

CUMULUS

SEASON 2023/2024

by J Malherbe, R Kuschke

21 December 2023



YOUNG PEOPLE

SEE THE FUTURE

Differently



“THE FUTURE OF AGRICULTURE... A CERTAIN FUTURE”

Contents

Summary	3
Scattered thundershowers continue.....	3
Overview of expected conditions over the main agricultural production areas	4
Medium term rainfall and temperature summary	6
Possible extreme conditions - relevant to agriculture	7
Seasonal forecast	8
Current ENSO conditions:.....	8
Seasonal forecasts issued by various international institutions	10
CUMULUS seasonal outlook	12
Observed conditions	13
Rainfall (% of long-term mean): November 2023	13
Rainfall (mm): 1 – 19 December 2023	14
Vegetation Condition Index: November 2023	15
Sources of information	16

Summary

Scattered thundershowers continue

The next few days will see a continuation of favorable circulation patterns for typical mid-summer thundershowers over the central to eastern parts, including especially the central to eastern summer-grain production region and at times also the western parts of this region. It will initially be hot over the central parts, with maximum temperatures exceeding 35°C daily until Sunday over the western to central interior and until Monday over the north-eastern areas and eastern low-lying areas.

While it will initially be hot over most areas with only isolated to scattered thundershowers, atmospheric circulation patterns are, according to current forecasts, expected to be quite favorable for somewhat more widespread thundershowers over the central to eastern and northeastern parts from the 24th to the 28th. Temperatures will also be somewhat lower during the Christmas period and possibly towards the end of the month following hot conditions initially. The more favorable conditions will occur when an upper-air trough is expected to traverse the country from the 24th, with a high-pressure system ridging around the country in the lower levels of the atmosphere, feeding moisture from the east over the interior and aiding in increasing cloud cover and lowering daytime temperatures.

Looking further ahead, the cooler conditions with scattered thundershowers over the central to eastern parts may last until the end of the month, but a drying trend may occur. It may generally become drier, with the wetter than normal conditions possibly concentrating more over the central parts towards the end of the month and early January.

On a Global scale, convection along the equator is fairly evenly distributed relative to the long-term average, but currently somewhat stronger over areas that are associated with significant rainfall events over the summer rainfall region. Convection along the equator will move into areas not associated with above-normal rainfall over South Africa during the next few days, indicating the possibility of drier conditions towards early January following the rainfall expected around Christmas and later this month. This is also indicated by the regional circulation patterns across the Atlantic and Indian Oceans that are expected to become less favorable for the development of rain over the subcontinent after the rain next week.

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

- Temperatures will be above normal over the central interior, but near normal to below normal over the eastern interior and winter rainfall region for this time of the year.
- The interior will be hot over most areas until Sunday, but cooler with more abundant cloud cover and lower maximum temperatures next week.
- More specifically, maximum temperatures will exceed 35°C over the interior of the Northern Cape, western to central and northern Free State, central to western North West and northern Gauteng until Sunday. Maximum temperatures will exceed 35°C over Limpopo and the Lowveld of Mpumalanga until Monday.
- It will be hot initially over most areas, with isolated thundershowers mostly over the central to southeastern parts. It will be cooler from late Sunday with scattered thundershowers over the central to eastern and northeastern parts (Free State, North West, Gauteng, KZN, northeastern parts of the Eastern Cape, Mpumalanga and Limpopo until at least Wednesday).

- Christmas day is expected to be partly cloudy to cloudy and mild with scattered thundershowers over the eastern parts, but dry in the west. It will be partly cloudy and warm over the central parts with late afternoon thundershowers. It will be cool along the Garden Route with light showers.
- The western parts of the winter rainfall region is expected to be dry and hot on several days. Light showers are expected along the Garden Route at times where it will be cooler.
- **The summer-grain production region** will be warm initially, but hot and windy in the west until Sunday. Isolated thundershowers are expected, but it will become cooler with more abundant cloud cover from late Sunday and with scattered to widespread thundershowers over the region.

Overview of expected conditions over the main agricultural production areas

It will be hot initially with isolated to scattered thundershowers. It will become cooler over the eastern to central parts from Sunday as an upper-air trough is expected to move across the country with a high-pressure system expected to ridge to the south. This sequence of events will result in increased cloud cover and rainfall over the interior from the 24th onwards.

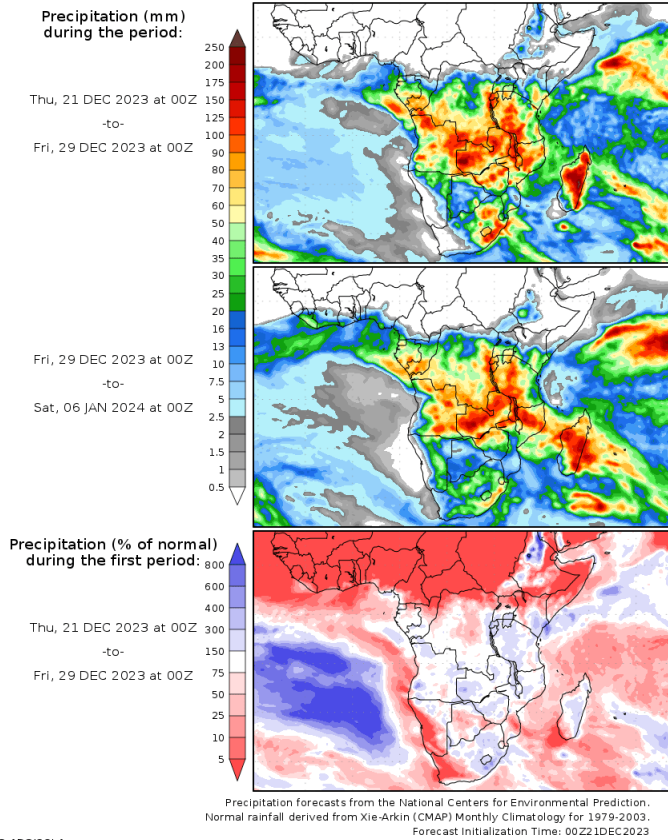
Maize production region: It will be hot with isolated thundershowers until Sunday. Cooler conditions with widespread thundershowers are expected next week:

- Maximum temperatures over the western maize-production areas will range between 32 and 37°C until Sunday. Maximum temperatures in the west will be around the mid-20s from Monday until Wednesday. Minimum temperatures will be in the order of 15 – 23°C, with the lower temperatures expected next week.
- Maximum temperatures over the eastern maize-production region will range between 30 and 33°C until the 24th. Maximum temperatures will range between 12 and 23°C from Monday to Wednesday. Minimum temperatures will be in the order of 10- 17°C, with the lower minimums next week.
- **Thursday (21st):** Partly cloudy and warm, but hot and windy in the west. Isolated thundershowers are possible.
- **Friday (22nd):** Partly cloudy and warm, but hot and windy over the central to western parts. Isolated thundershowers are possible, mostly over the southern to eastern parts.
- **Saturday (23rd):** Partly cloudy and warm, but hot and windy over the central to western parts. Isolated thundershowers are possible.
- **Sunday (24th):** Partly cloudy and warm, but hot and windy over the central to western parts. Scattered thundershowers will develop later during the day.
- **Monday (25th) to Wednesday (27th):** In contrast to conditions until the weekend, temperatures are expected to be lower with abundant cloud cover in the region. Thundershowers of a more widespread nature will occur, mostly developing in the afternoons and extending into the evenings.

Cape Wine Lands and Ruens: Southerly to easterly winds will dominate, leading to higher temperatures over the interior and the western parts than in the south, such as along the Garden Route. Light showers are expected regularly over the Garden Route from Saturday to Wednesday. It will be dry over the interior and in the west where it will be hot over the western to northern parts on most days. It will also be hot further inland, in the Karoo, until Sunday, after which these areas will also be cooler. Strong to gale-force south-easterly winds are expected over the southeastern parts on most days.

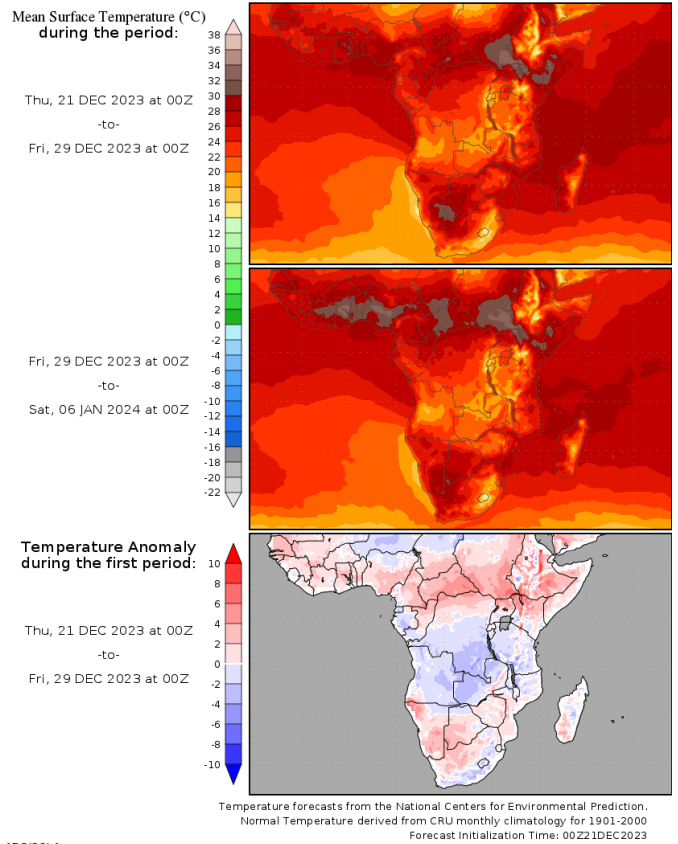
Medium term rainfall and temperature summary

Precipitation Forecasts

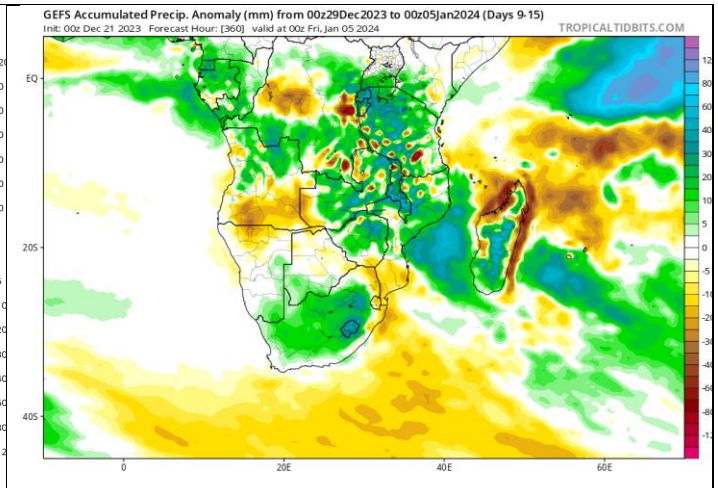
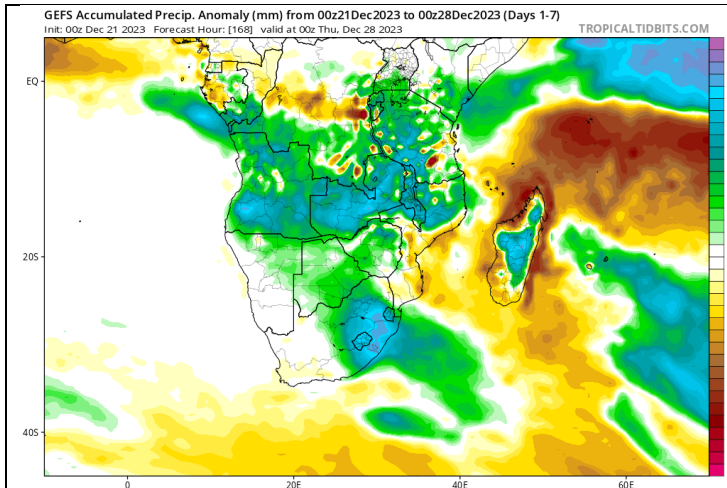


GrADS/COLA

Temperature Forecasts



GrADS/COLA



The GFS ensemble forecast (consisting of several forecasts with small initialization differences) favors relatively wet conditions over the central to eastern parts of the country during the next few days (left), with the wetter than normal conditions expected to shift to the central and western interior while drier conditions may develop in the northeast towards early January.

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 21 December) 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 negatively affect agricultural activities and production:

- **It will be hot and humid:**
 - Limpopo River Valley and Lowveld: **Thursday to Monday (21st to 25th).**

- **It will be hot:**
 - Central interior: **Thursday to Sunday (21st to 24th).**
 - Karoo: **Thursday to Saturday (21st to 23rd).**

- **It will be dry and windy, enhancing the fire hazard where vegetation is dry:**
 - Southern to western interior: **Sunday to Wednesday (17th - 20th).**

- **Cool, cloudy and wet conditions may result in the development and spread of fungal pathogens:**
 - Central to eastern parts of the summer grain production region: **Monday to Wednesday (25th – 27th).**

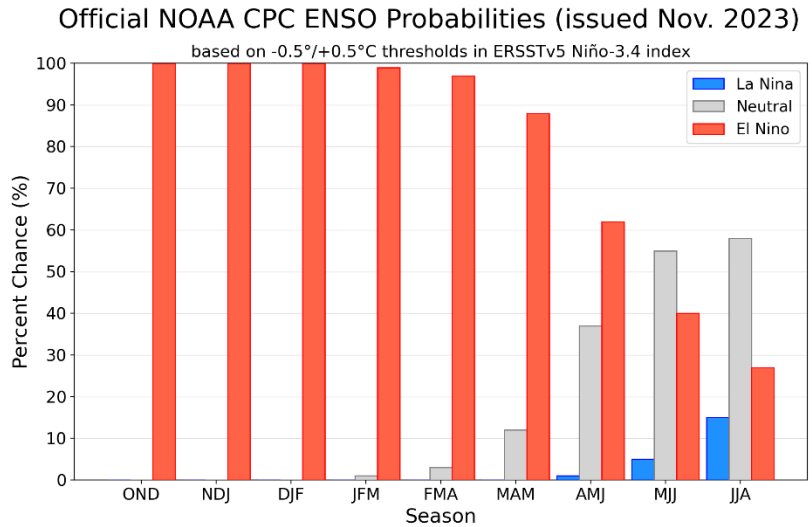
- **Strong to gale force south-easterlies are expected and may lead to the development and spread of wild fires where vegetation is dry:**
 - Southwestern parts of the Western Cape: **Thursday to Wednesday (21st – 27th).**

- **Some thundershowers may become severe:**
 - Free State, North West, Gauteng, western to southern Mpumalanga: **Sunday to Tuesday (24th – 26th).**

Seasonal forecast

Current ENSO conditions:

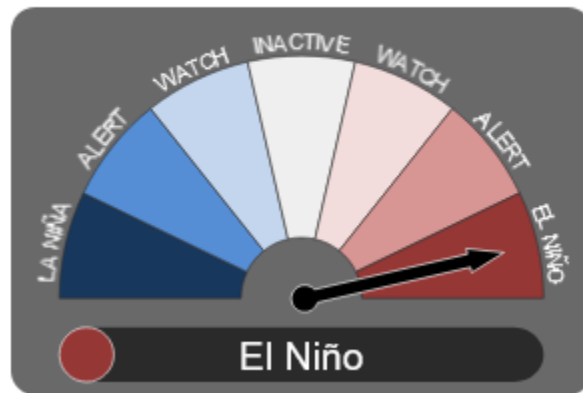
The current El Niño event is expected to last through our summer at least into early 2024 and it is unlikely that this outlook will change much during the next few months. Atmospheric indicators are consistent an event where coupling between the ocean and atmosphere is present, showing a mature state of the event. Observed trade winds in the Equatorial Pacific weaker than average, showing atmospheric anomalies consistent with a full-fledged El Niño. The International Research Institute for Climate and Society (IRI)'s latest ENSO forecast also maintains the expectation of a continuation into autumn:



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

Likewise, the Australian Bureau of Meteorology keeps their outlook to “El Niño”

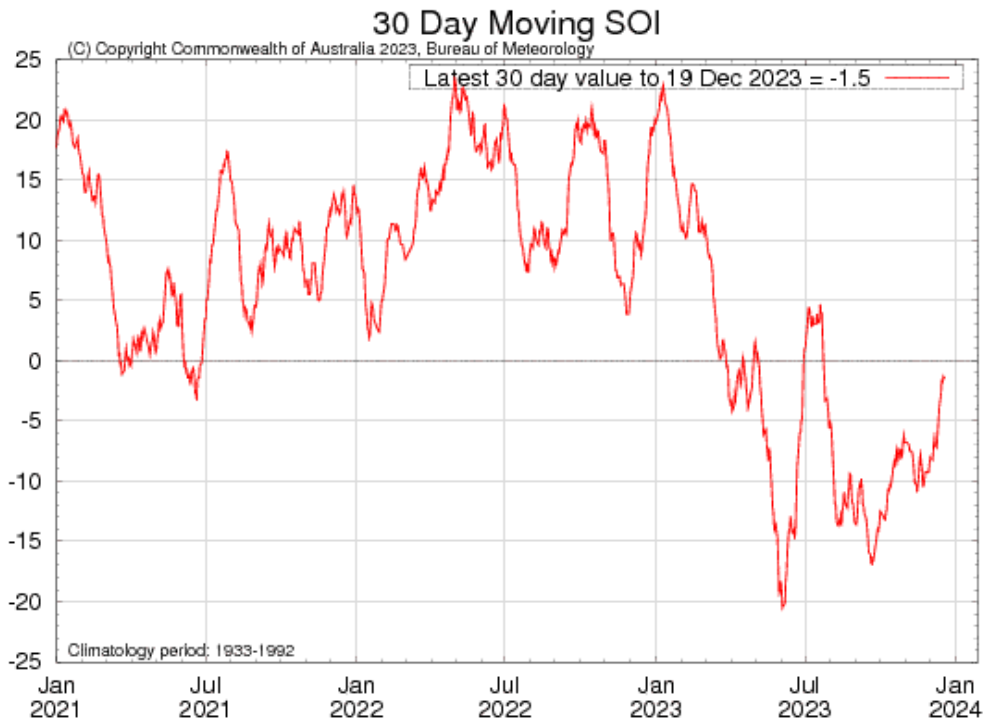
El Niño persists



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

In their most recent update (5 December), the BOM notes regarding Sea Surface Temperatures: “El Niño continues in the tropical Pacific. Indicators of the El Niño–Southern Oscillation (ENSO), including tropical Pacific sea surface temperatures (SSTs), cloud, wind, and pressure patterns are consistent with El Niño conditions. Climate model forecasts indicate some further warming of central to eastern Pacific SSTs is possible, with SSTs remaining above El Niño thresholds early into the second quarter of 2024.” *Australian Bureau of Meteorology* - <http://www.bom.gov.au>.

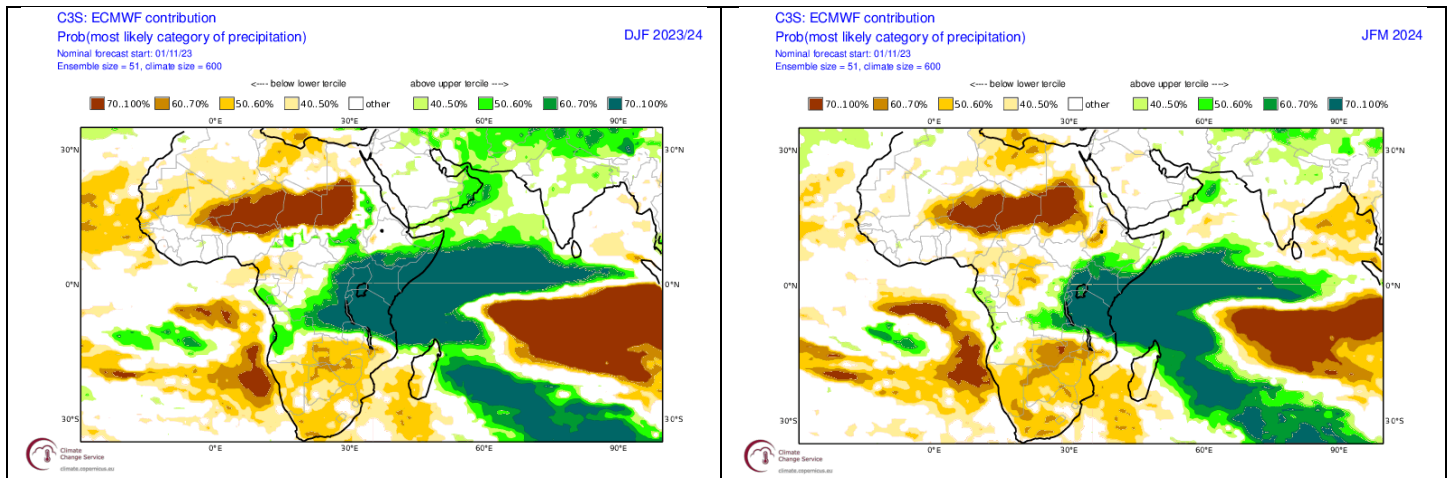
The 30-day Southern Oscillation Index (SOI) is currently -1.9 and therefore indicative of atmospheric pressure patterns in the Australia – Pacific region being in neutral to El Niño mode. In general, a negative SOI is associated with drier conditions over southern Africa.



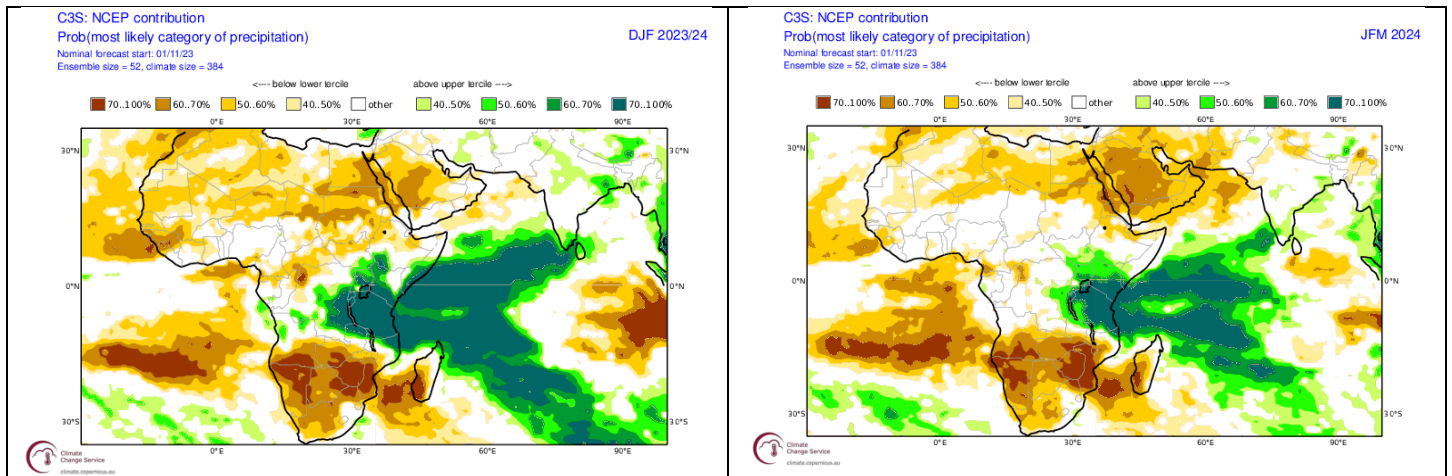
Australian Bureau of Meteorology - <http://www.bom.gov.au>

Seasonal forecasts issued by various international institutions

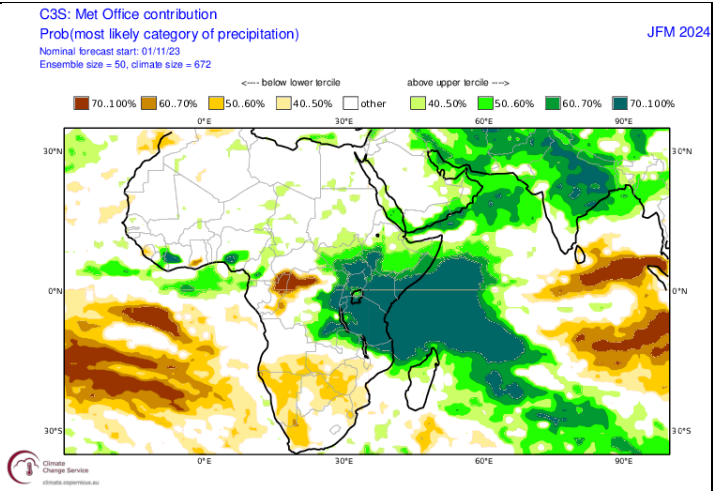
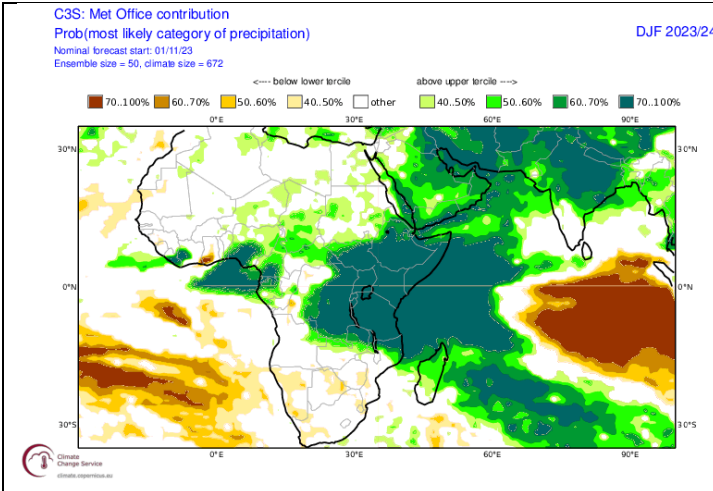
Seasonal forecasts (updated in November 2023) by various institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) and by the IRI, still expect drier conditions towards late summer compared to during early and mid-summer. Moreover, the forecasts for late summer have trended drier with the most recent (November-issued) forecasts. The drier pattern over southern Africa is to be expected with regard to seasonal forecasts given the current El Niño event. During the December – February and January – March period, forecasts still lean more strongly towards drier than normal conditions over the central to western parts of the country while the somewhat wetter signal over the eastern parts have weakened and mostly leans towards near-normal and drier-than-normal conditions.



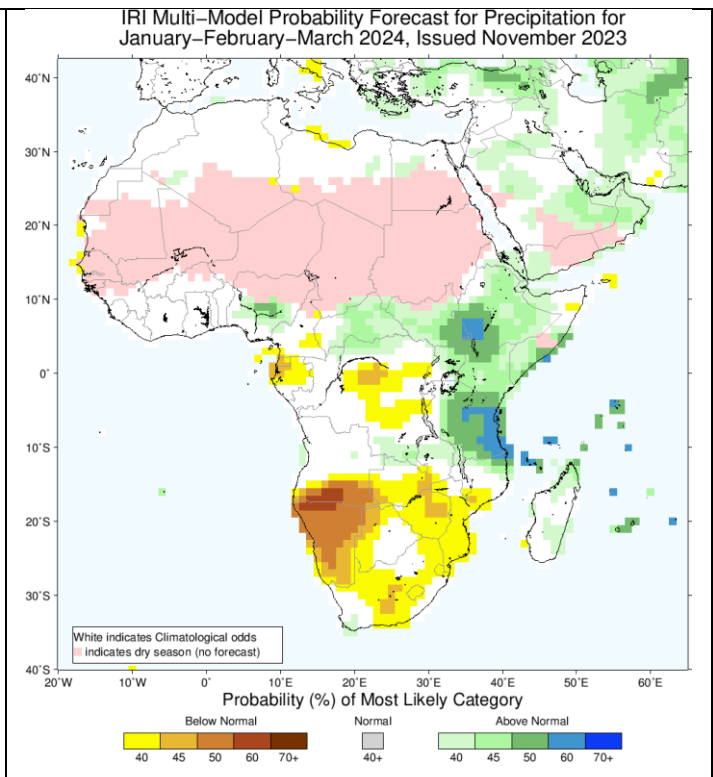
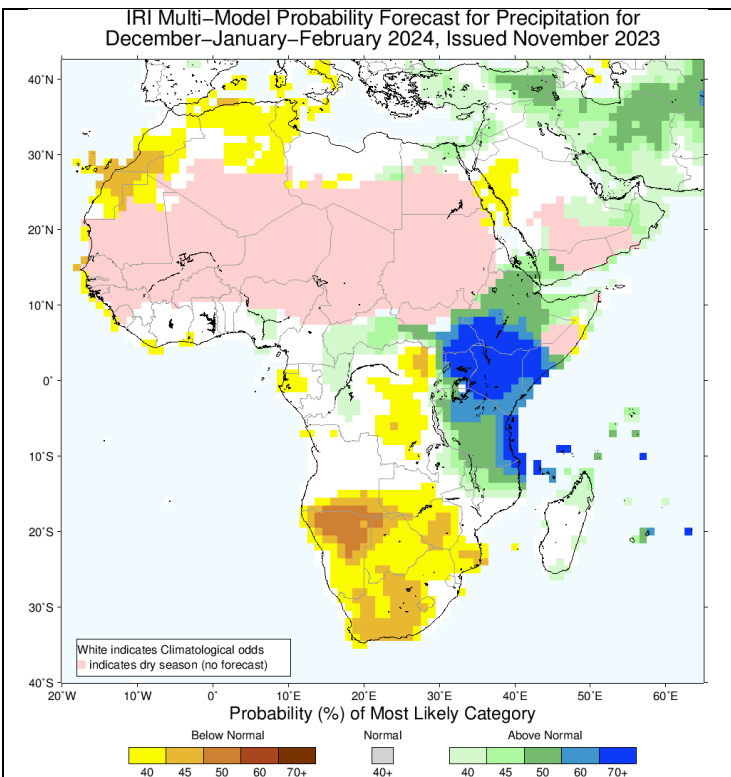
Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for mid-summer (December-February 2023/24; left - Forecast issued in 2023-11) and mid-to-late summer (January to March 2024; right).



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



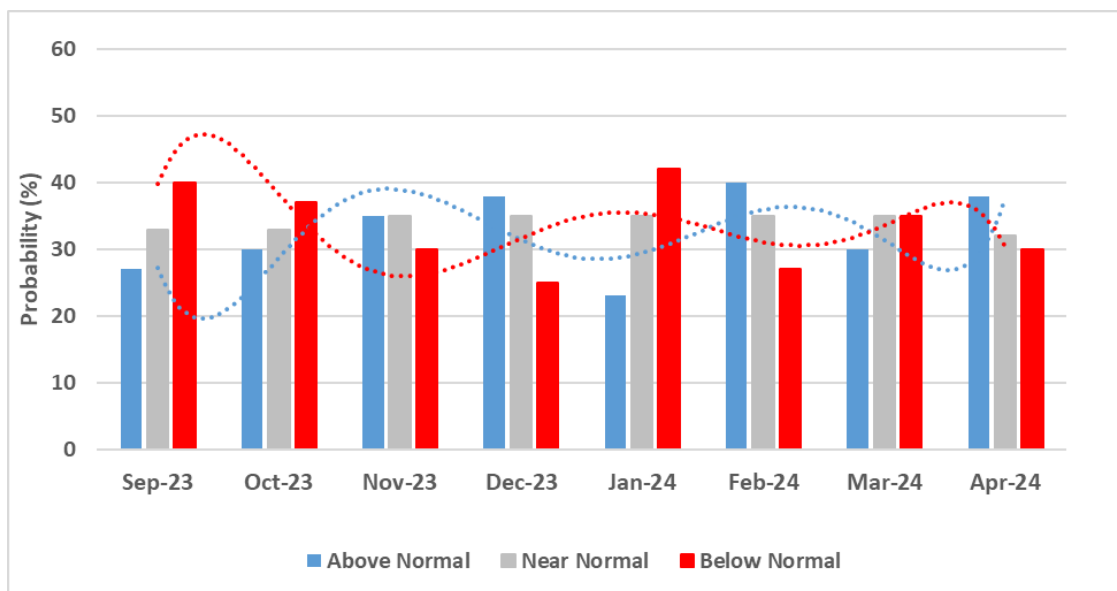
Same as above, but forecasts issued by the UK Met Office.



Probabilistic forecasts by the International Research Institute for Climate and Society (IRI) for rainfall for mid-summer (December-February 2023/24; left - Forecast issued in 2023-11) and mid-to-late summer (December to February 2023/24; right).

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 2023/24 usually experience near normal to below normal rainfall in total, with alternating wet and dry periods throughout the summer rather than one half of the summer being dry while the other half is wet.



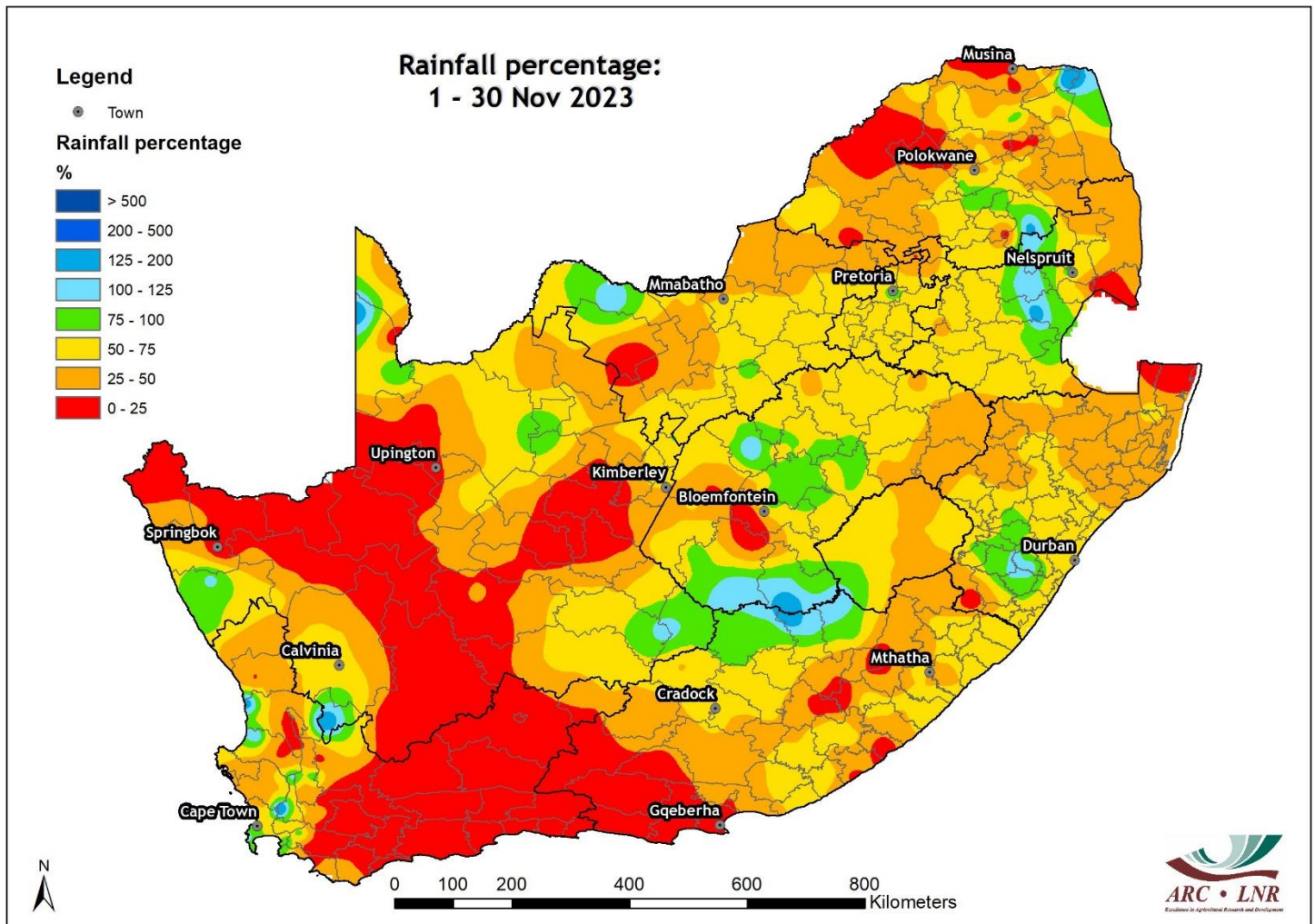
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2023 – April 2024 (Forecast issued in 2023-09).

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

- September – first half of October: Relatively dry conditions over the north-eastern half of the summer rainfall region
- Second half of October – early November: Near-normal rainfall over the north-eastern half of the summer rainfall region
- First half of November: Near-normal to below-normal rainfall over the north-eastern half of the summer rainfall region
- Late November and December to early January: Above-normal rainfall over the north-eastern half of the summer rainfall region
- Rest of January: Below-normal rainfall over the north-eastern half of the summer rainfall region
- February: Normal to above-normal rainfall over the north-eastern half of the summer rainfall region
- Late February and early March: Below-normal rainfall over the north-eastern half of the summer rainfall region
- Late March into Early April: Normal to above-normal rainfall over the north-eastern half of the summer rainfall region

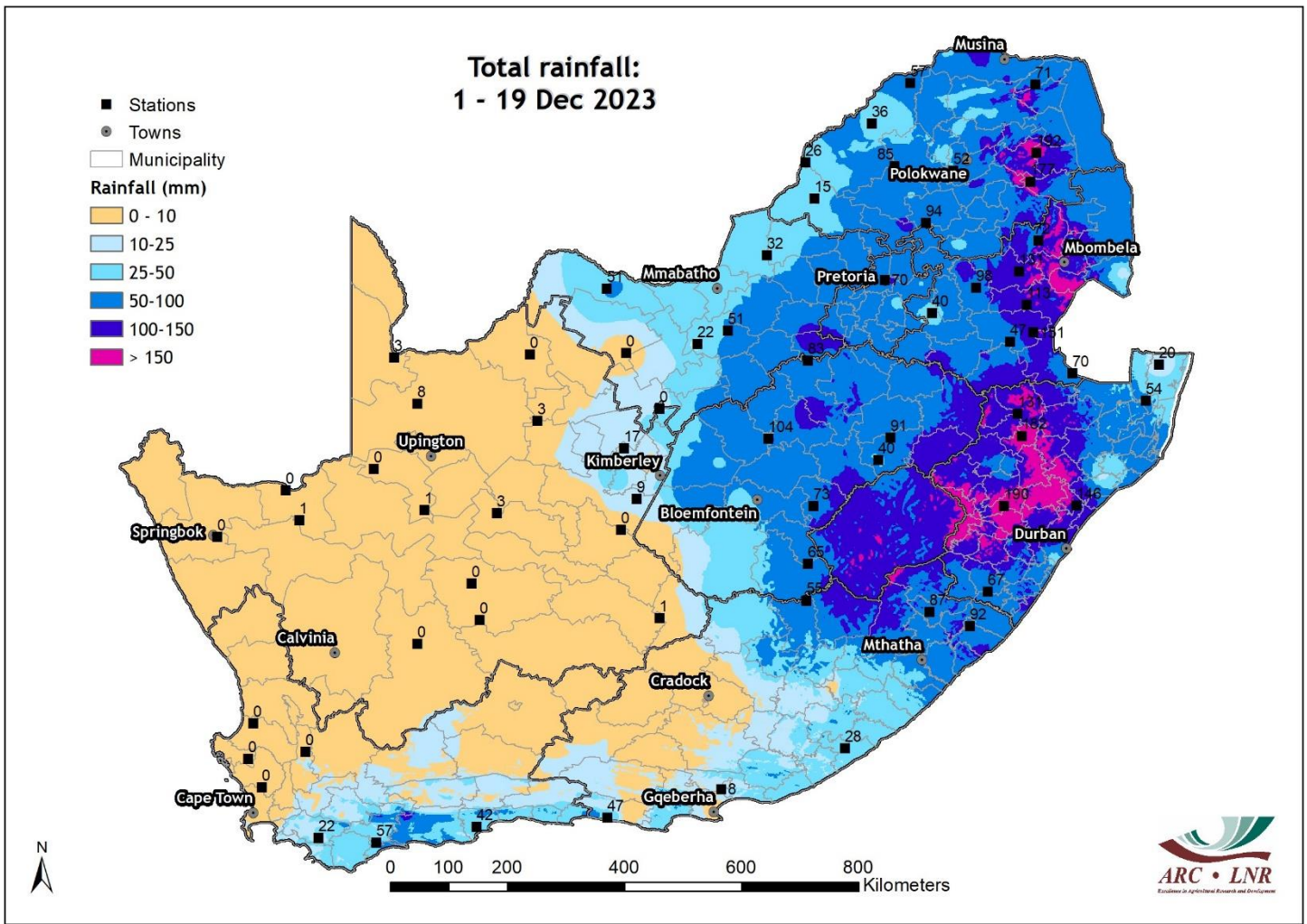
Observed conditions

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



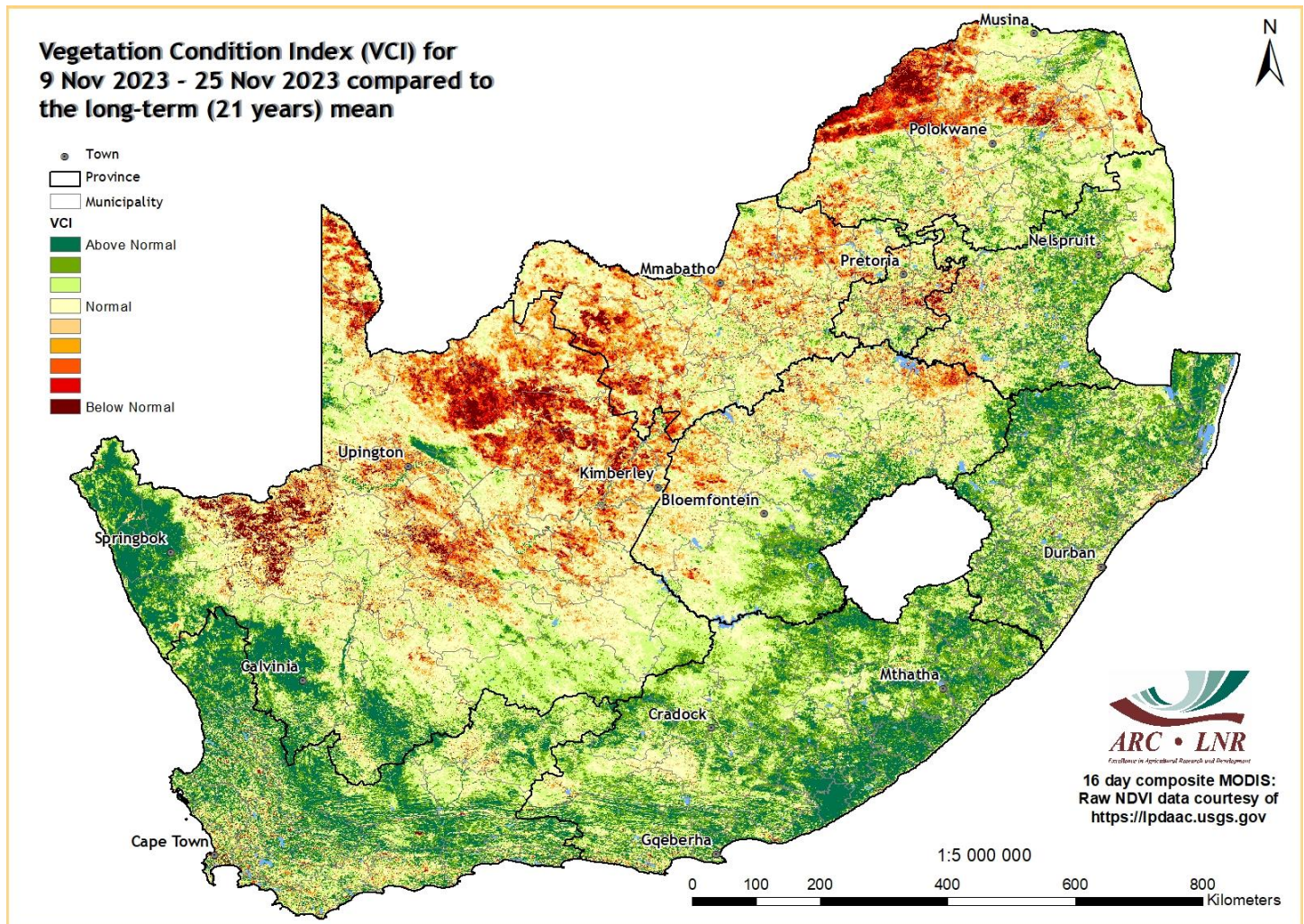
Total rainfall during November 2023 was below the long-term average over most of the country, with only relatively small areas, such as parts of the southern Free State and parts of the Highveld and escarpment of Mpumalanga where total rainfall exceeded the long-term average. Most of the summer-grain production region received between 50 and 75% of the long-term average.

Rainfall (mm): 1 – 19 December 2023



Most of the eastern summer rainfall region, including almost the entire summer-grain production region, received in excess of 50 mm of rain during the month so far.

Vegetation Condition Index: November 2023



By late November, drier conditions over the central to northern interior resulted in below-normal vegetation activity over these areas. Wetter than normal conditions supported above-normal vegetation activity over the rest of the country, especially the winter rainfall- and all-year rainfall regions in the south and southwest together with the southern interior. Over the summer-grain-production region, the eastern half of Mpumalanga and parts of the eastern Free State experienced above-normal vegetation activity while the rest of the region experienced below-normal activity.

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:

WRF model downscalings of GFS forecasts.

Fires:

MODIS data, distributed by the Land Processes Distributed Active Data Center (LP DAAC), located at the US Geological Survey's EROS Data Center

Soil moisture:

<https://nasagrace.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>



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