

CUMULUS

SEASON 2023/2024

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09 November 2023



YOUNG PEOPLE

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



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Summary

Mostly warm and dry conditions expected

It will be relatively dry during the next few days, with only isolated thundershowers expected to develop over the central to eastern summer rainfall region and only by the weekend. It will also be hot at times over the interior. By the middle of next week, the synoptic weather pattern suggest the possibility of more widespread thundershowers over the central to eastern parts, at least for a day or two, but forecast models are not yet in agreement regarding rainfall amounts and distribution, with some models still keeping it dry. However, being November and with model-agreement regarding a fairly strong high-pressure system ridging to the south of the country, it can be expected that thundershowers should at least be more widespread, covering the central to northeastern parts of the country, by mid-week. Unlike last week however, there are no indications of an upper-air trough moving across the country at least until the middle of next week, making another relatively widespread rainfall event highly unlikely. Isolated to scattered thundershowers will most likely to be confined to the Free State, Eastern Highveld and surrounding areas, through the weekend and into early next week.

Rainfall was somewhat more widespread on Monday into Tuesday this week over the summer-grain production area than expected earlier, associated in part with the upper-air trough being deeper than anticipated by last week. Rainfall totals over the western parts of the region ranged between 10 and 25 mm while the central areas received between 25 and 40 mm in total. While the larger southern-African region was largely dry, the sharp trough did provide much needed rainfall more locally over much of the summer-grain production region. Wetter conditions by late October into early November was however in agreement with the Cumulus intra-seasonal forecast.

Traditionally, mid-to late November is a period when the summer rainfall region should expect more widespread rainfall and it will be very unusual if thundershowers are absent during the next few days and weeks. Towards late November, larger parts of southern Africa traditionally also see more widespread rain, unlike what we have experienced so far with the main area of activity being the South African Highveld. Tropical moisture is still mostly confined to the far northern parts of southern Africa and cloud bands are sourced from very far north, with the intertropical convergence zone not yet active close to South Africa. Large amounts of tropical moisture in our own region are still absent, keeping rainfall totals relatively low. Looking further ahead (from the middle of next week), forecast models tend to keep low-pressure troughs to the southwest in the Atlantic Ocean for extended periods. Such a situation is indicative of large-scale circulation patterns still not favorable for above-normal rainfall over most areas until late November, with high-pressure systems most of the time in the upper atmosphere across southern Africa. While thundershowers will be more widespread at times, there isn't an indication of significant widespread rain yet. On a global scale, more intense convection along the equator will move into an area that is generally associated with better rainfall over South Africa around the middle of the month (around middle of next week) for a few days, coinciding with somewhat better rainfall expected according to current forecasts by that time.

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

General:

- Temperatures will on average be above normal over the interior.
- Rainfall is expected to be below normal over most areas.
- Isolated thundershowers are expected to develop during the weekend in a diagonal band that includes the Free State. Thundershowers should focus further northeast, including Mpumalanga, from late Sunday and into early next week. By the middle of next week, scattered thundershowers are expected in a diagonal band across the central to eastern parts according to current forecasts.
- The winter rainfall region will be dry except for light showers over the southern parts during the weekend.
- The summer-grain production region should be warm to hot in the west, but warm to mild in the east. Isolated thundershowers will occur at times from this weekend onwards, with a somewhat better chance according to current forecasts by the middle of next week over the entire region. Total rainfall is however expected to be below normal for this time of the year over most of the region.
- The winter-grain-production region in the southwest will experience mostly dry conditions, but there is a very slight chance for some light showers along the Garden Route during the weekend.

- As is typical in early summer, where thundershowers do develop during the next few days, they will have an enhanced tendency to become severe.

Overview of expected conditions over the main agricultural production areas

The upper-air over the country will be dominated by a weak high-pressure system for most of the time, but an upper-air trough towards the southwest may move closer and into the country by the middle of next week and may result in more widespread rainfall following relatively dry conditions until next week. The eastern parts will be somewhat cooler at times, associated with an on-shore flow at times by ridging high-pressure systems to the south and east. The dry air over the interior, together with atmospheric temperature and moisture profiles, will enhance the tendency of thundershowers over the central to eastern parts to become severe.

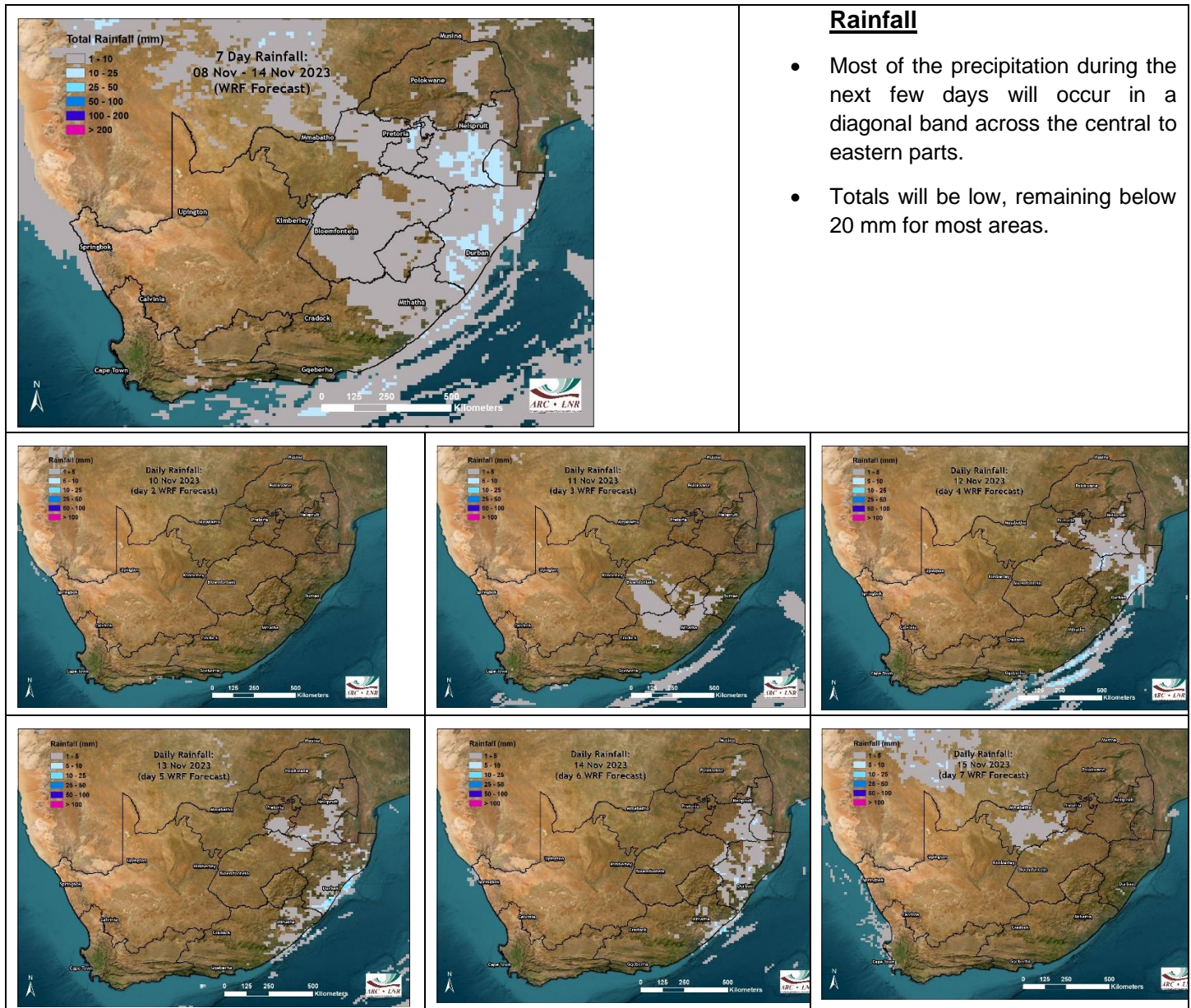
Maize production region: Generally speaking, temperatures will be above normal over the region with rainfall mostly below normal for this time of the year. It will be warm to hot at times over the western parts of the region, but the eastern parts will be mild at times. Widespread rainfall is not expected, with isolated to scattered thundershowers at times through the period following a dry start:

- Maximum temperatures over the western maize-production areas will be in the order of 31 – 35°C. Minimum temperatures will be in the order of 15 – 21°C.
- Maximum temperatures over the eastern maize-production region will range between 26 and 32°C. Minimum temperatures will be in the order of 10 - 15°C.
- **Thursday (9th):** Sunny and warm, but partly cloudy and mild in the east.
- **Friday (10th):** Sunny and warm, becoming windy in the west.
- **Saturday (11th):** Partly cloudy and warm. Isolated thundershowers are expected over the Free State and southern North West. It will be windy in the west.
- **Sunday (12th):** Partly cloudy and warm with isolated thundershowers over the eastern to northern parts of the region.
- **Monday (13th):** Sunny and warm in the west, otherwise partly cloudy. Isolated to scattered thundershowers are expected over the central to northern and eastern parts of the region.
- **Tuesday (14th):** Sunny and warm in the west, otherwise partly cloudy. Isolated thundershowers are expected over the central to northern and eastern parts.
- **Wednesday (15th):** Partly cloudy and warm. It will be windy over the central to western parts. Isolated to scattered thundershowers may develop over the region according to current forecasts.

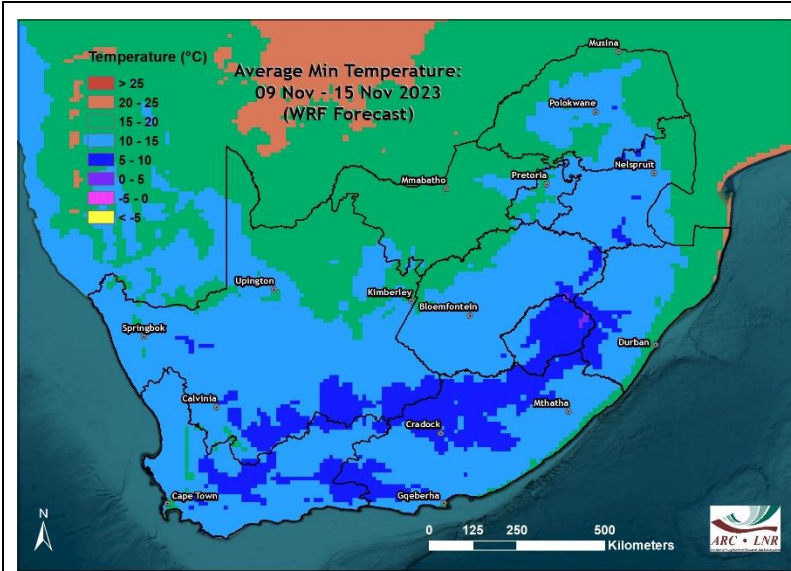
Cape Wine Lands and Ruens: Sunny to partly cloudy and mild to warm conditions will dominate. Little to no rain is expected, but light showers may occur over the southern parts and Garden Route during the weekend when it will be mild over the entire region. It will become warm to hot over the western to northern parts from Monday onwards, spreading to the entire region by the middle of the week. Strong southeasterly winds are expected over the southwestern coastal areas by Sunday and early next week.

Daily summary of expected conditions

(GFS forecast downscaled using WRF)

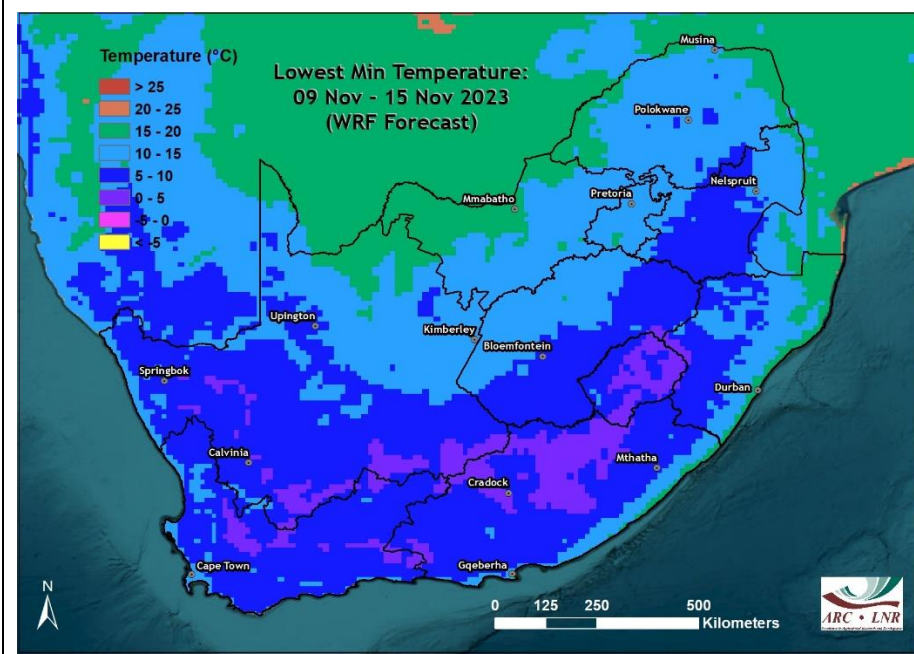


- It will be dry initially.
- Thundershowers may develop over the Free State by Saturday, moving to the northeast and focusing around Mpumalanga and Gauteng by Sunday.
- Isolated thundershowers may remain in place over the northeastern areas early next week.
- Current forecasts indicate the possibility of a band of isolated thundershowers developing over the central parts, favoring North West and the Free State, by the middle of next week.



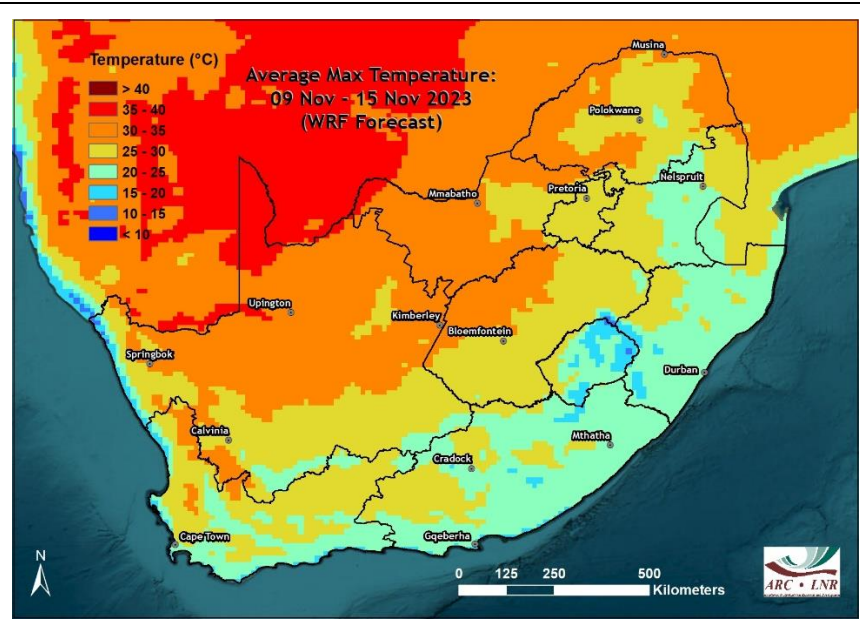
Average minimum temperatures

- Average minimum temperatures over the interior will be close to 15°C.
- Average minimum temperatures will be lowest over the southern high-lying areas (5 to 10°C).
- Average minimum temperatures will exceed 15°C over the northern to far-eastern low-lying areas.



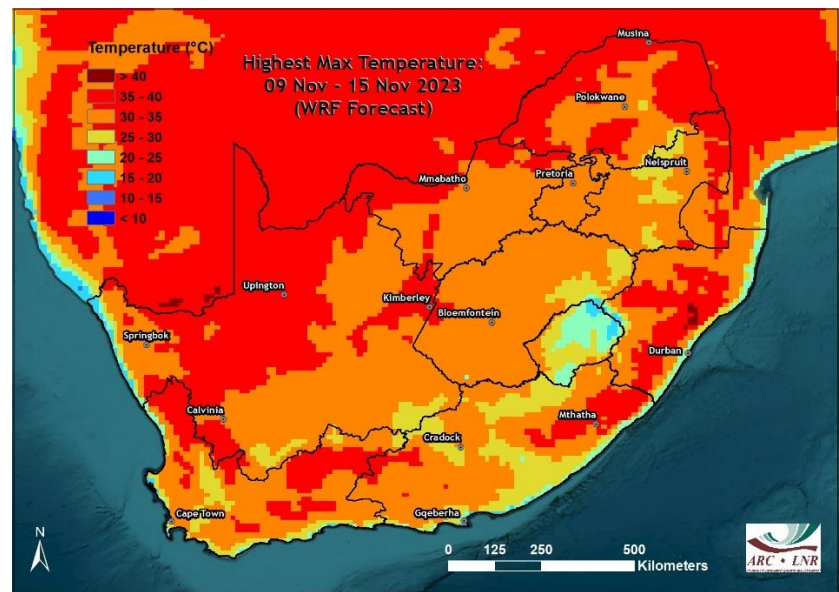
Lowest minimum temperatures

- Lowest minimum temperatures should exceed 5°C over the entire summer-grain production region.



Average maximum temperatures

- Average maximum temperatures will be relatively high, exceeding 35°C over the northern parts of the Northern Cape and exceeding 30°C over most of the northern parts of the country, including the western parts of the summer-grain production region.

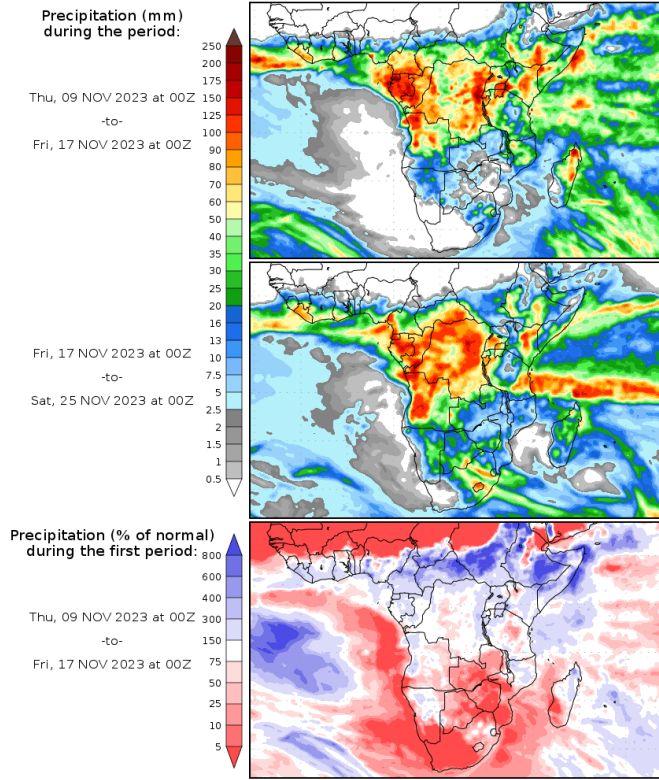


Highest maximum temperatures

- Hot conditions (>35°C) will occur initially (9th, 10th) over the western to southwestern interior.
- Hot conditions (>35°C) will occur over the northern areas and eastern low-lying areas, including central to northeastern KZN, on Saturday and remain in place in the northeast on Sunday.
- Hot conditions (>35°C) will shift to the central to northwestern parts again early next week.

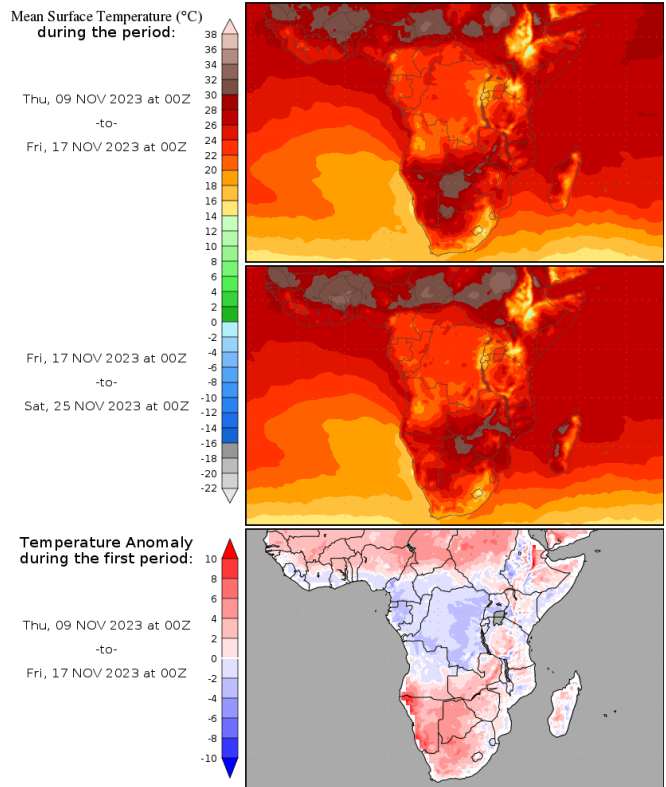
Medium term rainfall and temperature summary

Precipitation Forecasts

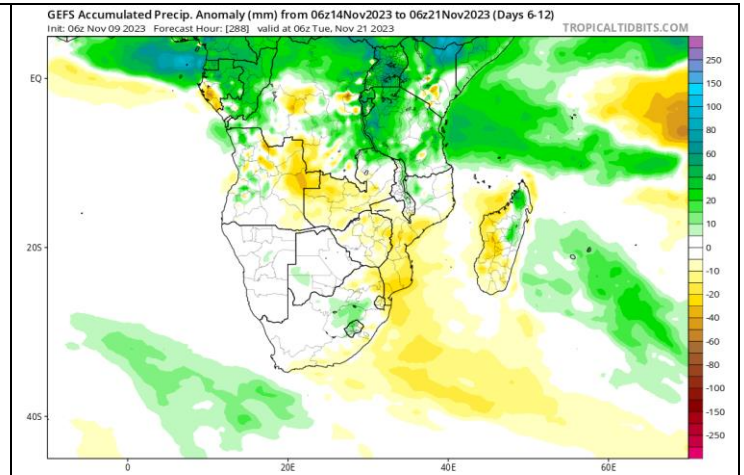
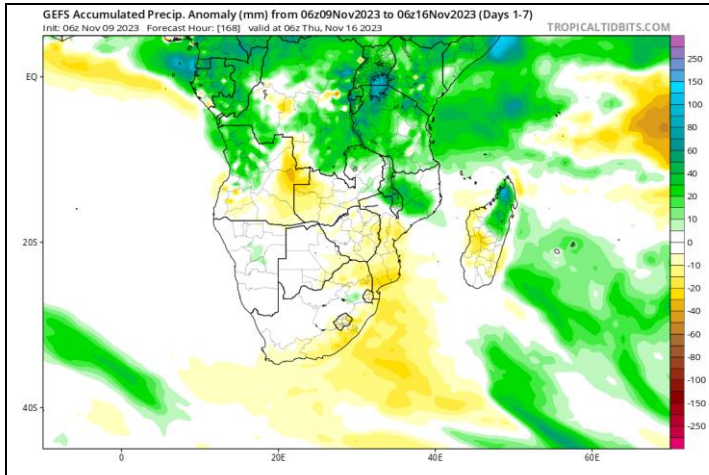


GRADS/COLA

Temperature Forecasts



GRADS/COLA



The GFS ensemble forecast (consisting of several forecasts with small initialization differences) favors relatively dry conditions for the next few days, but there are indications of somewhat wetter conditions from the middle of the month over the central to eastern and southeastern areas (right).

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 9 November) 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.

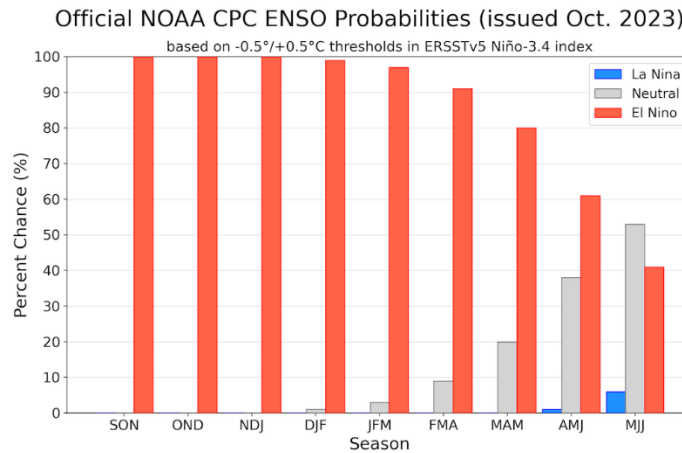
According to current model projections (GFS / ECMWF models) of weather conditions during the coming week, the following may negatively affect agricultural activities and production:

- **It will be hot:**
 - Western to southwestern interior: **Thursday and Friday (9th, 10th).**
 - Northern parts of the country and eastern low-lying areas, including central to northeastern KZN: **Saturday (11th).**
 - North West, Limpopo and Lowveld of Mpumalanga: **Sunday (12th).**
 - Northern to western parts of the Northern Cape and northwestern parts of the Western Cape: **Monday - Tuesday (13th, 14th).**
 - Northern to western parts of the Northern Cape and interior of the Western Cape: **Wednesday (15th).**
- **It will be hot and windy, enhancing the fire hazard where vegetation is dry:**
 - Central to southeastern interior: **Saturday (11th).**
 - Western interior: **Saturday and Wednesday (11th, 15th).**
- **Even though not widespread, some thundershowers may become severe given instability associated with the vertical temperature profile of the atmosphere and dry air to the west:**
 - Free State: **Saturday (11th).**
 - Mpumalanga: **Sunday and Monday (12th, 13th).**
 - The location of thundershowers, with forecasts currently favoring North West and northern Free State: **Wednesday (15th).**
- **Strong southeasterly winds are expected:**
 - Southwestern coastal areas: **Monday and Tuesday (13th, 14th).**

Seasonal forecast

Current ENSO conditions:

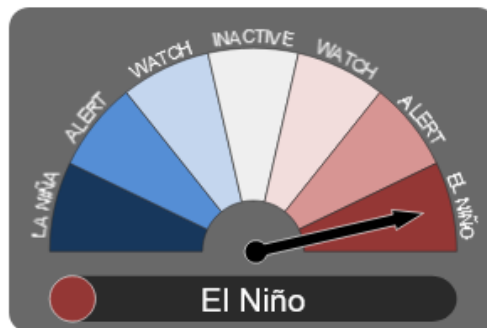
The current El Niño event is expected to last through our summer at least into early 2024 and it is unlikely that this outlook will change much during the next few months. The Australian Bureau of Meteorology (BOM) has again noted that atmospheric indicators are now also consistent an event where coupling between the ocean and atmosphere is present, showing a mature state of the event. Observed trade winds in the Equatorial Pacific have now been weaker than average for more than a month, showing atmospheric anomalies consistent with a full-fledged El Niño with ocean-atmosphere coupling. 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 under way in the tropical Pacific



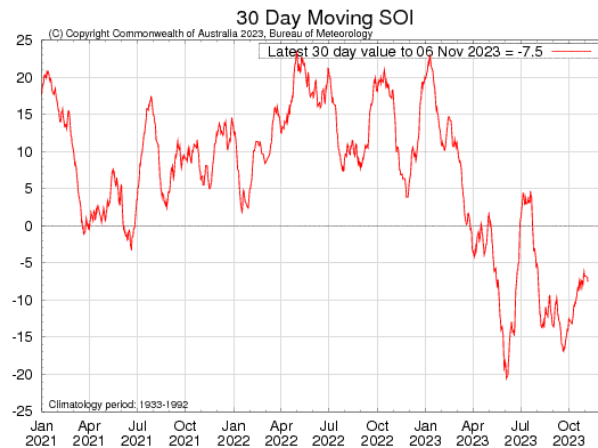
Australian Bureau of Meteorology - <http://www.bom.gov.au>

However, they (the Australian Bureau of Meteorology) do note that the trade winds have not yet been weaker than average in the western or central equatorial Pacific Ocean during any three of the last four months, which is the 4th criterion used. It is weaker currently, and if this will persist, the 4th criterion will be met later.

In their most recent update (8 November), the BOM notes regarding Sea Surface Temperatures: “El Niño continues in the tropical Pacific. Warmer than average sea surface temperatures (SSTs) in the tropical Pacific persist above El Niño thresholds, with warmer water beneath the surface to support that at the surface..... Climate model forecasts indicate some further warming of the central to eastern Pacific is likely, with SSTs remaining above El Niño thresholds into the early southern hemisphere autumn 2024.” Australian Bureau of Meteorology - <http://www.bom.gov.au>.

Regarding the atmospheric component, they also note that “.....cloud, wind and pressure patterns are consistent with El Niño conditions.” - Australian Bureau of Meteorology - <http://www.bom.gov.au> .

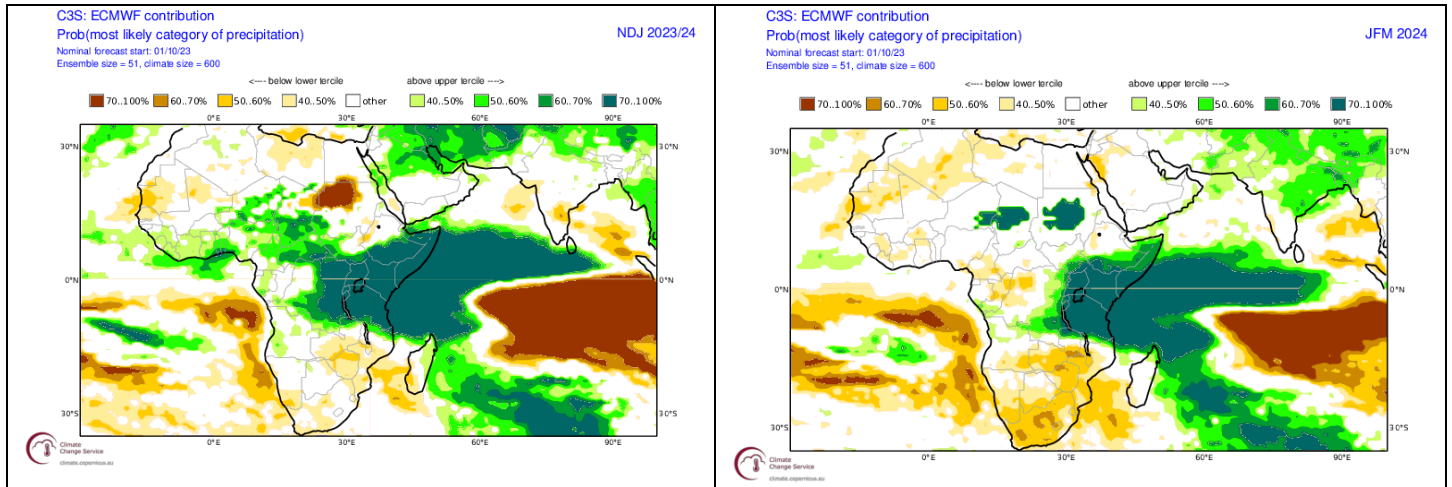
The 30-day Southern Oscillation Index (SOI) is currently -7.5 and therefore indicative of atmospheric pressure patterns in the Australia – Pacific region being in El Niño mode. In general, a negative SOI is associated with drier conditions over southern Africa.



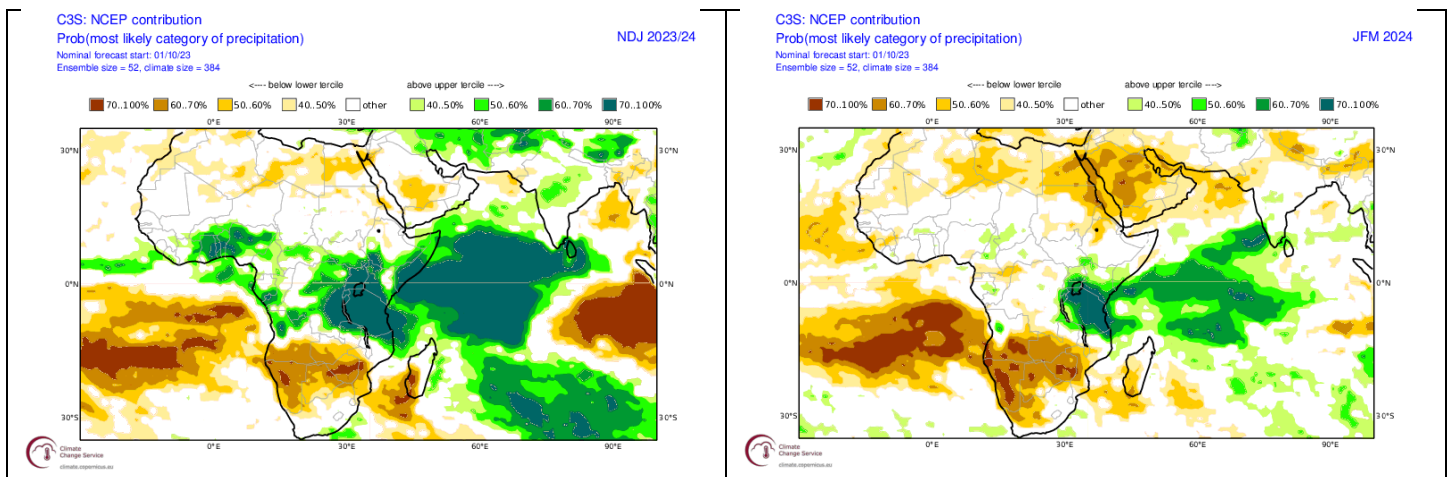
Australian Bureau of Meteorology - <http://www.bom.gov.au>

Seasonal forecasts issued by various international institutions

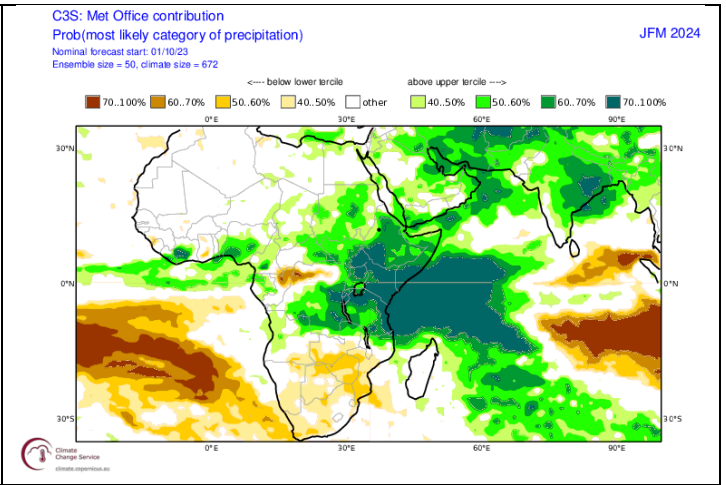
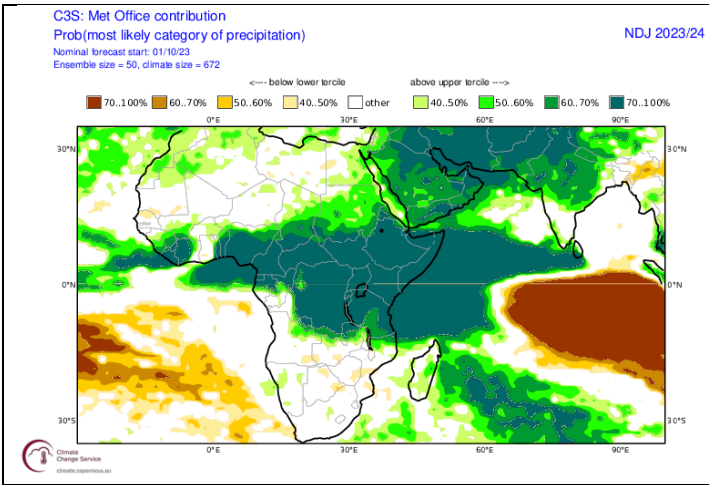
Seasonal forecasts (updated in October 2023) by various institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) and by the IRI, still expect drier conditions towards late summer compared to during early and mid-summer. Moreover, the forecasts for late summer have drifted drier with the most recent (October-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 drier conditions.



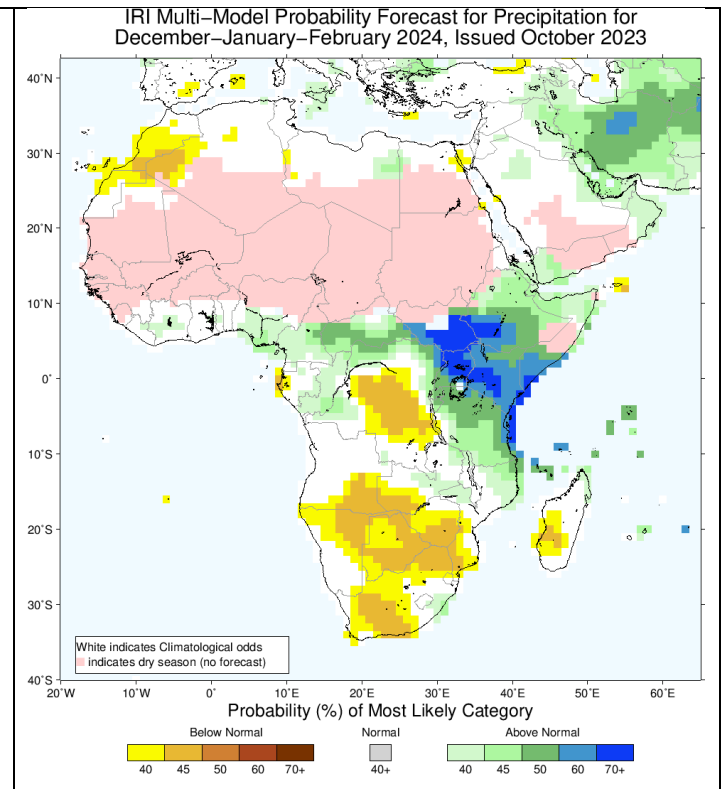
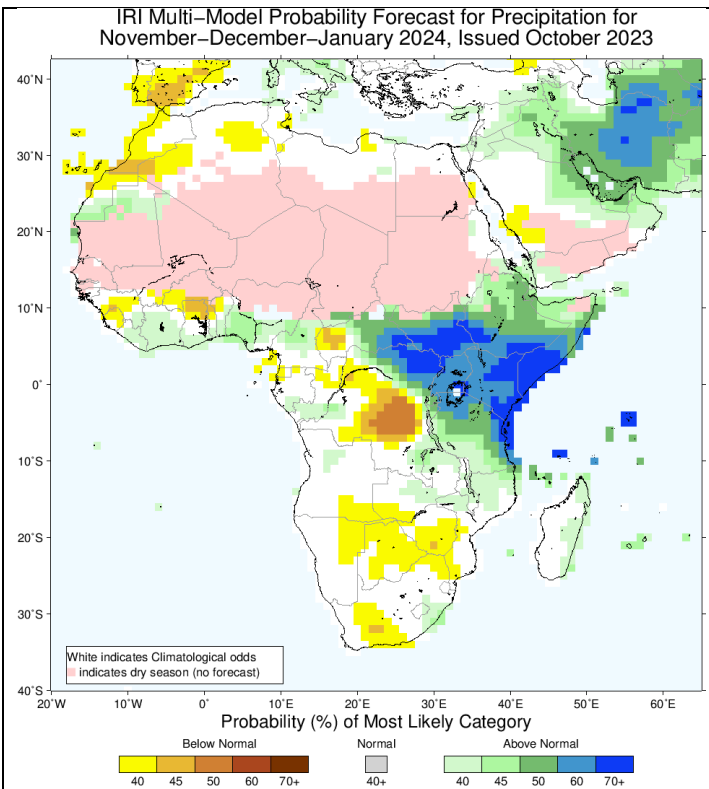
Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for mid-summer (November-January 2023/24; left - Forecast issued in 2023-10) and mid-to-late summer (January to March 2024; right).



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



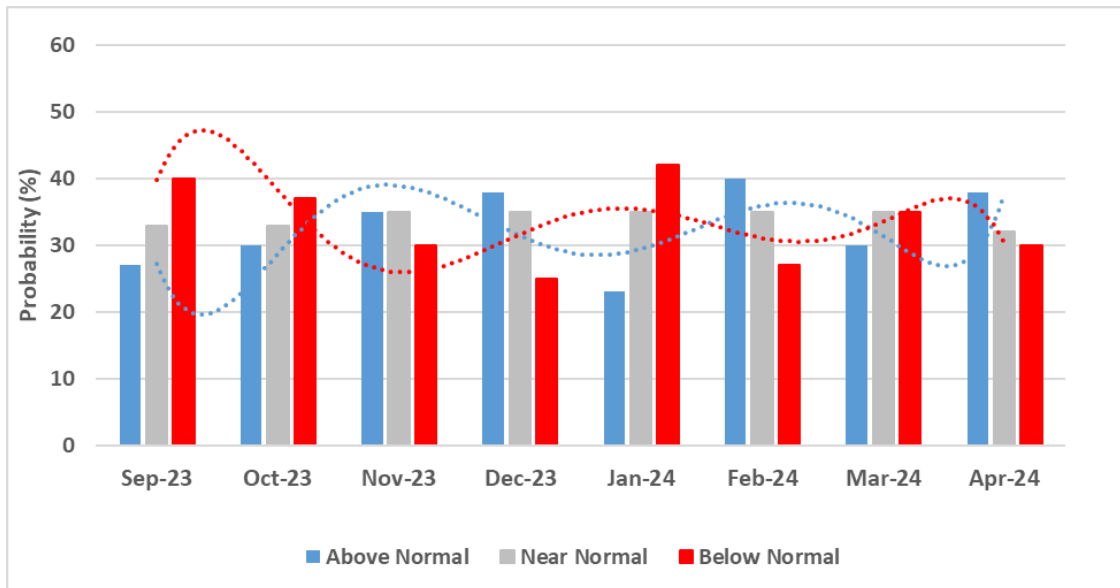
Same as above, but forecasts issued by the UK Met Office.



Probabilistic forecasts by the International Research Institute for Climate and Society (IRI) for rainfall for mid-summer (November-January 2023/24; left - Forecast issued in 2023-10) 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.



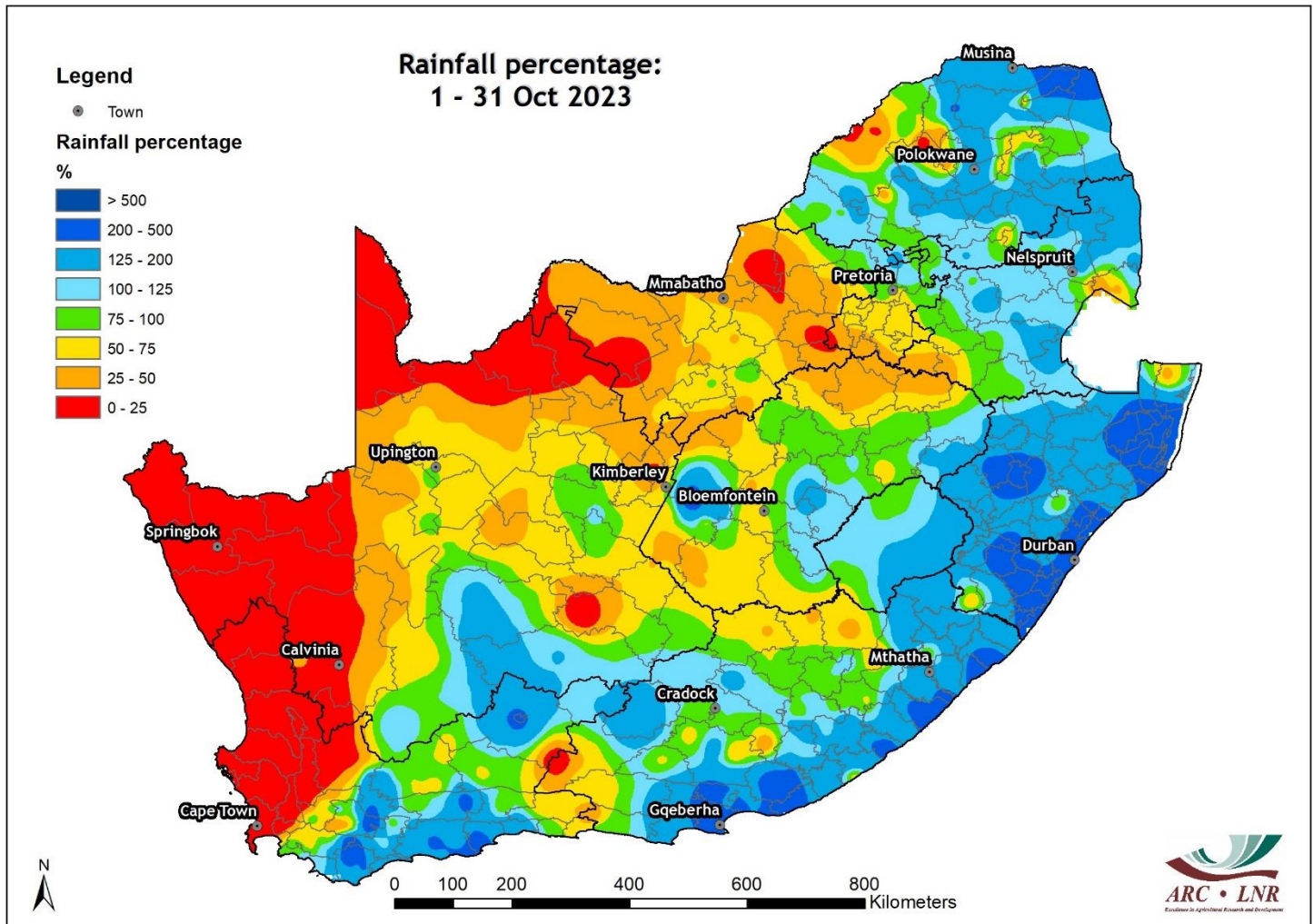
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2023 – April 2024 (Forecast issued in 2023-09).

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

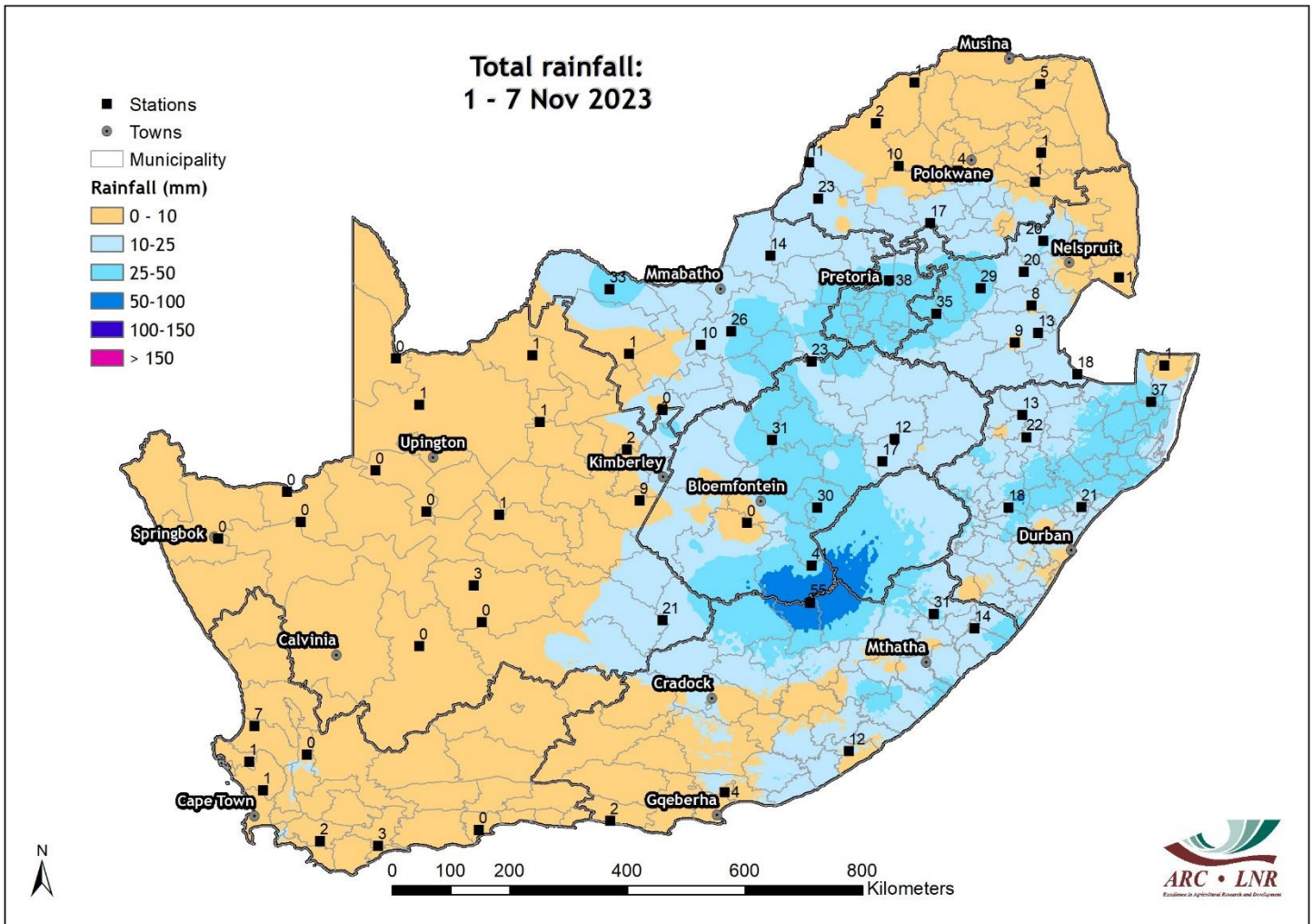
Observed conditions

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



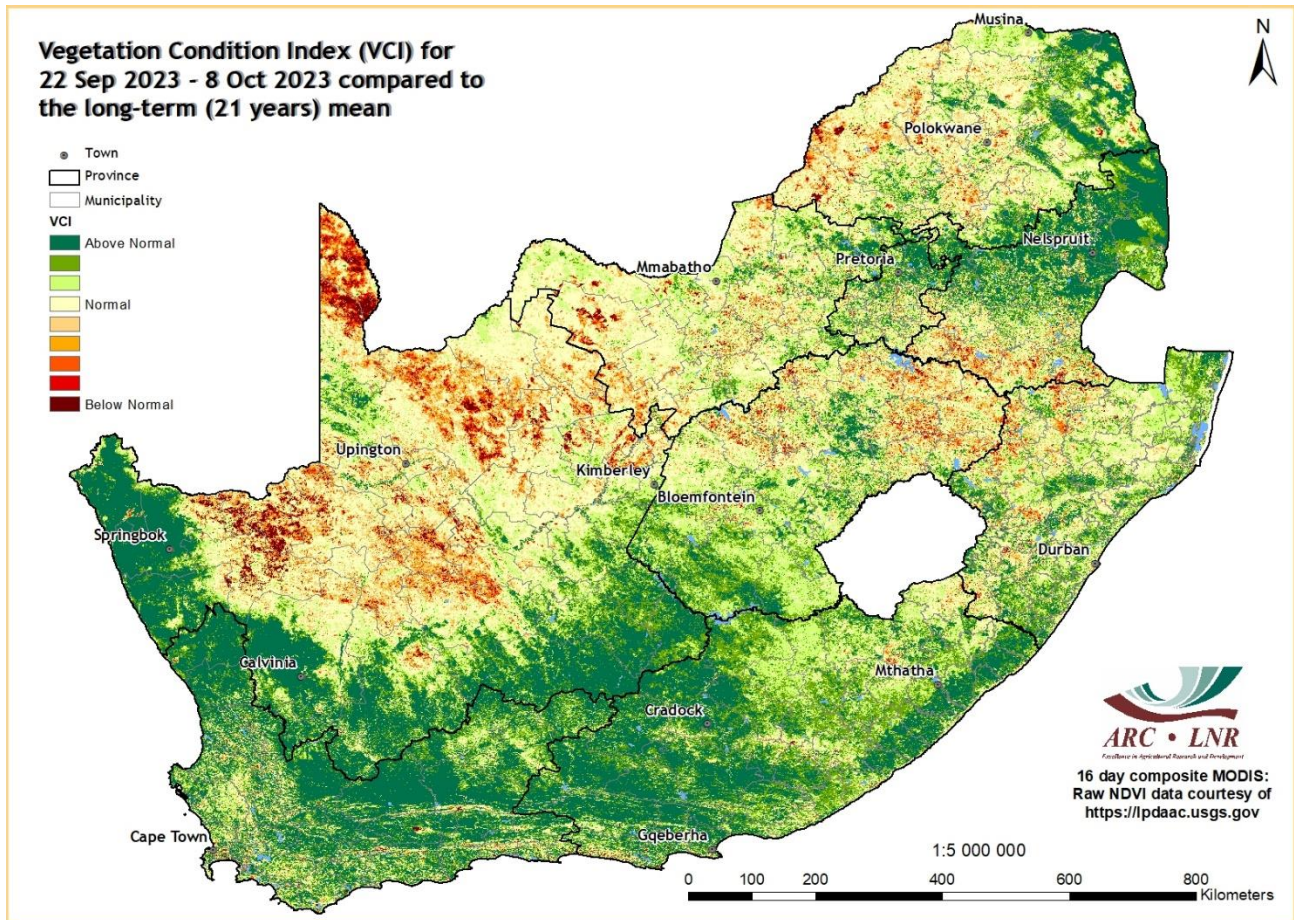
The pattern of a relatively dry northern to northwestern interior with anomalously high rainfall over the southern to southeastern and far eastern to far northeastern parts continued during October. This pattern is in contrast to the rainfall pattern observed during the 2021-2023 La Niña, when the interior was wet and the southern parts dry.

Rainfall (mm): 1 – 7 November 2023



While widespread rain occurred over the country, only small areas received more than 50 mm of rain. Most of the summer-grain production region received between 10 and 25 mm of rain, with totals exceeding 25 mm over the western parts of Mpumalanga Gauteng, eastern to southern North West and the northern to central Free State.

Vegetation Condition Index: September to early October 2023



By early October, drier conditions earlier over the Northern Cape interior and western Limpopo 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. The northeastern parts of the summer-grain-production region (northern half of Mpumalanga), where above-normal rainfall occurred since September, also experienced above-normal vegetation activity while large areas further west and south in the region experience below-normal vegetation 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:

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>

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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.

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