



CUMULUS

16 JANUARY 2025
by J Malherbe, R Kuschke

1 FUTURE 2 FOCUS 3 AGRICULTURE

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Summary

Drier pattern ahead

Following hot and dry conditions earlier this summer, widespread rain occurred from the middle of December onwards over the north-eastern parts of the country. The area with widespread showers or thundershowers expanded by late December. Wet conditions continued until this week over much of the central to north-eastern areas. Drier conditions can be expected going forward, with more typical afternoon convective thundershowers expected over the northeastern parts while it will be dry towards the west. Rainfall totals are expected to be low compared to the previous few weeks. Current forecasts indicate dry conditions over the western summer grain production region on most days while the central to northeastern parts of the region are expected to see isolated to scattered thundershowers.

The rains since mid- to late December were associated largely with a tropical low-pressure system that was active over northern Botswana and the surrounding areas. The introduction of large amounts of tropical moisture increased rainfall amounts over the interior while it also decreased the chance of severe weather over the areas where rain occurred. The tropical low over Botswana is moving out of our region at this stage. A cold front that moved over the southern to western parts on Tuesday and westerlies in the upper air have introduced a drier pattern. Rainfall totals and -distribution over the north-eastern parts are expected to diminish substantially. Thundershowers will also regain a more early-to-mid-summer-like character and be associated with a higher likelihood of strong wind gusts and hail as the deep layer of tropical moisture is replaced by drier air. Little to no rain is expected over the western and much of the central interior during the next few days.

The gradual contraction of wet conditions towards the northeast during early January usually signals the advent of a hotter and drier period over the interior. This is also associated with increased tropical convective activity towards the north-east, over the Mozambique Channel and into Mozambique. Tropical Cyclone Dikeledi which is moving southeastwards in the Channel is one example, and current forecasts indicate a continuation of such activity through the remainder of the month with another system expected to develop early next week over the Channel. Other regional atmospheric circulation patterns, such as low-pressure areas over the oceanic areas to the south and south-west as reflected in the negative Southern Annular Mode (SAM) are also indicative of drier conditions. It is not rare for a drier period during mid-January, coupled with cyclonic activity in the south-west Indian Ocean, to occur even during La Niña events. During most years, these conditions are replaced by a return to wetter conditions over the interior by early February. The pattern will be monitored and discussed next week.

The following is a summary of weather conditions during the next few days (until early next week):

- Temperatures will on average be above normal over the central to western interior, but near normal to below normal for this time of the year over the rest of the country, including the winter rainfall region.
- Rainfall will be near normal over the northeastern parts (including the central to eastern and northern parts of the summer-grain production region), but below normal over the central to western and southern parts of the country.
- The winter rainfall region will be dry.

- Partly cloudy and warm conditions with isolated to scattered thundershowers will dominate the north-eastern to central parts. Rainfall will be in the form of convective thundershowers and will not be as widespread as earlier this month.
- Rainfall totals will be low over the central interior, with little to no rain expected in the west.
- It will become hot over the central to western parts, spreading into the winter rainfall region at times.
- **The winter rainfall region** will be sunny to partly cloudy and warm. Except for the possibility of a few light showers early Monday, no rain is expected during the next few days. It will be hot over the interior on Friday and again by Tuesday and Wednesday next week.
- **The summer-grain production region** will be partly cloudy and warm with isolated to scattered thundershowers on most days over the central to northern and eastern parts. It will be hot in the west with only isolated thundershowers expected later in the period while it will be dry initially.

Overview of expected conditions over the main agricultural production areas

With the tropical low moving out of our region and most tropical activity being replaced towards the east of South Africa, the period of widespread rain and thundershowers is now over. Upper-air support will be weak, mostly in the form of upper-air perturbations, and thundershowers will be isolated to scattered at best and be concentrated in the afternoon to evening periods. The possible development of an upper-air trough over the southern parts next week may result in more widespread thundershowers over the southeastern to eastern parts.

Maize production region:

It will generally be warmer with more sunshine than the previous few weeks. Isolated to scattered convective thundershowers are expected over the region, but the west will be dry at first. It will also be hot over the western parts at times while the rest of the region will be warm.

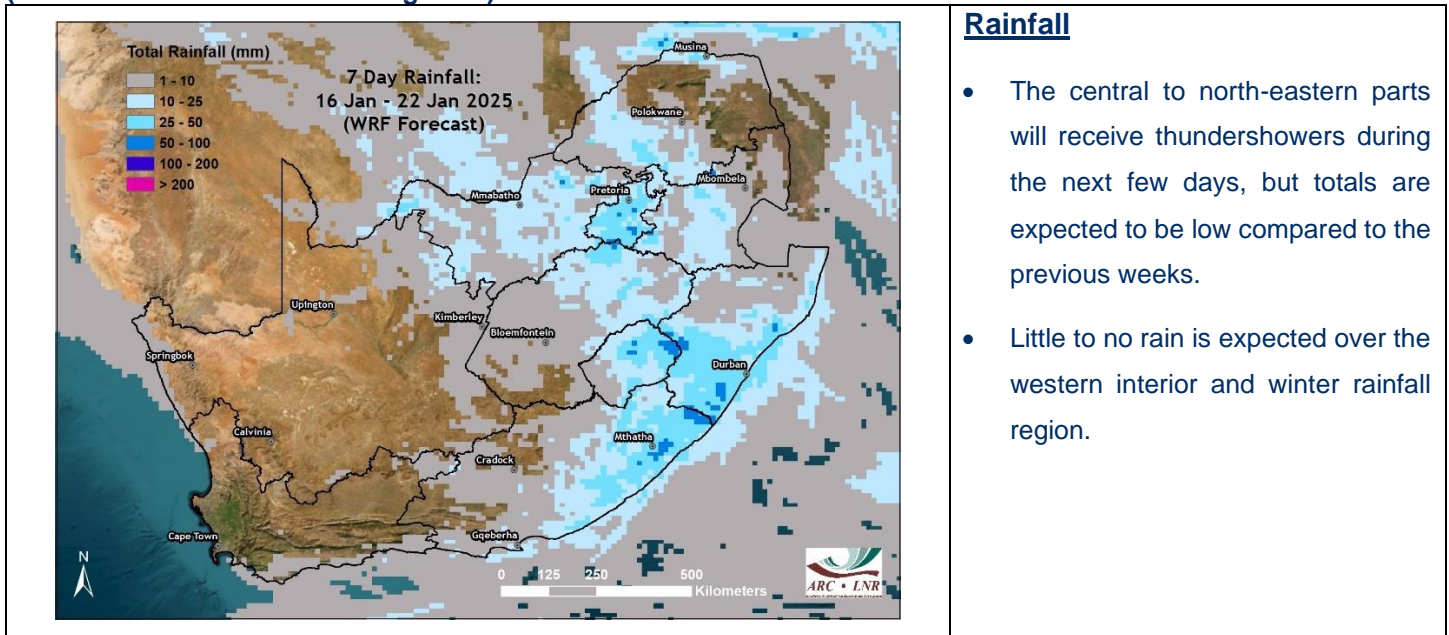
- Maximum temperatures over the eastern maize-production areas will be higher than the previous week and will range between 23°C and 31°C. Minimum temperatures will be in the order of 13°C to 17°C.
- Maximum temperatures over the western maize-production areas will range between 31°C and 38°C, with the higher temperatures further west. Minimum temperatures will be in the order of 16°C to 22°C.
- **Thursday (16th):** Partly cloudy and warm with scattered thundershowers over the central to eastern parts. It will be sunny in the west.
- **Friday (17th):** Partly cloudy and warm with scattered thundershowers over the central to eastern parts. It will be sunny in the west where it will become hot.
- **Saturday (18th):** Partly cloudy and warm with isolated to scattered thundershowers over the eastern and northern parts. It will be sunny in the west where it will be hot.
- **Sunday and Monday (19th – 20th):** Partly cloudy and warm, but hot over the central to western parts. Isolated thundershowers are possible over the central to western parts.
- **Tuesday to Wednesday (21st – 22nd):** Current forecasts indicate a continuation of hot conditions in the west. Conditions may become more favourable for scattered thundershowers and lower daytime temperatures, especially over the eastern to central and southern parts.

Cape Wine Lands and Ruens:

The region will be partly cloudy and warm for the most part. Frontal activity may result in a few light showers, especially in the south and southwest, on Monday. It will become hot at times over the interior, specifically on Friday and again by Tuesday and Wednesday. The wind during the period will have a southerly to easterly component, having a moderating effect on temperatures in the south while regularly resulting in hot conditions over the northern to western parts of the region.

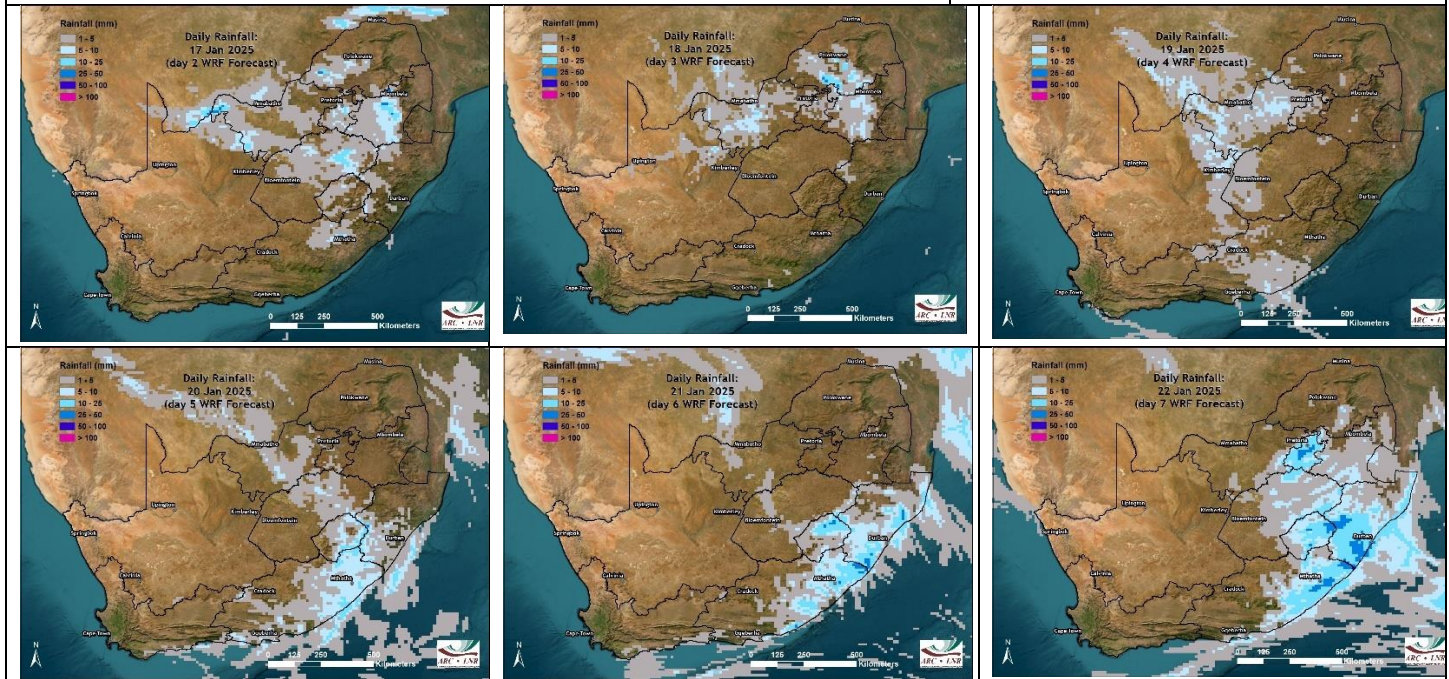
Daily summary of expected conditions (16 – 22 Jan)

(GFS forecast downscaled using WRF)

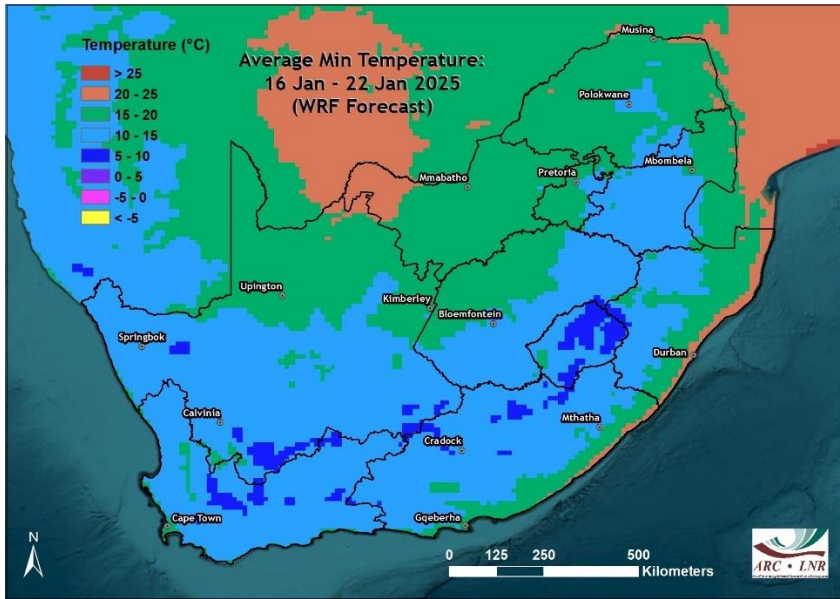


Rainfall

- The central to north-eastern parts will receive thundershowers during the next few days, but totals are expected to be low compared to the previous weeks.
- Little to no rain is expected over the western interior and winter rainfall region.

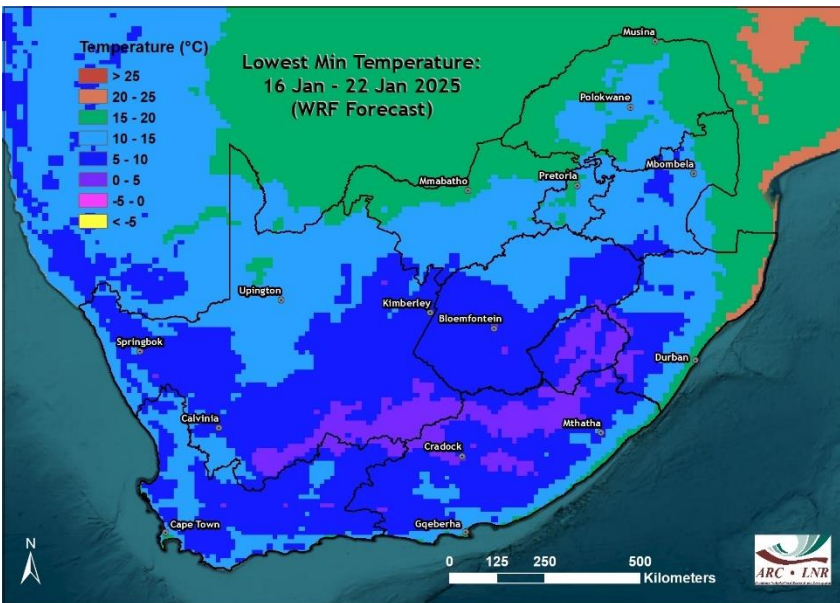


- Thundershowers are expected in a band over the central to north-eastern parts initially, clearing over the north-eastern parts by early next week, but remaining active over the central parts.



Average minimum temperatures

- Average minimum temperatures will range between 10 and 20°C over most of the country.



Lowest minimum temperatures

- Lowest minimum temperatures will remain above 10°C over the summer-grain production region.
- Lowest minimum temperatures may be in the order of 5°C over the southern-high-lying escarpment and as far north as Lesotho.

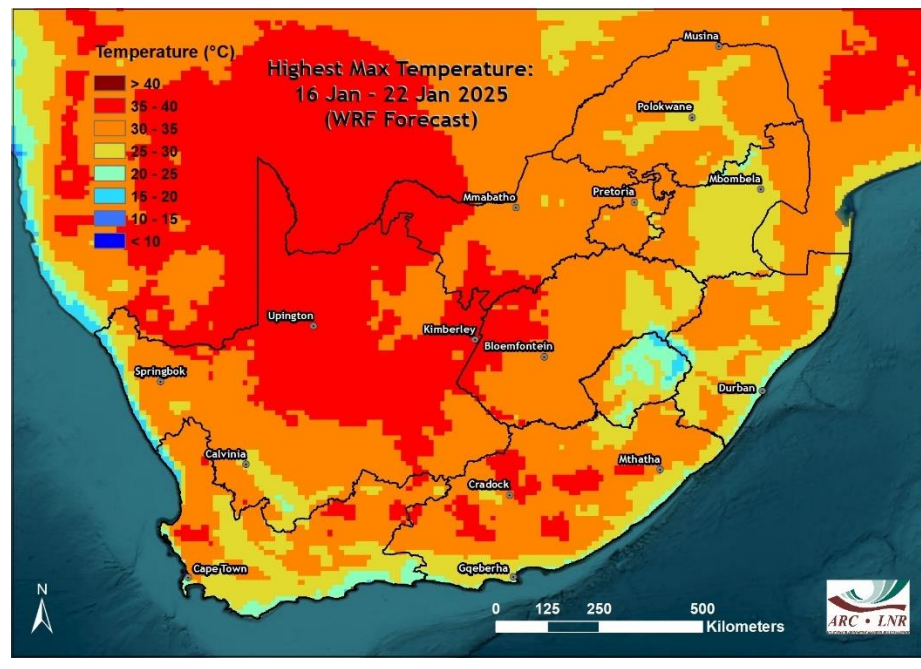
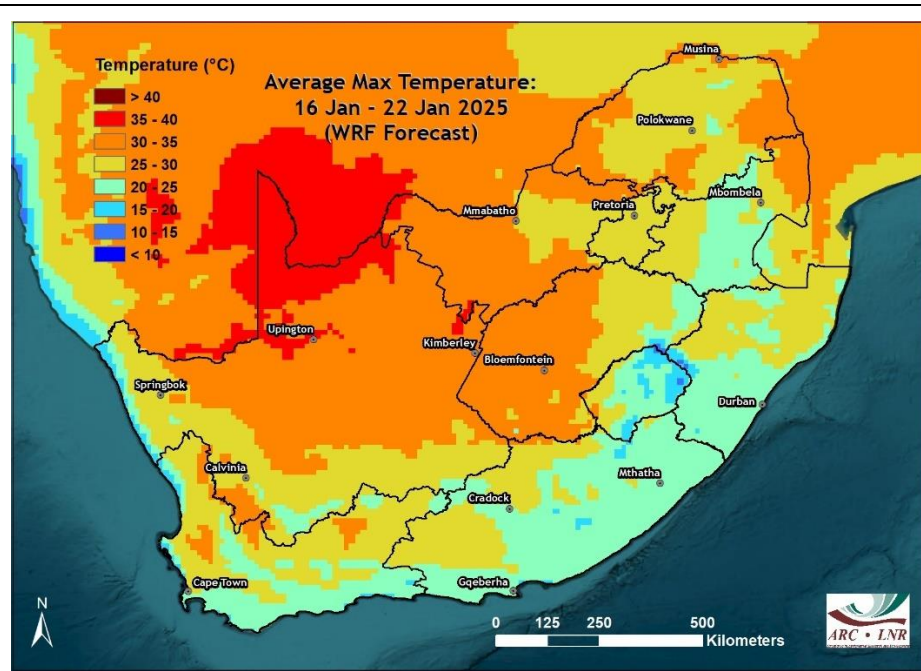
- Falls will become more widespread over the southeastern parts Tuesday, spreading into the eastern interior by Wednesday according to current forecasts.

Average maximum temperatures

- Average maximum temperatures will range between 20 and 30°C over most of the north-eastern interior and southern to south-eastern and eastern parts.
- Average maximum temperatures will range between 30 and 35°C over most of the central to northern parts.

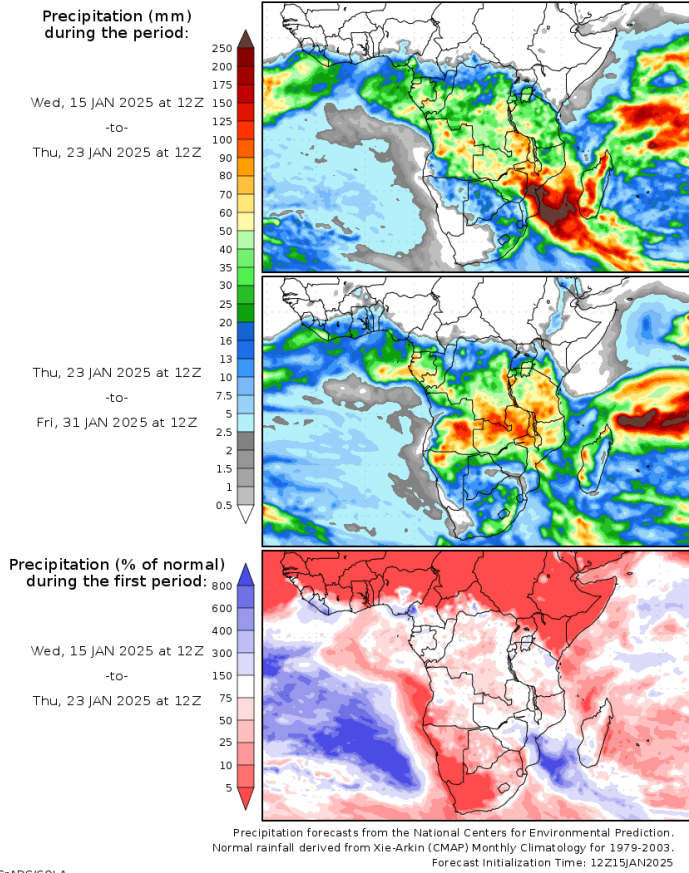
Highest maximum temperatures

- Highest temperatures during the next few days are expected to exceed 35°C over large parts of the cape provinces as well as the western to southwestern parts of the North West and Free State provinces.



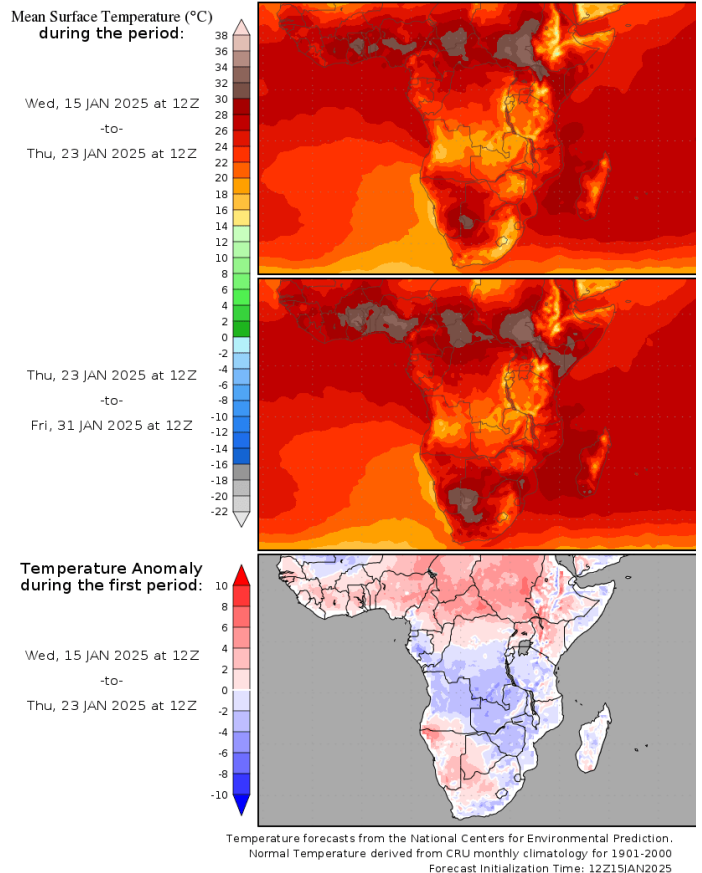
Medium term rainfall and temperature summary

Precipitation Forecasts

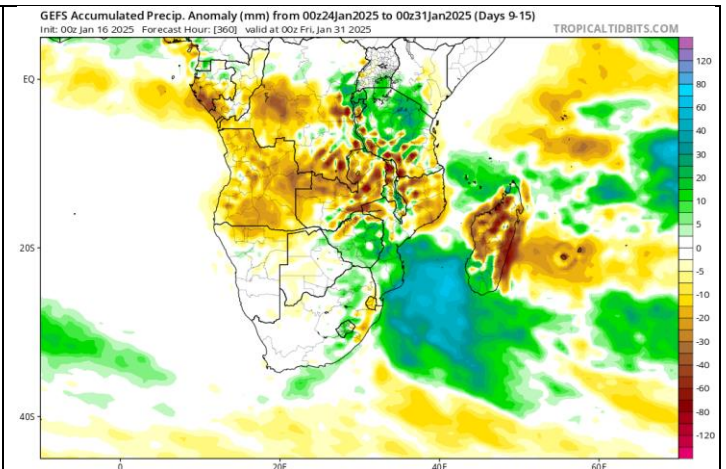
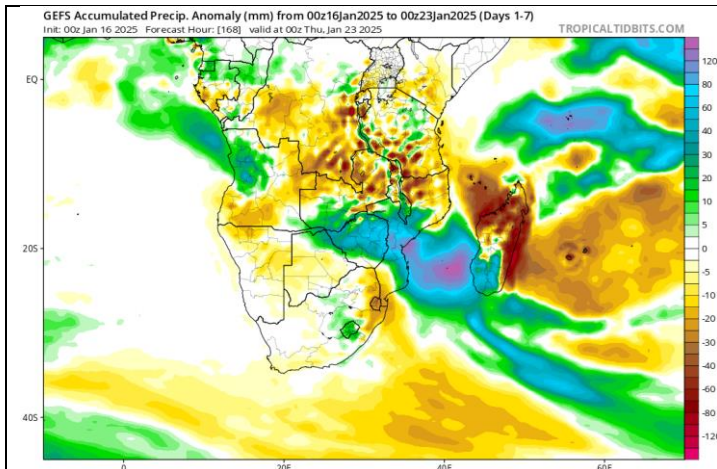


GRADS/COLA

Temperature Forecasts



GRADS/COLA



The GFS ensemble forecast (consisting of several forecasts with small initialization differences) favors above-average rainfall to the north-east of South Africa during the next few days (left), with the main focus of rainfall shifting into the Mozambique Channel. It will be relatively dry over the interior for this time of the year. The pattern is expected to persist towards the end of the month (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 16 January) 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:

- **Some thundershowers will have a tendency to become severe and produce strong wind gusts and hail:**
 - Eastern parts of North West, southern Gauteng, southern Mpumalanga, central to eastern and northern Free State: **Thursday to Friday (16th – 17th).**
 - Eastern parts of the Eastern Cape, southern parts of KZN: **Monday (20th).**
 - Eastern interior, especially along the escarpment, where thundershowers develop: **Tuesday and Wednesday (21st – 22nd).**
- **Dry, warm to hot and windy conditions at times will increase the fire hazard where vegetation is dry:**
 - Western to southern interior, as far east as the far-western parts of the Free State: **Thursday to Wednesday (16th – 22nd).**
- **Dry, windy conditions at times will increase the fire hazard where vegetation is dry:**
 - Western to south-western parts of the winter rainfall region: **Sunday (12th).**
- **It will be hot, with maximum temperatures exceeding 35°C:**
 - Interior of the Northern Cape: **Friday to Wednesday (17th – 22nd).**
 - The Karoo: **Saturday (18th) to Monday (20th).**
 - Northern KZN: **Sunday (19th) to Monday (20th).**
 - Lowveld and northern to eastern parts of the Limpopo River Valley: **Sunday (19th) to Monday (20th).**
 - Western Free State and south-western North West: **Friday to Wednesday (17th – 22nd).**

Seasonal forecast

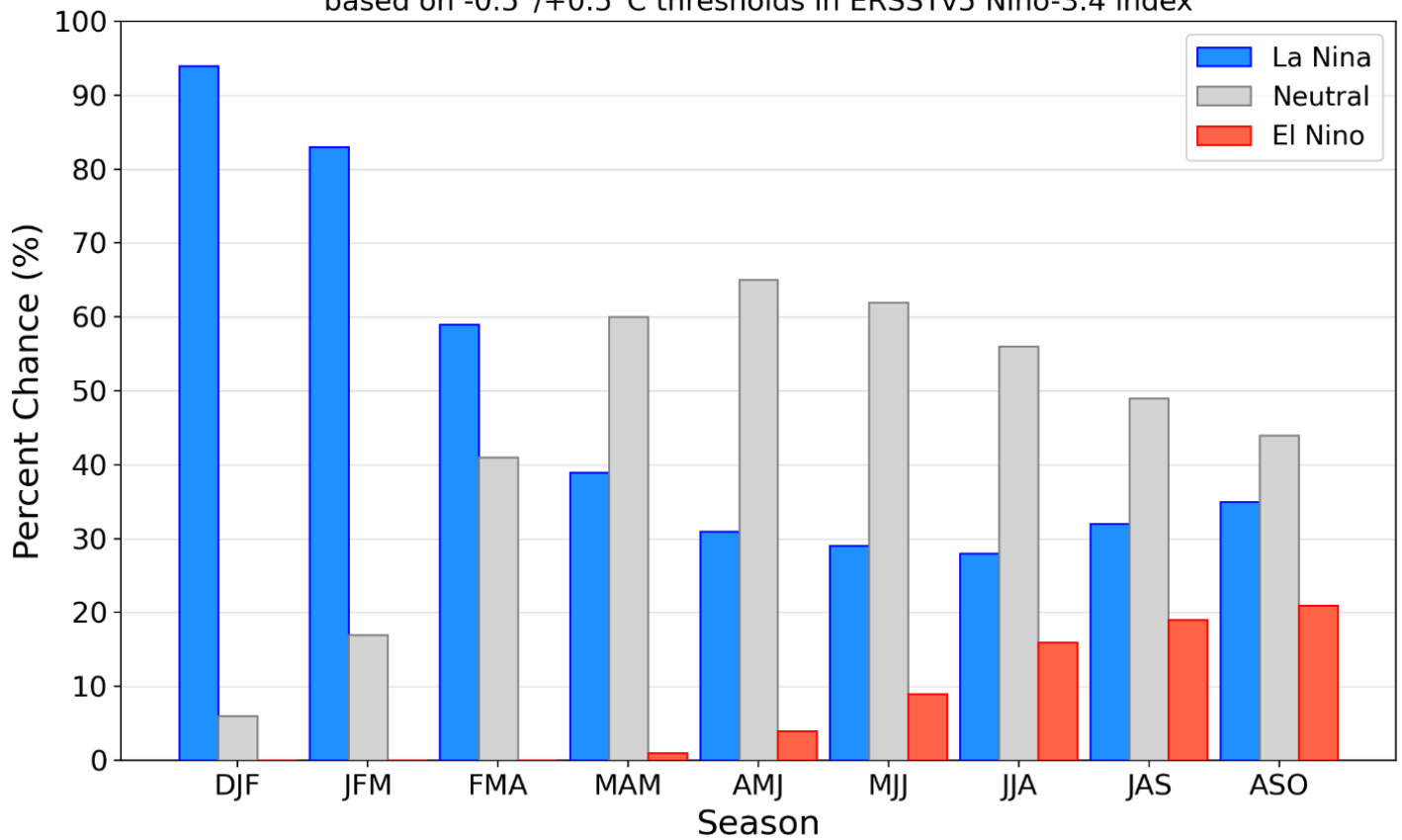
Current ENSO conditions:

The ENSO state has finally been declared to be a weak La Niña by the NOAA Climate Prediction Centre. This is based on evidence from the Sea Surface Temperatures which remained below the La Niña thresholds during the last few weeks and with atmospheric indicators such as the Southern Oscillation Index (SOI) and the strength of the easterly winds over the equatorial central to eastern Pacific Ocean now more consistently remaining in La Niña territory. La Niña conditions are expected to persist through February-April 2025.

The graph below shows the International Research Institute for Climate and Society (IRI) ENSO forecast which maintains the expectation of borderline La Niña or neutral conditions by mid-summer:

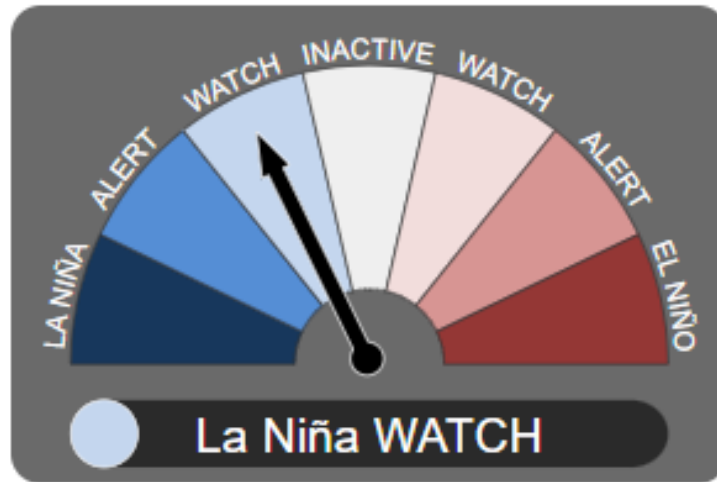
Official NOAA CPC ENSO Probabilities (issued January 2025)

based on $-0.5^{\circ}/+0.5^{\circ}\text{C}$ thresholds in ERSSTv5 Niño-3.4 index



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

Likewise, the Australian Bureau of Meteorology keeps their outlook to “La Niña Watch”



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

In their most recent update (issued 9 January), the IRI notes that “As of mid-December 2024, ENSO-neutral conditions persist in the equatorial Pacific, and both oceanic and atmospheric indicators remain in an ENSO-neutral state. The IRI ENSO prediction plume forecasts slightly higher chances (59%) for ENSO-neutral conditions for Dec-Feb, 2025, with a continuation of ENSO-neutral conditions from Jan-Mar, 2025 to Jul-Sep, 2025. For Aug-Oct 2025, no specific ENSO category emerges as favored. In summary, ENSO-neutral conditions are expected to persist through the *austral summer, autumn, and winter* of 2025.....According to the most recent official CPC ENSO Outlook (issued on December 12, 2024), the La Nina onset is forecasted in Nov-Jan 2024, with 59% chances; however, the objective IRI model-based ENSO outlook forecasts indicate the continuation of ENSO-neutral conditions for Dec-Feb, 2025.”.

The **Australian Bureau of Meteorology** has stated that atmospheric indicators have recently remained more consistently within La Niña thresholds while SSTs are already at La Niña levels. This has increased the chance for a La Niña to be declared should the atmospheric indicators remain within La Niña thresholds. In their most recent update (8 January), the **Australian Bureau of Meteorology** states that “The El Niño Southern Oscillation (ENSO) in the tropical Pacific remains neutral. While many of the indicators have recently met the threshold for La Niña they have not been sustained for levels or duration sufficient to warrant La Niña status:

- The El Niño–Southern Oscillation (ENSO) in the tropical Pacific has remained neutral for the past 6 months, despite changes in sea surface temperature patterns consistent with a developing La Niña over this period.
- In recent observations, both ocean and atmosphere indicators are now showing signs of stronger coupling, that is more consistent with a La Niña event.
- Trade winds have also been stronger than average across the equatorial Pacific, strengthening during December.
- The most recent value of the Niño3.4 SST index in the central Pacific Ocean to 5 January is -0.83 °C, which meets the La Niña threshold of -0.8 °C.
- The most recent 30-, 60- and 90-day Southern Oscillation Index (SOI) values are all close to or above the La Niña thresholds. A continuation of SOI values above threshold will likely see a La Niña event established for at least part of the summer of 2024–2025.

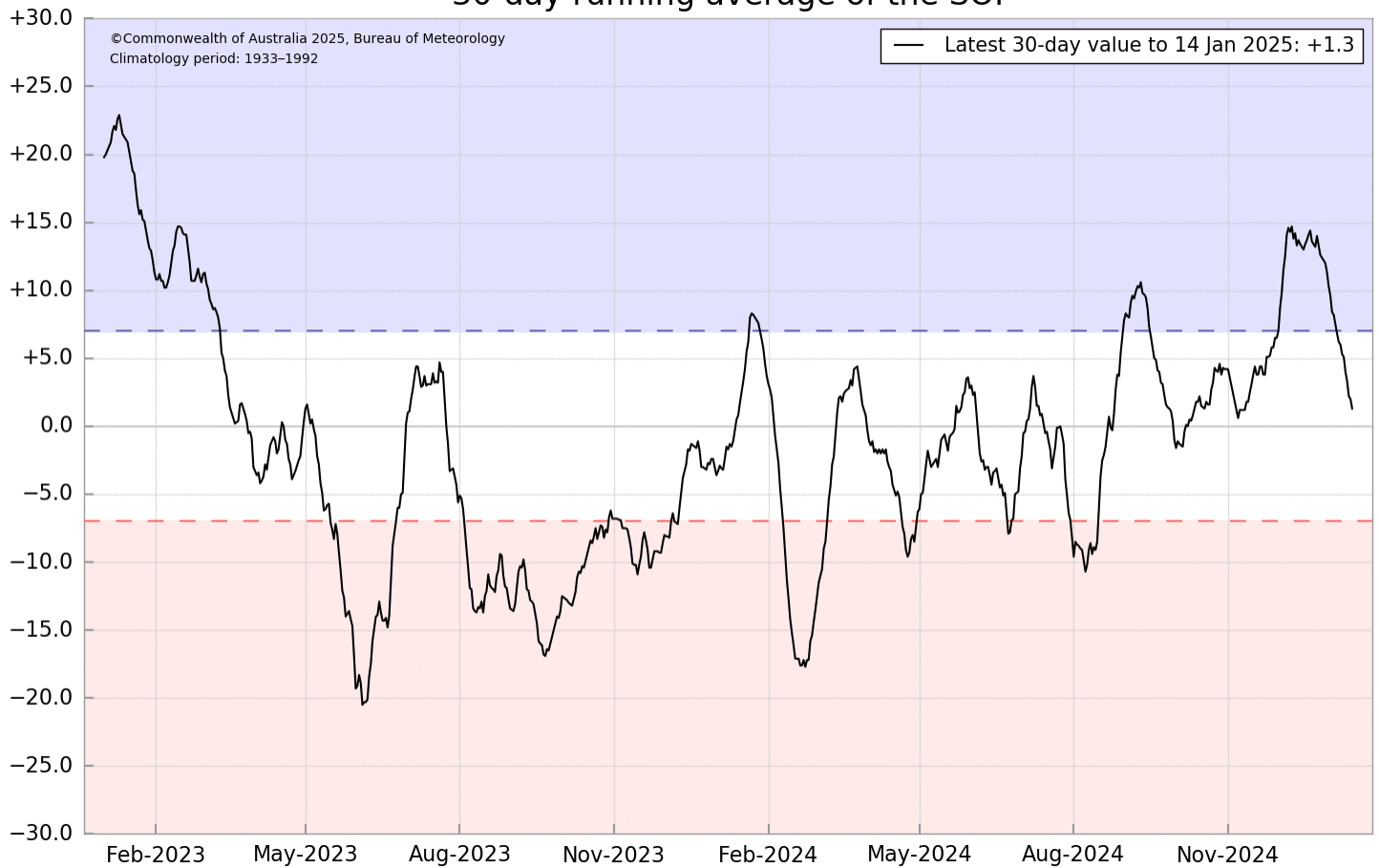
- Historically, it is very late in the typical ENSO cycle for a La Nina event to become established. Typically, an event forms during winter and spring and declines over autumn. Most models have ENSO returning to neutral by March

” - <http://www.bom.gov.au>.”

The Southern Annular Mode (SAM) is currently negative. A negative SAM during mid-to late summer is associated with below-average rainfall over the summer rainfall region of South Africa and is sometimes also associated with drier conditions over large parts while rain is confined to the far north-eastern areas. The index is expected to trend positive over the next few weeks.

The 30-day Southern Oscillation Index (SOI) is currently +1.3 and therefore representing atmospheric pressure patterns in the Australia – Pacific region indicative of borderline La Niña conditions. The SOI is still slowly trending positive.

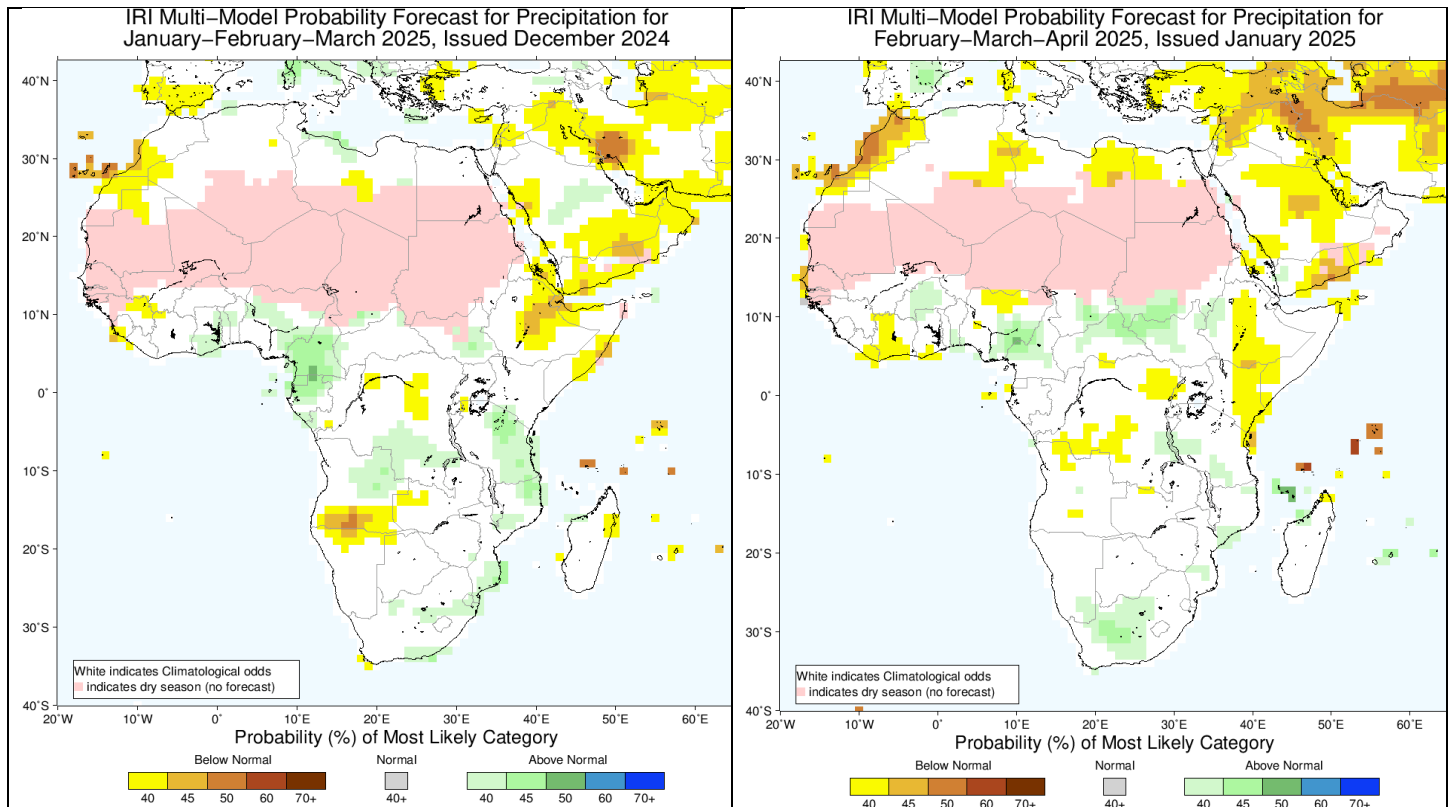
30-day running average of the SOI



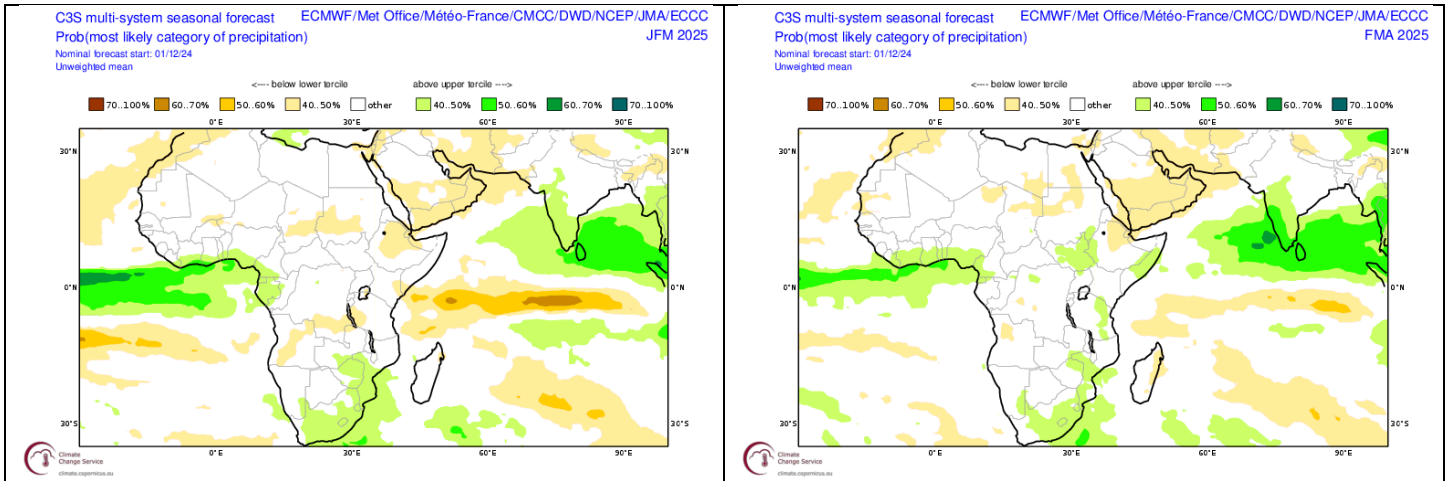
Australian Bureau of Meteorology - <http://www.bom.gov.au>

Seasonal forecasts issued by various international institutions

Seasonal forecasts (updated in December 2024 and January 2025) remain relatively neutral for summer given the weak signal from the Pacific Ocean but have trended slightly positive for rainfall over the summer rainfall region. The IRI seasonal forecast for the period January to April (first pair of maps) indicates an enhanced probability for relatively wet conditions over the central interior. The drier signal to the north, shown in earlier forecasts, has now disappeared due to the cooling trend in the equatorial Pacific. This is still very much an uncertain forecast due to the weak state of ENSO. The COPERNICUS multi-model assimilated forecast (second pair of maps) also shows the expectation of relatively wet conditions over large parts of the interior, but this is also a very conservative outlook, associated with the very late development of a weak La Niña.



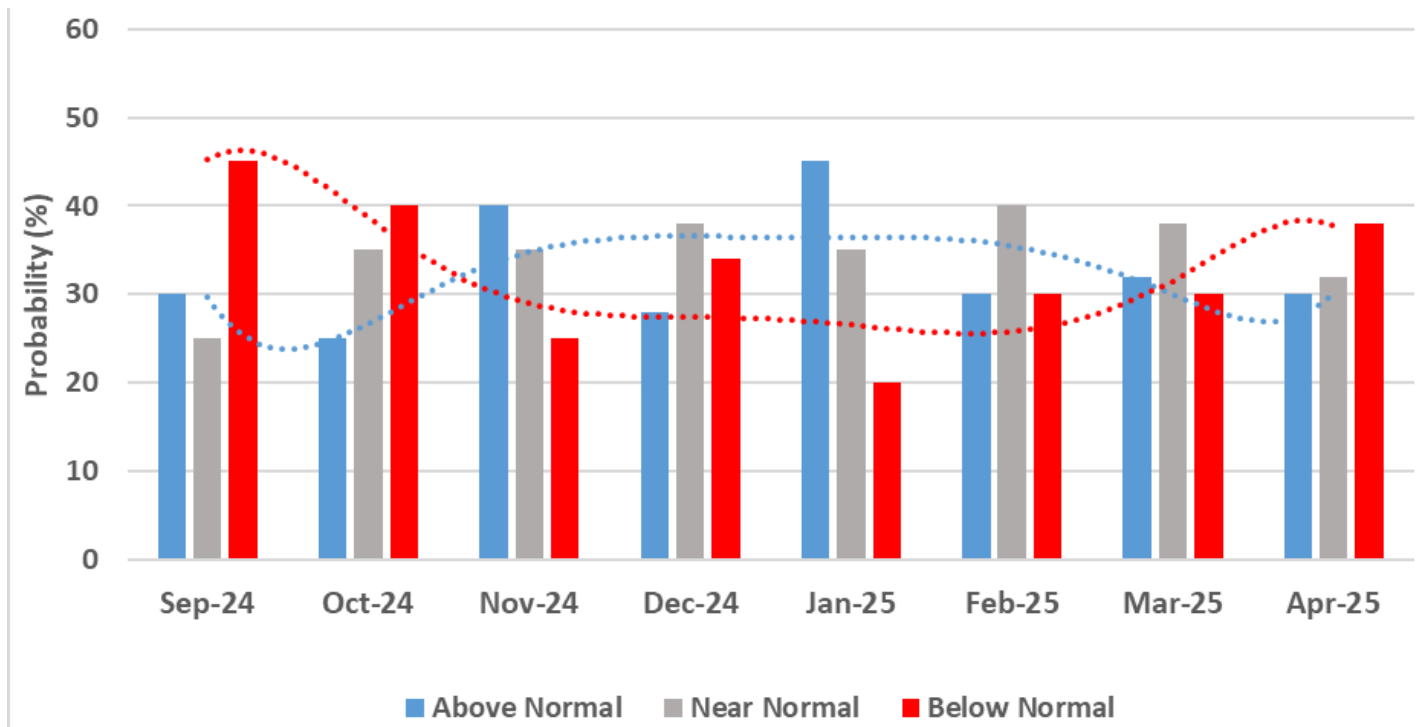
Probabilistic forecasts by the International Research Institute for Climate and Society (IRI) for rainfall for summer (January to March 2025; left - Forecast issued in 2024-12) and late summer/autumn (February to April 2025, right - Forecast issued in 2025-01).



Probabilistic multi-model forecasts by the ECMWF COPERNICUS Programme for rainfall for mid-to-late summer (January to March 2025; left - Forecast issued in 2024-12) and late summer (February to April 2025, right – Forecast issued in 2024-12).

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), associated with the cyclic variability of the global climate system. Summers that are similar to 2024/25 usually experience near normal rainfall in total, with a delayed start and a wetter signal during November and again by January/February.



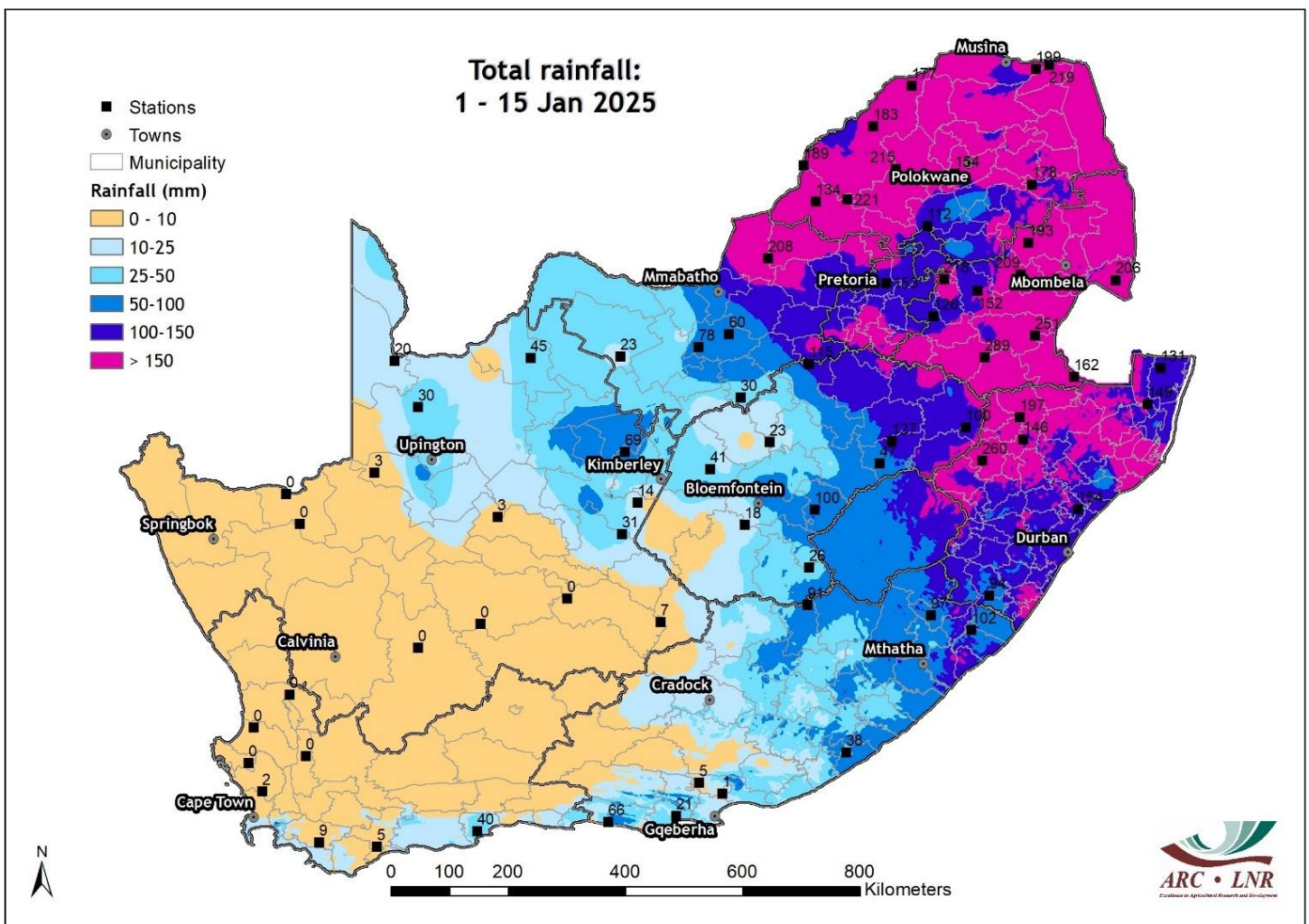
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2024 – April 2025 (Forecast issued in 2024-10).

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

- September – October: Relatively dry conditions over the north-eastern half of the summer rainfall region
- November: Near-normal to above-normal rainfall over the north-eastern half of the summer rainfall region
- December: Near normal to below-normal rainfall over the north-eastern half of the summer rainfall region
- January: Above-normal rainfall over the north-eastern half of the summer rainfall region
- February-March: Near-normal rainfall over the north-eastern half of the summer rainfall region
- April: Below-normal rainfall over the north-eastern half of the summer rainfall region

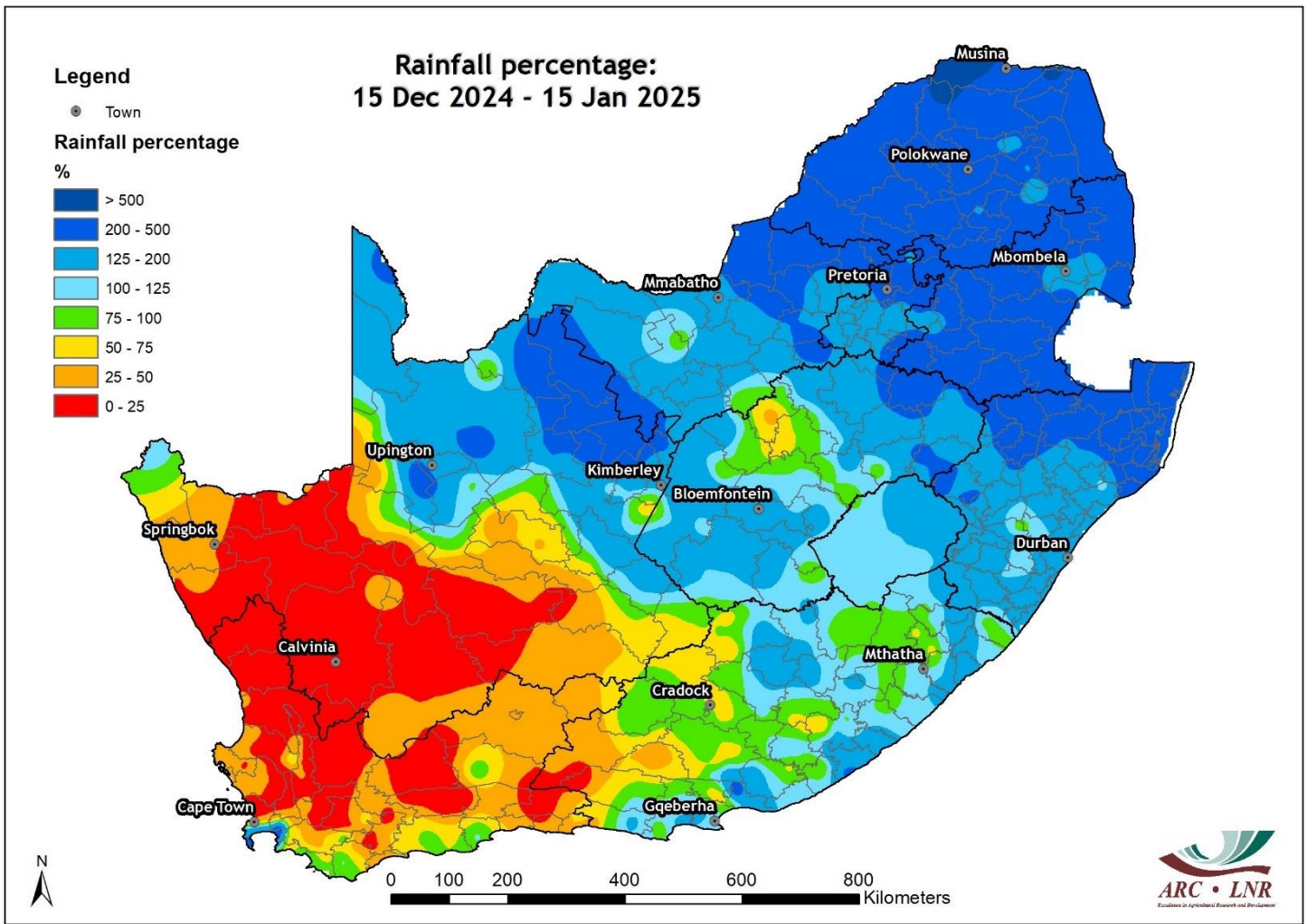
Observed conditions

Rainfall (mm): 1 - 15 Jan 2025



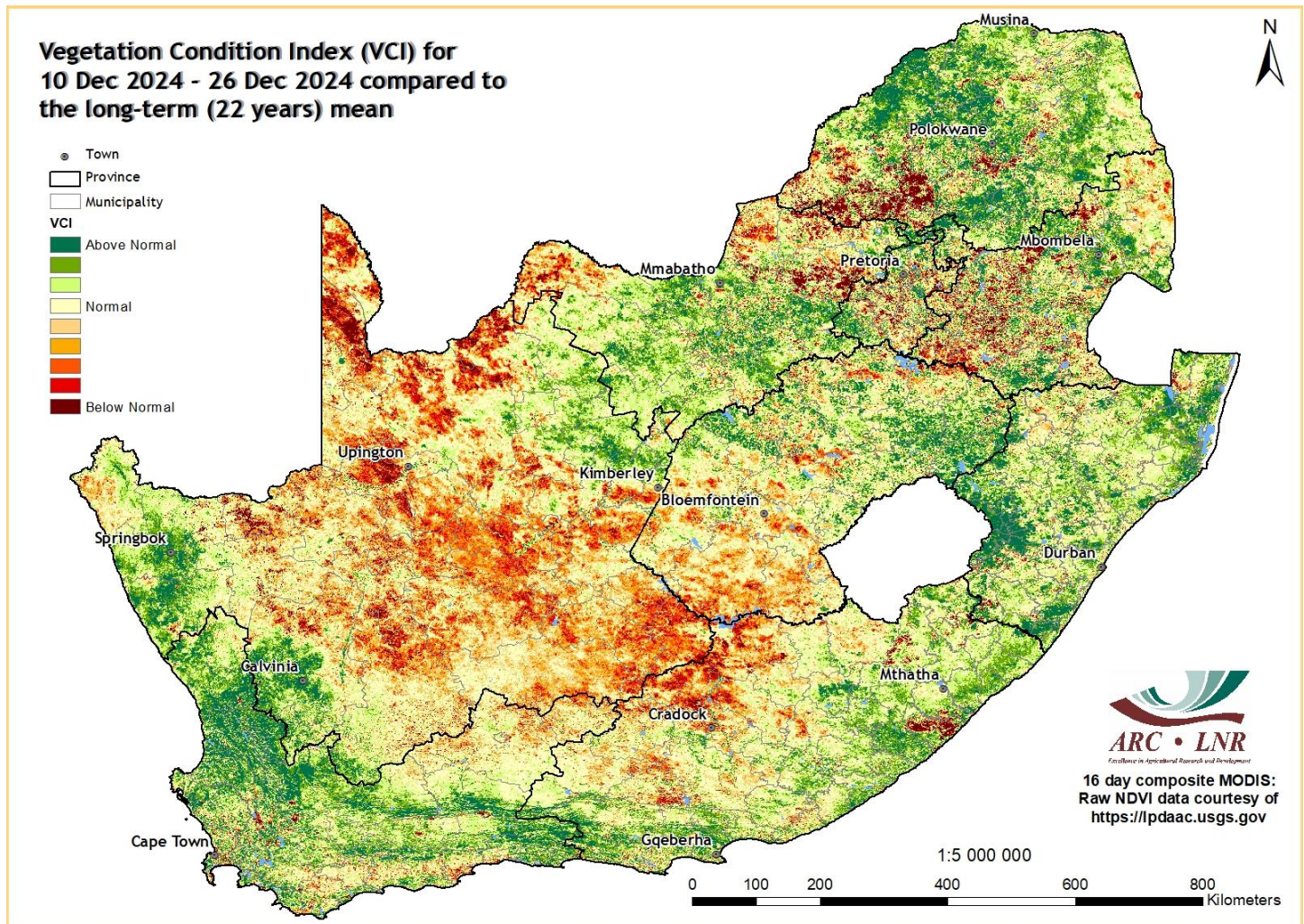
Most of the northeastern parts of the country received more than 150mm of rain during the first half of January 2025. Much of the central parts of the country (including the western parts of the summer-grain-production region) received less than 50 mm of rain while it was dry in the west.

Rainfall (% of long-term mean): 15 Dec 2024 to 15 Jan 2025



Most of the central to north-eastern parts received above-average rainfall from late December until mid-January. The south-western areas were dry for this time of the year.

Vegetation Condition Index: Late December 2024



By late December 2024, vegetation activity recovered over the north-eastern parts due to widespread rain from mid-December onwards. Vegetation was stressed over most of the Northern Cape and south-western half of the Free State, associated with warm and dry conditions. Vegetation activity was above normal over the winter rainfall region following above-normal rainfall during 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:

WRF model downscaling 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>

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