

# CUMULUS

23 February 2023

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AGRICULTURE'S *heartbeat*

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Photo credit: Stefni Kuschke

# Summary

## Drier conditions while the tropical cyclone is active to the northeast

Tropical Cyclone Freddie, currently approaching the Mozambique coast, is expected to make landfall with its center just north of Vilanculos. The system will result in widespread heavy rainfall and windy conditions from late Friday until early Monday over the extreme northeastern parts of South Africa (Northern Lowveld, eastern Limpopo River Valley and northeastern escarpment). Current forecasts favor a track from eastern Limpopo towards southern Zimbabwe and then out east again, but these may change as weather models are not particularly accurate when it comes to the forecasting of tropical cyclone tracks. However, given the projected track of the system currently, most of South Africa should experience relatively warm and dry conditions during the next few days while the system results in inclement weather in the extreme northeast. The summer-grain production region should be relatively dry also, even though it is expected to become cloudy and cooler over the eastern parts of the region with isolated thundershowers during the weekend.

**The following is a summary of weather conditions during the next few days:**

### General:

- Temperatures will on average be above normal, but normal to below normal over the northeastern parts.
- Rainfall during the period will be below normal, but above-normal over the extreme eastern and northeastern parts.
- Tropical Cyclone Freddie will cause cloudy and windy conditions with widespread rain and thundershowers over the central to northern Lowveld and eastern parts of the Limpopo River Valley as well as the northeastern escarpment from Friday evening, with heavy falls. These conditions should clear by early Monday.
- Widespread showers and thundershowers may also occur over the southern parts of the Lowveld and northeastern KZN on Sunday due to the influx of cooler air underneath the tropical air mass.
- Most of the interior will be warm to hot and dry while Freddy is active in the far northeast.
- The summer-grain production region is not expected to receive widespread rain in association with the tropical cyclone in the northeast according to current forecasts. Partly cloudy to cloudy and cooler conditions with isolated showers or thundershowers and moderate to fresh easterly winds may however be expected over the eastern parts of the region by Saturday and Sunday, clearing by Monday. Scattered thundershowers are expected over the central parts of the region on Sunday, unrelated to the tropical cyclone.
- While current forecasts don't indicate rainfall further to the west associated with the tropical cyclone, the tracks of these systems are difficult to predict accurately and the outlook may change significantly depending on the movement of the system.
- Isolated thundershowers are expected over the central to northwestern interior from Sunday onwards (not associated with the tropical cyclone).
- No rain is expected over the western to southern interior according to current forecasts during the next few days.
- It will be hot over the interior of the Northern Cape, western Free State and western North West, spreading to the Swartland and northern parts of the Karoo on several days.
- The wind will be strong southeasterly over the southwestern parts of the Western Cape, becoming gale force southeasterly at times during the weekend and early next week.
- The summer-grain production region should be relatively warm and dry according to current forecasts, with the tropical cyclone limited to the extreme northeastern parts of South Africa according to current forecasts. However, these outlooks may change. It will be hot over the western parts of the region on several days:
  - Maximum temperatures over the eastern maize-production areas will be in the order of 18 – 29°C, with lowest temperatures expected from Saturday to Monday. Minimum temperatures will be in the order of 10 – 15°C.
  - Maximum temperatures over the western maize-production region will range between 28 and 35°C, with higher temperatures in the west. Minimums will be in the order of 15 - 20°C.

## Overview of expected conditions over the main agricultural production areas

The tropical cyclone (Freddy) making landfall and moving across the extreme northeastern parts of South Africa and into Zimbabwe will result in widespread precipitation over the extreme northeastern parts. Over the rest of the country, large-scale atmospheric circulation patterns will, according to current forecasts, not be conducive to widespread rainfall. While most of the southern to western interior is expected to remain dry, some thundershowers may at times occur over the central to northwestern parts. It will be hot over the western to northwestern interior as anti-cyclonic flow will dominate the region according to current forecasts. The presence of the Atlantic Ocean Anticyclone to the southwest, and ridging around the country of the system at times, will result in somewhat milder conditions in the far south, with light showers at times over the Garden Route and also strong to gale-force southeasterly winds over the southwestern parts of the Western Cape most of the time. Ridging will also result in more widespread rain over northern KZN and eastern Mpumalanga on Sunday, and isolated to scattered thundershowers over these areas again next week.

**Maize production region:** The region should be relatively dry. Partly cloudy to cloudy, cooler and windy conditions are expected over the eastern parts with some showers during the weekend and Monday. Thundershowers are expected over the central parts by Sunday, spreading over most of the region on Monday and Tuesday. It will be hot over the western parts on most days with maximum temperatures in the mid-to upper 30s.

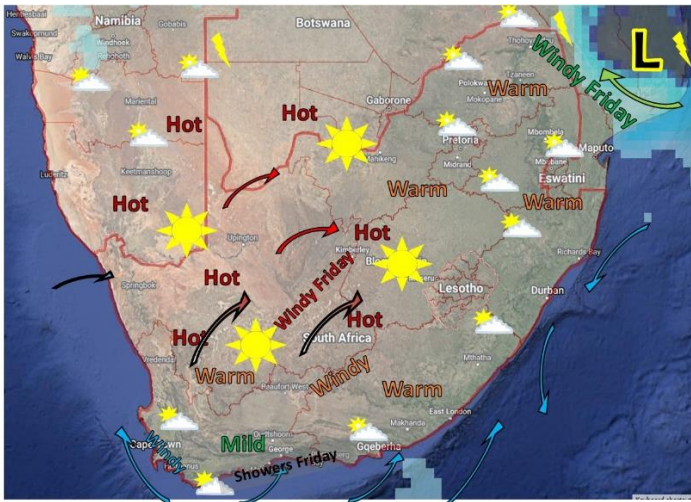
- Maximum temperatures over the eastern maize-production areas will be in the order of 18 – 29°C, with lowest temperatures expected from Saturday to Monday. Minimum temperatures will be in the order of 10 – 15°C.
- Maximum temperatures over the western maize-production region will range between 28 and 36°C, with higher temperatures in the west. Minimums will be in the order of 15 - 20°C.
- **Thursday (23<sup>rd</sup>):** Sunny and warm. It will be hot in the west.
- **Friday (24<sup>th</sup>):** Sunny and warm. It will be hot in the west.
- **Saturday (25<sup>th</sup>):** Partly cloudy and warm, becoming cloudy and windy (easterly winds) over the eastern parts with isolated showers or thundershowers. It will be hot in the west.
- **Sunday (26<sup>th</sup>):** Partly cloudy and warm with scattered thundershowers over the central to western parts. It will remain partly cloudy to cloudy, mild and windy (easterly winds) over the eastern parts with isolated showers or thundershowers.
- **Monday (27<sup>th</sup>):** Partly cloudy and warm with isolated thundershowers, but mild in the east.
- **Tuesday (28<sup>th</sup>):** Partly cloudy and warm with isolated thundershowers, but hot in the west.
- **Wednesday (1<sup>st</sup>):** Partly cloudy and warm, but hot in the west. Isolated thundershowers are expected in the east.

**Cape Wine Lands and Ruens:** With the wind during the period from the south or southeast, the southern parts (Garden Route) should remain partly cloudy to cloudy and mild most of the time. Light showers are possible over these areas during the weekend. The interior will be warm most of the time, with no rain expected according to current forecasts. It will become hot over the Swartland, northwestern interior and western Karoo on Thursday and again by Monday to Wednesday. The wind will be fresh to strong southeasterly in the southwest most of the time, becoming gale force at times during the weekend and early next week.

# Daily summary of expected conditions

(GFS forecasted rainfall for indicated periods shown in shades of blue, with darkest shading > 50mm)

## Thursday to Friday, 23 - 24 February



It will be sunny and warm over most of the interior, but hot over the western to central and northern interior.

It will be sunny to partly cloudy and warm over the northeastern parts.

It will be warm to mild in the south, with an on-shore flow resulting in light showers along the Garden route by late Friday.

It will become cloudy and windy over the northern Lowveld late Friday as tropical Cyclone Freddy approaches.

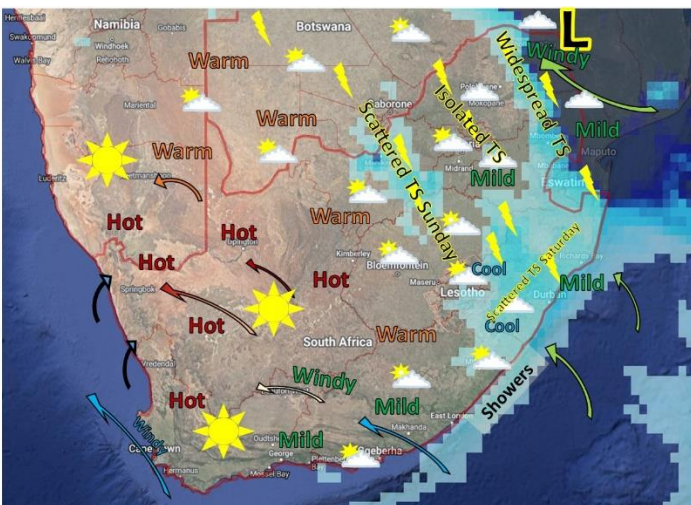
It will be windy over the southern to western interior.

It will be hot and windy over the western interior.

It will be windy and warm over the southern parts.

The wind over the southwestern parts of the Western Cape will be fresh to strong southeasterly.

## Saturday to Sunday, 25 - 26 February



It will be warm to mild and windy over the southern interior.

It will be hot and windy over the southwestern and western parts.

The wind over the southwestern parts of the Western Cape will be fresh to strong southeasterly.

It will be cloudy, mild and windy with widespread rain and thundershowers over the eastern parts of the Limpopo River Valley, northeastern escarpment, and central to northern Lowveld.

It will be cloudy to partly cloudy and warm to mild with isolated thundershowers over the rest of the northeastern interior with moderate easterly winds.

It will be cloudy and mild over Mpumalanga and northeastern Free State with isolated showers or thundershowers and moderate easterly winds.

It will be partly cloudy and warm over central to eastern North West and northern Free State with scattered thundershowers on Sunday.

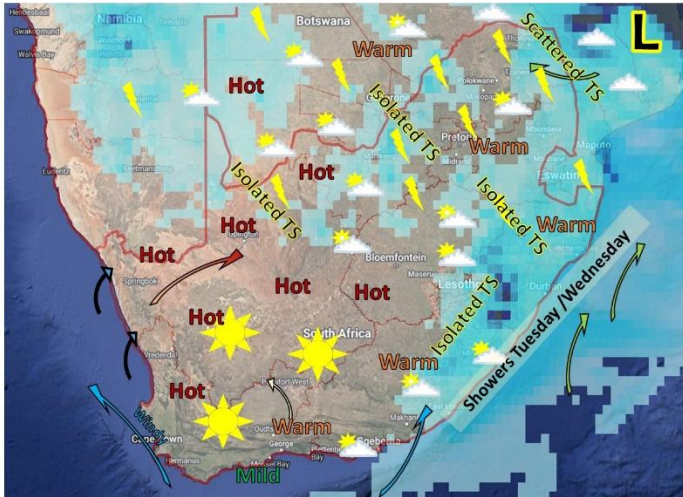
It will be partly cloudy to cloudy and cool over the northeastern interior of the Eastern Cape and southwestern KZN with isolated showers.

Partly cloudy to cloudy and mild with light showers along the garden route on Friday.

Showers are expected over the southeastern coastal areas on Saturday, spreading northwards along the coast.

Warm to hot and dry over the western interior, west coast and northern to western parts of the winter rainfall region.

## Monday to Wednesday, 27 February – 1 March



Partly cloudy and warm to hot with isolated thundershowers over the northern to northwestern interior.

Partly cloudy and warm with isolated thundershowers over the eastern to northeastern parts.

Scattered showers or thundershowers are still possible over the far northeastern parts while the tropical system (ex Tropical Cyclone Freddy) moves away slowly.

Light showers are possible along the southeastern to eastern coastal areas on Tuesday and Wednesday.

It will be sunny and hot over the western to southwestern parts.

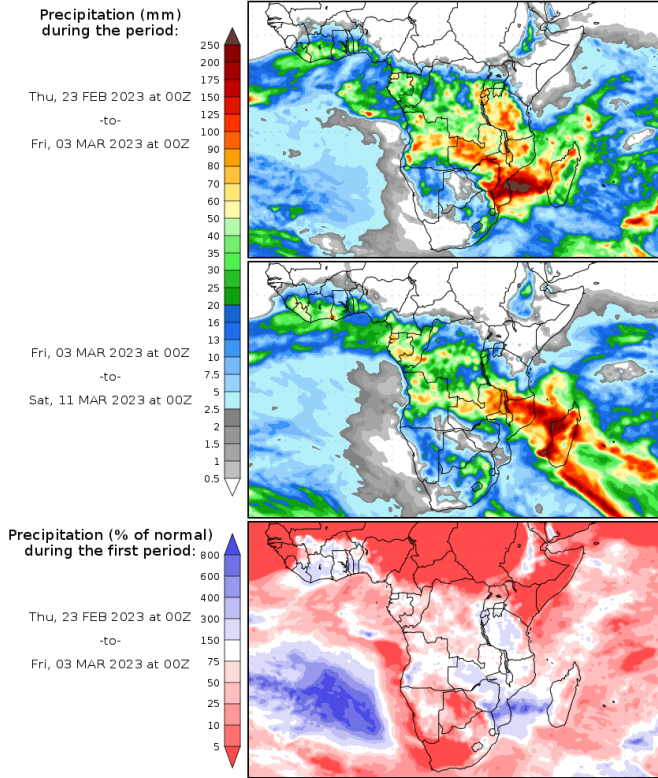
It will be warm in the south.

It will be partly cloudy and mild to warm along the Garden Route.

Strong southeasterly winds are expected over the southwestern parts of the Western Cape.

# Medium term rainfall and temperature summary

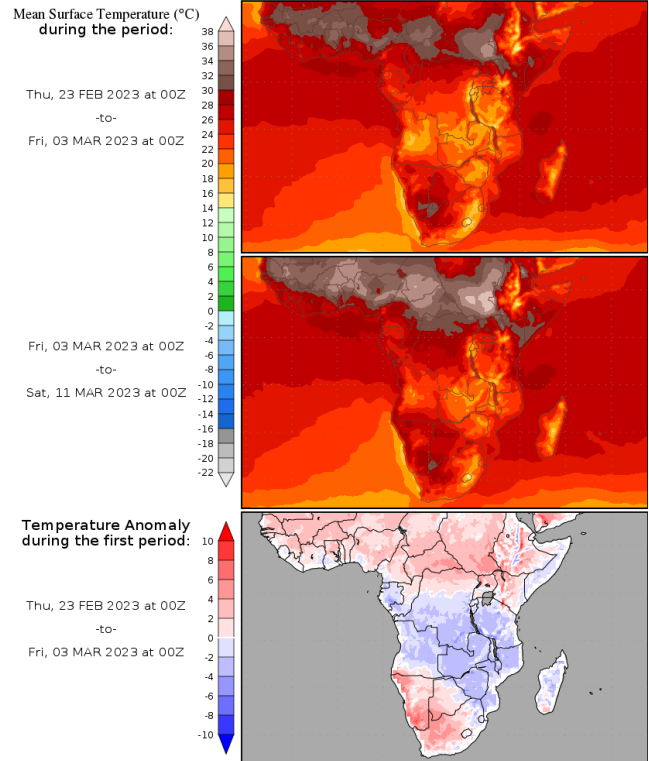
## Precipitation Forecasts



Precipitation forecasts from the National Centers for Environmental Prediction.  
Normal rainfall derived from Xie-Arkin (CMAP) Monthly Climatology for 1979-2003.  
Forecast Initialization Time: 00Z23FEB2023

GrADS/COLA

## Temperature Forecasts



Temperature forecasts from the National Centers for Environmental Prediction.  
Normal Temperature derived from CRU monthly climatology for 1901-2000  
Forecast Initialization Time: 00Z23FEB2023

GrADS/COLA

## Possible extreme conditions - relevant to agriculture

The South African Weather Service issues warnings for any severe weather that may develop, based on much more information (and in near-real time) than the output of only 2 weather model (GFS and the ECMWF model) considered here in the beginning of a week-long (starting 23 February) period. It is therefore advised to keep track of warnings that may be issued by the SAWS ([www.weathersa.co.za](http://www.weathersa.co.za)) as the week progresses.

**According to current model projections (GFS / ECMWF models) of weather conditions during the coming week, the following may be deduced:**

- **Significant daily rainfall totals, exceeding 50 mm in 24 h, may occur:**
  - Central to northern Lowveld, northeastern escarpment, associated with Tropical Cyclone Freddy: **Saturday to Sunday (25<sup>th</sup>- 26<sup>th</sup>).**
  - Northeastern KZN and southern Lowveld: **Sunday (26<sup>th</sup>).**
- **Flood-producing rainfall, with 48h totals exceeding 200 mm, are expected:**
  - Northern Lowveld, eastern parts of the northeastern escarpment: **Saturday to Sunday (25<sup>th</sup>- 26<sup>th</sup>).**
- **Moderate to strong easterlies to southeasterly winds are expected:**
  - Lowveld, eastern half of the Limpopo River Valley and northeastern escarpment (associated with tropical Cyclone Freddy): **Saturday to Sunday (25<sup>th</sup> – 26<sup>th</sup>).**
- **Mild conditions with extensive cloud cover and high humidity may result in the development and spread of fungal pathogens:**
  - Over the eastern summer-grain production areas: **Sunday to Monday (26<sup>th</sup> – 27<sup>th</sup>).**
- **It will be hot:**
  - Over the western to northwestern interior: **Thursday to Wednesday (23<sup>rd</sup> – 1<sup>st</sup>).**
  - Over the Karoo: **Thursday to Friday (23<sup>rd</sup> – 24<sup>th</sup>).**
  - Over the western parts of the Karoo, Swartland and west coast: **Thursday (23<sup>rd</sup>) and Sunday to Wednesday (26<sup>th</sup> – 1<sup>st</sup>).**
- **It will be hot and windy:**
  - Western to southern interior: **Thursday to Friday (23<sup>rd</sup> – 24<sup>th</sup>).**
- **Strong southeasterly winds are expected, becoming gale force at times later:**
  - Over the southwestern parts of the Western Cape: **Thursday to Wednesday (23<sup>rd</sup> – 1<sup>st</sup>).**



## Seasonal forecast

**Seasonal forecasts for the remainder of summer and autumn over South Africa** still favor wetter conditions over the summer rainfall region.

**ENSO forecasts** indicate a further weakening of the current La Niña during the remainder of our summer, with a return to neutral conditions in mid-2023. La Niña is associated with above-normal rainfall during mid- to late summer over the summer rainfall region of South Africa.

**The Australian Bureau of Meteorology points out that the La Niña in the tropical Pacific is still expected to weaken further in the coming weeks**

(Updated 14 February): La Niña continues in the tropical Pacific Ocean. While oceanic indicators, including sea surface temperatures (SSTs), have weakened to ENSO-neutral values, the atmosphere has been slower to respond and remains La Niña-like. Even as La Niña weakens, it can continue to influence global weather and climate.

All models anticipate SSTs in the central Pacific Ocean will warm further, but remain at neutral levels (neither La Niña nor El Niño) until at least mid-autumn. As accuracy is generally lower for long-range ENSO forecasts made during summer, ENSO outlooks that extend past autumn should be viewed with caution.

The Southern Annular Mode (SAM) is neutral but is expected to briefly dip into negative values before remaining neutral for the coming weeks to months.

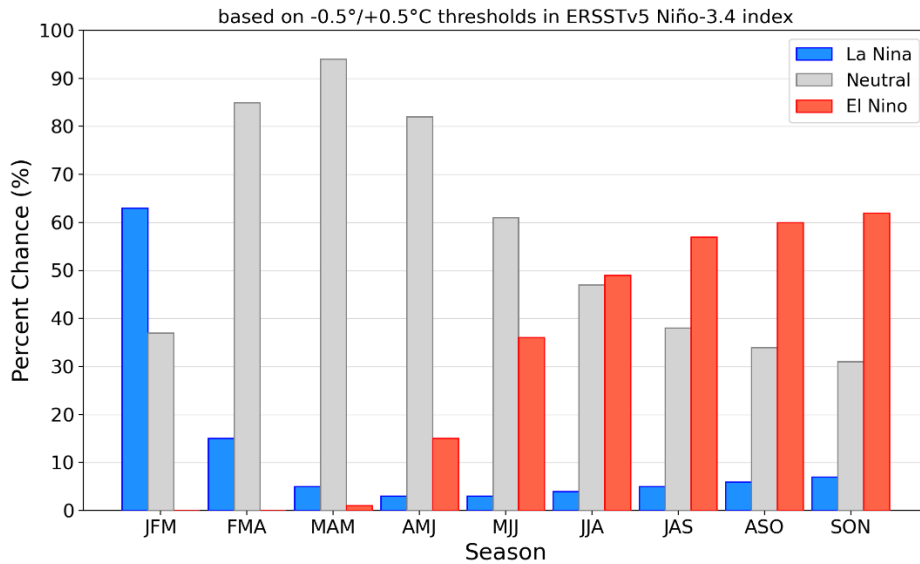
A strong Madden–Julian Oscillation (MJO) pulse is currently over the western Pacific and is forecast to move into the eastern Pacific next week. An active pulse of the MJO over the Pacific Ocean may reduce trade wind strength and hence further weaken La Niña.....*Australian Bureau of Meteorology* - <http://www.bom.gov.au>

**While La Niña conditions are associated with wetter than normal conditions over the summer rainfall region of South Africa, a positive SAM is associated with above-normal rainfall over the eastern parts during mid to late summer. The SAM will be positive during the next few days, but is expected to reduce to neutral values during the next few days. A quick reduction in the SAM is often associated with the influence of west-wind troughs around South Africa and generally a large change in the position and strength of the pressure patterns to the south. The MJO during the next few days will be very weak, not specifically associated with wet or dry episodes in South Africa.**

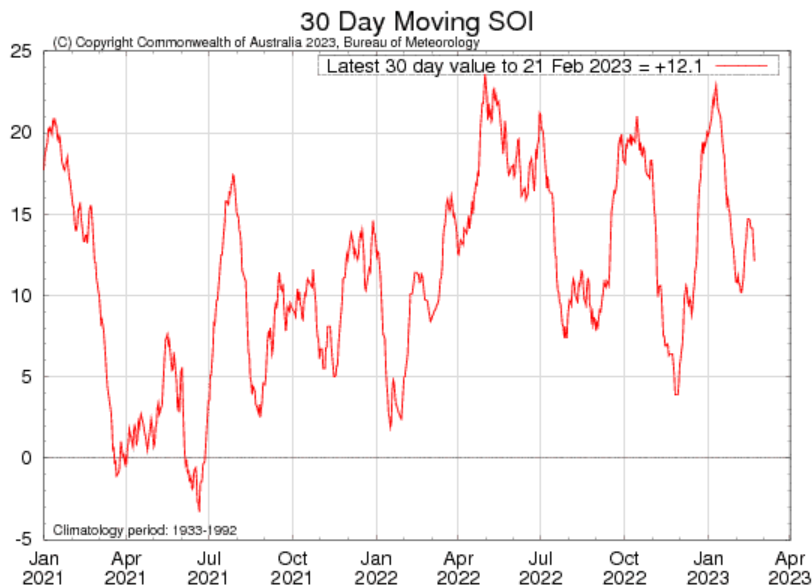
**The International Research Institute for Climate and Society (IRI) also expects La Niña conditions to persist into summer**

**According to the IRI** (Updated 9 February): In mid-January 2023, sea surface temperatures in the central-eastern equatorial Pacific remain below-average. Key oceanic and atmospheric variables have remained consistent with La Niña conditions, though there are indications that this is weakening. A CPC La Niña Advisory still remains in place for January 2023. The majority of models (19 out of 23) in the IRI ENSO prediction plume predict SSTs to transition from the level of a La Niña to ENSO-neutral state during Feb-Apr, 2023. The likelihood of El Niño remains low through May-Jul 2023 (44% chance), but becomes the dominant category thereafter with probabilities in the 53-57% range.....*International Research Institute for Climate and Society*- <http://iri.columbia.edu/>

## Official NOAA CPC ENSO Probabilities (issued Feb. 2023)



International Research Institute for Climate and Society- <http://iri.columbia.edu/>

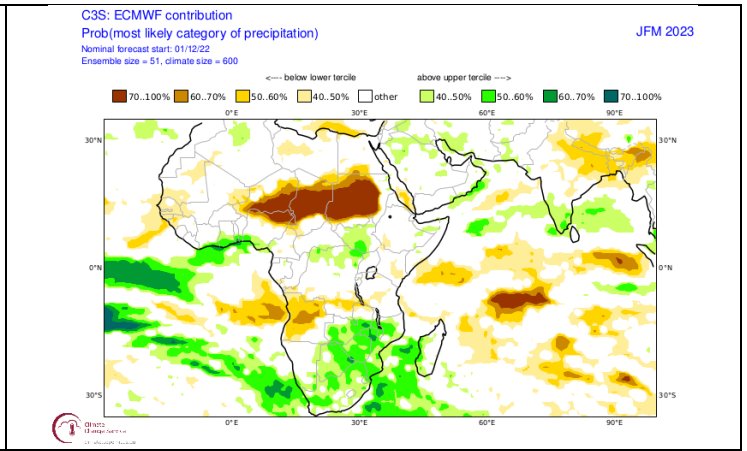
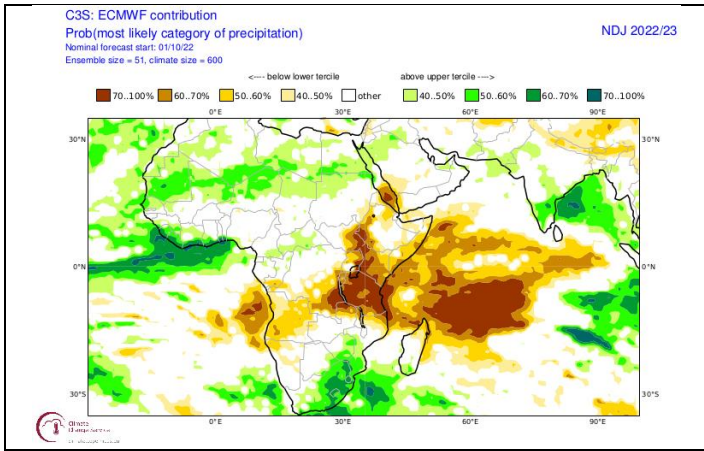


Australian Bureau of Meteorology - <http://www.bom.gov.au>

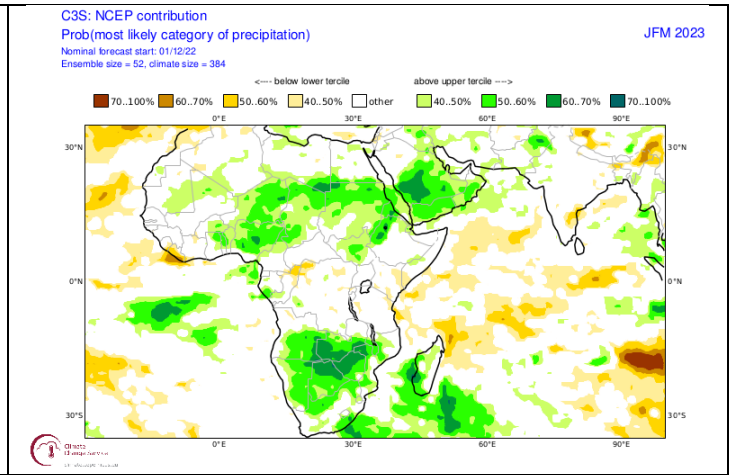
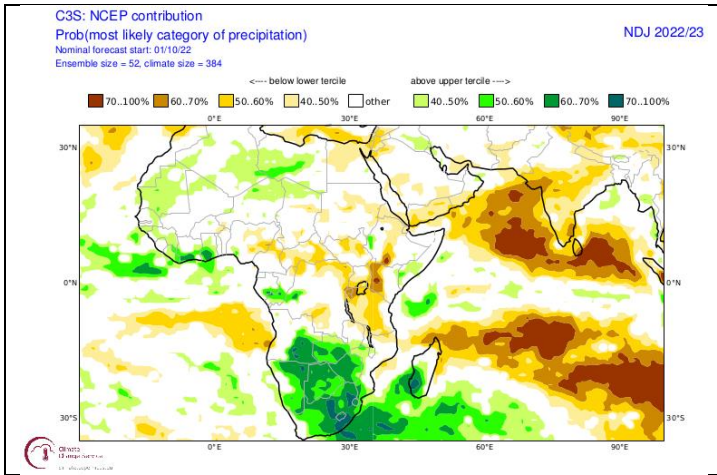
**The Southern Oscillation Index is in positive territory (+12.1). This is indicative of atmospheric circulation patterns associated with La Niña conditions.**

## Seasonal forecasts issued by various international institutions

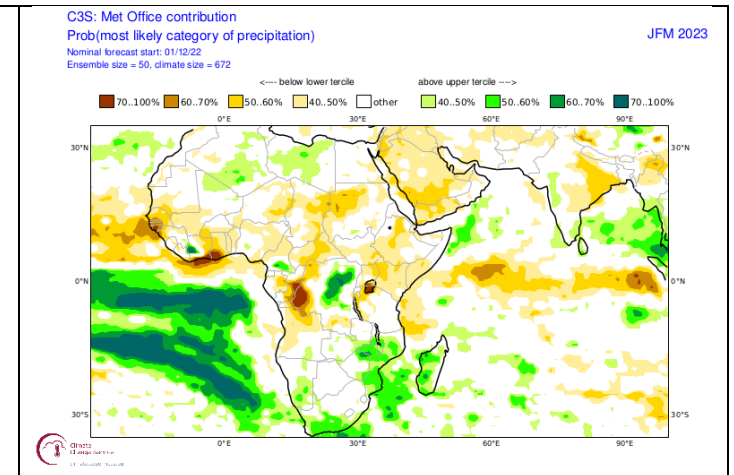
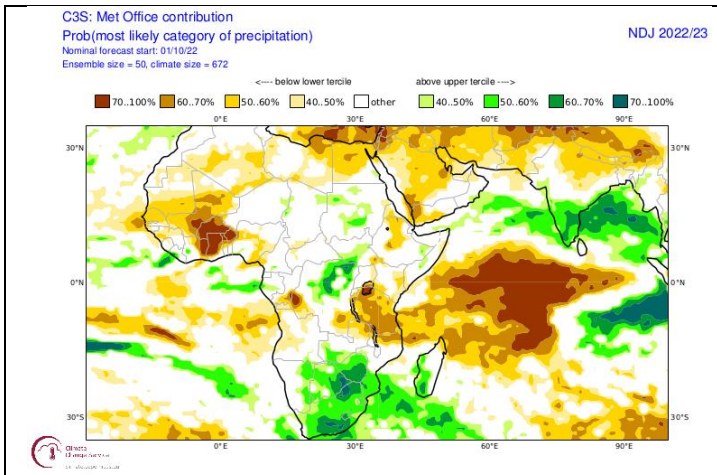
Seasonal forecasts (updated in October 2022) by these institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) for both early to mid-summer, and mid-to late summer reflect an expectation for a relatively wet summer over the interior. The signal for relatively wet conditions over the summer rainfall region of South Africa is somewhat stronger for mid-summer (NDJ) than late summer (JFM) according to most of these institutions. The relatively wet conditions expected are partly associated with the observed moderate La-Niña. Similar tendencies are also present in the IRI seasonal forecasts (not shown).



**Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for mid-summer (November - January 2022/23; left – Forecast issued 2022-10) and late summer (January-March 2023; right - Forecast issued in 2022-12).**



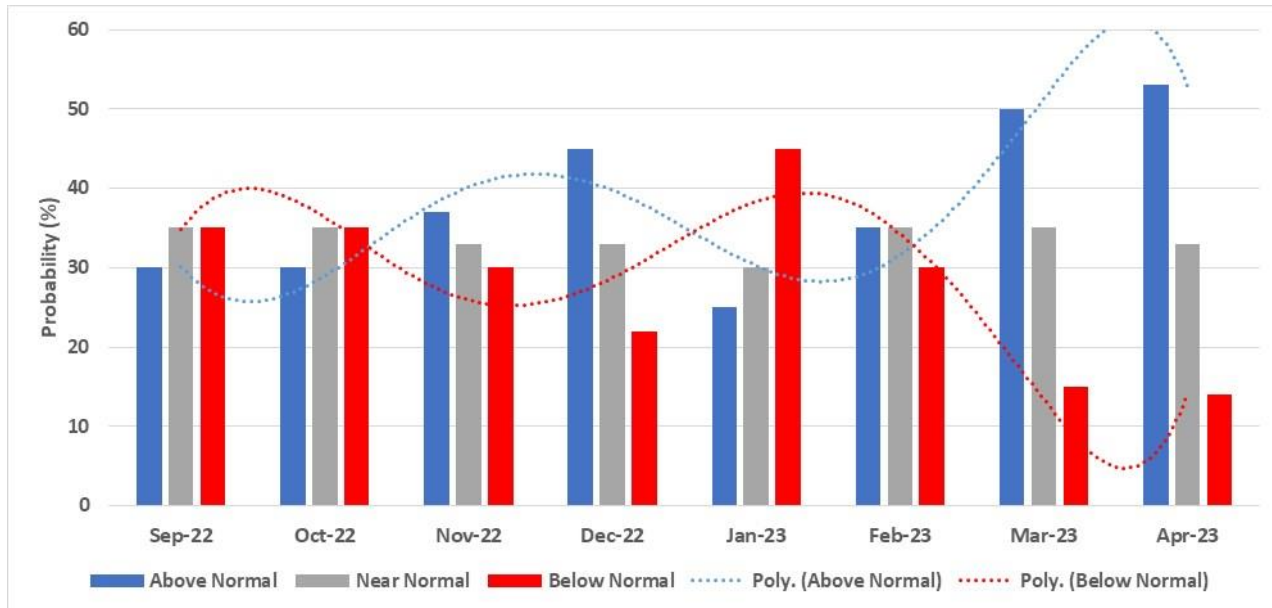
**Same as above, but forecasts issued by the National Centres for Environmental Prediction.**



**Same as above, but forecasts issued by the UK Met Office.**

## CUMULUS seasonal outlook

This outlook is based on the typical observed rainfall patterns over the **north-eastern half** of the country (including most of the summer grain production region), as associated with the cyclic variability of the global climate system. Summers that are similar to 2022/23 more often experience a seasonal rainfall curve that compares to normal conditions as indicated in the bar graph below, with wetter conditions focussing on November to December and again from mid-February to April while drier than normal conditions focus on October and January to mid-February:



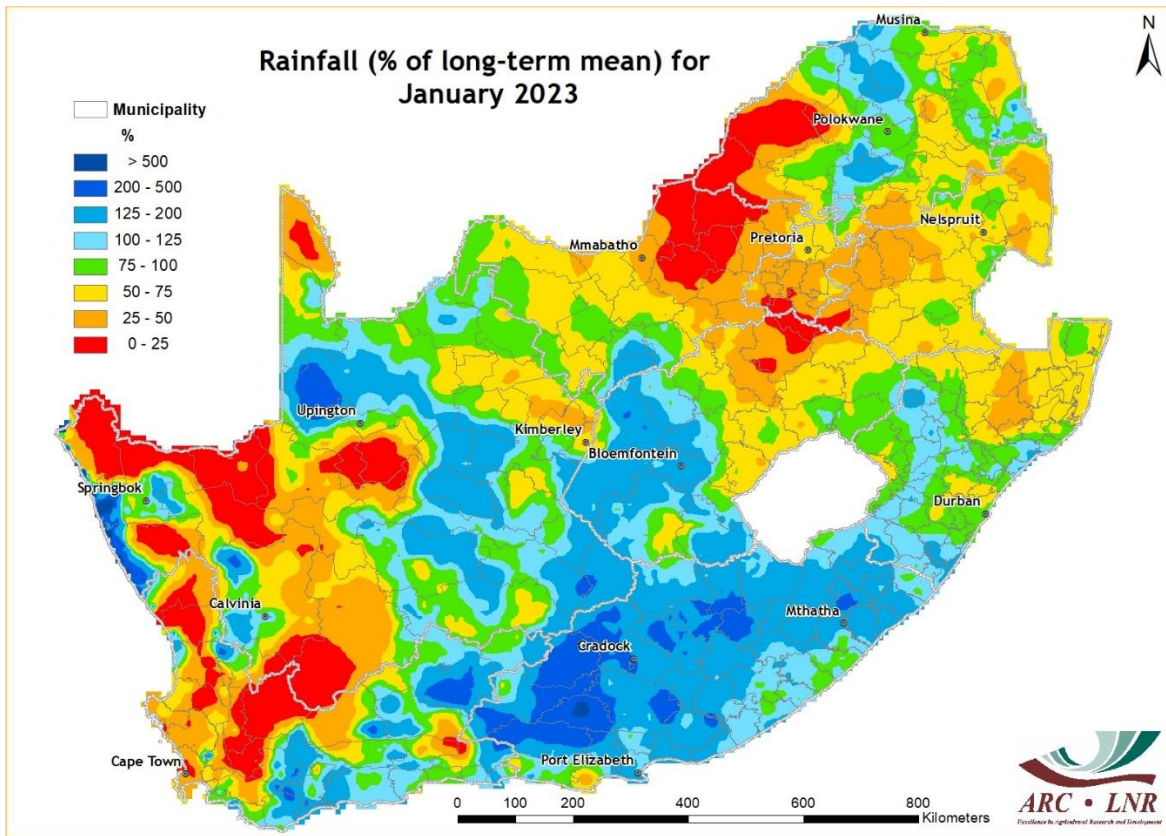
***Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2022 – April 2023 (Forecast issued in 2022-10).***

Typical patterns during similar summers, over the north-eastern half of the summer rainfall region, are:

- September – 9 October: Relatively dry conditions over the north-eastern half of the summer rainfall region
- 10 October – 10 November: Near-normal rainfall over the north-eastern half of the summer rainfall region
- 10 November – end of December: Near-normal to above-normal rainfall over the north-eastern half of the summer rainfall region
- January – mid-February: Below-normal rainfall over the north-eastern half of the summer rainfall region
- Mid-February - April: Above-normal rainfall over the north-eastern half of the summer rainfall region

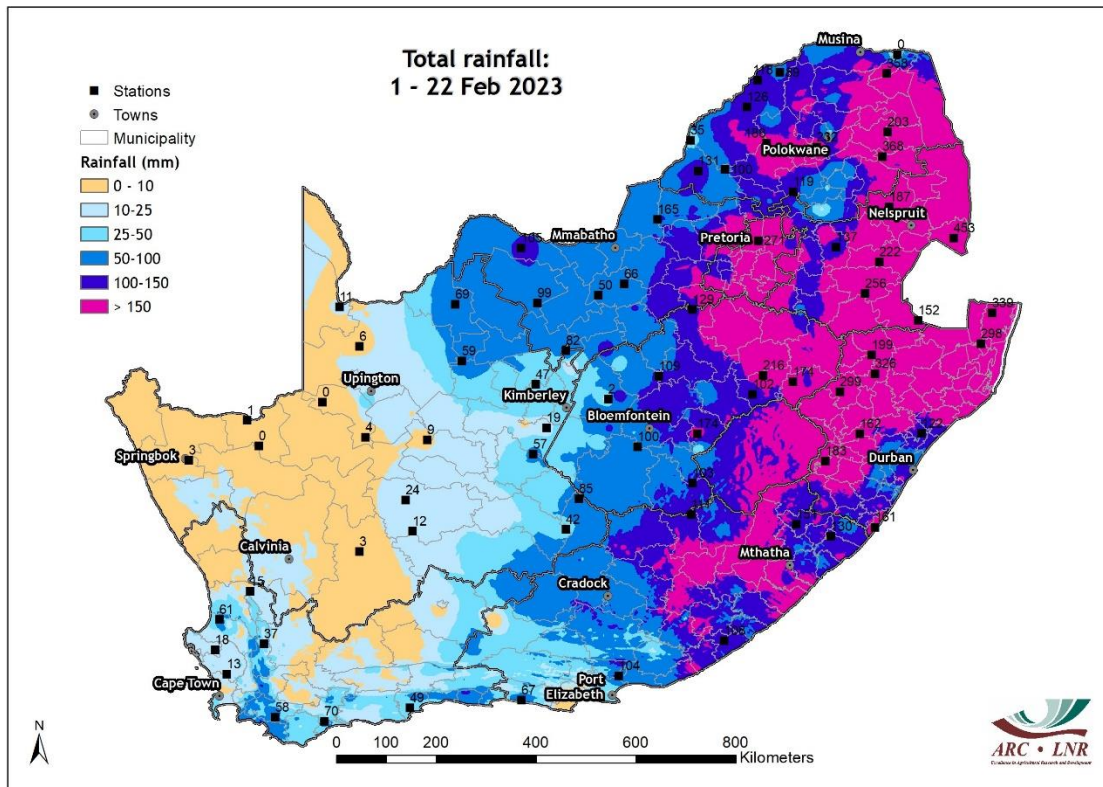
# Observed conditions

## Rainfall (% of long-term mean): January 2023



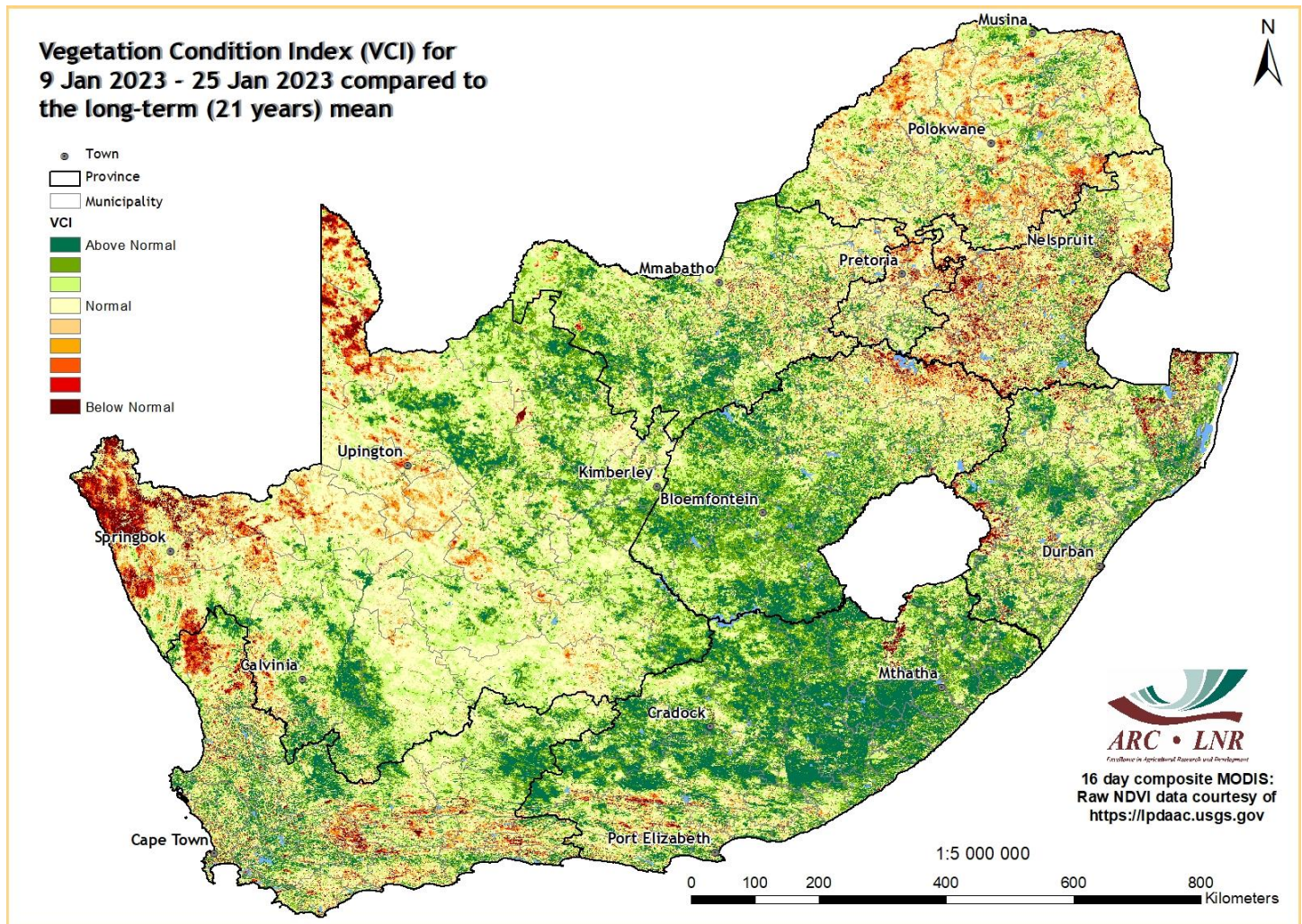
*The northern half of the summer rainfall region received below-average rainfall during January while the southern parts received above-average rainfall. Rainfall over the winter rainfall region was mostly below average.*

## Rainfall (mm): 1 – 22 February 2023



**Rainfall totals exceeding 200 mm were recorded over much of the northeastern to eastern parts for February so far. Totals for the month so far over the central parts of the country, including the western summer-grain production region, range between 50 mm and 100 mm. The winter rainfall region also received some rain, with totals exceeding 25mm mostly in the mountainous areas.**

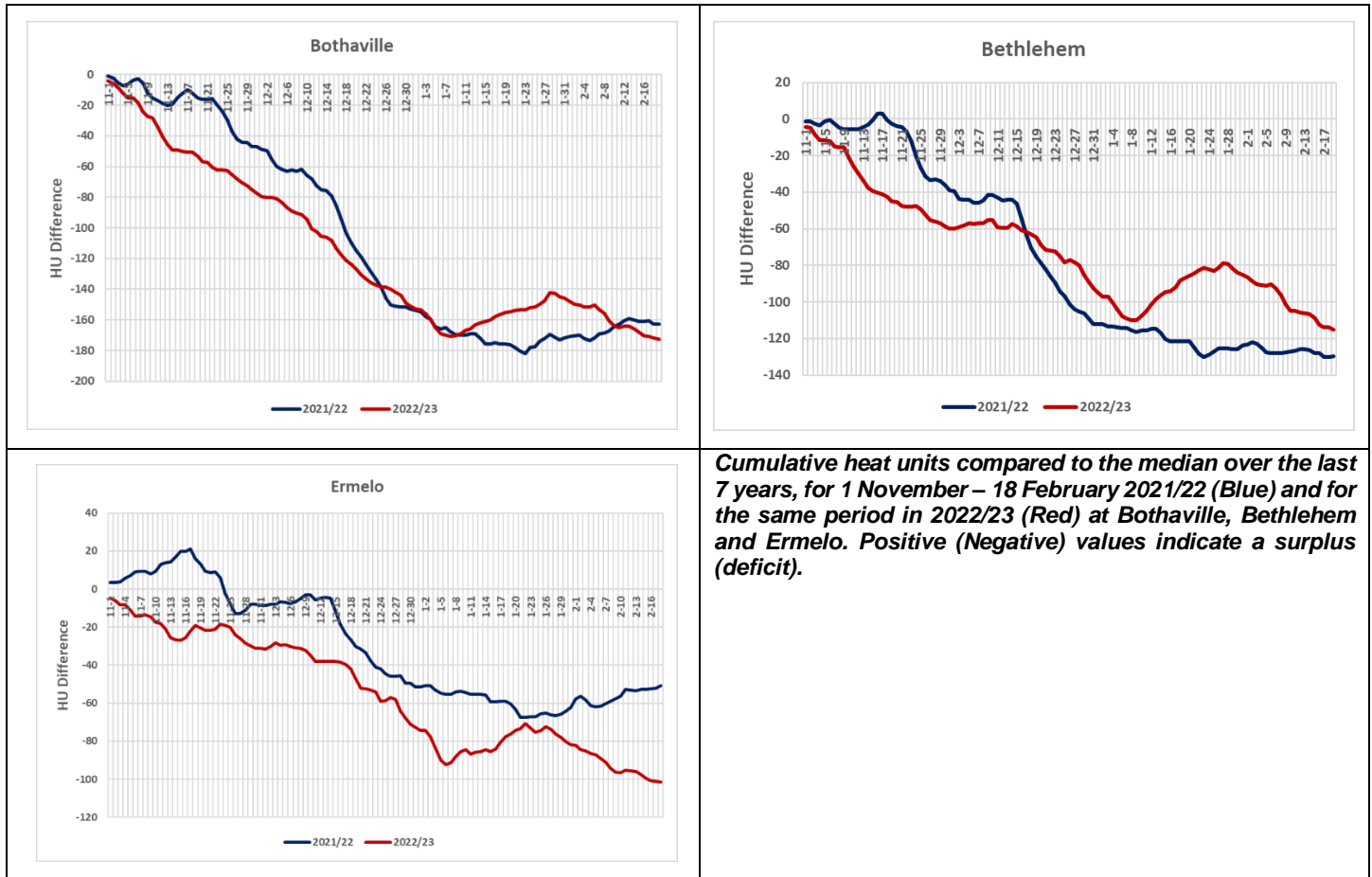
## Vegetation Condition Index: January 2023



***By late January, vegetation activity still reflected widespread above-normal rainfall since mid-October over most of the interior. Isolated areas over the far northeastern Free State, southwestern to western Mpumalanga and east/central North West however experienced below-normal vegetation activity associated with relatively dry conditions during January.***

## Heat units since 1 November 2022

Due to cool, rainy conditions around the middle of November and around mid- to late December together with cooler conditions since early February, heat units are behind the median value calculated over the last seven years over the summer-grain production region, especially in the northeast (Mpumalanga).



Cumulative heat units since 1 November still lag the 7-year median. Warm to hot and dry conditions during January resulted in decreasing deficits relative to both last summer as well as the 7-year median. However, the deficit has increased since early February.



## Sources of information

**Seasonal forecasts:** Published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>)

**Rainfall, temperature and wind maps over South Africa for the past week:**

Agricultural Research Council - Institute for Soil, Climate and Water (ISCW) – Climate Data Bank. Data recorded by the automatic weather station network of the ARC-ISCW.

**Vegetation condition maps:** Copernicus Global Land service, distributed by VITO.

**Information related to: ENSO, IOD and SOI:**

Australian Bureau of Meteorology - <http://www.bom.gov.au>

Climate Prediction Center - <http://www.cpc.ncep.noaa.gov>

International Research Institute for Climate and Society- <http://iri.columbia.edu/>

**Information related to the SAM:**

The Annular Mode Website - <http://www.atmos.colostate.edu/ao/index.html>

**SST map:**

NOAA Climate Prediction Center - <http://www.cpc.ncep.noaa.gov>

**Daily conditions over South Africa:**

Accumulations of GFS 6-hourly rainfall fields, done in Google Earth Engine

**Tropical cyclone/hurricane/typhoon information:**

Weather Underground - <http://www.wunderground.com>

Cooperative Institute for Meteorological Satellite Studies (CIMMS) - Tropical Cyclone Group -<http://tropic.ssec.wisc.edu/>

Tropical Cyclone Centre La Reunion -[http://www.meteo.fr/temps/domtom/La\\_Reunion/webcmrs9.0/anglais/index.html](http://www.meteo.fr/temps/domtom/La_Reunion/webcmrs9.0/anglais/index.html)

**Information on drought conditions over the USA:**

NOAA National Weather Service - <http://www.weather.gov>

United States Drought Monitor - <http://droughtmonitor.unl.edu>

**Precipitation and temperature outlooks for the coming week:**

Center for Ocean-Land-Atmosphere Studies (COLA) and Institute of Global Environment and Society (IGES) – <http://Wxmaps.org>

“COLA and IGES make no guarantees about and bear no responsibility or liability concerning the accuracy or timeliness of the images being published on these web pages. All images are generated by COLA and do not represent the actual forecasts issued by the National Weather Service. These products are not a substitute for official forecasts and are not guaranteed to be complete or timely. The underlying data are the direct product of the various operational forecast models.

# YOUNG PEOPLE

SEE THE FUTURE

# Differently



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