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CUMULUS
17 APRIL 2025
by J Malherbe, R Kuschke
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Contents

Summary

More autumn rain

During the next few days, more rain will occur over the interior. This will occur in the form of showers and thundershowers while some areas may experience longer periods of persistent rain next week also. Until the weekend, most of the precipitation will occur over the northern to eastern parts. By Sunday, a new band of showers and thundershowers will develop over the western parts. This is expected to slowly shift eastwards during next week, resulting in more showers and thundershowers over the central parts, including large parts of the summer-grain production region according to current forecasts.

During this time of the year, precipitation over the interior is most likely associated with upper-air lows and troughs. The occurrence of hail during this time of the year is typically elevated during thunderstorms due to lower atmospheric temperatures and this week associated also with the dynamic nature of the upper-air systems. The occurrence of severe storms will likely not exceed the climatological mean for this time of the year, especially over the grain-production region. The frequency of severe events will be what is typically associated with higher rainfall totals this time of the year. Where hail occurs, it will likely be small.

Lower temperatures occur during rain events associated with upper-air lows this time of the year. It often happens that snow occur over the Lesotho Drakensberg during precipitation events. Multi-day periods of cloudy, mild and wet conditions over the summer-grain production region (mostly in the east initially and in the west later) may continue to impact crop production through fungal pathogens, reduced heat unit accumulation and difficulty with access to fields for management interventions in some areas. With somewhat lower minimum temperatures until the weekend, light frost may occur over the areas surrounding Lesotho.

Depending on the exact position of the upper-air low next week, the winter rainfall region will also receive some rain. Forecasts are still uncertain. There is still not a strong indication of a significant cold front with widespread winter rain over the region during the next week according to current forecasts.

Looking further ahead, rainfall extent and intensity over the interior will decrease following the rain by the middle of next week. Large-scale atmospheric circulation patterns over the Southern Hemisphere are expected to change next week, with frontal activity expected on average to occur further north and with a lower tendency for high-pressure systems around South Africa. This means that the summer-like circulation patterns and wet conditions over the interior will likely be replaced by conditions that more closely reflect the climatological norm for this time of the year. Minimum temperatures will be lower towards the end of the month given more frequent periods with drier continental air masses over the interior. The shift in Southern Hemisphere atmospheric circulation will also result in enhanced chances for cold fronts to affect the southern parts, including the winter rainfall region, towards the end of the month and early May. While it should be drier than earlier this month, there is no indication of a complete end to the occasional occurrence of rain-bearing systems over the interior until at least early May. Another upper-air low may develop over the interior by the end of the month. There is no forecast yet that is indicative of severe and widespread frost over the interior until early May.

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

- Temperatures will on average be near normal for this time of the year, but above normal in the west.
- Due to a continuation of elevated atmospheric moisture levels and cloud cover, maximum temperatures will be relatively low over the interior while minimum temperatures will be relatively high.
- Daytime temperatures will be suppressed, and hot conditions are only expected over the far western parts of the country early in the period and lower-lying far north-eastern parts by next week.
- Rainfall will be above normal over most of the country.
- Partly cloudy to cloudy and mild conditions will dominate over large parts of the interior with scattered showers and thundershowers on several days until the middle of next week.
- Showers and thundershowers will occur mostly over the northern to eastern parts until Saturday.
- Showers and thundershowers will occur mostly over the western parts by Sunday, moving into the central, southern and eastern parts during next week.
- There are no indications of a significant cold event with frost during the next few days until at least the 24th. Low temperatures in and around Lesotho may result in light frost during the next few days in areas adjacent to the Drakensberg. There is a possibility that low minimum temperatures may result in frost over the south-eastern parts, especially the higher-lying areas surrounding Lesotho and possibly including the southern to eastern high-lying areas of the summer-grain production region during the second half or by the end of next week.
- The movement of an upper-air low over the country by the middle of next week may cause a temporary increase in the occurrence of severe weather over the interior.
- The summer-grain production region will experience extensive cloud cover with mild daytime conditions and regular rainfall events in the form of showers or thundershowers. Low night-time temperatures may result in light frost over the areas adjacent to the Drakensberg, but it should be warmer by the weekend. It will be windy over the western to central parts at times. Showers or thundershowers will firstly occur over the northern to eastern areas until the weekend, shifting more towards the western and central parts next week. Total rainfall during the period until Wednesday next week may exceed 50 mm over some of the central to western parts of the region.
- **The winter rainfall region** will be warm to hot, with hot conditions especially over the northern to western parts of the region until Saturday. Showers or thundershowers may occur at times from Saturday onwards, especially over the interior. It will be cooler from Sunday with the possibility of black south-easter conditions, resulting in enhanced chances of rainfall over the southern parts of the region (depending on the position of the low next week). Strong south-easterly winds are expected over the south-western parts.

Overview of expected conditions over the main agricultural production areas

Two more upper-air systems will result in widespread showers and thundershowers over the interior. The first is a trough that will cause further showers and thundershowers over the north-eastern parts until the weekend. The second system will be a cut-off low that is currently expected to develop over the western to central parts of the country and result in showers and thundershowers over especially the western to central and south-eastern parts later the weekend and next week. The band of showers and thundershowers is expected to move eastwards during the week.

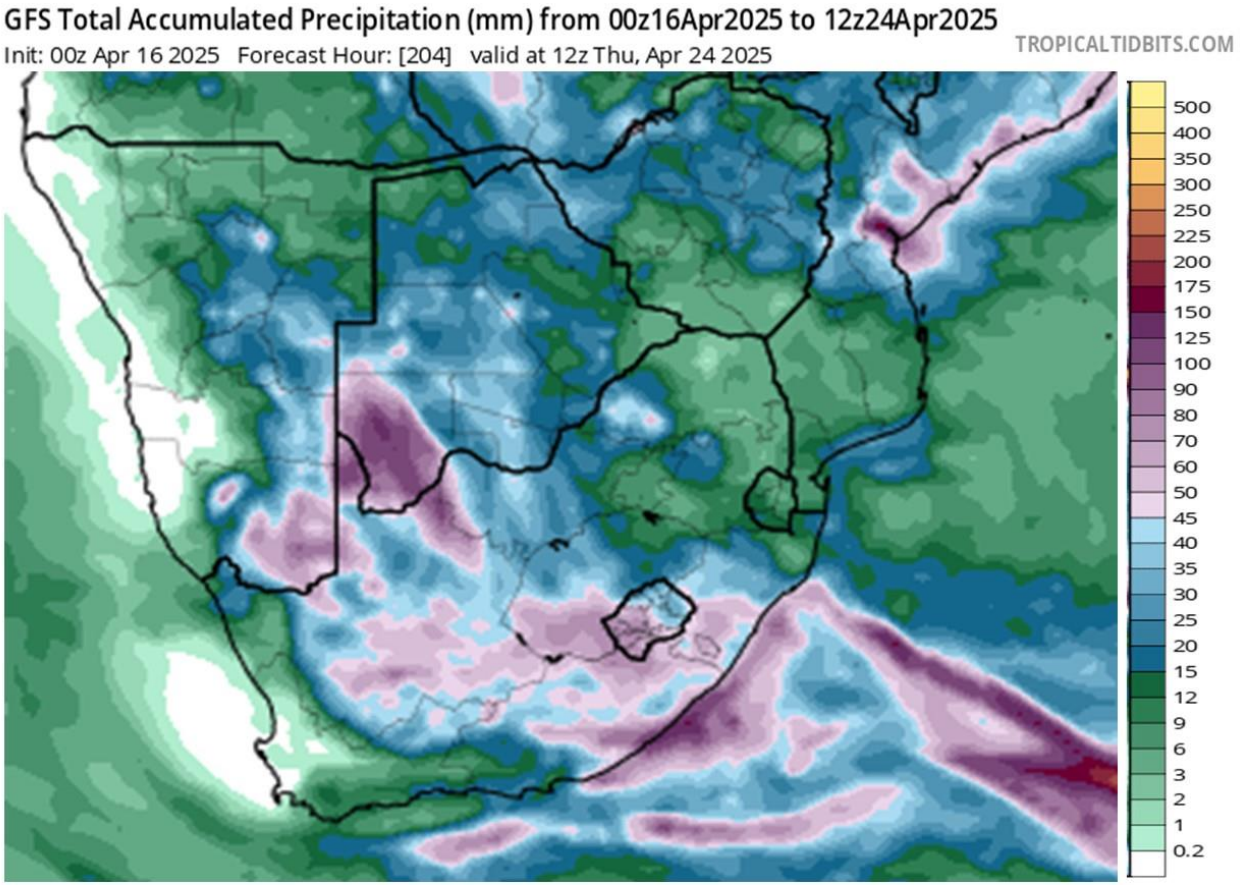
Maize production region:

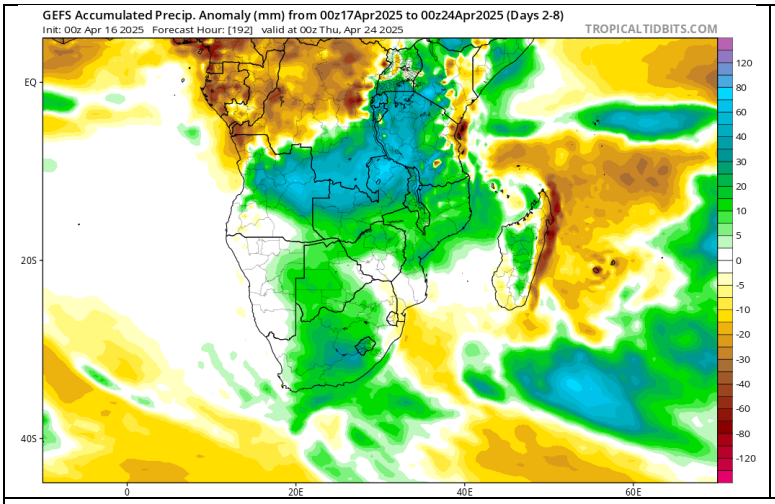
It will remain cool during the next few days over the region, with maximum temperatures relatively low for this time of the year due to cloud cover while minimum temperatures will be somewhat higher than the long-term mean, associated with higher moisture levels in the atmosphere and cloud cover.

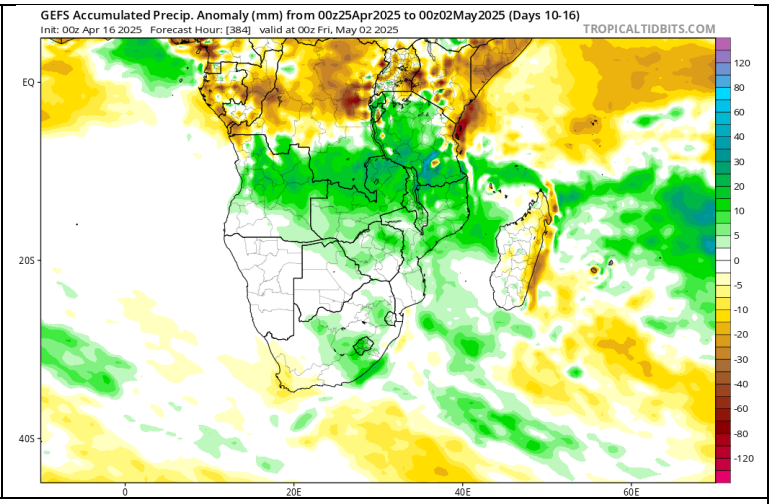
- Maximum temperatures over the eastern grain-production areas will range between 16°C and 24°C. Minimum temperatures will be in the order of 7°C to 13°C, with lower temperatures possible along the Drakensberg early in the period.
- Maximum temperatures over the western grain-production areas will range between 16°C and 27°C. Minimum temperatures will be in the order of 14°C to 18°C.
- **Wednesday (16th):** Partly cloudy to cloudy and mild with scattered showers and thundershowers over the eastern parts. It will be sunny in the west. Moderate to fresh north-westerly winds are expected, but westerly over the western to southern parts.
- **Thursday (17th):** Sunny and mild, but partly cloudy to cloudy in the north-east with scattered thundershowers. It will be cool in the morning, especially around the Drakensberg. Moderate to fresh north-easterly winds are expected later.
- **Friday (18th):** Cloudy and cool with isolated showers. It will become partly cloudy later. Moderate to fresh north-easterly winds are expected in the west.
- **Saturday (19th):** Cloudy and cool with isolated showers over the central to eastern parts. It will be mild in the west where moderate to fresh northerly winds are expected.
- **Sunday (20th):** Partly cloudy and mild. Scattered showers and thundershowers are expected in the west. Moderate to fresh north-westerly winds are expected over the western to central parts.
- **Monday to Wednesday (21st – 23rd):** Current forecasts indicate more showers and thundershowers during the first half of the week over the region. While the entire region should experience more showers and thundershowers, the western to central parts are expected to receive the highest totals. As the upper-air system and cloud band moves through, drier, cooler air may invade the region, resulting in lower minimum temperatures late next week and a possibility of frost over the southern parts and areas around Lesotho.

Cape Wine Lands and Ruens: An off-shore flow will result in hot conditions, especially over the northern to western parts, until Saturday. The development of an upper-air low in the region will support thundershowers over the interior from Saturday onwards. It will also be cooler from Sunday onwards. Depending on the movement of the low, inclement conditions may develop, with showers and thundershowers especially over the southern parts during next week. Strong south-easterly winds will dominate in the southwest.

Medium term rainfall summary







The GFS ensemble forecast (consisting of several forecasts with small initialization differences) favors above-average rainfall over the interior, including the entire grain-production region during the next few days. Forecast models indicate a continuation of relatively wet conditions, but with lower intensity, towards early May (right). While cold fronts are expected to become more frequent in the southwest, forecast models don't indicate above-normal rainfall over the winter rainfall region towards the end of April.

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 models (GFS and the ECMWF model) considered here in the beginning of a week-long (starting 16 April and ending 23 April) 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:

- **Wet conditions may be conducive to various fungal diseases:**
  - Maize production region**.**

- **More rain and low evaporation rates may result in waterlogged conditions and hinder access to fields:**
  - Maize production region, especially the Free State and southern North West**.**

- **Cloud cover at times and suppressed maximum temperatures may result in reduced accumulation of heat units:**
  - Entire maize-production region**.**

- **Significant rainfall totals, exceeding 50 mm in 24h, may occur:**
  - Northern to eastern part of the Northern Cape, Free State (the exact location will be indicated by weather forecast closer to the time): **Wednesday (23rd).**
  - Interior and eastern parts of the Eastern Cape (the exact location will be indicated by weather forecast closer to the time): **Wednesday to Thursday (23rd, 24th).**

- **Some thundershowers will tend to become severe and produce strong wind gusts and hail:**
  - Northern Gauteng, southern Limpopo, northern Mpumalanga: **Thursday (17th).**
  - Southern to south-western parts of the Northern Cape, Western Cape interior, Eastern Cape interior: **Saturday to Wednesday (19th – 23rd).**
  - Eastern parts of the Northern Cape, western Free State, south-western North West: **Wednesday (23rd).**

- **It will be hot, with maximum temperatures exceeding 35°C:**
  - Far-western parts of the Northern cape, western to north-western parts of the Western Cape: **Friday (18th).**
  - Karoo, southern to south-eastern parts of the Eastern Cape: **Saturday (19th).**
  - Lowveld: **Wednesday (23rd).**

- **Dry, warm and at times windy conditions will increase the fire hazard where vegetation is dry:**
  - Western to northern parts of the winter rainfall region: **Thursday to Monday (17th – 21st).**

- **Cool, wet and windy conditions may pose a threat to small stock:**
  - Western Cape and Eastern Cape interior, including the Karoo: **Monday to Wednesday (21st – 23rd).**

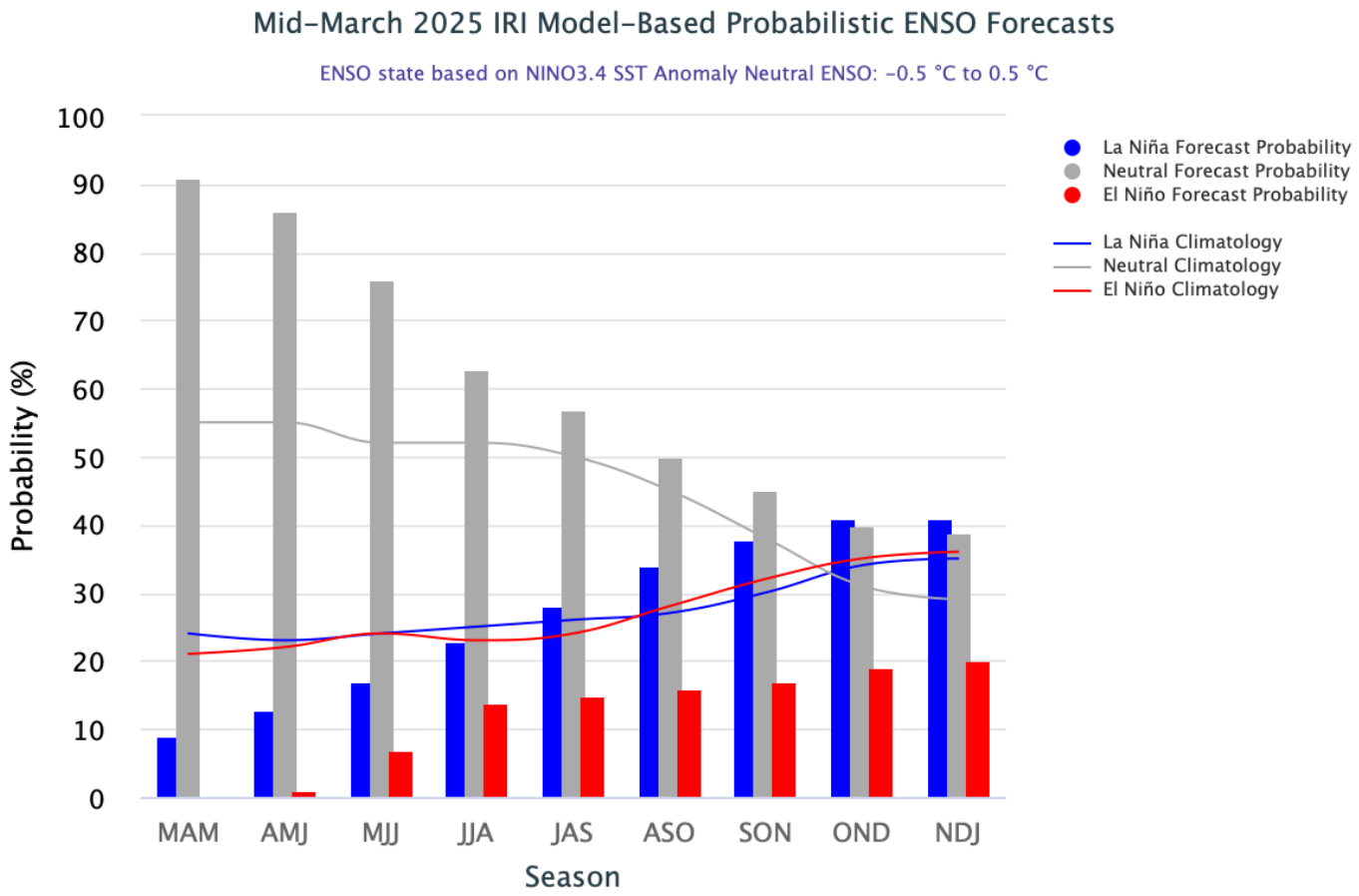
- **Frost may occur:**
  - Light frost surrounding Lesotho: **Thursday morning (17th)**

Seasonal forecast

Current ENSO conditions:

The ENSO state has returned to neutral according to institutions such as the NOAA Climate Prediction Centre and the IRI that earlier identified La Niña conditions. This is based on evidence from the Sea Surface Temperatures which returned back to levels above La Niña thresholds. Neutral conditions are expected to persist until next summer, with the chance for an El Niño looking very slim at this point.

The graph below shows the International Research Institute for Climate and Society (IRI) ENSO forecast.



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

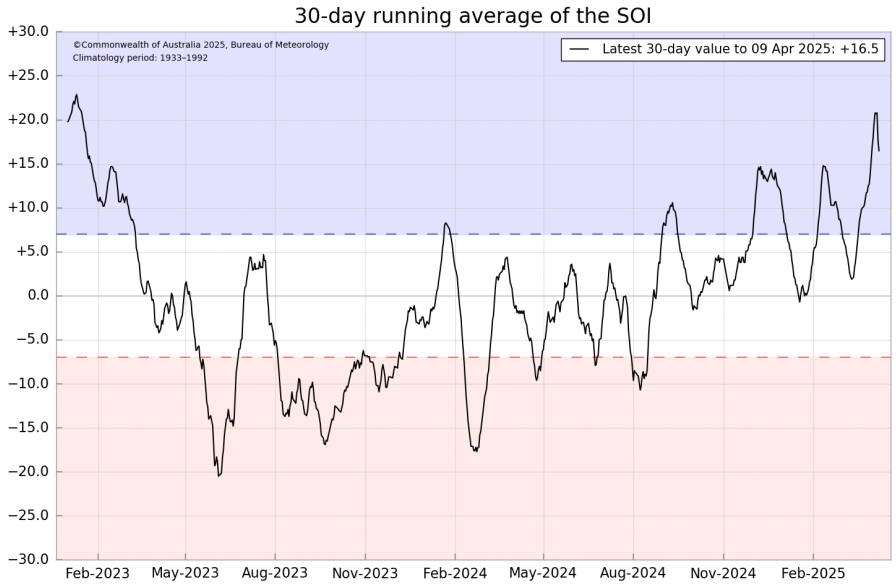
In their most recent update (issued 10 April), the IRI states that ”As of mid-March 2025, the equatorial Pacific is transitioning from weak La Niña conditions to an ENSO-neutral state. This shift is marked by sea surface temperatures in the Niño 3.4 region that are now closer to average, with anomalies at -0.35°C for Feb, 2025, well above the -0.5°C threshold required for La Niña conditions. The IRI ENSO plume forecast indicates a high probability (91%) for ENSO-neutral conditions from Mar-May 2025, and these conditions are favored to continue through Sep-Nov 2025. For the later forecast seasons, Oct-Dec 2025 and Nov-Jan 2025/26, there is no strong preference for any category, although La Niña is slightly favored over ENSO-neutral. The probability of El Niño remains very low throughout the forecast period, increasing gradually from 1% in Apr-Jun to 20% in Nov-Jan 2025/26.”.

In their most recent update (15 April), the **Australian Bureau of Meteorology** states that “The El Niño Southern Oscillation (ENSO) in the tropical Pacific remains neutral:

- The El Niño–Southern Oscillation (ENSO) is neutral. The latest Niño3.4 value for the week ending 13 April is −0.31 °C. Neutral ENSO values are between –0.8 °C and +0.8 °C.
- The Bureau's model predicts neutral ENSO (neither El Niño nor La Niña) until at least September. This is consistent with forecasts from a range of international models. However, skill for ENSO forecasts at this time of the year has historically been low beyond winter……..” http://www.bom.gov.au. ..

The Southern Annular Mode (SAM) is currently still positive and expected to become neutral next week. The decrease in the SAM will be reflected in the development of a major cut-off low over the interior. The expected neutral index value later is supportive of generally more climatologically average conditions over South Africa than the summery conditions up to now.

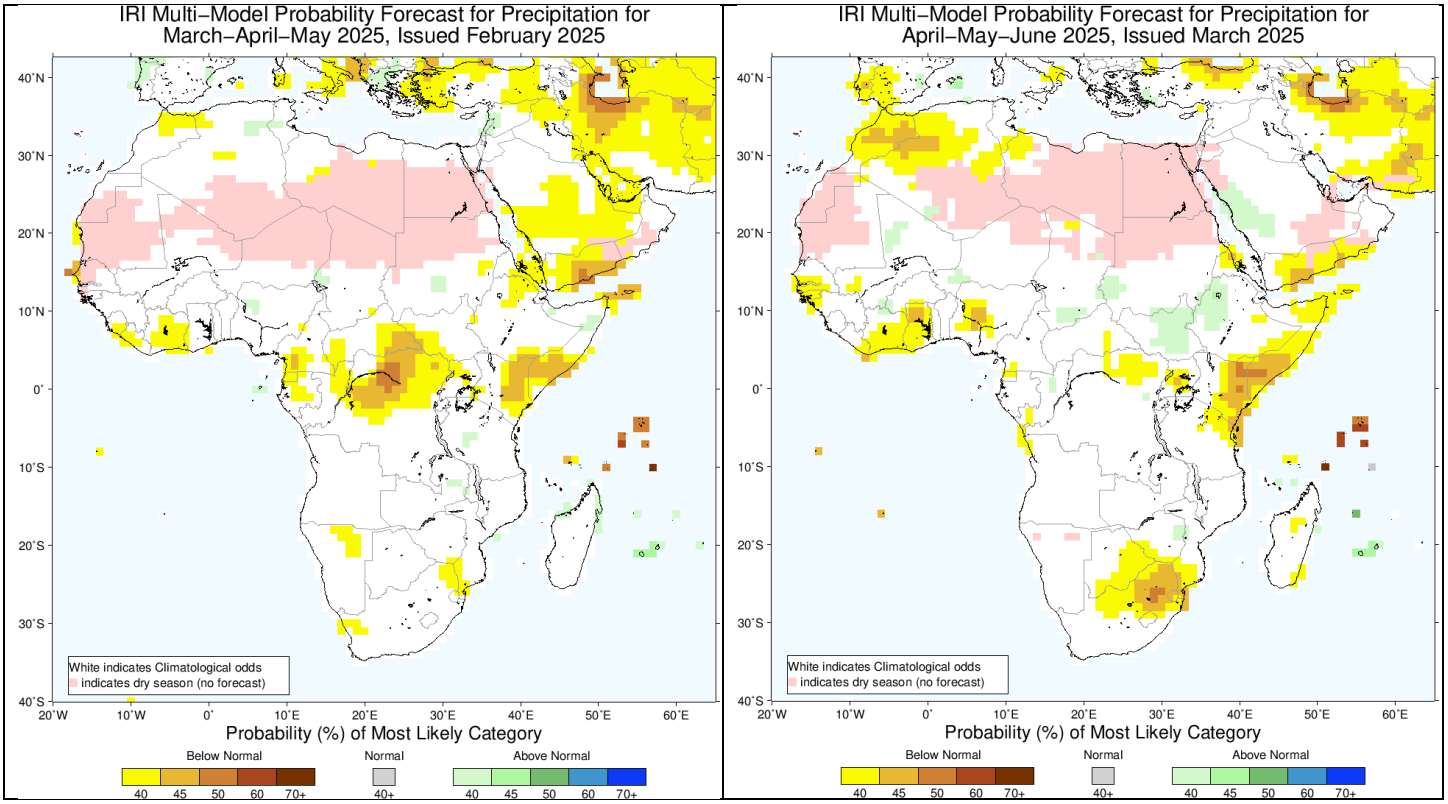
The 30-day Southern Oscillation Index (SOI) is currently +16.5 and therefore representing atmospheric pressure patterns in the Australia – Pacific region indicative of Neutral to La Niña conditions. The slow upward trend in the SOI since summer 2023/24 seems to have reached a peak.



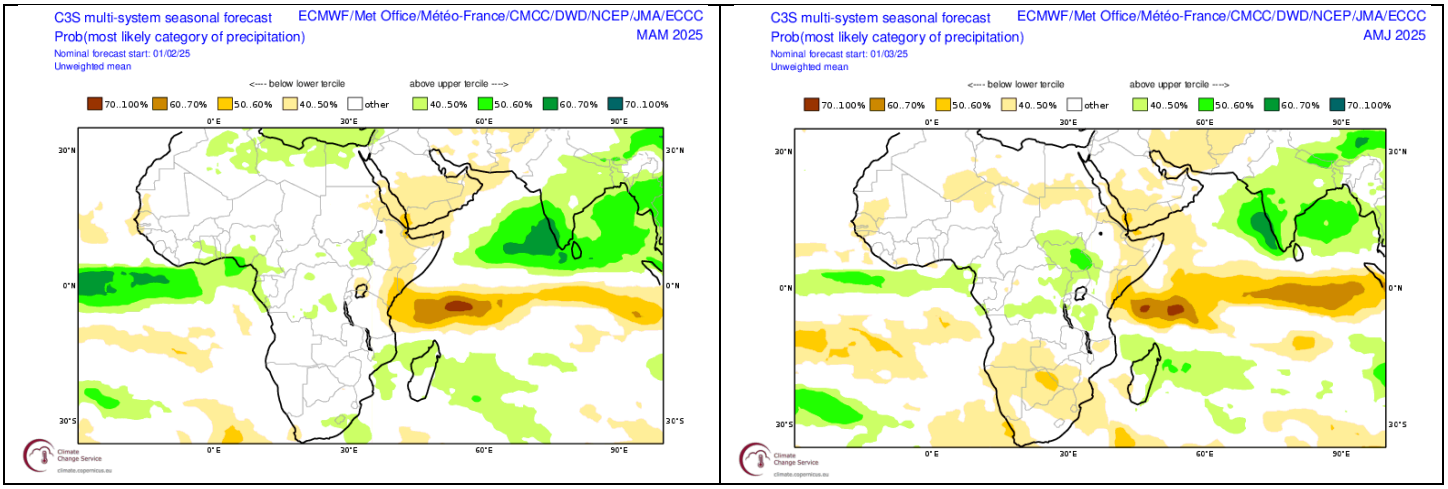
Australian Bureau of Meteorology - http://www.bom.gov.au

Seasonal forecasts issued by various international institutions

Seasonal forecasts (updated in February and March 2025) are trending drier for the remainder of autumn, given the return to neutral conditions regarding ENSO. The IRI seasonal forecast (first pair of maps) for the period March to June leans dry over the summer rainfall region as we approach late autumn and early winter. The COPERNICUS multi-model assimilated forecast (second pair of maps) also shows the expectation of relatively dry conditions towards late autumn over the interior.



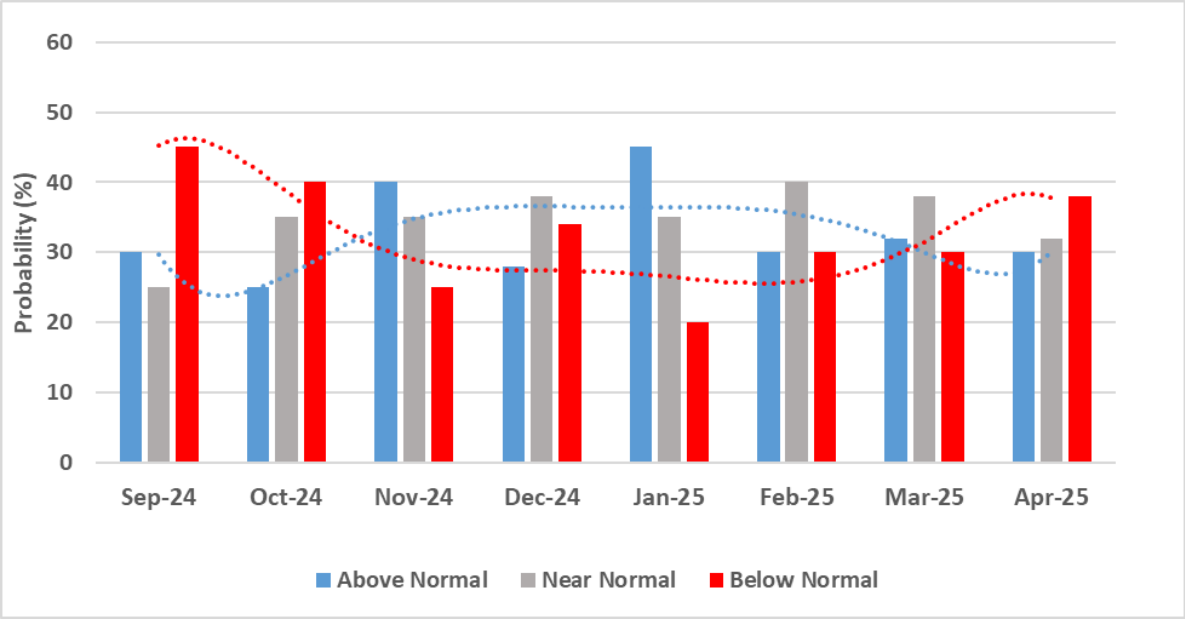
Probabilistic forecasts by the International Research Institute for Climate and Society (IRI) for rainfall for autumn (March to May 2025, left – Forecast issued in 2025-02) and autumn/early winter (April to June 2025, right – Forecast issued in 2025-03).



Probabilistic multi-model forecasts by the ECMWF COPERNICUS Programme for rainfall for autumn (March to May 2025, left – Forecast issued in 2025-02) and autumn/early winter (April to June 2025, right – Forecast issued in 2025-03).

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.



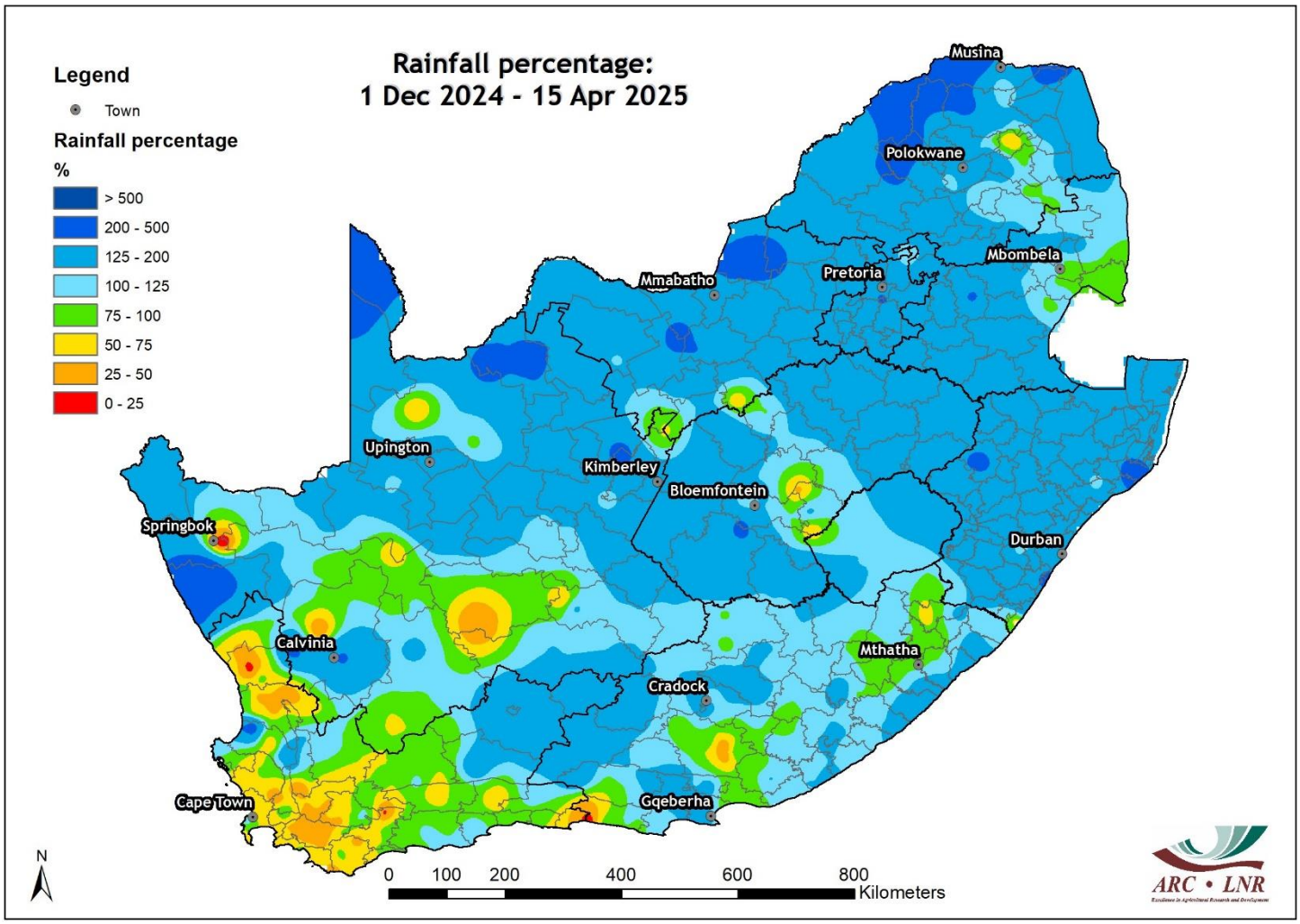
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2024 – April 2025 (Forecast issued in 2024-10).

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

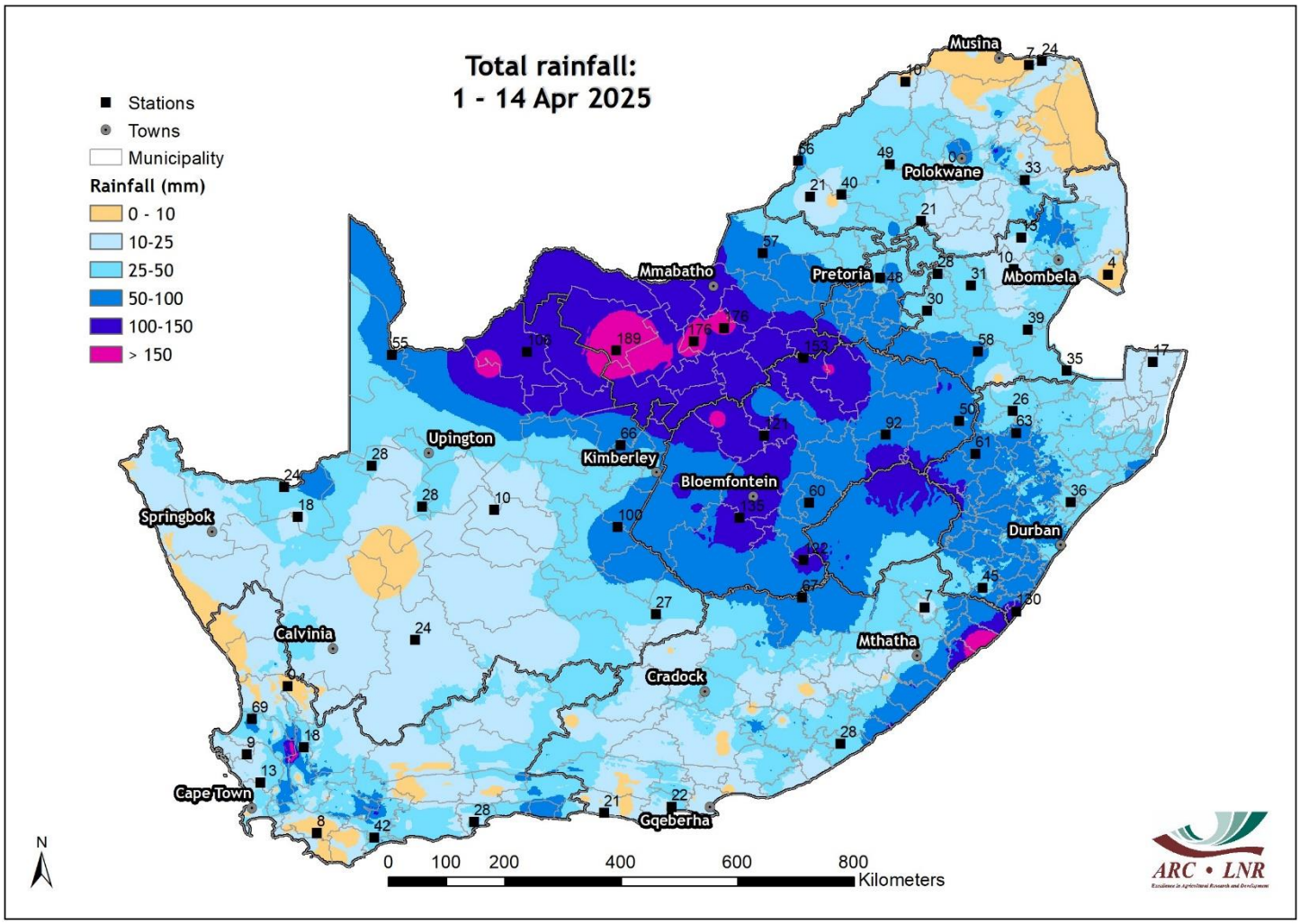
Observed conditions

Rainfall (%): 1 December 2024 – 15 April 2025



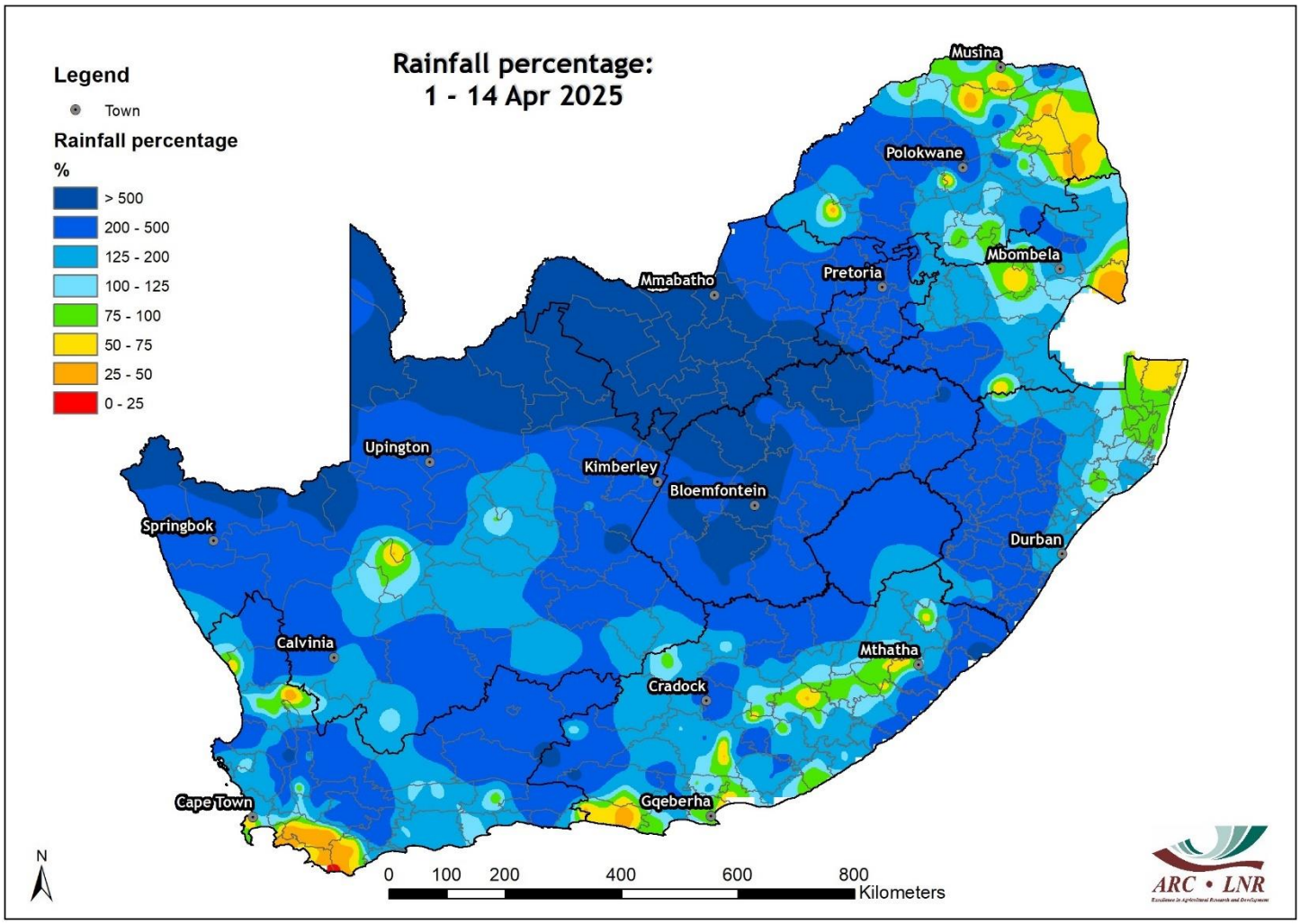
Most of the summer-rainfall region received near-average to above average rainfall for the period 1 December to 15 April. Parts of the central to western Free State received near-average rainfall. Most of the winter rainfall region received below-average rainfall.

Rainfall (mm): 1 – 14 April 2025



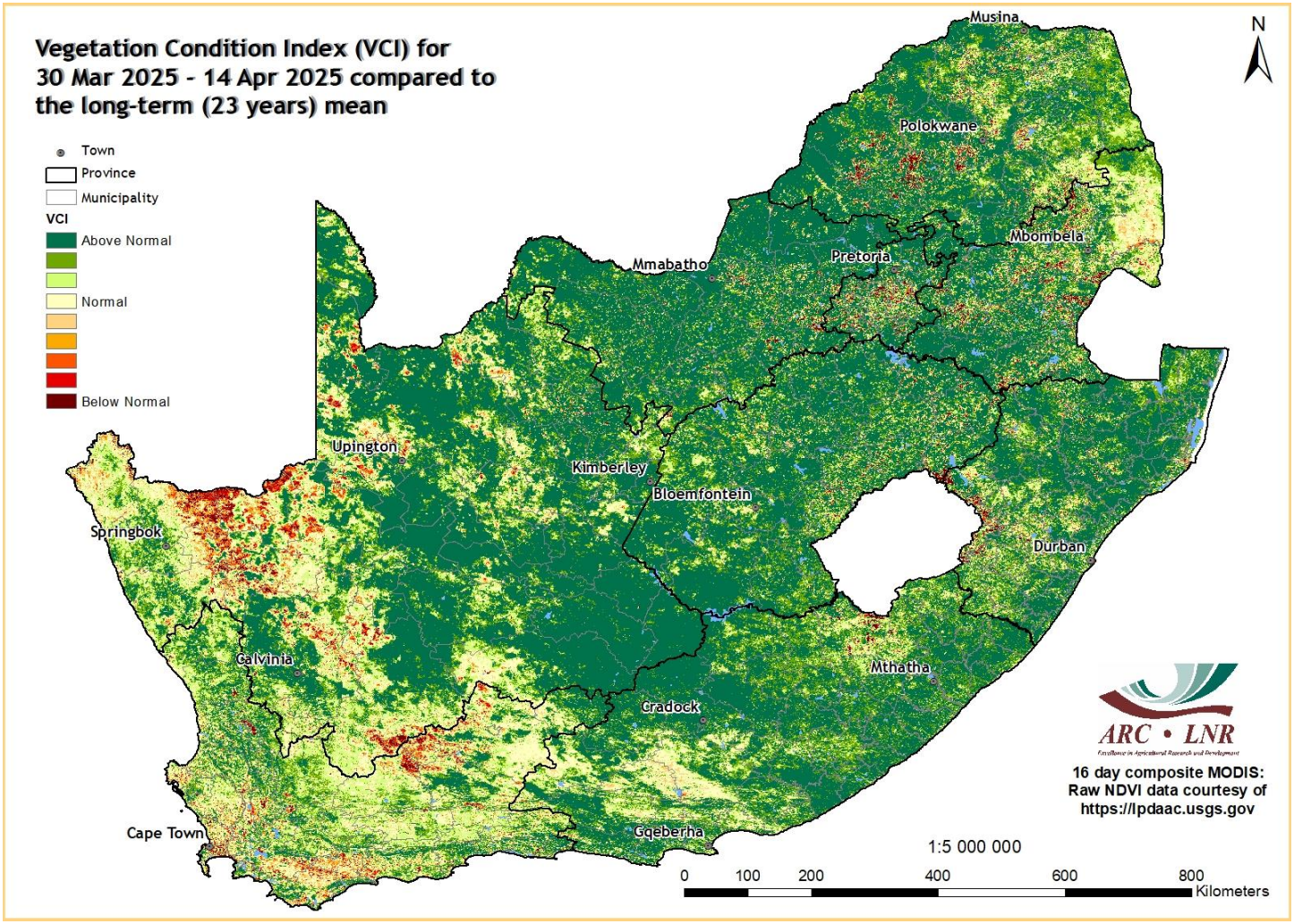
Highest rainfall totals, in some places exceeding 150 mm, occurred over parts of North West and along the south-eastern coastal belt. Most of the grain production region received between 50 and 200 mm during the first half of April with lower totals over Mpumalanga. Little to no rain was recorded over the lower-lying extreme north-eastern to eastern parts. The winter rainfall region received some rain, but totals were mostly below 25 mm.

Rainfall (% of long-term mean): 1 - 14 April 2025



Large parts of the interior, including most of the summer-grain production region, received above average rainfall during the first 14 days of April 2025.

Vegetation Condition Index: Early April 2025



Vegetation activity was above normal over most of the country by early April, following above-normal rainfall over most areas during certain parts of the summer. Exceptions include parts of the Lower Orange, western interior of the Northern Cape and north-eastern parts of the Western Cape.

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***