------------|-------|------|------|------|--------|-----------|-----------------|
| Shakawe                | 69.5  | 57.0 | 55.9 | 52.5 | 40.0   | 33.4      | 66.9            |
| Pandamatenga           | 77.4  | 51.1 | 55.2 | 49.2 | 34.4   | 29.9      | 69.9            |
| Mababe                 | 80.1  | 62.7 | 58.9 | 53.7 | 37.6   | 31.7      | 71.9            |
| Tubu                   | 70.8  | 51.3 | 52.8 | 50.5 | 36.2   | 30.9      | 69.3            |
| Sowa                   | 63.4  | 47.9 | 49.8 | 44.5 | 31.1   | 29.8      | 66.6            |
| Ghanzi                 | 71.7  | 49.6 | 48.3 | 42.5 | 26.6   | 24.8      | 64.9            |
| Baines Drift           | 61.7  | 52.9 | 51.0 | 49.5 | 38.2   | 34.0      | 70.2            |
| Mahalapye              | 70.5  | 61.4 | 58.8 | 54.6 | 37.8   | 36.4      | 80.0            |
| Lephephe               | -     | -    | -    | -    | -      | -         | -               |
| Tshane                 | 65.8  | 52.7 | 52.4 | 41.8 | 31.0   | 25.4      | 76.0            |
| Werda                  | 70.2  | 61.8 | 59.0 | 47.8 | 39.8   | 30.5      | 77.7            |
| Goodhope               | 80.7  | 67.6 | 61.8 | 55.5 | 41.5   | 35.4      | 84.9            |
| <b>Monthly average</b> | 71.1  | 56.0 | 54.9 | 49.3 | 35.8   | 31.1      | 72.6            |

Source: Department of Meteorological Services and SASSCAL  
Dashes (-) show no data

April 2022 recorded the highest average relative humidity extremes for the period April to September 2022.

### 5.3 Lowest relative humidity

Table 15 shows the lowest relative humidity recordings for the stations, during the period April to September 2022. The lowest humidity extremes were recorded during September 2022. September recorded the lowest monthly average relative humidity extremes for the period.

**Table 15: Highest relative humidity percentage of month by station for April to September 2022**

| Stations               | April | May  | June | July | August | September | Station average |
|------------------------|-------|------|------|------|--------|-----------|-----------------|
| Shakawe                | 52.1  | 41.1 | 36.5 | 40.7 | 29.8   | 20.4      | 36.8            |
| Pandamatenga           | 49.9  | 30.2 | 33.0 | 28.6 | 15.4   | 17.6      | 29.1            |
| Mababe                 | 65.3  | 46.6 | 38.1 | 40.5 | 21.4   | 21.3      | 38.9            |
| Tubu                   | 55.1  | 33.1 | 31.3 | 36.4 | 22.0   | 16.7      | 32.4            |
| Sowa                   | 45.7  | 29.0 | 29.5 | 27.6 | 13.8   | 11.5      | 26.2            |
| Ghanzi                 | 53.6  | 33.9 | 26.0 | 24.6 | 15.8   | 16.6      | 28.4            |
| Baines Drift           | 41.2  | 37.3 | 34.3 | 23.5 | 13.9   | 15.1      | 27.6            |
| Mahalapye              | 44.7  | 46.1 | 41.6 | 26.7 | 18.5   | 15.1      | 32.1            |
| Lephephe               | -     | -    | -    | -    | -      | -         | -               |
| Tshane                 | 41.0  | 35.3 | 25.0 | 28.3 | 15.5   | 14.1      | 26.5            |
| Werda                  | 41.3  | 38.4 | 38.5 | 32.2 | 22.9   | 20.4      | 32.3            |
| Goodhope               | 47.8  | 47.6 | 42.2 | 33.7 | 24.7   | 19.1      | 35.9            |
| <b>Monthly average</b> | 48.9  | 38.1 | 34.2 | 31.2 | 19.4   | 17.1      | 31.5            |

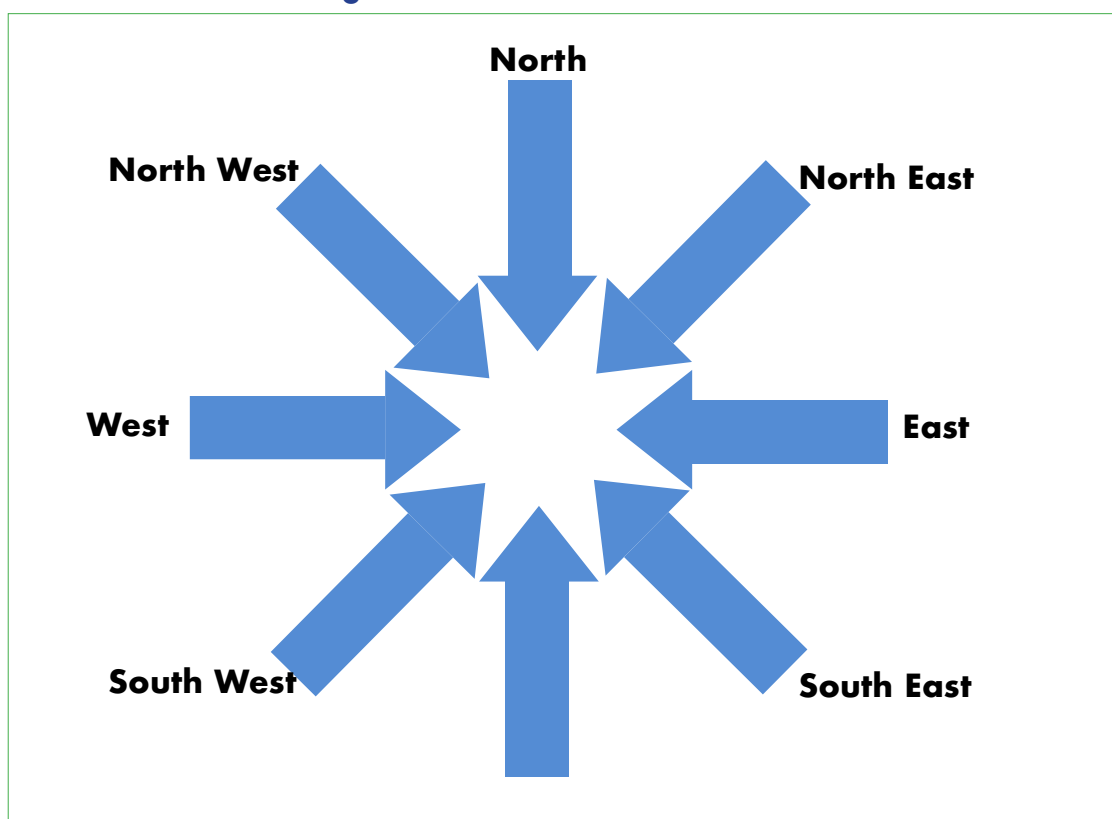
Source: Department of Meteorological Services and SASSCAL  
Dashes (-) show no data

## 5. APPENDIX

**Table 16: Wind Scale**

| m/s       | Km/h    | Beaufort scale | Label           | Effects   |
|-----------|---------|----------------|-----------------|---|
| 0 - 0.2   | 1       | 0              | Calm            | Calm. Smoke rises vertically.   |
| 0.3-1.5   | 1-5     | 1              | Light Air       | Wind motion visible in smoke.   |
| 1.6-3.3   | 6-11    | 2              | Light Breeze    | Wind felt on exposed skin. Leaves rustle.   |
| 3.4-5.4   | 12-19   | 3              | Gentle Breeze   | Leaves and smaller twigs in constant motion.  |
| 5.5-7.9   | 20-28   | 4              | Moderate Breeze | Dust and loose paper raised. Small branches begin to move.  |
| 8.0-10.7  | 29-38   | 5              | Fresh Breeze    | Branches of a moderate size move. Small trees begin to sway.  |
| 10.8-13.8 | 39-49   | 6              | Strong Breeze   | Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.   |
| 13.9-17.1 | 50-61   | 7              | Near Gale       | Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially by people on upper floors.                                      |
| 17.2-20.7 | 62-74   | 8              | Gale            | Twigs broken from trees. Cars veer on road.   |
| 20.8-24.4 | 75-88   | 9              | Severe Gale     | Larger branches break off trees, and some small trees blow over. Construction/ temporary signs and barricades blow over. Damage to circus tents and canopies.                 |
| 24.5-28.4 | 89-102  | 10             | Storm           | Trees are broken off or uprooted, saplings bent and deformed, poorly attached asphalt shingles and shingles in poor condition peel off roofs.                                 |
| 28.5-32.6 | 103-117 | 11             | Violent Storm   | Widespread vegetation damage. More damage to most roofing surfaces, asphalt tiles that have curled up and/or fractured due to age may break away completely.                  |
| >32.7     | >118    | 12             | Hurricane       | Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns. Debris may be hurled about. |

**Figure 5: Winds Direction illustration**



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