

CUMULUS

23 March 2023

by J Malherbe, R Kuschke



WE GET
AGRICULTURE'S *heartbeat*

Contents

- Summary.....3
 - Thundershowers spreading into the northeast.....3
- Overview of expected conditions over the main agricultural production areas.....4
- Daily summary of expected conditions.....5
- Medium term rainfall and temperature summary7
- Possible extreme conditions - relevant to agriculture.....8
- Seasonal forecast9
- Seasonal forecasts issued by various international institutions.....11
- CUMULUS seasonal outlook12
- Observed conditions13
 - Rainfall (% of long-term mean): February 202313
 - Rainfall (mm): 1 – 22 March 2023.....14
 - Vegetation Condition Index: February 2023.....15
 - Heat units since 1 November 202216
- Sources of information17



Photo credit: Google

Summary

Thundershowers spreading into the northeast

The mostly sunny and warm conditions over the northern half of the country will be replaced by cooler conditions with more extensive cloud cover and thundershowers in places during the next few days. Most places should receive near normal rainfall during the next few days, with precipitation also shifting into the northeast where it has been dry during the last few weeks. More widespread and significant falls will once again focus on the southern to the far eastern parts, as can be expected during times when upper-air low pressure systems move over the southern parts of the country. More rain is expected therefore during the remainder of the month over most of the country, following drier conditions earlier especially over the northern parts. Most of the winter rainfall region will again receive rain, as experienced during February and earlier this month too, again related to the positioning of the upper-air lows responsible for rainfall over the country as well as the development of cold fronts in the region associated with the upper-air lows.

The intense upper-air systems (the cut-off low-pressure systems more typical in spring and autumn) that will cause some of the rain during the next few days are usually also associated with strong high pressure system to the south. The exact positioning of the low in the vicinity of SA and the high to the south can sometimes result in heavy rainfall in some areas. Conversely, a different positioning of the systems can result in an influx of cold air that in some years may produce relatively early frost. The current circulation patterns favor strengthening of these systems further to the west and east than what is ideal for widespread significant rain over the interior while it rather results in an influx of colder air over the southern to southeastern parts. Such events can result in early onset of frost over the interior, but current forecasts, while indicating two events of colder air invading the southern to southeastern parts over the next few days, don't indicate the occurrence of widespread frost.

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

General:

- Temperatures will on average be near normal for this time of the year.
- Cooler conditions will occur over the southern parts of the country on several days.
- Southerly winds will bring colder conditions to the southern to southeastern interior by Sunday and again by the middle of next week.
- Rainfall during the period is expected to be near normal over most of the interior.
- A band of isolated thundershowers will be present on several days over the interior, mostly focusing on the central to eastern parts.
- Frontal systems will bring showers to the winter rainfall region initially and also during the weekend. More showers may occur over this region also by the middle of next week.
- The summer-grain production region will receive somewhat more widespread rain, with rainfall not only limited to the western to southern parts and Drakensberg area as during the last few days. It will also be somewhat cooler:
 - Maximum temperatures over the eastern maize-production areas will be in the order of 22 – 27°C. Minimum temperatures will be in the order of 7 – 11°C.
 - Maximum temperatures over the western maize-production region will range between 24 and 28°C. Minimums will be in the order of 13 - 18°C.

Overview of expected conditions over the main agricultural production areas

With at least two cut-off low pressure systems expected to influence the southern parts of the country during the next few days, large parts of the country can expect at least some rain at times. The first system will focus more over the southwestern parts, resulting in widespread rainfall over the winter rainfall region too. Another intense system is expected next week. Current forecasts favor a deepening of the system over the southeastern parts, moving out east and resulting in an intensification of the band of precipitation over the central to eastern parts and a possibility of dry, cool air invading the interior with possible frost in isolated areas. However, forecasts will certainly still change before the system finally develops early next week.

Maize production region: The region is expected to receive more widespread precipitation and can also expect more extensive cloud cover than during the previous week. It will be windy at times, mostly in the west. Given the cloud cover and precipitation, it will generally be milder than the previous week:

- Maximum temperatures over the eastern maize-production areas will be in the order of 22 – 27°C. Minimum temperatures will be in the order of 7 – 11°C.
 - Maximum temperatures over the western maize-production region will range between 24 and 28°C. Minimums will be in the order of 13 - 18°C.
-
- **Thursday (23rd):** Partly cloudy and mild to warm. Isolated thundershowers are expected in the west where moderate to fresh northerly winds are expected.
 - **Friday (24th):** Partly cloudy and mild to warm. Isolated thundershowers are possible over the central to western parts where moderate to fresh northerly winds are expected.
 - **Saturday (25th):** Partly cloudy and mild to warm. Isolated thundershowers are possible, becoming scattered in the west where moderate to fresh north-westerly winds are expected.
 - **Sunday (26th):** Sunny in the west, but partly cloudy over the rest of the region with isolated thundershowers.
 - **Monday (27th):** Cloudy and mild in the east with moderate easterly winds. It will be partly cloudy and warm over the central to western parts with scattered afternoon thundershowers and moderate northerly winds.
 - **Tuesday (28th):** Partly cloudy and mild in the east. It will be warm in the west where scattered thundershowers are expected later in the afternoon, spreading eastwards during the evening.
 - **Wednesday (29th):** Partly cloudy over the central to eastern parts with scattered thundershowers, clearing from the west. Fresh north-westerly winds are expected over the western parts, becoming south-westerly later. This forecast is still very uncertain given the long lead time. Current forecasts suggest an invasion of dry, cool air over the southern to western parts of the region as an upper-air low pressure system deepens southeast of the country – forecasts may still change closer to the time.

Cape Wine Lands and Ruens: Following widespread showers on Thursday, the region should remain partly cloudy to cloudy with showers at times until early Sunday. The wind will be moderate to fresh northwesterly initially, becoming fresh to strong southeasterly in the southwest on Sunday. It will become warm on Monday, especially over the Swartland and west coast, as southeasterly to easterly winds are expected. The development of another upper-air low in the region, with southerly winds over the region, may again produce further showers over the region from late Tuesday, with falls expected to be more significant over the southern parts along the Garden Route.

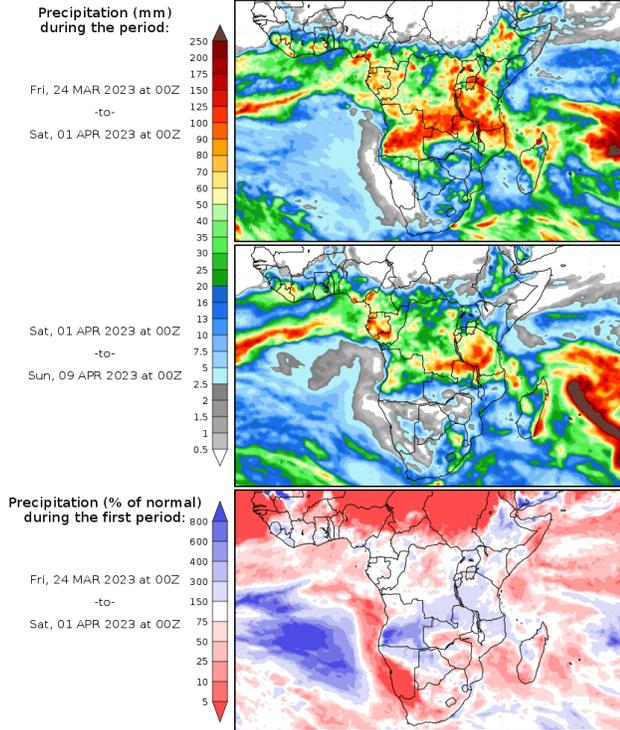
Daily summary of expected conditions

- **Friday (24th):** A cut-off low moving south over the southwestern parts will result in early morning showers over the winter rainfall region.
 - Widespread showers are also expected along the Garden Route and into the Eastern Cape, clearing over the western parts.
 - It will be partly cloudy to cloudy and mild over the central to southeastern parts of the country, with isolated thundershowers.
 - A band of thundershowers will also develop over the eastern parts of the Northern Cape and eastern parts of the Western Cape later, where it will be warm to hot earlier in the day.
 - Little to no rain is expected over the northeastern parts of the country.
 - It will be warm in the far northeast.
- **Saturday (25th):** Isolated thundershowers will again develop over the central to southeastern parts, where it will be partly cloudy to cloudy and mild.
 - A cold front will result in light showers over the winter rainfall region.
 - Fresh westerly to northwesterly winds are expected over the western to southeastern interior.
 - It will be hot over the central to eastern parts of the Eastern Cape and coastal belt and adjacent interior of KZN.
 - It will be warm in the northeast.
- **Sunday (26th):** The band of isolated thundershowers over the country will move somewhat northeastwards, clearing over the central to southern parts. A high-pressure to the south will cause an influx of cooler air over the southern parts.
 - The cold front will move eastwards over the southern parts while the on-shore flow will result in showers along the Garden Route, spreading up the east coast into KZN.
 - It will become cool and windy over the southern interior.
 - The wind will become fresh southerly to southeasterly over the southern parts.
 - It will be warm to hot over the Limpopo River Valley, Lowveld and northern KZN.
 - With cooler air invading northwards over KZN during the day, scattered to widespread thundershowers may develop over the northern parts of KZN and southeastern to eastern Mpumalanga later during the day.
 - Cooler air will spread over the northeastern parts from the east by the evening.
- **Monday (27th):** With easterly winds dominating, it will be cooler over the eastern parts while it will become warm to hot over the western interior, west coast and western escarpment.
 - It will be windy over the northeastern to central parts, spreading southeastwards towards the western interior later during the day.
 - Scattered thundershowers are initially expected over the northeastern parts, partly associated with the influx of cooler air over the region.
 - Scattered thundershowers will develop later during the day over the central parts.
 - It will become warm to hot over the western to northwestern interior, the western escarpment and west coast.
- **Tuesday (28th):** With a new upper-air low developing towards the southwest according to current forecasts, activity will shift towards the western and central parts.
 - It will be windy, with northerly to westerly winds over the central to western and southeastern interior.
 - It will become partly cloudy, with a band of thundershowers expected to develop over the western to central and southeastern parts.
 - A cold front will result in light showers over the winter rainfall region where it will be cooler.

- Depending on the position of the developing upper-air low, showers may also spread eastwards over the southern interior into the Karoo while also expanding eastwards along the Garden Route.
- It will be mild to warm with little to no rain over the eastern to northeastern parts.
- **Wednesday (29th):** Some current forecasts indicate intensification of the upper-air low over the southeastern parts. This will result in inclement conditions especially over the southern to southeastern parts of South Africa.
 - It will become partly cloudy to cloudy with scattered thundershowers over the Free State, Lesotho, central to eastern parts of the Eastern Cape and southern KZN according to current forecasts. Thundershowers will be moving eastwards during the day.
 - Isolated thundershowers may also occur later over the northeastern parts as the cloud band moves east during the day.
 - Moderate to fresh southwesterly winds will invade the southern to western interior, spreading towards the central parts where fresh northwesterly winds are expected initially.
 - The on-shore flow in the south may also result in showers over the Garden Route, spreading over the southern interior into the Karoo.
 - The southerly winds over the southern to western and central parts will result in lower temperatures over these areas. It is still too far ahead of time to give a clear indication of the possibility of frost over the higher-lying areas, but depending on the strength of the influx of colder air, this remains a possibility.
 - It will become warm to hot over the Limpopo River Valley, Lowveld and northern KZN. It will become cooler from the south later over these areas, with isolated to scattered thundershowers.

Medium term rainfall and temperature summary

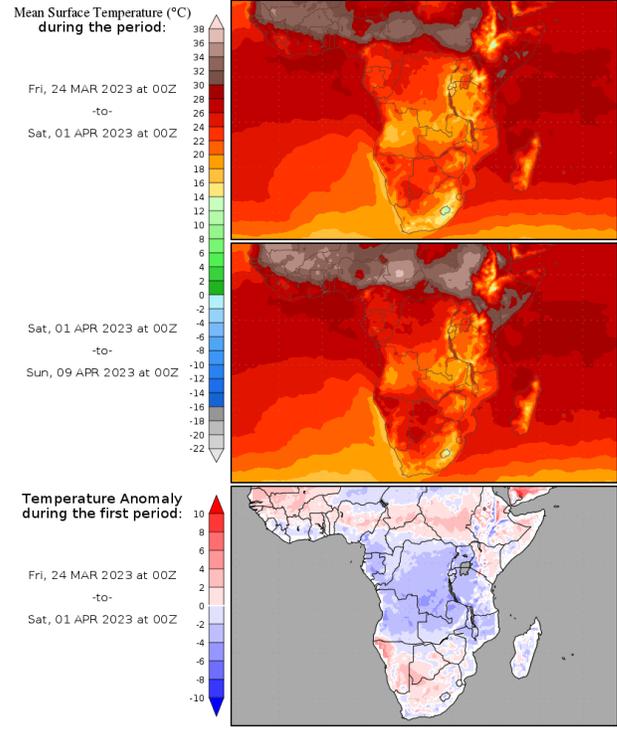
Precipitation Forecasts



Precipitation forecasts from the National Centers for Environmental Prediction. Normal rainfall derived from Xie-Arkin (CMAP) Monthly Climatology for 1979-2003. Forecast Initialization Time: 00Z24MAR2023

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: 00Z24MAR2023

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 March) period. It is therefore advised to keep track of warnings that may be issued by the SAWS (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 Limpopo River Valley, Lowveld and northern KZN: **Sunday and Wednesday (26th, 29th).**
- **It will be hot and windy, enhancing the fire hazard where vegetation is dry:**
 - Western to central and southeastern interior (northwesterly winds): **Friday to Saturday (24th- 25th).**
- **Thundershowers may become severe:**
 - Western to southern Free State and central to eastern parts of the Eastern Cape: **Saturday (25th).**
- **Cool, windy conditions with showers in places will pose a hazard to small stock:**
 - Southwestern to southern and southeastern interior: **Sunday to Monday morning and Wednesday (26th – 27th, 29th).**
 - Southern and southeastern interior: **Wednesday (29th).**
- **Strong southeasterly winds are expected:**
 - Over the southwestern parts of the Western Cape: **Sunday (26th).**

Seasonal forecast

Seasonal forecasts for autumn over South Africa are less indicative of wet conditions than earlier, reflecting global atmospheric circulation patterns moving out of the La Niña state that has been present for much of the last few years.

ENSO observations and forecasts indicate that the 2022/23 La Niña has come to an end. ENSO neutral conditions are present. 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 has come to an end

(Updated 14 March): La Niña has ended in the tropical Pacific Ocean. The El Niño–Southern Oscillation (ENSO) is now neutral (neither La Niña nor El Niño) with oceanic and atmospheric indicators having returned to neutral ENSO levels.

International climate models suggest neutral ENSO conditions are likely to persist through the southern autumn. However, there are some signs that El Niño could form later in the year. Hence the Bureau has issued an El Niño WATCH. This means there is around a 50% chance of an El Niño in 2023.

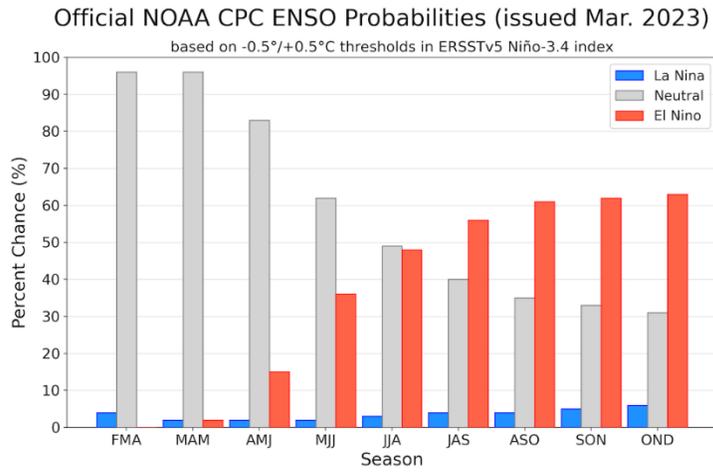
The Madden–Julian Oscillation (MJO) is currently very strong over the Pacific Ocean but is forecast to move into the Atlantic Ocean in the coming fortnight.

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

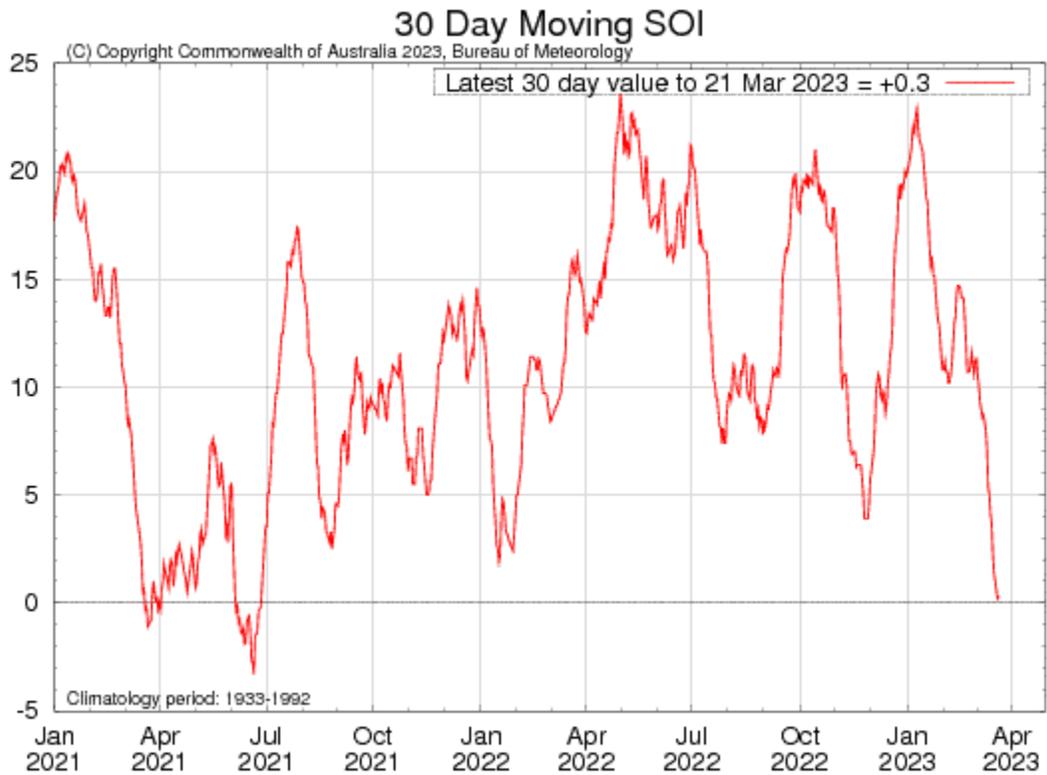
With La Niña conditions weakening, recent atmospheric circulation patterns have been less favourable for rainfall over especially the northern interior. The Southern Annular Mode (SAM) is strongly positive currently, but it is expected to fall sharply and become negative during the next few days. This type of change over the Southern Hemisphere usually results in the development of deep troughs or low-pressure systems, often also in the vicinity of South Africa, including the development of upper-air lows and movement of strong high-pressure systems towards the south of the continent. Current expected circulation patterns suggest an influx of colder air from the south at times due to the positioning of the high-pressure systems to the south during the next few days.

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

According to the IRI (Updated 9 March): In mid-February 2023, sea surface temperatures in the central-eastern equatorial Pacific weakened further but remain at the level of the La Niña threshold (as of 15 February 2023, the last observed value in the NINO3.4 region was -0.5 °C). Key oceanic and atmospheric variables have remained consistent with La Niña conditions. A CPC La Niña Advisory still remains in place for February 2023. All models (except one statistical model) in the IRI ENSO prediction plume predict SSTs to transition to an ENSO-neutral state during Mar-May, 2023. The likelihood of El Niño remains low during Mar-May (3%), increasing to 20% in Apr-Jun, and 47% in May-Jul, and then becomes the dominant category thereafter with probabilities in the 56-59% range from Jun-Aug to Oct-Dec 2023. ENSO-neutral is the next most-likely category starting from boreal summer onward, but the probabilities remain in the range of 31-38%.....*International Research Institute for Climate and Society*- <http://iri.columbia.edu/>



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

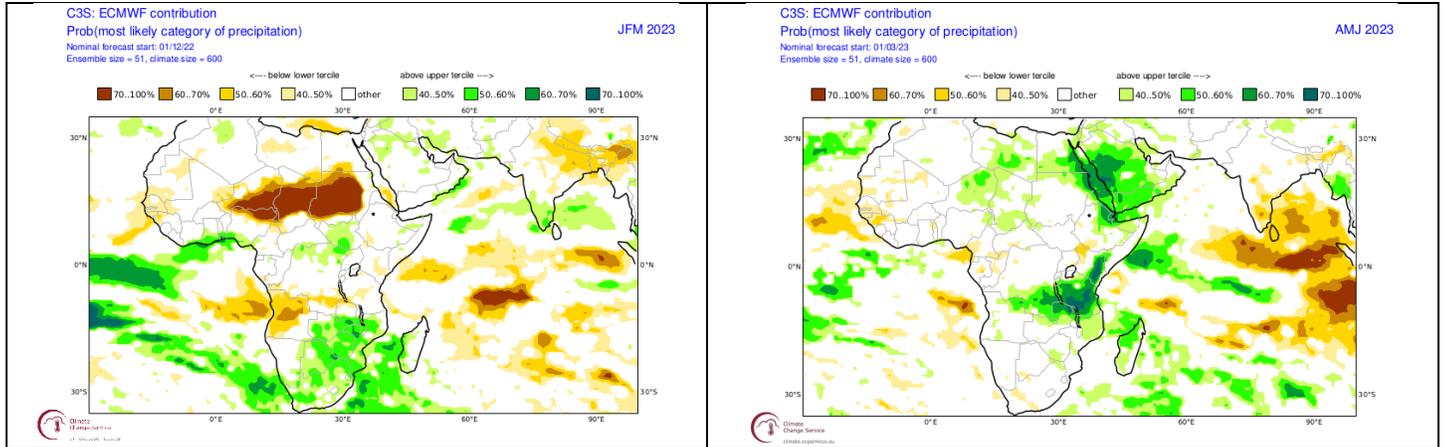


Australian Bureau of Meteorology - <http://www.bom.gov.au>

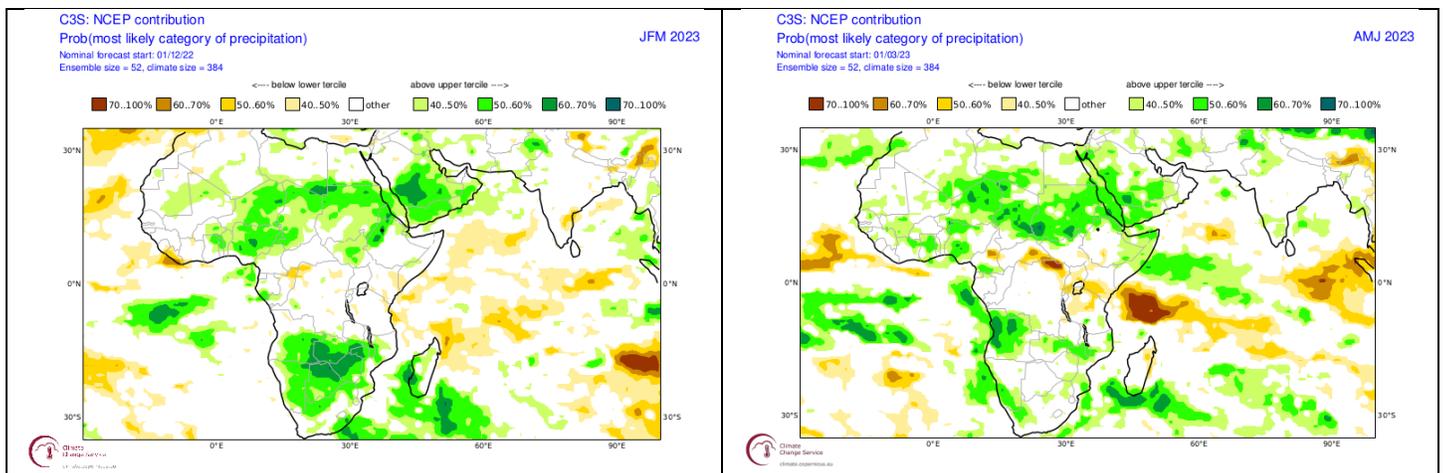
The Southern Oscillation Index is in neutral territory (+0.3). This is indicative of atmospheric circulation patterns not being associated with La Niña conditions anymore.

Seasonal forecasts issued by various international institutions

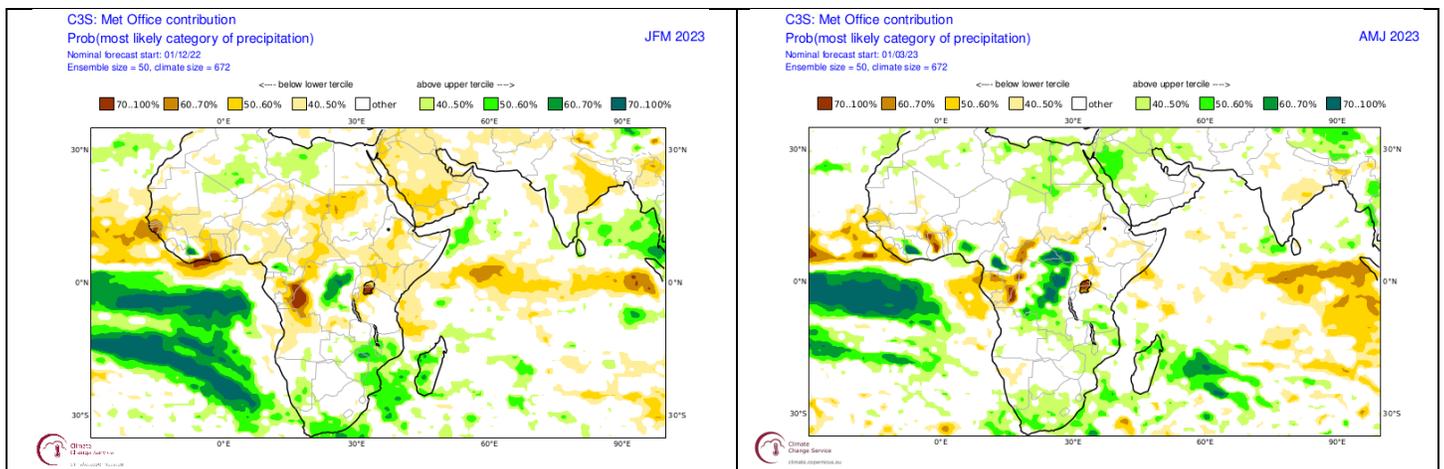
Seasonal forecasts (updated in October 2022) by these institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) for autumn to early winter, reflect weak signals with regard to rainfall anomalies over both the interior and the winter rainfall region, as opposed to the late summer forecast that was dominated by the 2022/23 La Niña event that has come to an end.



Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for late-summer (January-March 2023; left – Forecast issued 2022-12) and autumn to early winter (April-June 2023; right - Forecast issued in 2023-03).



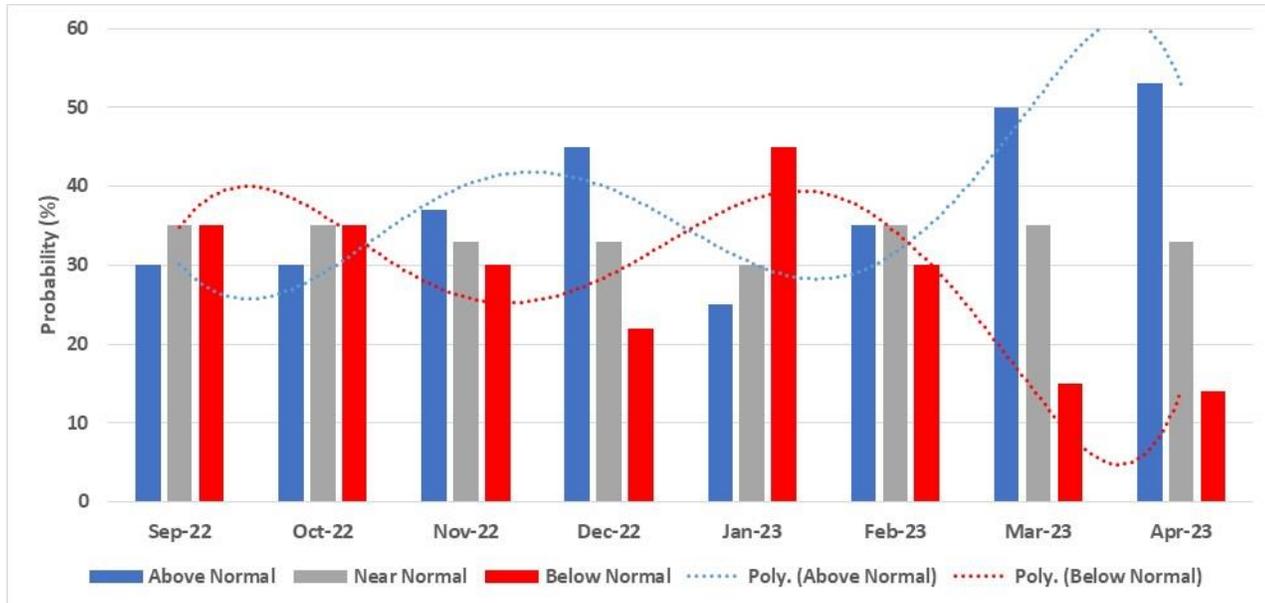
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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:



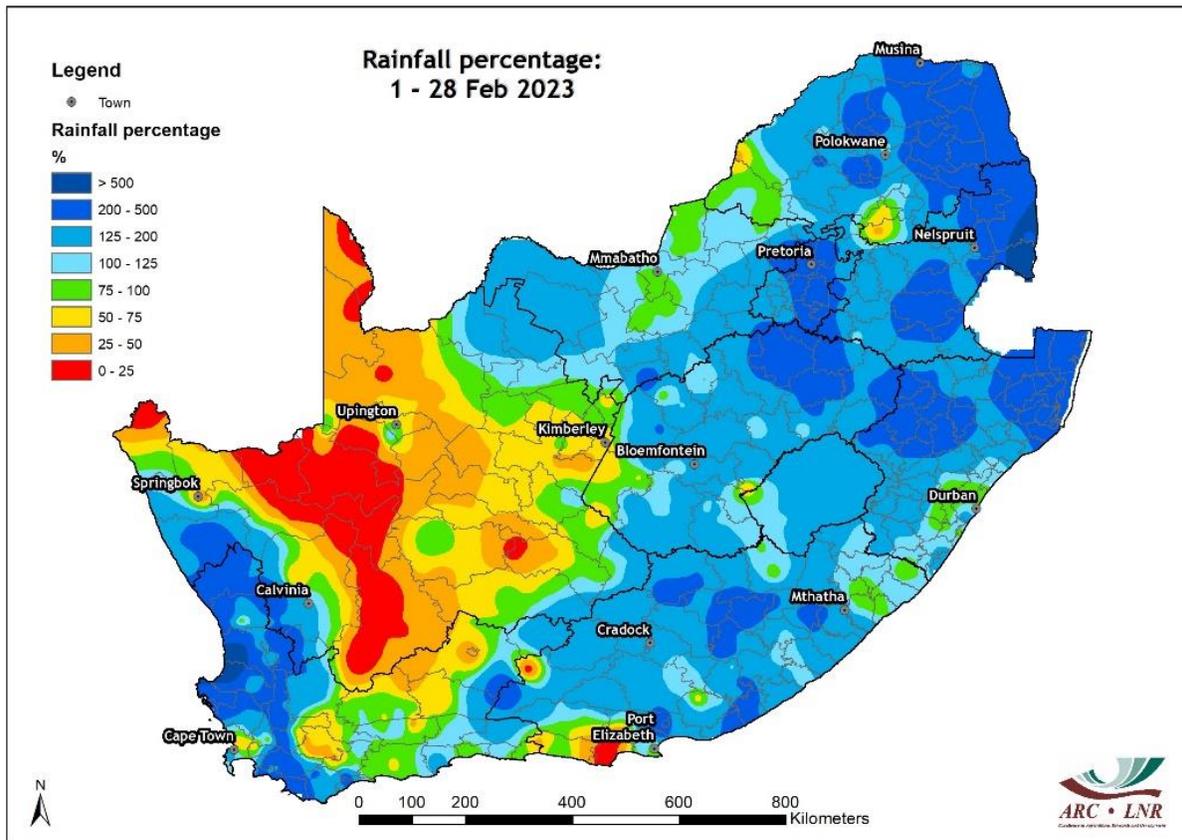
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2022 – April 2023 (Forecast issued in 2022-10).

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

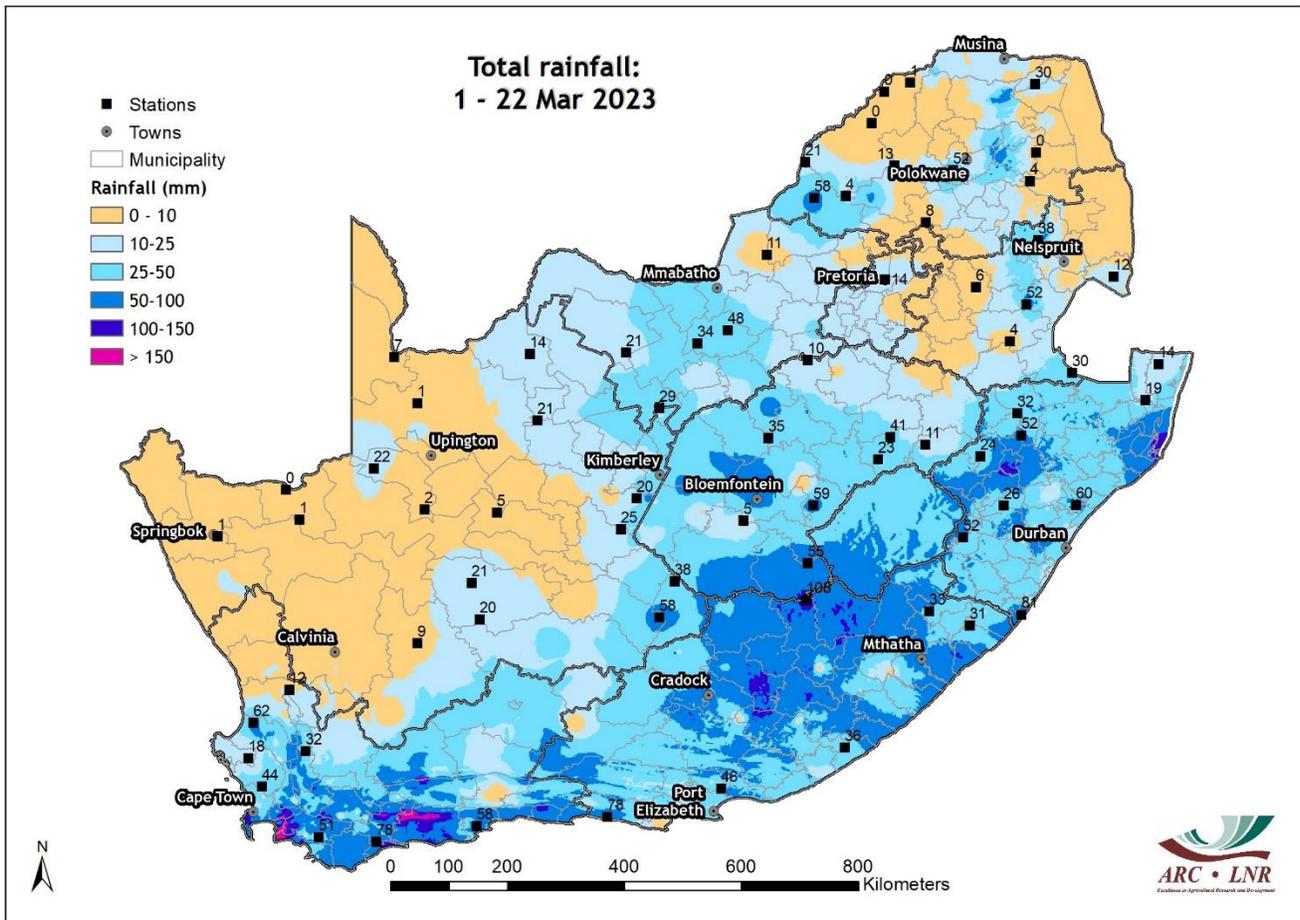
Observed conditions

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



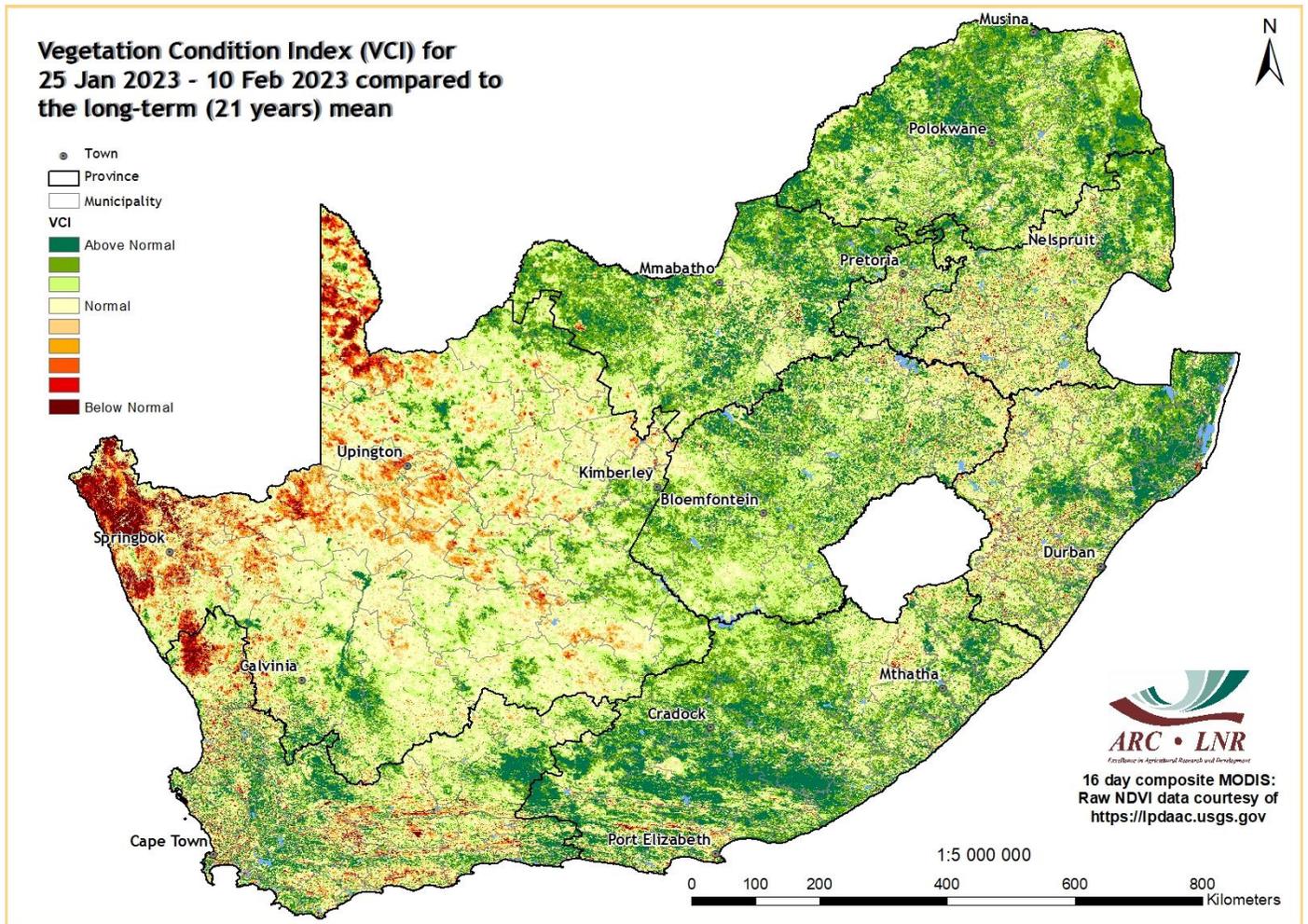
Most of the central to northeastern parts received above-average rainfall during February, in contrast to January when most of the northern parts were relatively dry. The winter rainfall region also received above-average rainfall.

Rainfall (mm): 1 – 22 March 2023



Most of the country received some rain during March so far. Significant totals were recorded over the southern parts, focusing on the Garden Route and adjacent areas of the Karoo and Boland as well as the interior of the Eastern Cape and large parts of KZN. The central to western parts of the summer-grain production region received in excess of 25 mm, but large parts of Mpumalanga received very little rainfall.

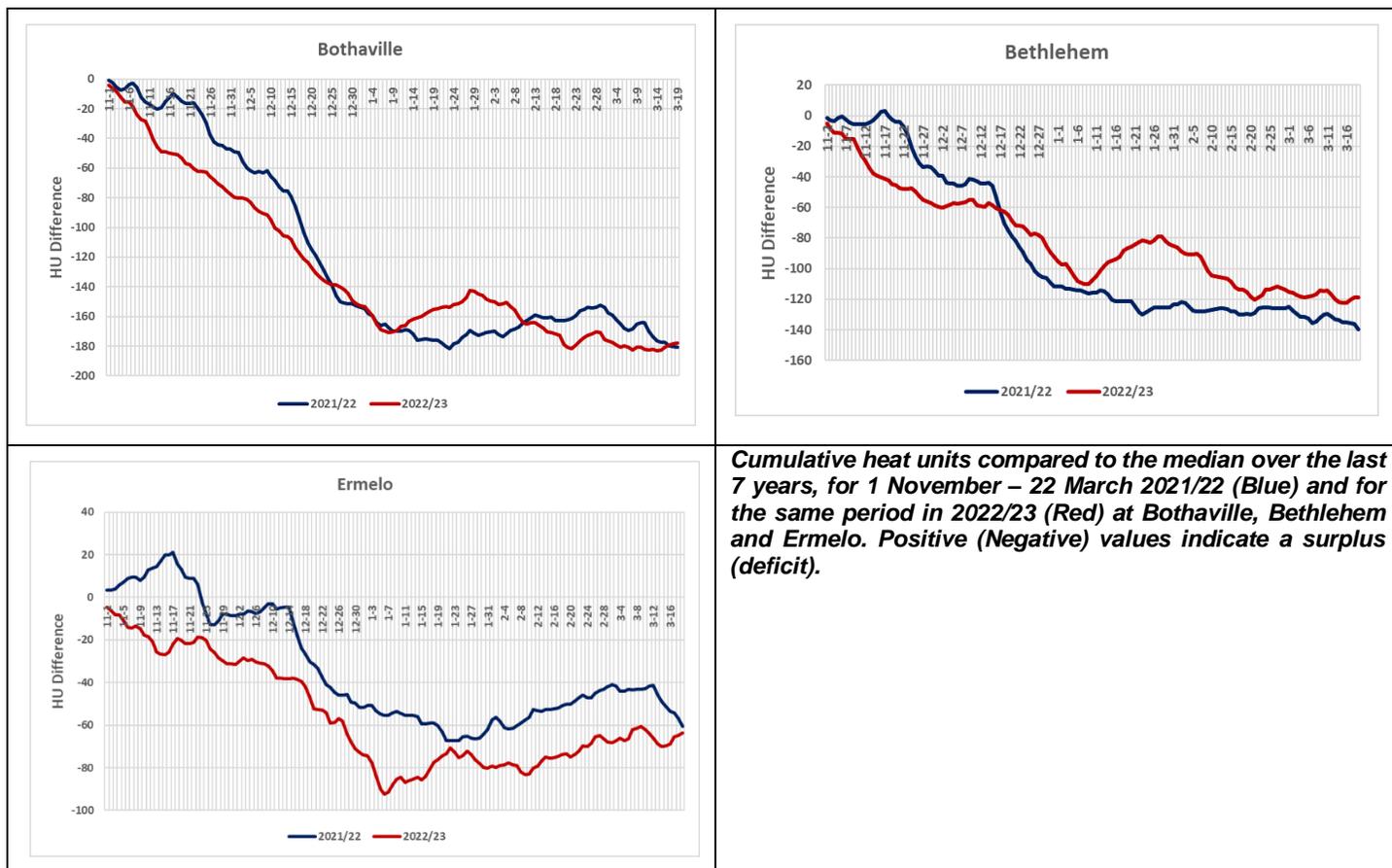
Vegetation Condition Index: February 2023



By early-mid-February, vegetation activity still reflected widespread above-normal rainfall since mid-October over most of the interior. Isolated areas over the far northeastern Free State, Mpumalanga and northwestern KZN however experienced below-normal vegetation activity associated with relatively dry conditions during January. Below-normal vegetation activity was also more observed over the western to northwestern parts of the Northern Cape.

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. Deficits have trended smaller over the north-eastern parts of the grain production region recently (Ermelo), but remained constant further west and south. With near-normal temperatures expected during the next few days, the current deficits should remain in place.

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

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



The way in which **young people see the future** speaks of a positive attitude – and of the choice to be relevant in a new era. AgriSeker shares this excitement about the future of agriculture in South Africa. Our motto is 'A certain future', after all.

AgriSeker is motivated to make a contribution to the future of our country with a dedicated focus on agriculture through knowledge, understanding and participation in this sector. Our focus is on producers and young people, because for agriculture to survive, we need you.

Ask your insurance broker or find us online at agriseker.co.za