

# CUMULUS

8 March 2023

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**WE GET**  
AGRICULTURE'S *heartbeat*

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# Summary

## Drier conditions ahead

Tropical Cyclone Freddy is still active in the Mozambique Channel and has been present in the channel and Mozambique now for almost 2 weeks (since 23 February). It is also the longest living Tropical Cyclone in recorded history according to the WMO, with a life span exceeding one month already. The presence of this system in the Mozambique Channel is an indication of recent large-scale atmospheric circulation already moving into a state that is more El Niño like than what dominated for most of the last three years. Such large-scale unfavorable conditions are represented by a high-pressure system located over the interior of the southern African subcontinent, centered roughly over Botswana and northern Namibia. While some thundershowers are expected over the interior during the next few days, the general absence of a deep layer of tropical moisture in the vicinity of South Africa, due to the largely anti-cyclonic flow in the atmosphere, will negatively impact the rainfall potential of thundershowers over the interior. Typically in these conditions, thundershowers are more short-lived and produce heavy downpours that usually last only for shorter periods, leaving most areas to receive only modest rainfall totals or nothing at all. Current forecasts maintain the unfavorable large-scale pattern for at least another week, with isolated thundershowers from time to time over the central to eastern parts, spreading further west next week. Some forecast models indicate a possible shift towards more favorable conditions for widespread rain later towards or after next weekend.

The summer-grain production region will experience sunny to partly cloudy days while temperatures are expected to be normal to above normal for this time of the year, aiding in diminishing the accumulated heat units deficit over large areas. Isolated afternoon thundershowers should occur on most days over the region.

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

#### **General:**

- Temperatures will on average be above normal over the interior, but near normal to below normal along the coast and winter rainfall region.
- The western to central and northern interior, including the western parts of the summer-grain production region, will be hot for most of the period.
- Rainfall during the period will be below normal, but near normal over the winter rainfall region and KZN.
- A band of convective afternoon thundershowers will be present through most of the period over the summer rainfall region, stretching from southeastern Botswana towards KZN most of the time.
- Showers are possible over the southern parts of the winter rainfall region at times, associated with cold fronts that will brush the region from time to time during the period.
- Tropical Cyclone Freddie will still be active over the Mozambique Channel during this period and is forecasted to make landfall along the central coast of Mozambique. From here it may remain over the country for a while and could later again move out into the Mozambique Channel after the weekend or remain over the subcontinent as a low pressure system towards the north. Apart from possible light showers over the eastern parts of Limpopo and the Lowveld, the system is not expected to directly influence South Africa except for keeping rainfall potential lower.
- The summer-grain production region will be warmer and drier than the last few days; the region should be sunny to partly cloudy and warm with isolated to scattered thundershowers on most days. The western parts of the region may however be hot and dry on several days until next week:
  - Maximum temperatures over the eastern maize-production areas will be in the order of 25 – 32°C. Minimum temperatures will be in the order of 11 – 16°C.
  - Maximum temperatures over the western maize-production region will range between 31 and 36°C, with the higher temperatures towards the west. Minimums will be in the order of 14 - 19°C.

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

Large-scale atmospheric circulation patterns will be unfavorable for widespread rain over the interior. However, some upper-air perturbations east of the broad trough towards the southwest together with some tropical moisture flowing down from the northwest will aid in producing some afternoon and evening thundershowers over the central to eastern parts on several days. Occasional ridging of the high to the south, albeit weak, will further support the development of thundershowers through the influx of moisture in the lower levels from the east. Several cold front will brush the southwestern parts during the period, resulting in showers over the southern parts of the winter rainfall region at times.

**Maize production region:** The region should experience isolated to scattered thundershowers on most days, with partly cloudy skies and temperatures near normal for this time of the year.

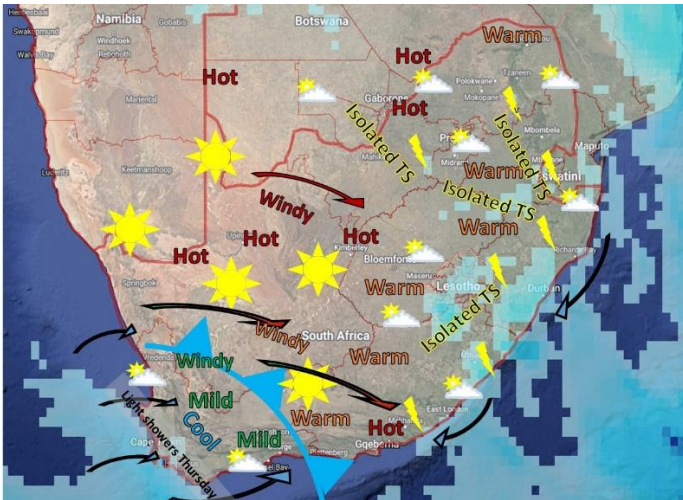
- Maximum temperatures over the eastern maize-production areas will be in the order of 25 – 32°C. Minimum temperatures will be in the order of 11 – 16°C.
- Maximum temperatures over the western maize-production region will range between 31 and 36°C, with the higher temperatures towards the west. Minimums will be in the order of 14 - 19°C.
- **Thursday (9<sup>th</sup>):** Sunny to partly cloudy and warm. Moderate westerly winds are expected over the western to central parts of the region in the afternoon. Isolated thundershowers are possible in the east.
- **Friday (10<sup>th</sup>):** Partly cloudy and warm. Isolated thundershowers are possible in the east and north. It will become hot in the west.
- **Saturday (11<sup>th</sup>):** Partly cloudy and warm with isolated thundershowers, but scattered over the north-eastern Free State and southern Mpumalanga. It will be hot with moderate north-westerly winds in the west.
- **Sunday (12<sup>th</sup>):** Partly cloudy and warm with isolated to scattered thundershowers over the central to eastern parts. It will be hot in the west.
- **Monday (13<sup>th</sup>):** Sunny and hot in the west. It will be partly cloudy and warm over the central to eastern parts with isolated thundershowers mostly over the central parts.
- **Tuesday (14<sup>th</sup>):** Partly cloudy and warm with isolated thundershowers except in the west.
- **Wednesday (15<sup>th</sup>):** Partly cloudy and warm with isolated thundershowers.

**Cape Wine Lands and Ruens:** It will be partly cloudy to cloudy and mild to cool and windy over the region with showers, mostly in the southwest, as cold fronts move over the region from the southwest on Thursday and Saturday. Showers will also spread eastwards along the Garden Route, especially following the system on Saturday. Another cold front may also bring some rain to the southern parts and Garden Route early next week. The rest of the period should be sunny to partly cloudy and warm across the region. The northern to northwestern parts, including the Swartland, will become warm to hot early next week when the wind is expected to become fresh to strong southeasterly over the southwestern parts.

# Daily summary of expected conditions

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

## Thursday to Friday, 9 - 10 March



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

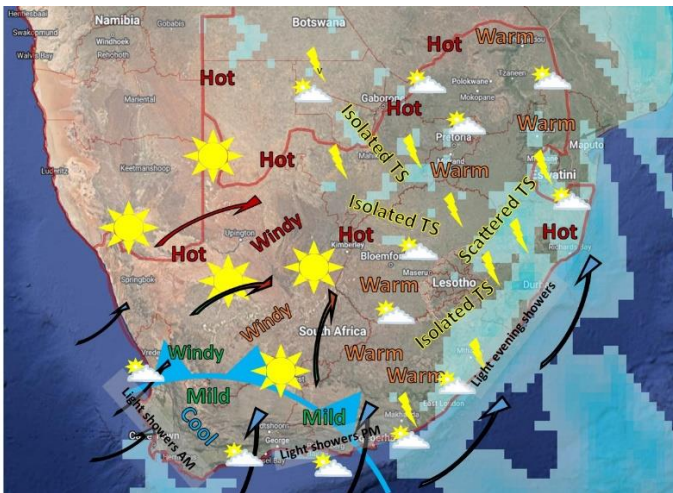
It will be sunny, hot and windy over the northwestern to central and southeastern parts.

It will be partly cloudy, windy and mild over the southwestern parts.

Light showers are expected over the southwestern to southern parts of the winter rainfall region on Thursday.

It will also be hot over the northern parts of the country including the western parts of Limpopo.

## Saturday, 11 March



It will be partly cloudy and warm with scattered thundershowers in a band from Botswana southeastwards into KZN, with scattered falls around the Drakensberg.

It will be partly cloudy, mild and windy over the southwestern to southern parts.

Light showers are expected over the southwestern parts of the winter rainfall region in the morning.

Light showers are expected along the Garden Route in the afternoon.

Light showers will spread up the southeastern to eastern coastal belt during the evening.

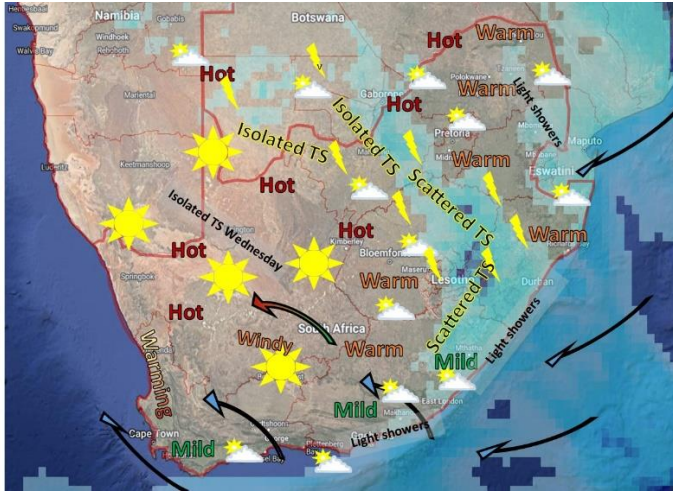
It will be sunny, hot and windy over the northwestern interior.

It will be partly cloudy and hot over the western parts of Limpopo.

It will be partly cloudy and warm over the rest of the northeastern interior.

It will be hot over the eastern parts of KZN.

## Sunday to Wednesday, 12 - 15 March



It will remain hot over the northern parts of the country, including the western parts of Limpopo.

It will be partly cloudy and warm with scattered thundershowers in a band from Botswana through into southern to central KZN.

Light showers are expected at times along the southeastern to eastern coastal belt until Tuesday.

Light showers are expected at times over northern KZN, the Lowveld and northeastern escarpment.

Isolated thundershowers will spread into the western interior by Wednesday.

It will be mild over the southern parts with southeasterly to easterly winds.

It will become warmer to hot over the southwestern interior and the Swartland.

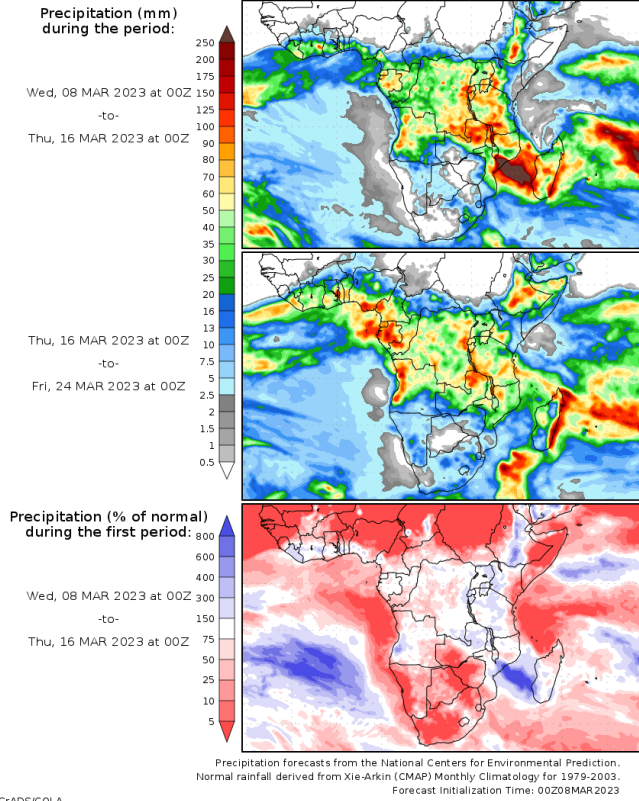
It will become very hot over the northwestern interior, especially the Lower Orange River Valley.

Fresh to strong southeasterly winds are expected over the southwestern parts of the Western Cape.



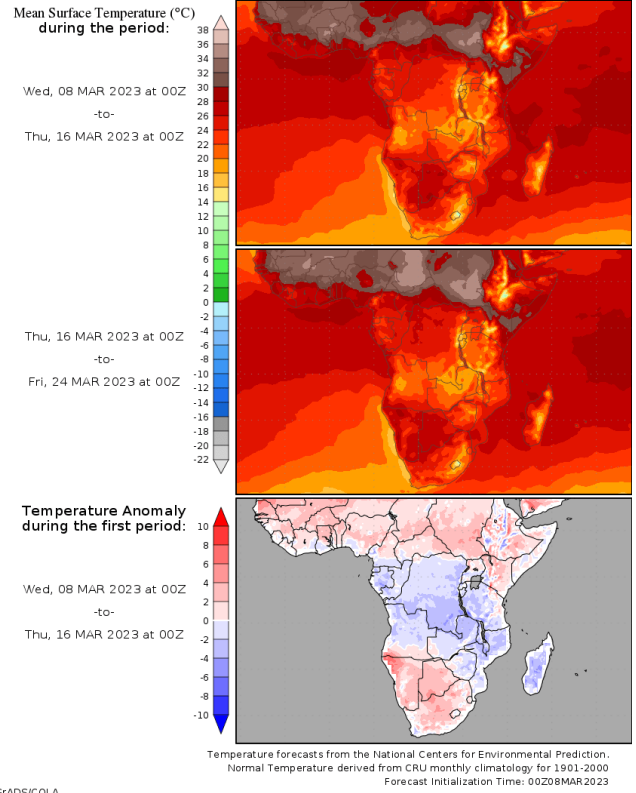
# Medium term rainfall and temperature summary

## Precipitation Forecasts



GrADS/COLA

## Temperature Forecasts



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 8 March) 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:**

- **It will be hot:**
  - Over the western to central and northern parts: **Thursday to Wednesday (9<sup>th</sup> – 15<sup>th</sup>).**
  - Over the southwestern interior and into the Swartland: **Monday - Tuesday (13<sup>th</sup> to 14<sup>th</sup>).**
  - Over the northern to western parts of the Limpopo River Valley: **Thursday to Saturday (9<sup>th</sup>– 11<sup>th</sup>).**
  - Over the eastern parts of KZN: **Saturday (11<sup>th</sup>).**
- **It will be hot and windy:**
  - Western to central interior (westerly winds): **Thursday to Saturday (9<sup>th</sup> – 11<sup>th</sup>).**
  - Southern to southeastern interior: **Friday (10<sup>th</sup>).**
- **It will be windy:**
  - Southern interior (southerly to southeasterly winds): **Sunday to Tuesday (12<sup>th</sup> – 14<sup>th</sup>).**
- **Strong southeasterly winds are expected:**
  - Over the southwestern parts of the Western Cape: **Monday to Wednesday (13<sup>th</sup> – 15<sup>th</sup>).**



## Seasonal forecast

**Seasonal forecasts for autumn over South Africa** still favor wetter conditions over the summer rainfall region, still dominated by the La Niña that is in a weakening state.

**ENSO forecasts** indicate a further weakening of the current La Niña during autumn, with a return to neutral conditions in mid-2023 and possibly an El Niño later this year. While the Southern Oscillation Index still indicates La Niña conditions, certain other indicators are leaning towards ENSO neutral conditions. Over the Western Equatorial Pacific Ocean, westerly wind anomalies are present, indicating atmospheric circulation over this region favoring the development of warmer surface water anomalies and El Niño. Moreover, eastern Equatorial Pacific surface water temperatures have been rising recently, also indicating a potential trend towards El Niño conditions later.

### **The Australian Bureau of Meteorology points out that the La Niña in the tropical Pacific is likely near its end**

(Updated 28 February): La Niña has weakened in the tropical Pacific Ocean and is likely near its end. Ocean indicators of La Niña have returned to neutral levels, while atmospheric indicators that remain at La Niña levels have started to weaken.

All but one of the surveyed international climate models suggest sea surface temperatures in the tropical Pacific (including NINO3.4) will remain neutral (neither El Niño nor La Niña) through autumn; one model is neutral in March and April but touches on El Niño thresholds in May. ENSO outlooks extending beyond autumn should be viewed with caution as models typically have lower forecast accuracy at this time of year.

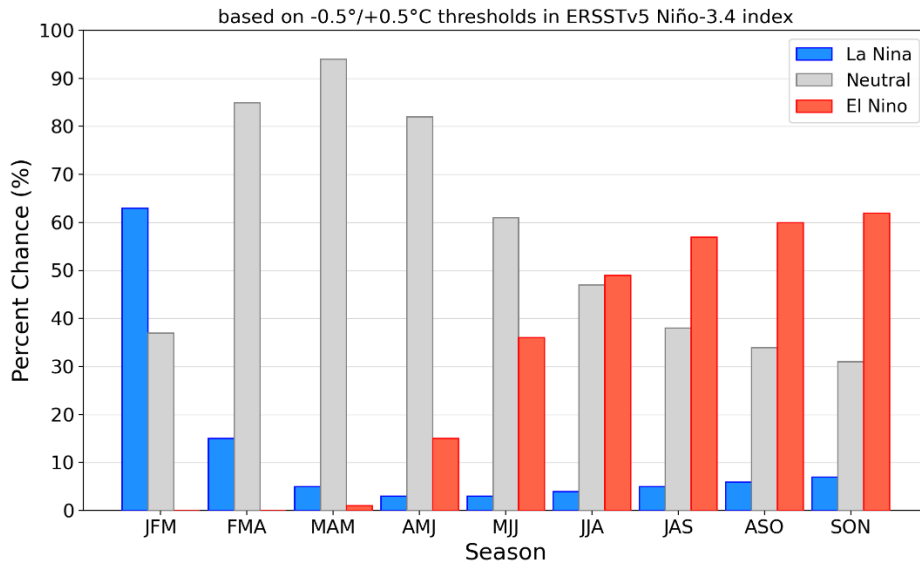
The Southern Annular Mode (SAM) index is currently positive, but is expected to return to neutral values over the coming weeks.....*Australian Bureau of Meteorology* - <http://www.bom.gov.au>

**While La Niña conditions are associated with wetter than normal conditions over the summer rainfall region of South Africa, a Negative SAM is associated with below-normal rainfall over the eastern parts during mid to late summer. The SAM will be negative during the next few days. It is also more common to see cold fronts making landfall over the winter rainfall region during times when the SAM is negative. The MJO during the next few days will be in Phase 7, moving in Phase 8 by next week. When the MJO is in Phase 6 – 7, it is more commonly associated with cloud bands and significant rainfall events over South Africa than other phases.**

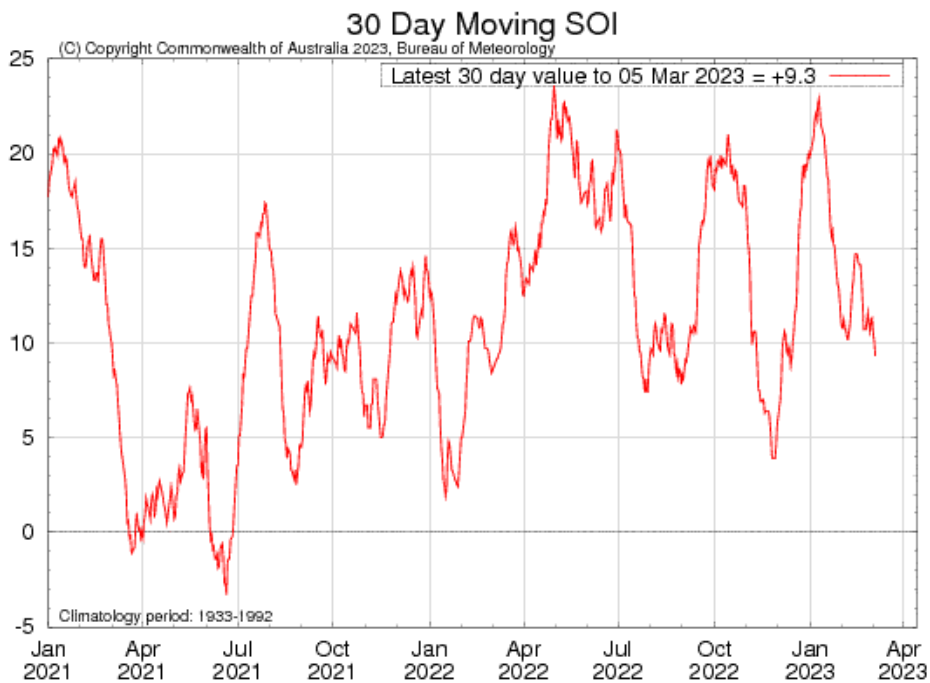
### **The International Research Institute for Climate and Society (IRI) also expects La Niña conditions to persist into summer**

**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/>

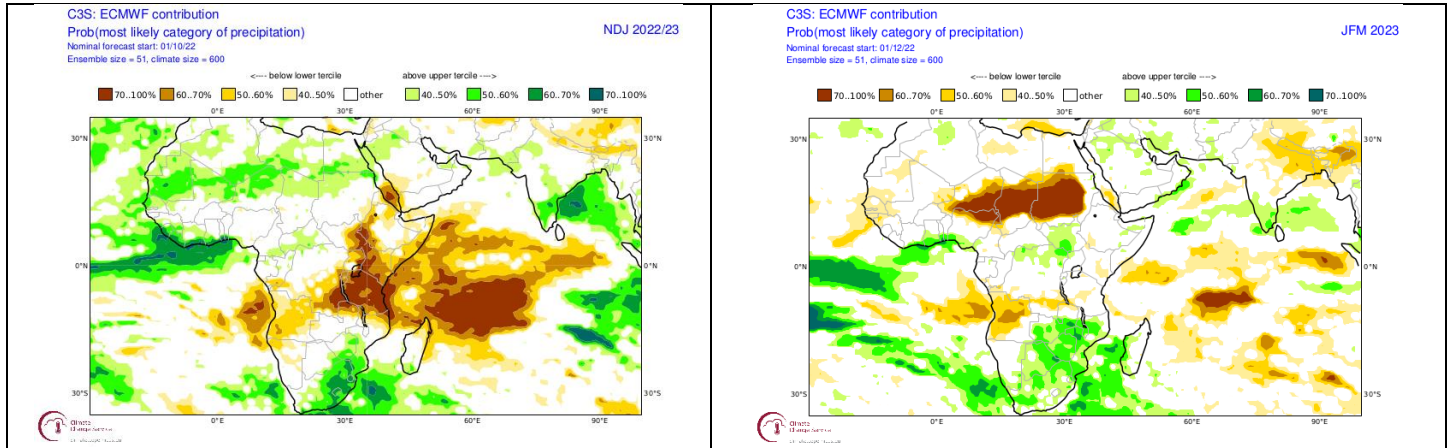


Australian Bureau of Meteorology - <http://www.bom.gov.au>

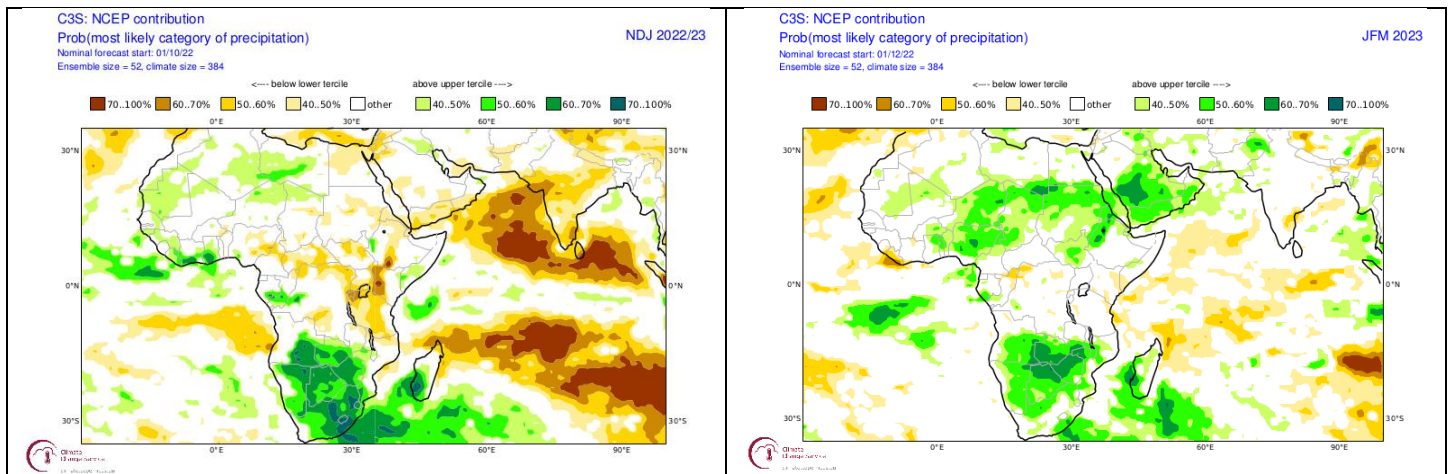
**The Southern Oscillation Index is in positive territory (+9.3). This is indicative of atmospheric circulation patterns associated with La Niña conditions.**

# Seasonal forecasts issued by various international institutions

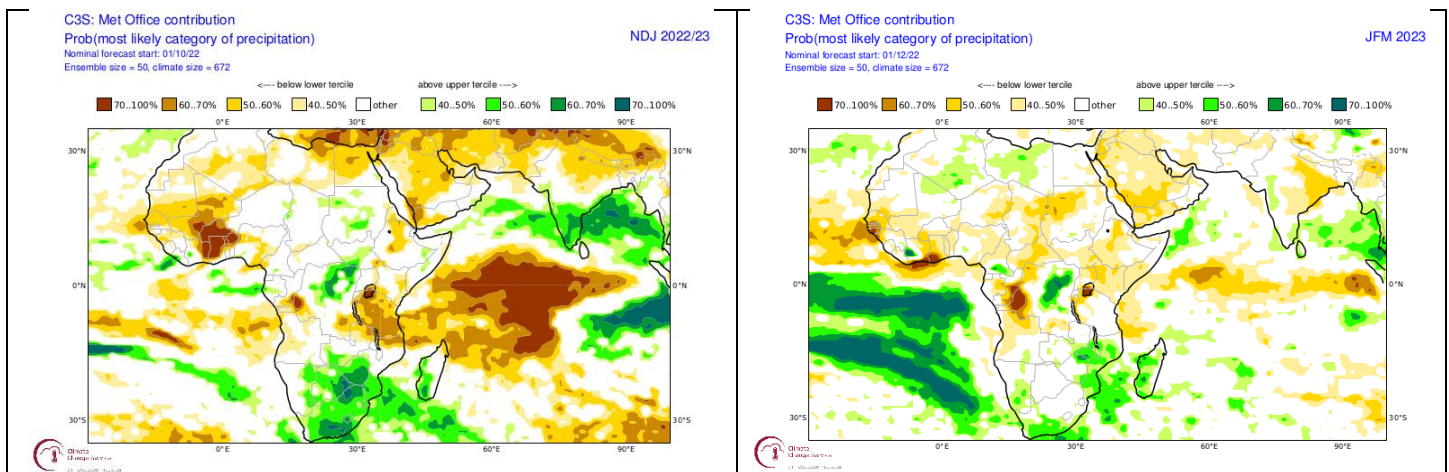
Seasonal forecasts (updated in October 2022) by these institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) for both early to mid-summer, and mid-to late summer reflect an expectation for a relatively wet summer over the interior. The signal for relatively 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.**

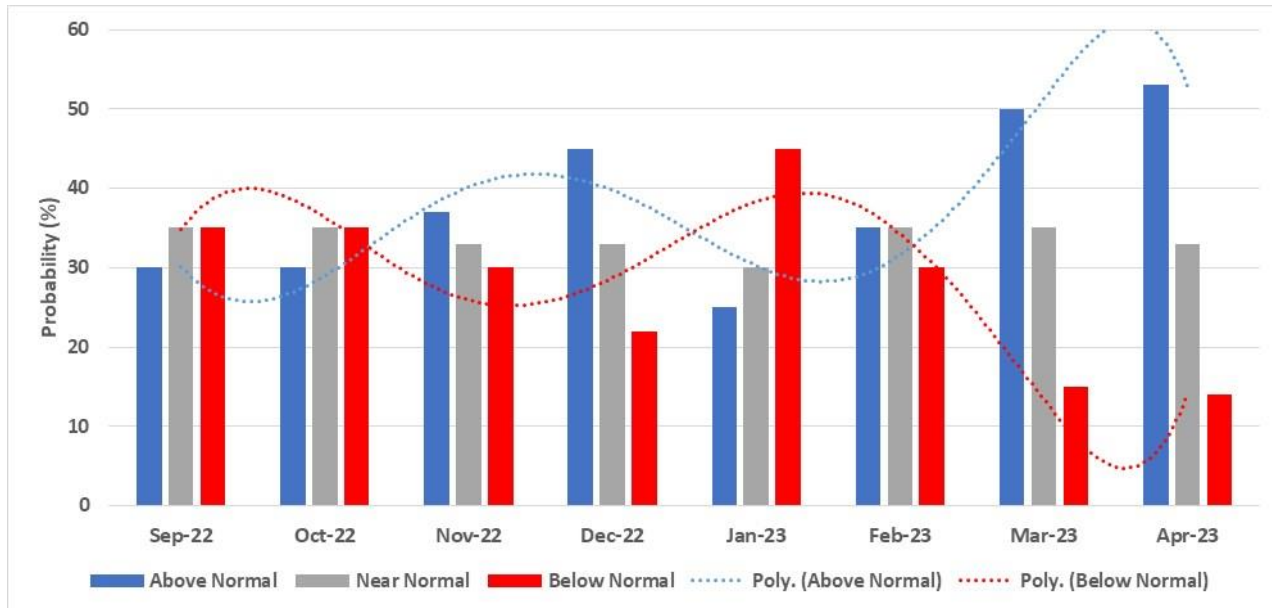


**Same as above, but forecasts issued by the UK Met Office.**



## 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:



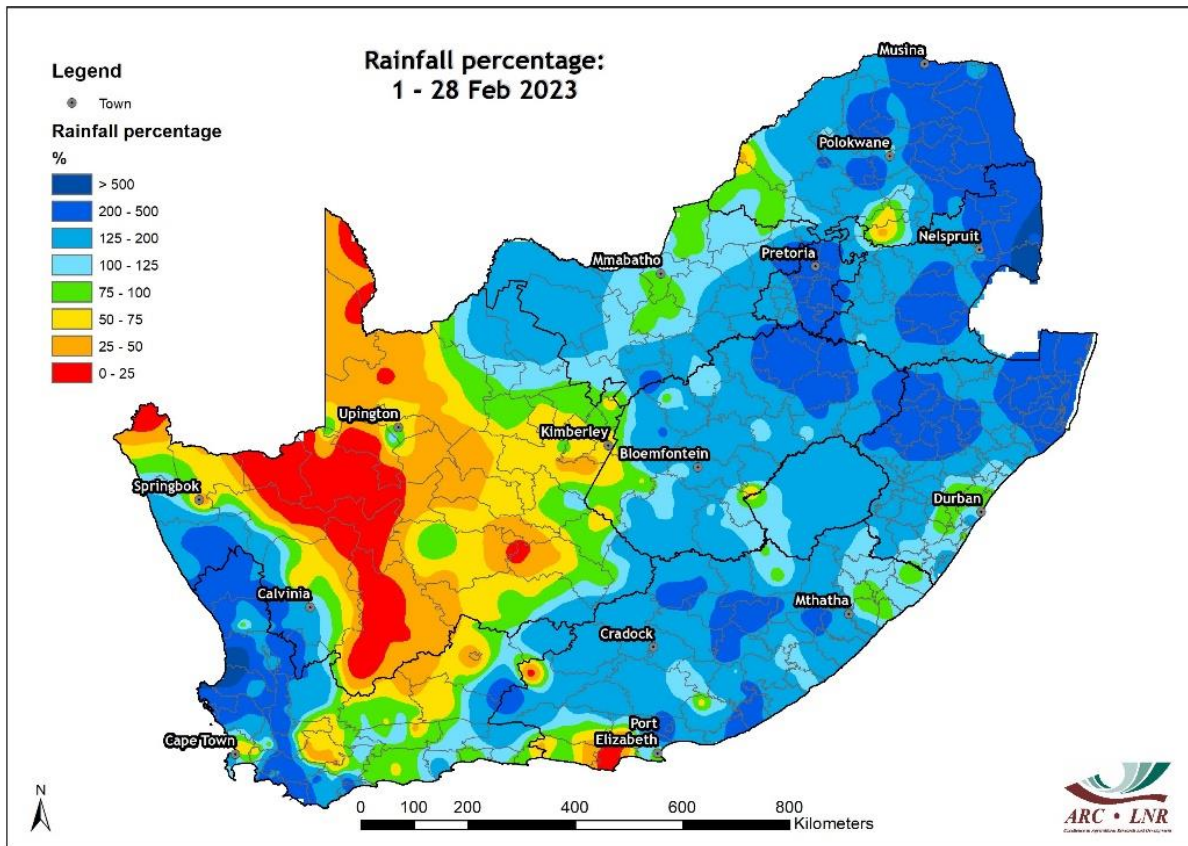
***Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2022 – April 2023 (Forecast issued in 2022-10).***

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

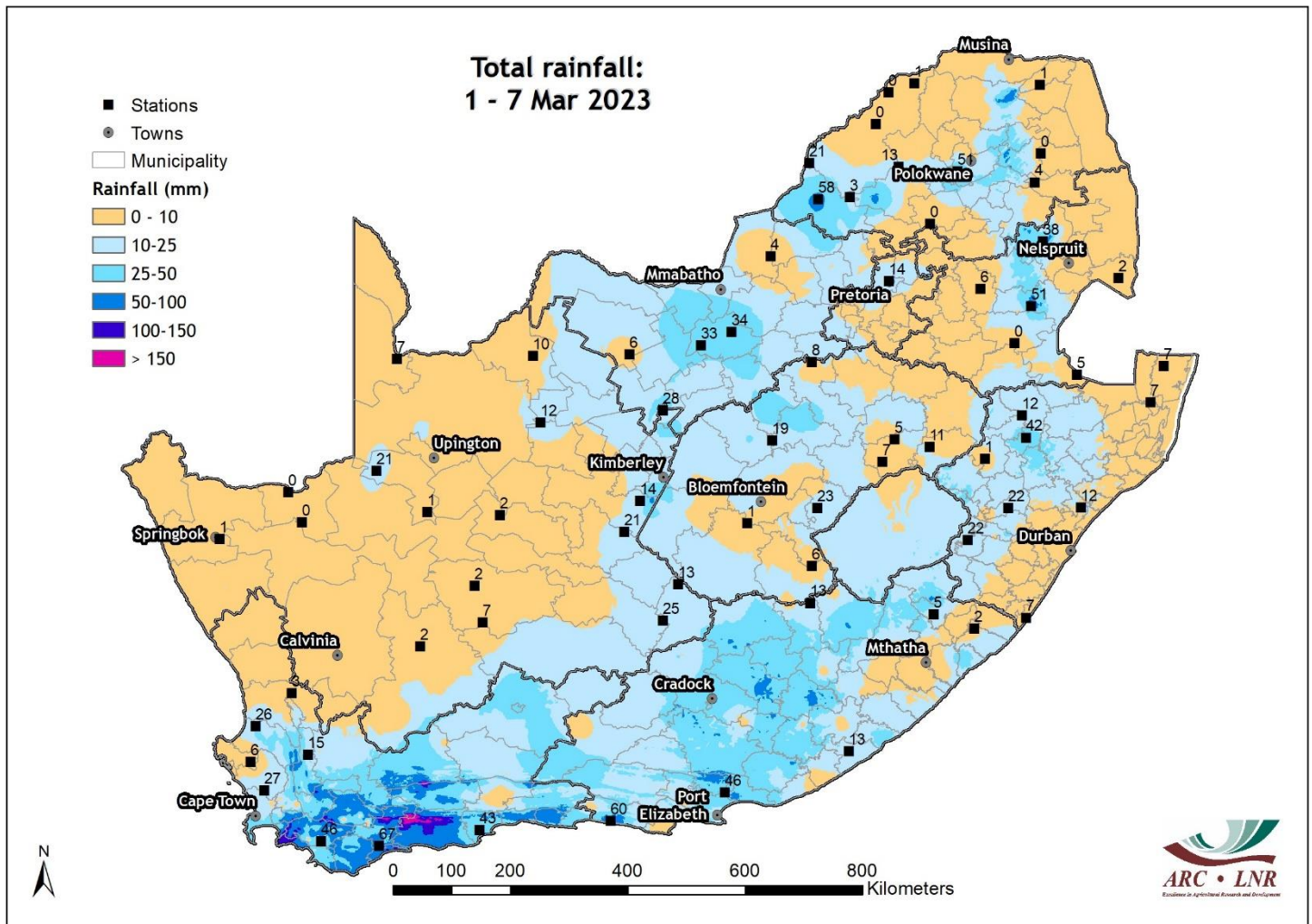
# Observed conditions

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



*Most of the central to northeastern parts received above-average rainfall during February, in contrast to January when most of the northern parts were relatively dry. The winter rainfall region also received above-average rainfall.*

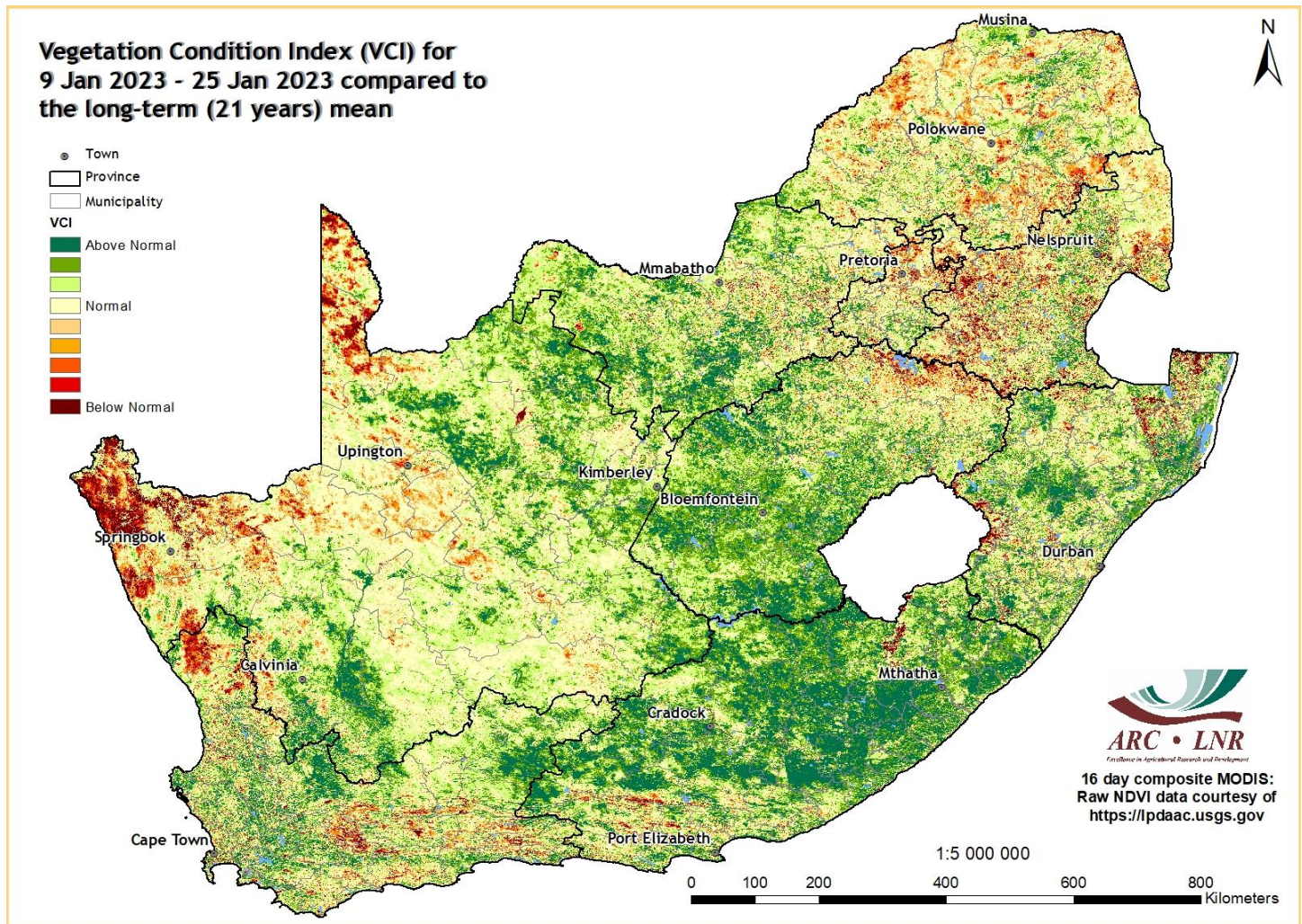
## Rainfall (mm): 1 – 7 March 2023



*Most of the country received some rain during the first few days of March. Significant totals were recorded over the southern parts, focusing on the Garden Route and adjacent areas of the Karoo and Boland.*



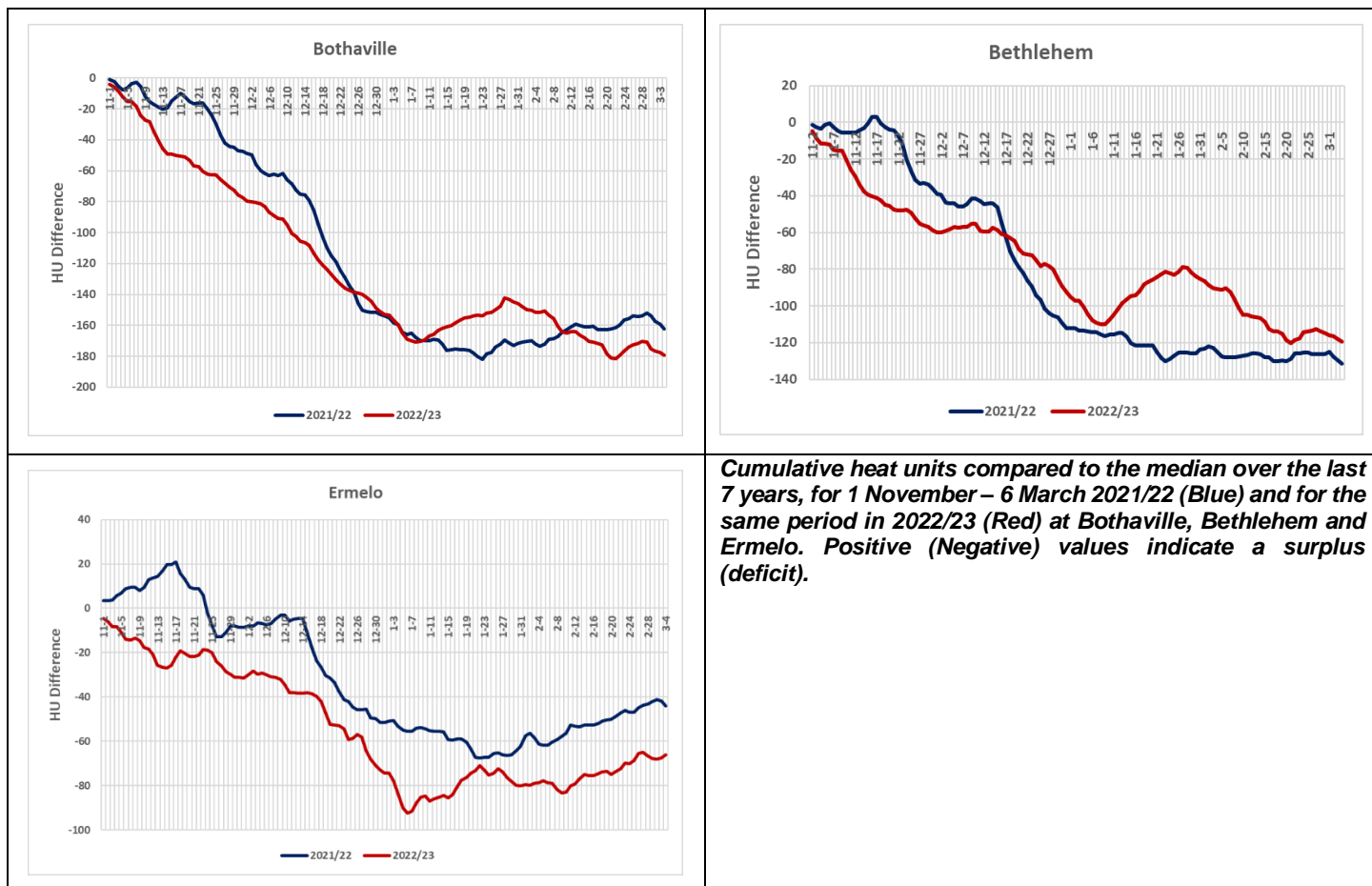
## Vegetation Condition Index: January 2023



*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 during extended periods in the 2022/23 summer, heat units are behind the median value calculated over the last seven years over the summer-grain production region.



Cumulative heat units since 1 November still lag the 7-year median and are in line with or slightly below the figure for 2021/22. Warmer conditions during the next few days will diminish the magnitude of the cumulative heat units deficit with respect to the 7-year median.

## 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>

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