CUMULUS

23 November 2022

by J Malherbe, R Kuschke

WE GET
AGRICULTURE'S *heartbeat*

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Contents

Photo credit: Google

Summary

Rain returning to the northeast

A number of rain-producing systems moved across the country during the last few days, but rainfall was less extensive and totals generally lower than during the preceding weeks. More significant and extensive rainfall is however expected during the coming weekend, focusing on the northeastern half of the summer rainfall region and including the summer-grain production region. Scattered to widespread thundershowers are expected as an upper-air trough moves through during the weekend. Following the system, current forecasts indicate a return to typical mid-summer conditions with isolated to scattered thundershowers over the summer rainfall region, but no intense system causing widespread heavy rainfall at this stage according to forecast models, after the weekend. Large-scale atmospheric circulation patterns are not expected to be particularly favorable for widespread rainfall during the remainder of next week according to current forecasts and it should be somewhat warmer with only isolated to scattered thundershowers over the central to eastern parts.

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

General:

- Temperatures will on average be near normal, but above normal over the central to northwestern interior.
- Westerly to southerly winds will keep the western to southern interior dry on most days.
- Rainfall will be normal to above-normal over the northeastern half of the country, but below normal over the southwestern parts.
- Scattered to widespread thundershowers are expected over the central to eastern parts during the weekend, including the summer-grain production region. Significant daily totals are possible over parts of the Highveld and into northern KZN according to current forecasts.
- The southeastern coastal areas and adjacent interior will experience mild to cool and cloudy conditions with rain or showers on most days.
- The southern to southeastern interior and coast will be mild to cool until Sunday.
- It will be windy on several days over the southern and western parts.
- While there isn't a particularly strong indication for widespread severe storms over the country, some thundershowers over the summer rainfall region may produce hail and strong winds given the time of year together with the periodic intrusion of dry air from the west.
- Over the summer-grain production region, wetter conditions will coincide with somewhat lower maximum temperatures on average than during the previous week, while minimum temperatures are expected to be somewhat higher:
  - Maximum temperatures over the eastern maize-production areas will be in the order of 21 – 29°C, with coolest conditions expected during the weekend when rainfall will be more widespread. Minimum temperatures will be in the order of 11 – 18°C.
  - Maximum temperatures over the western maize-production region will range between 25 and 33°C. Minimums will be in the order of 15 – 21°C.

Overview of expected conditions over the main agricultural production areas

Atmospheric circulation patterns will be favorable for scattered thundershowers over the interior, especially during the weekend when an upper-air trough will move over the southern parts, supporting instability towards the north and east. Semi-permanent ridging of the high-pressure system to the south will result in cloudy and rainy conditions along the southeastern to eastern coastal areas most of the time until early next week. With the high to the south somewhat more prominent, moderate to fresh south-easterlies will return to the south-western parts of the Western Cape.

Maize production region: With enhanced cloud cover and more frequent rain over the summer-grain production region, temperatures will moderate compared to the previous week:

- Maximum temperatures over the eastern maize-production areas will be in the order of 21 – 29°C, with coolest conditions expected during the weekend when rainfall will be more widespread. Minimum temperatures will be in the order of 11 – 18°C.
- Maximum temperatures over the western maize-production region will range between 25 and 33°C. Minimums will be in the order of 15 – 21°C.

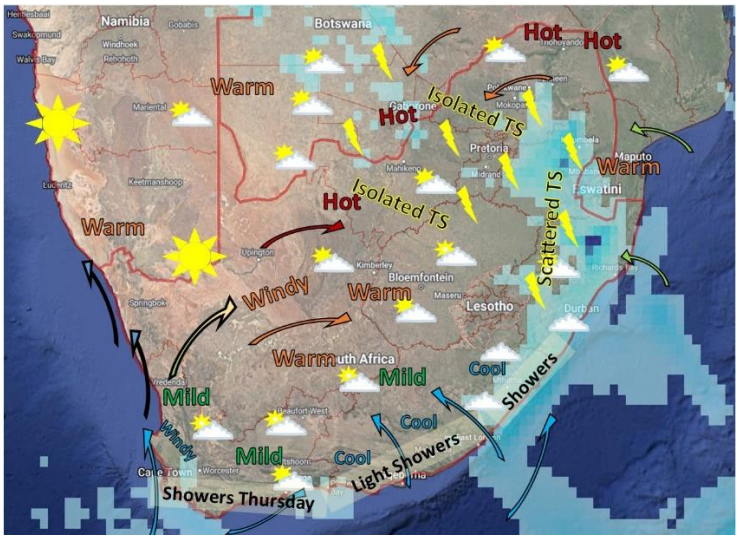
- **Thursday (24th):** Partly cloudy and warm, but mild in the east. Isolated thundershowers are expected over the central to eastern parts. Moderate to fresh northerly to westerly winds are expected over the central to western parts.
- **Friday (25th)**: Partly cloudy and warm, but mild in the east. Scattered thundershowers are expected over the central to eastern parts. Moderate to fresh westerly winds are expected over the central to western and southern parts.
- **Saturday (26th):** Partly cloudy to cloudy and mild with widespread thundershowers.
- **Sunday (27th):** Partly cloudy and warm, but mild in the east. Scattered thundershowers are expected, but isolated in the southwest.
- **Monday to Tuesday (28th – 29th):** Partly cloudy and mild, but warm in the southwest. Scattered thundershowers are expected, but isolated in the southwest. The wind will be fresh northerly over the central to western parts.

Cape Wine Lands and Ruens: This region will experience mild conditions, with showers initially as a cold front moves through early on Thursday. A southerly flow will result in a continuation of mild conditions until Sunday, when the wind over the region will become easterly and offshore over the western to northwestern parts. This will result in warm to hot conditions from Sunday over the western to northwestern parts and the interior of the region. Moderate to fresh southeasterly winds will return to the southwestern parts and will dominate from late Thursday until Sunday.

Daily summary of expected conditions

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

Thursday to Friday, 24 - 25 November



It will be partly cloudy and warm with isolated thundershowers over the northeastern parts.

Light showers over the winter rainfall region on Thursday morning.

Light showers along the Garden Route on Thursday.

Cloudy and mild to cool with showers along the Eastern Cape northeastern coast and southern KZN coast.

It will be warm and windy over the central parts.

It will be hot and windy over the northeastern parts of the Northern Cape, western North West and Western Free State.

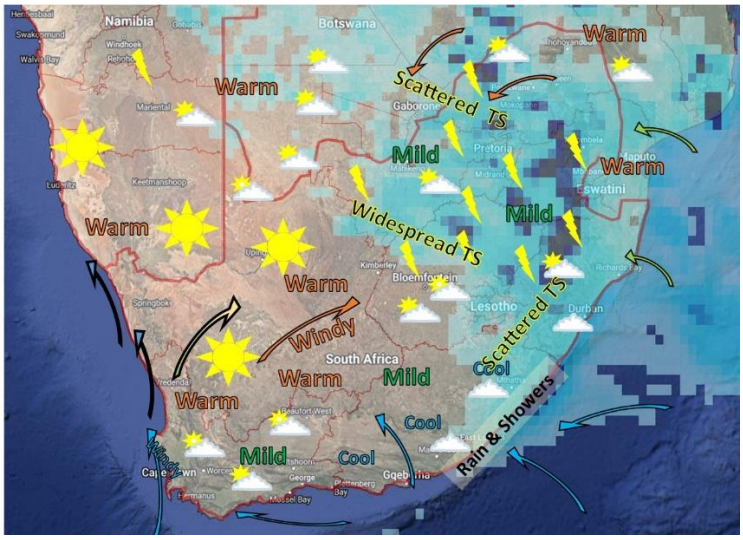
Hot over the Limpopo River Valley and Lowveld.

It will be mild over the southern interior, including the Karoo.

It will be cool over the southeastern parts.

Fresh to strong south easterlies over the southwestern parts of the Western Cape.

Saturday, 26 November



Partly cloudy to cloudy and mild with scattered thundershowers over the northeastern and eastern parts, becoming widespread over the northern half of the Free State, North West, Gauteng, northern KZN and Mpumalanga.

Rain and showers will continue over the southeastern to eastern coastal areas and adjacent interior.

It will be warm and windy over the western interior.

Mild over the southern parts.

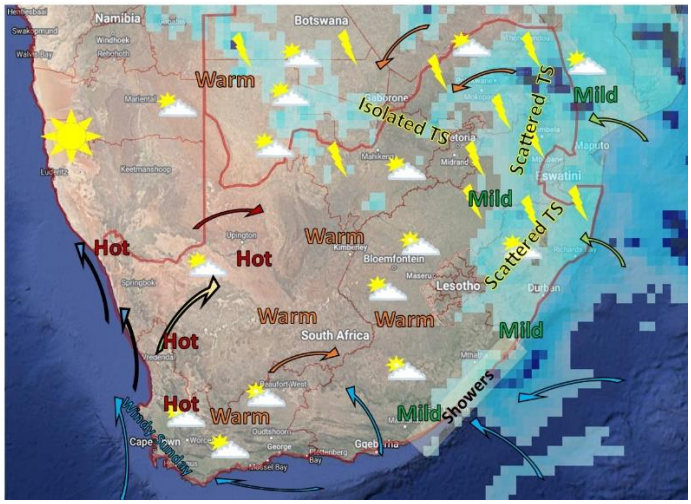
Cool in the southeast.

Warm over the Lowveld.

Mild over the Highveld.

Fresh to strong south-easterlies over the southwestern parts of the Western Cape.

Sunday, 27 November



It will be partly cloudy and mild with scattered thundershowers in the northeast and east.

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

It will be warm over the central parts.

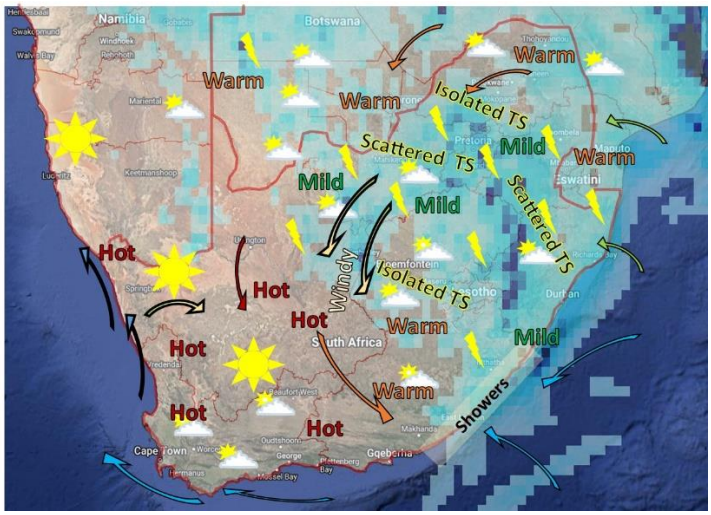
Hot over the west coast and western interior.

Mild in the east and northeast.

Cloudy and mild with showers along the southeastern and eastern coastal belt.

Fresh to strong south easterlies over the southwestern parts of the Western Cape.

Monday to Tuesday, 28 - 29 November



Partly cloudy and mild with scattered thundershowers over North West, northern Free State Gauteng and Mpumalanga.

Isolated thundershowers are possible over the rest of the northeastern half of the country where it will be warm.

Showers along the southeastern coastal belt will clear during Monday.

It will be hot over the western to southern parts.

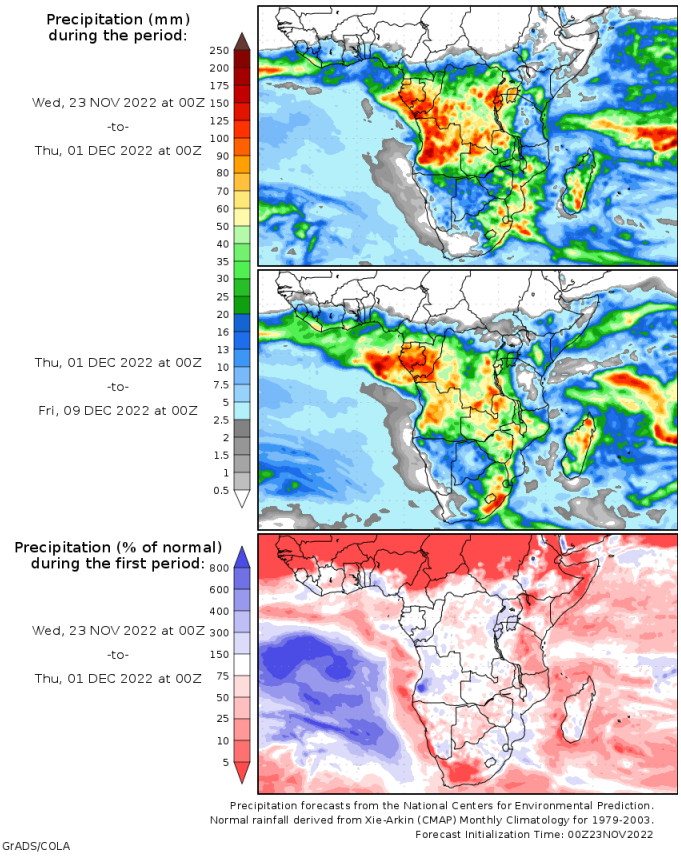
It will be mild over most of the east and northeast.

It will be warm over the Limpopo River Valley and Lowveld.

It will be windy over the central interior, with mostly northerly winds dominating.

Medium term rainfall and temperature summary

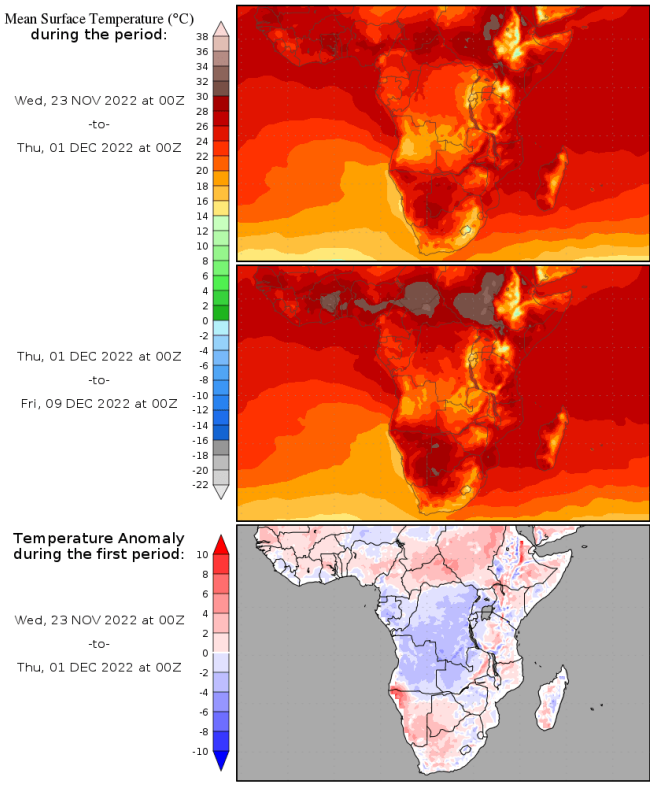
Precipitation Forecasts



Precipitation forecasts from the National Centers for Environmental Prediction.
Normal rainfall derived from Xie-Arkin (CMAP) Monthly Climatology for 1979-2003.
Forecast Initialization Time: 00Z23NOV2022

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: 00Z23NOV2022

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 one single weather model (GFS atmospheric model - *Center for Ocean-Land-Atmosphere Studies (COLA) and Institute of Global Environment and Society (IGES)* – http://Wxmaps.org) considered here in the beginning of a week-long (starting 23 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 model) of weather conditions during the coming week, the following may be deduced:

- **As is typical for thunderstorm-producing systems in spring, some thunderstorms may at times become severe, producing strong winds and hail. However, the intensity and distribution of these are not indicated to be above the norm for this time of the year. Somewhat more unstable conditions may result in an elevated chance for severe storm formation:**
  - Northern to eastern Free State, southern North West, southern Gauteng and northern KZN: **Saturday (26th).**
- **Significant daily rainfall totals, exceeding 50 mm in 24 hours, may occur:**
  - Northeastern Free State, northern KZN and southeastern Mpumalanga: **Saturday (26th).**
- **Windy conditions could enhance the fire danger where vegetation is dry:**
  - Karoo and Northern Cape: **Thursday to Sunday (24th - 27th).**
- **Partly cloudy to cloudy and mild conditions with showers or thundershowers may be conducive to the spread of fungal pathogens over the central to eastern summer-grain production region: Saturday to Monday (26th – 28th).**
- **It will be hot and humid:**
  - Over the Lowveld and Limpopo River Valley: **Thursday to Friday (24th to 25th).**
  - Northeastern KZN: **Thursday (24th)**
- **It will be hot:**
  - Over the western to southern interior: **Monday to Tuesday (28th - 29th).**
  - Over the Swartland and West Coast: **Monday (28th).**

Seasonal forecast

Seasonal forecasts for spring and summer over South Africa favor wetter conditions over the summer rainfall region, with a bias towards drier conditions over the winter rainfall region in the southwest.

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

The Australian Bureau of Meteorology points out that the La Niña continues in the tropical Pacific

(Updated 22 November): La Niña continues in the tropical Pacific. Atmospheric and oceanic indicators of the El Niño–Southern Oscillation (ENSO) reflect a mature La Niña. Models indicate La Niña may start to ease in early 2023.

The Southern Annular Mode (SAM) is positive and likely to continue to be positive into December.

A Madden–Julian Oscillation (MJO) pulse is strengthening as it moves into the Western Pacific region. It is expected to remain moderately strong in the coming week before weakening as it tracks into the central Pacific. This may lead to …..a brief reduction in the strength of trade winds over the western tropical Pacific.……*Australian Bureau of Meteorology* - http://www.bom.gov.au

While La Niña conditions are associated with wetter than normal conditions over the summer rainfall region of South Africa, a positive SAM is associated with above-normal rainfall over the eastern parts during mid to late summer.

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

According to the IRI (Updated 10 November): In mid-October, sea surface temperatures in the central-eastern equatorial Pacific remain below-average. Key oceanic and atmospheric variables have remained consistent with La Niña conditions. A CPC La Niña Advisory still remains in place for October 2022. A large majority of the models in the plume predict SSTs to remain below-normal at the level of a La Niña until at least Jan-Mar 2023. Similar to the most-recent official CPC ENSO Outlook issued on October 13, 2022, the objective model-based ENSO outlook forecasts a continuation of the La Niña event with high probability during Nov-Jan, Dec-Feb, and Jan-Mar 2023. Based on objective ENSO forecasts, La Niña is expected to transition into ENSO-neutral during Feb-Apr 2023, which remains the most likely category thereafter..……*International Research Institute for Climate and Society*- http://iri.columbia.edu/

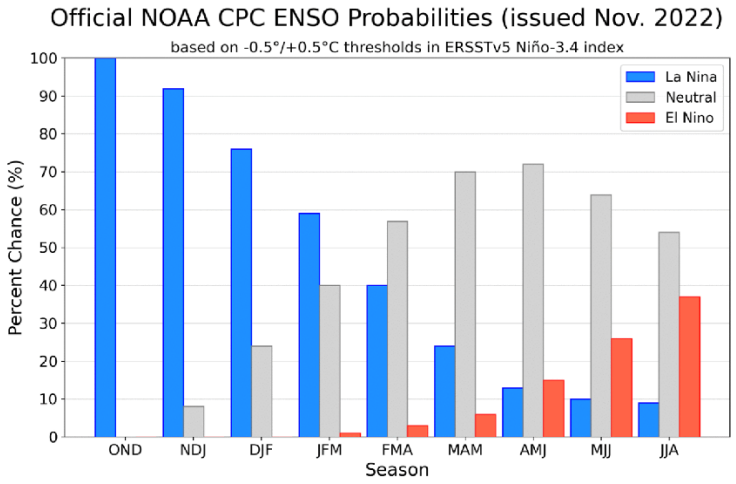
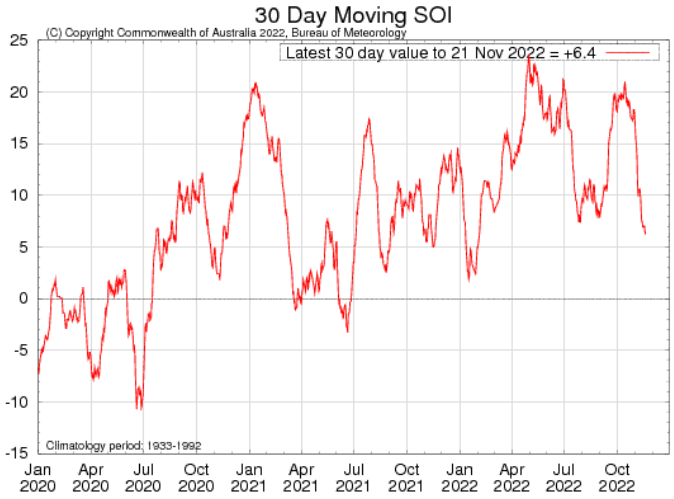


Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index (5°N-5°S, 120°W-170°W). Figure updated 10 November 2022.

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

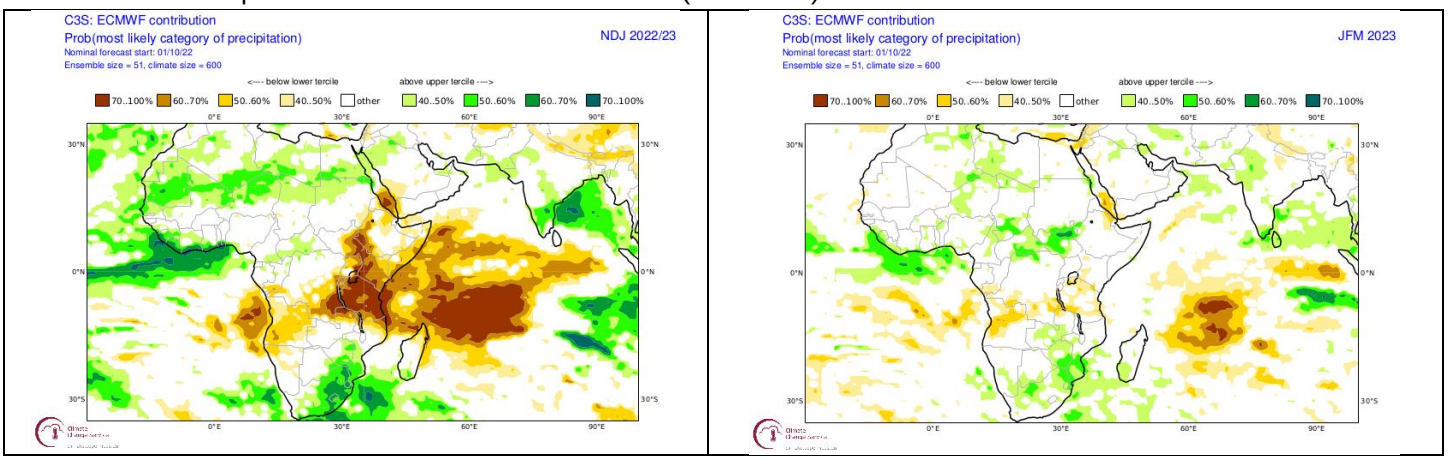


Australian Bureau of Meteorology - http://www.bom.gov.au

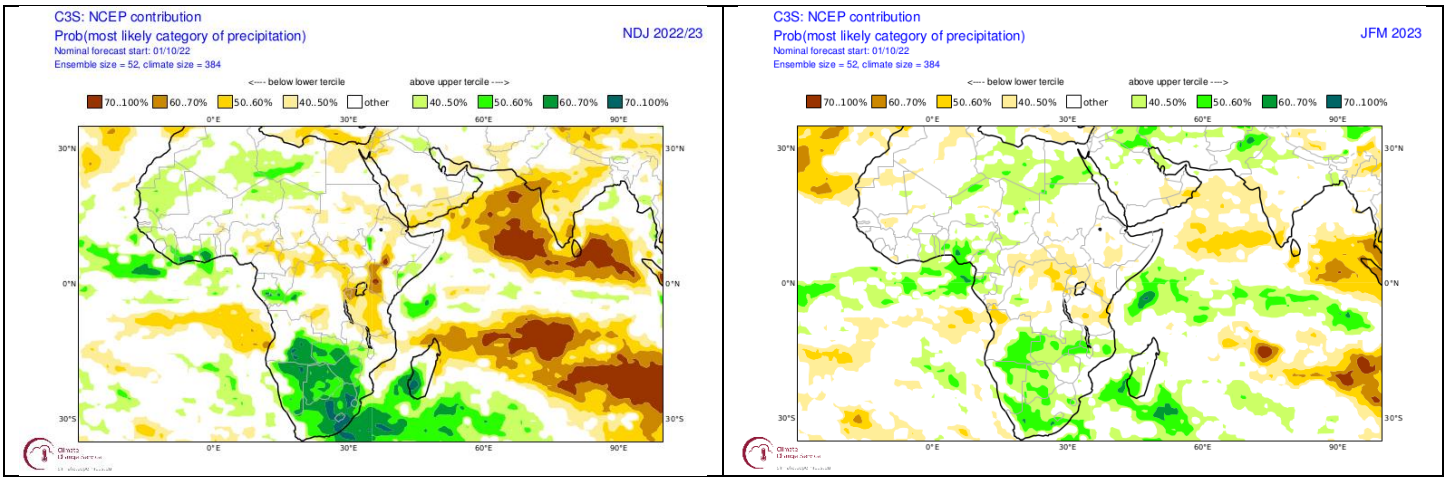
The Southern Oscillation Index is in positive territory (+6.4). This is indicative of atmospheric circulation patterns bordering La Niña conditions.

Seasonal forecasts issued by various international institutions

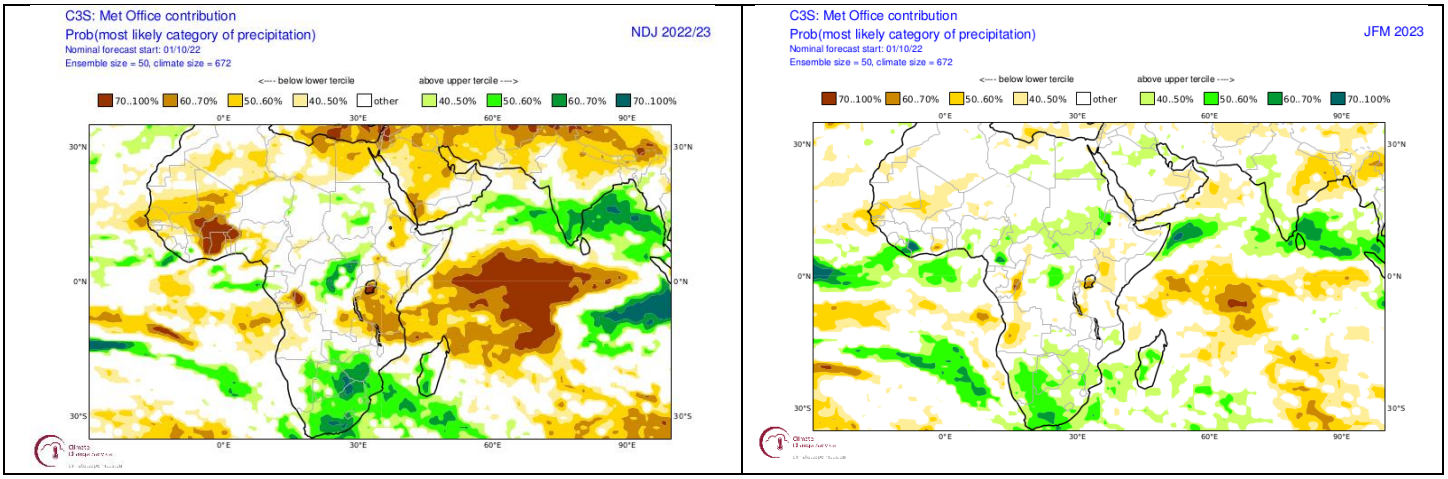
Seasonal forecasts (updated in October 2022) by these institutions, as published by the COPERNICUS Programme (***https://climate.copernicus.eu/seasonal-forecasts***) for both early to mid-summer, and mid-to late summer reflect an expectation for a relatively wet summer over the interior. The signal for 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) and late summer (January-March 2023; right) (Forecasts issued in 2022-10).



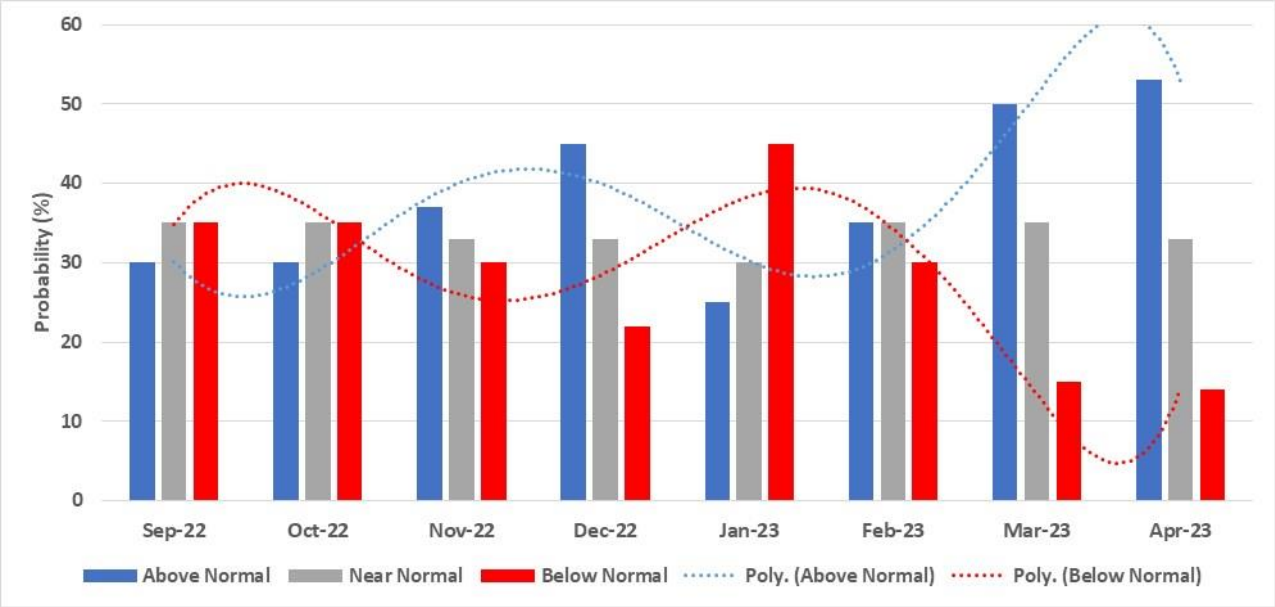
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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:



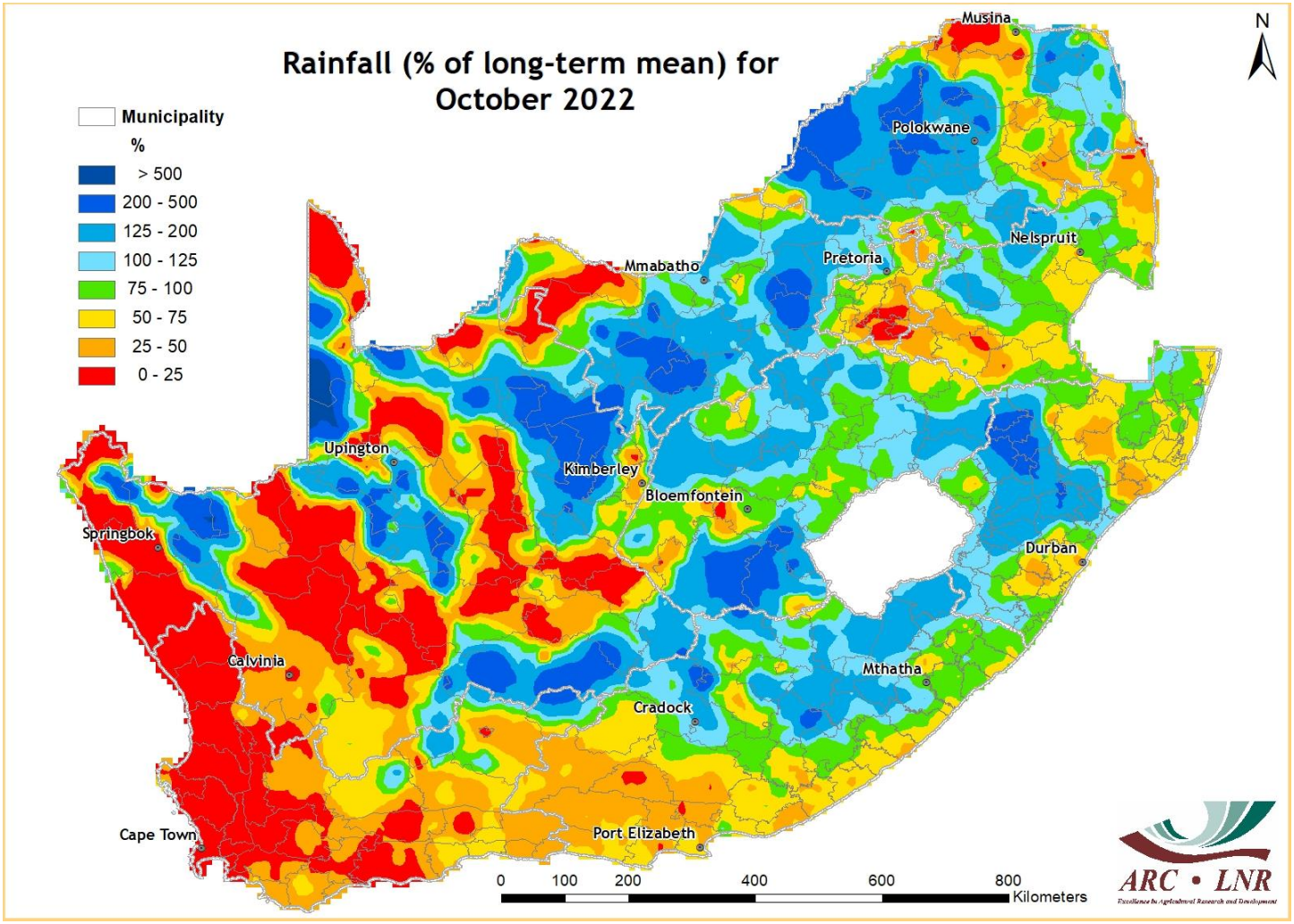
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2022 – April 2023 (Forecast issued in 2022-10).

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

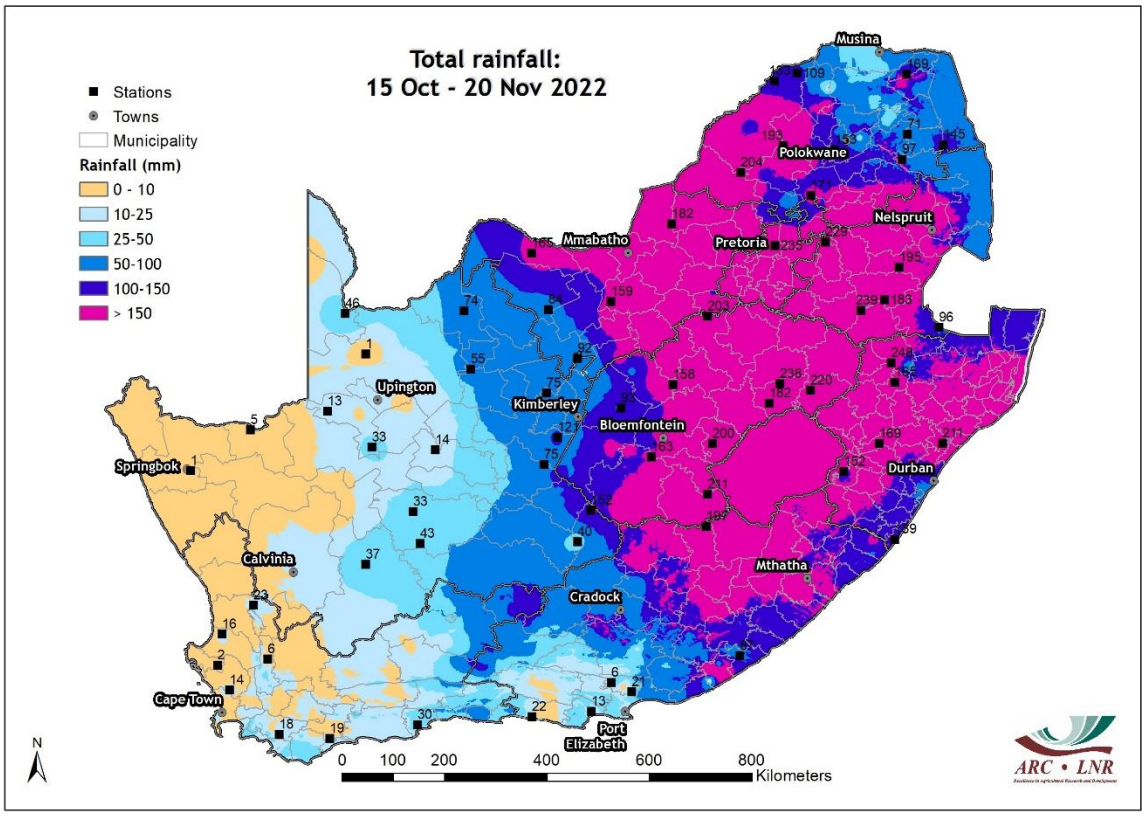
Observed conditions

Rainfall (% of long-term mean): October 2022



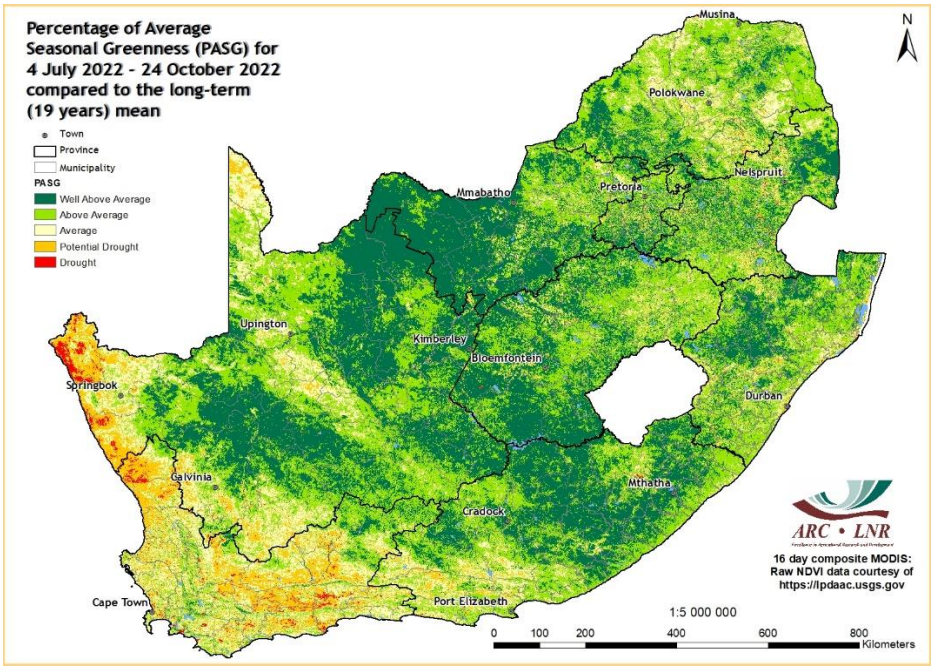
Total monthly rainfall was above average over most of the summer rainfall region during October.

Rainfall (mm): 15 October to 20 November 2022



Widespread, significant rainfall occurred from mid-October until mid-November, with totals exceeding 150 mm over most of the summer-grain production region.

Percentage of Average Seasonal Greenness: July – October 2022



Recent cumulative vegetation activity remains above average over much of the interior, related to wet conditions during autumn, relatively warm conditions during winter and above-normal rainfall since mid-October. Cumulative vegetation activity is below average over the winter rainfall region, reflecting mostly below-normal rainfall throughout the winter.

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.

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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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