CUMULUS

24 March 2022

by J Malherbe, R Kuschke

AgriSeker Onderskrywingsbestuurder (Pty) Ltd. Reg No: 2014/235270/07 is an Authorised Financial Service Provider FSP no:45767
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Summary

Mostly warmer, drier conditions ahead

While autumn conditions continue, the position of rain-producing systems during the next few days will be such that large areas of the country should receive below-normal rainfall. The northeastern parts should however receive normal to above-normal rainfall, with widespread thundershowers expected early this weekend. The central to western parts should be relatively dry during the next few days. Following the weekend, it should become warmer with little in the way of rainfall over most areas while northerly to northwesterly winds will dominate the interior as a cold front approaches the winter rainfall region early next week. While the cold front is expected to result in cooler conditions and rain over the winter rainfall region according to current forecasts, it is not at this stage expected to move deep into the interior. With the warmer conditions ahead, there is currently no indication of early or severe frost during the next few days. The warmer conditions during the next few days over the summer rainfall region will be conducive to crop production over the summer-grain-production areas.

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

- **General:**
  - Temperatures will on average be normal to above normal over most areas.
  - It will progressively become warmer during the period.
  - Most of the country will be relatively dry, with below-normal rainfall expected especially over the central to western parts.
  - Normal to above-normal rainfall may occur over the northeastern parts and eastern to southeastern coastal areas, associated with expected thundershowers over the northeastern parts and showers along the coast during the weekend.
  - Some thundershowers may develop over the western interior later next week.
  - A cold front is expected to cause cooler, windy conditions over the winter rainfall region by Tuesday according to current forecasts.
  - There is no indication currently of a cold front influencing interior during the next few days.
  - Strong southeasterlies are expected in the southwest on early in the period.
  - Temperatures over the summer-grain production area are expected to recover and be in the normal to above-normal category for this time of the year:
    - Maximum temperatures over the eastern maize-production areas will be in the order of 24 – 29°C. Minimums will be in the order of 10 – 15°C.
    - Maximum temperatures over the western maize-production region will range between 25 and 31°C, generally following a warming trend through the period. Minimums will be in the order of 13 – 18°C, also warming during the period.

Overview of expected conditions over the main agricultural production areas

Initially, an eastward tracking upper-air trough will support scattered to widespread thundershowers over the eastern to northeastern parts. Anti-cyclonic circulation will become dominant later during the weekend and early next week, when it will become warmer across the country. A cold front will move over the southwestern parts by Tuesday according to current forecasts. Between the high over the country and the cold front with its trough over the southwestern parts, fairly strong northerly to northwesterly winds will dominate over the central to western and southern parts, bringing also higher temperatures with hot, berg wind conditions expected over the southern parts by early next week. A band of thundershowers will develop over the western to central and southeastern parts as the upper-air trough associated with the front in the southwest approaches by Tuesday and Wednesday.

Maize production region: Fairly widespread thundershowers will occur over the central to eastern parts of this region initially, reaching a maximum on Friday. It should clear for the most part, with isolated thundershowers still possible until Monday except for the south-western parts. It will warm further during early next week, but there is little to no indication of further precipitation over the region until middle next week. Temperatures will be supportive of agricultural production while being slightly higher than normal for this time of the year:

- Maximum temperatures over the eastern maize-production areas will be in the order of 24 – 29°C. Minimums will be in the order of 10 – 15°C.
- Maximum temperatures over the western maize-production region will range between 25 and 31°C, generally following a warming trend through the period. Minimums will be in the order of 13 – 18°C, also warming during the period.

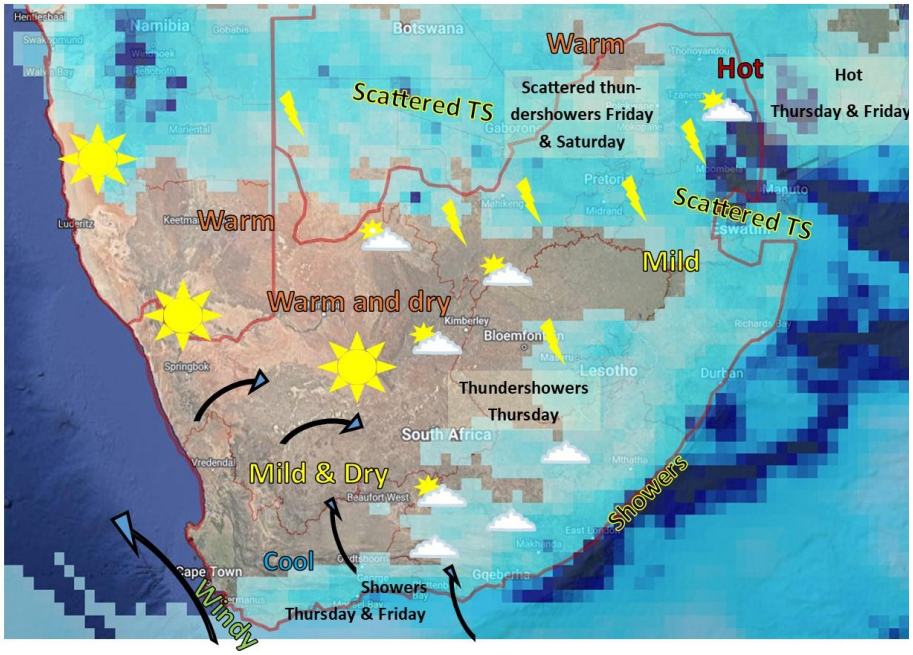
- **Thursday (24th)**: Partly cloudy and mild. Isolated thundershowers are possible over the central to south-eastern parts of the region.
- **Friday and Saturday (25th, 26th)**: Partly cloudy to cloudy and mild over the central to eastern parts of the region with scattered thundershowers. It should be dry in the southwest.
- **Sunday and Monday (27th and 28th)**: Partly cloudy and mild, becoming warm in the west. Isolated thundershowers are still possible except over the south-western parts.
- **Tuesday and Wednesday (29th, 30th)**: Partly cloudy and mild, but warm in the west.

Cape Wine Lands and Ruens: Light showers are possible over the southern parts initially but it should clear by Friday (25th). The wind will be strong southeasterly to easterly over the southwestern parts until Saturday, while is will become warm over the Swartland and the West Coast. The wind will become strong northwesterly over the region as a cold front approaches by Monday (28th). The northwesterly winds will cause the western parts of the Karoo to become hot on Monday (28th). As the frontal system moves through by Tuesday (29th), it will become partly cloudy to cloudy with showers over especially the southwestern and southern parts, while the whole region will be cooler with westerly winds on Wednesday (30th).

Daily summary of expected conditions

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

Thursday to Saturday, 24 – 26 March



Partly cloudy becoming cloudy with scattered thundershowers over the northeastern parts Friday and Saturday.

Isolated thundershowers over the central to southeastern parts Thursday.

Cool with showers along the Garden Route Thursday and Friday.

Cool with showers along the southeastern to eastern coastal areas Friday and Saturday.

The Northern Cape should remain dry.

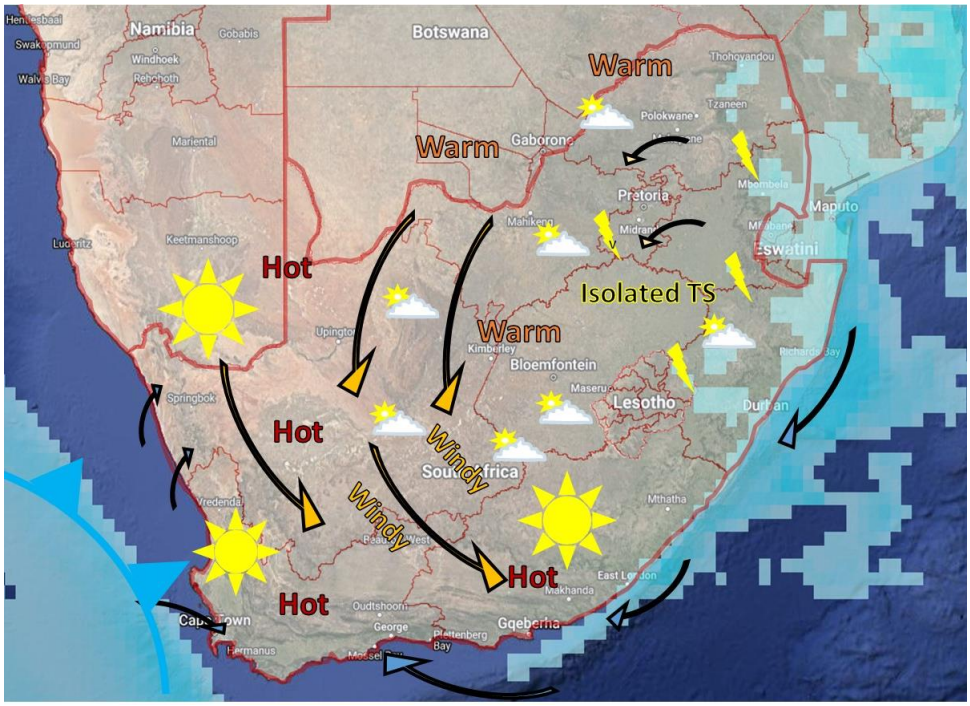
It will be hot in the Lowveld Thursday and Friday.

It will be hot in northern KZN Thursday.

The southern parts of the country will be cool to mild.

Strong south-easterlies in the southwest.

Sunday and Monday, 27 - 28 March



Partly cloudy with isolated thundershowers over the eastern to northeastern parts.

Light showers along the eastern coastal areas.

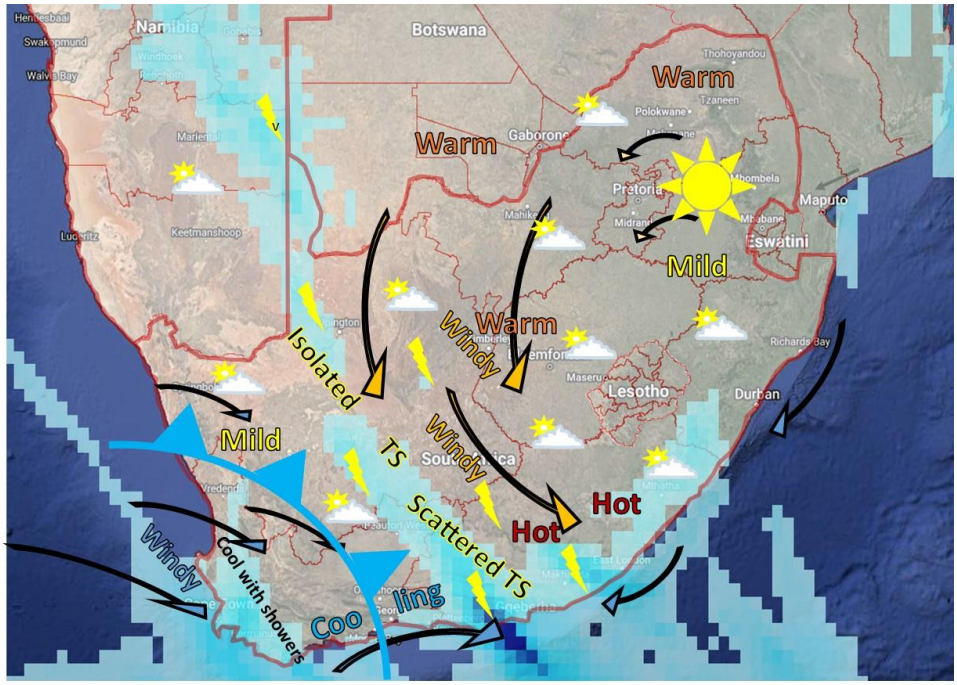
The central to western and southern parts of the country should remain dry.

It will become warmer over most of the country.

It will become hot over the western interior and southern parts.

It will become windy over the central to western and southern parts.

Tuesday to Wednesday 29 – 30 March



Dry over the northeastern parts.

A cold front will result in showers over the southern and southwestern parts of the winter rainfall region.

Isolated thundershowers over the central to eastern Northern Cape.

Scattered thundershowers over the eastern Western Cape and western to southern Eastern Cape.

It will be hot over the central to eastern and southern parts of the Eastern Cape, especially on Tuesday.

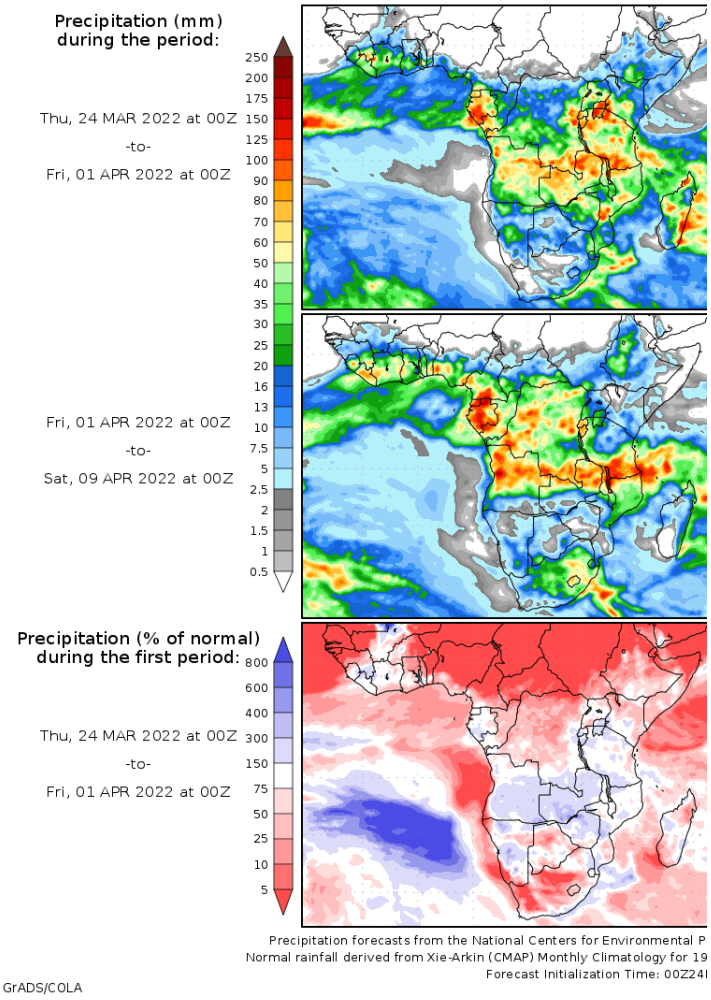
It will be mild in the west and cool in the southwest.

It will be windy over the western to central interior and southeastern parts.

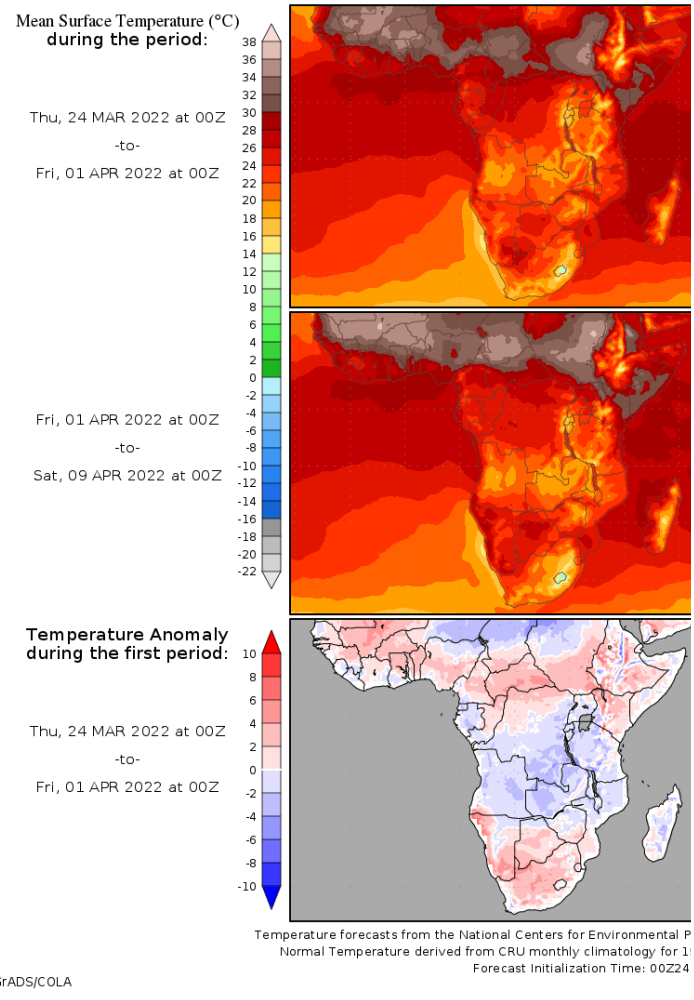
Strong north-westerlies to westerlies over the southwestern parts.

Medium term rainfall and temperature summary

Precipitation Forecasts



Temperature Forecasts



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 24 March) 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:

- It will be hot:
  - Over northern KZN on **Thursday (24th)**
  - Over the Lowveld on **Thursday and Friday (24th, 25th)**
  - Over the Karoo and most of the Eastern Cape on **Monday and Tuesday (28th, 29th)**
- Thundershowers may become severe:
  - Over the Eastern Highveld on **Friday (25th).**
- Strong south-easterlies over the southwestern parts from **Thursday (24th) to Saturday (26th)** may be conducive to the spread of wild fires where vegetation is dry.
- Dry and windy conditions over the western to southern parts on **Monday and Tuesday (28th, 29th)** may be conducive to the spread of wild fires where vegetation is dry.

Seasonal forecast

Recently, forecasts have shifted from an expectation of a return to neutral conditions, to a longer continuation of La-Niña into the SH winter. Seasonal forecasts for autumn over South Africa once again favor wetter conditions over the summer rainfall region after trending somewhat drier for February.

The Australian Bureau of Meteorology points out that the La Niña retreat stalls as trade winds strengthen

(Updated 15 March): The 2021–22 La Niña event continues but is past its peak. However, trade winds remain stronger than average in the western Pacific, which has delayed further weakening of the La Niña over the past fortnight. Latest outlooks indicate a return to neutral El Niño–Southern Oscillation (ENSO) levels—neither La Niña nor El Niño—late in the southern hemisphere autumn. Even as La Niña weakens, it will continue to influence global weather and climate.

Atmospheric and oceanic indicators over the Pacific persist at La Niña levels. Persistently strong trade winds over the past fortnight have driven a cooling to La Niña levels of the central tropical Pacific. This has also cooled water beneath the surface, pausing the warming trend seen during January and February. Warming below the surface of the Pacific Ocean typically foreshadows a breakdown in La Niña, and usually occurs in the southern hemisphere autumn. In the atmosphere, indicators largely remain at La Niña levels, with decreased cloudiness along the Date Line, strengthened trade winds in the western Pacific, and a positive Southern Oscillation Index (SOI).

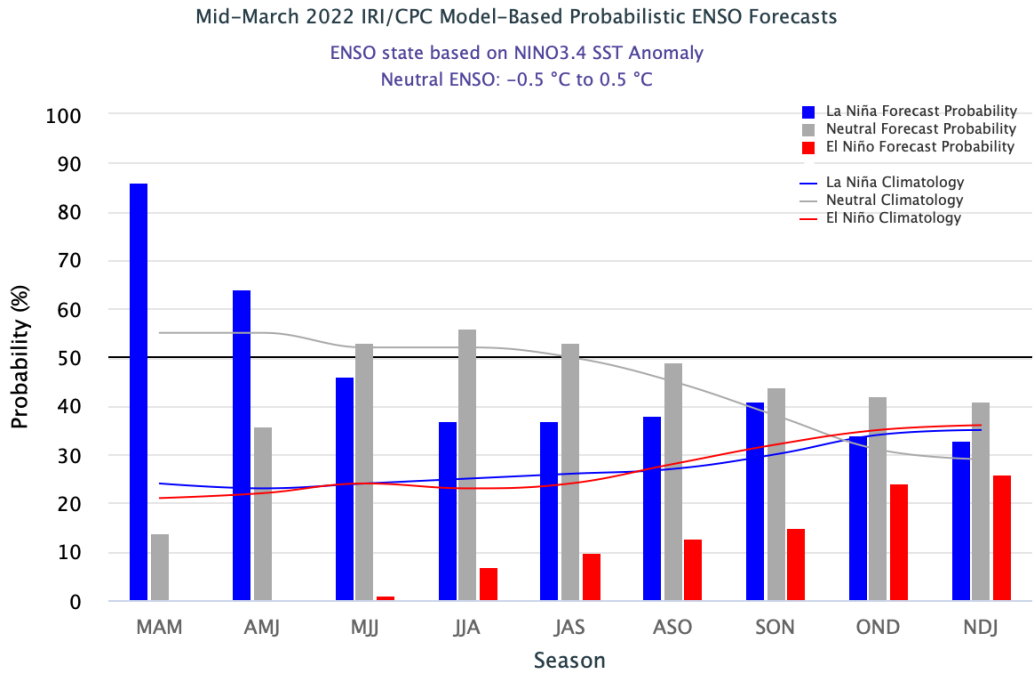
The Southern Annular Mode (SAM) is currently neutral. It is forecast to remain neutral over the coming three weeks.....*Australian Bureau of Meteorology* - http://www.bom.gov.au

The Southern Annular Mode (SAM) was positive going into February. It has gradually weakened into negative or neutral territory during the last few days. A positive SAM during summer typically brings wetter weather to the summer rainfall region of South Africa.

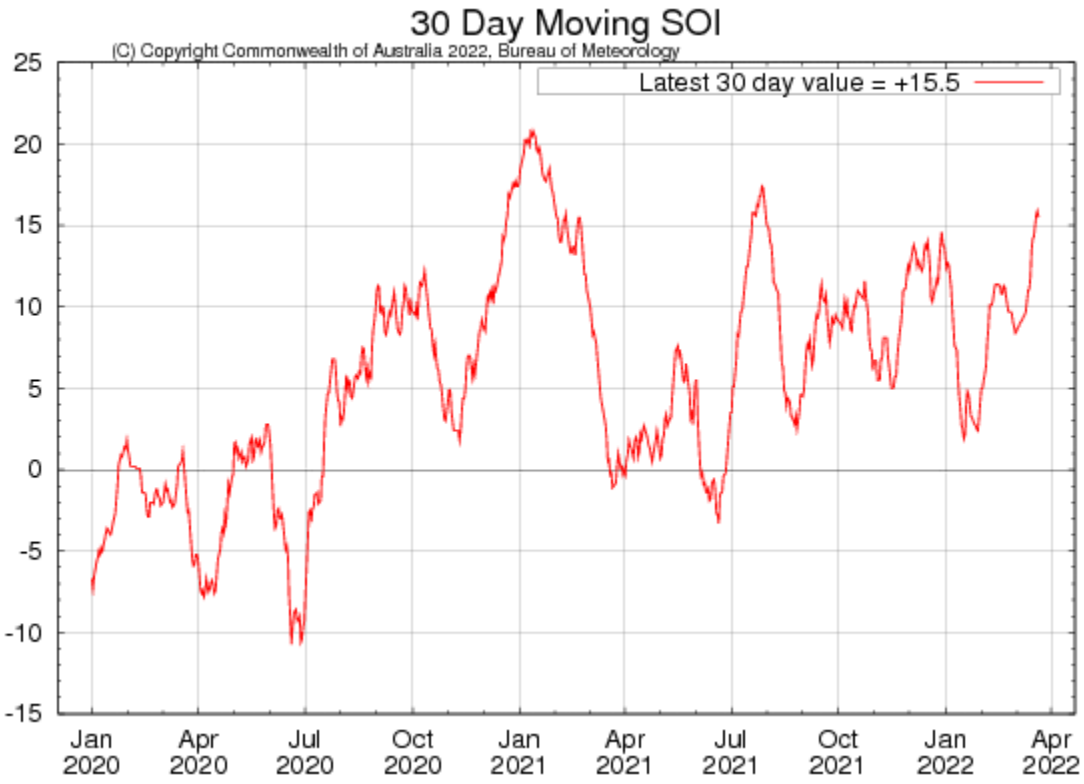
The International Research Institute for Climate and Society (IRI) also expects La Niña conditions to persist until autumn

According to the IRI (Updated 10 March): Below-average sea surface temperatures (SSTs) strengthened during February 2022 across the central and east-central tropical Pacific, with negative anomalies stretching from the central to eastern equatorial Pacific Ocean. In particular, the weekly Niño-3.4 index decreased from -0.6ºC at the beginning of February to -1.1ºC in the last week, while the other Niño SST regions were between -0.6ºC and -1.3ºC in the last week. Subsurface temperatures anomalies (averaged between 180º-100ºW and 0-300m depth) were near zero, as the recent warming associated with the downwelling Kelvin wave has attenuated. Below-average temperatures have expanded near the surface and at depth near ~150ºW. Tropical atmospheric anomalies strengthened during the past month, with the extension of enhanced low-level easterly winds across the equatorial Pacific and upper-level westerly wind anomalies remaining over the east-central and eastern Pacific Ocean. Suppressed convection strengthened around the Date Line, while convection was enhanced near Indonesia. Overall, the coupled ocean-atmosphere system reflected the continuation of La Niña.

The IRI/CPC plume average for the Niño-3.4 SST index continues to forecast a transition to ENSO-neutral during the Northern Hemisphere spring. This month, the forecaster consensus favors a slower decay of La Niña due to the recent renewal of ocean-atmosphere coupling, which contributed to cooler near-term forecasts from several state-of-the-art climate models. For the summer and beyond, there is large uncertainty in the state of ENSO; however forecasters lean toward negative Niño-3.4 index values even if the index does not reach La Niña thresholds. In summary, La Niña is favored to continue into the Northern Hemisphere summer (53% chance during June-August 2022), with a 40-50% chance of La Niña or ENSO-neutral thereafter….*International Research Institute for Climate and Society*- http://iri.columbia.edu/



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

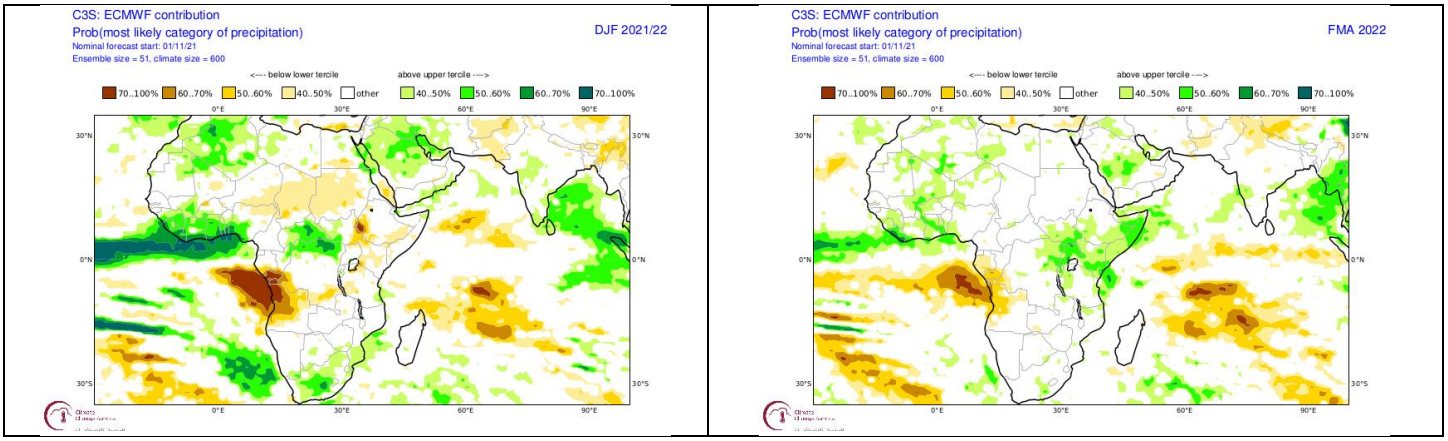


Australian Bureau of Meteorology - http://www.bom.gov.au

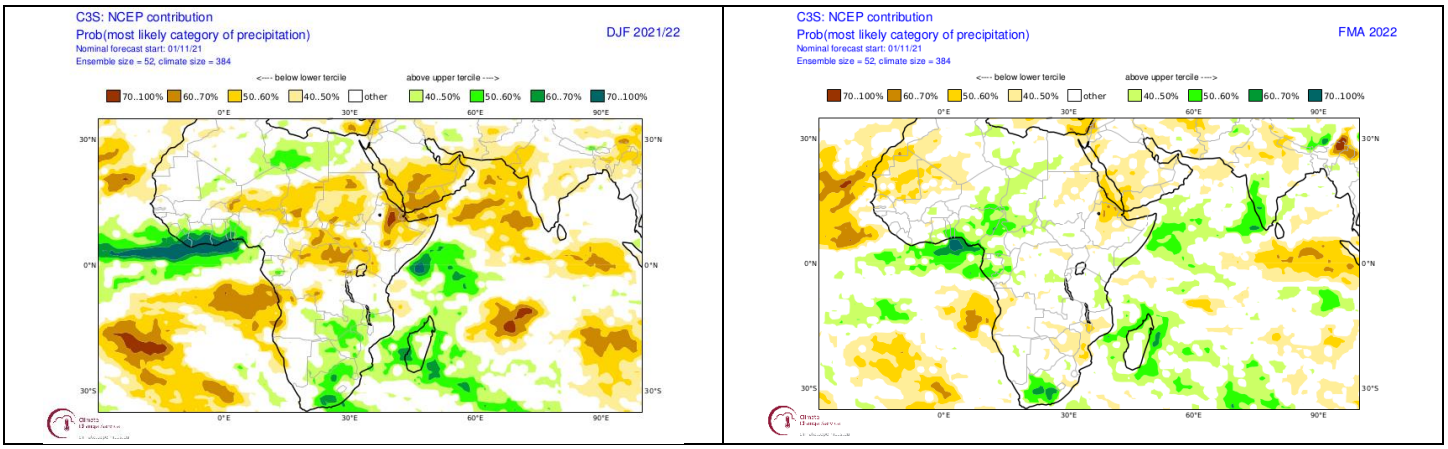
The Southern Oscillation Index is in positive territory (+15.5). This is indicative of atmospheric circulation patterns reflecting La Niña conditions.

Seasonal forecasts issued by various international institutions

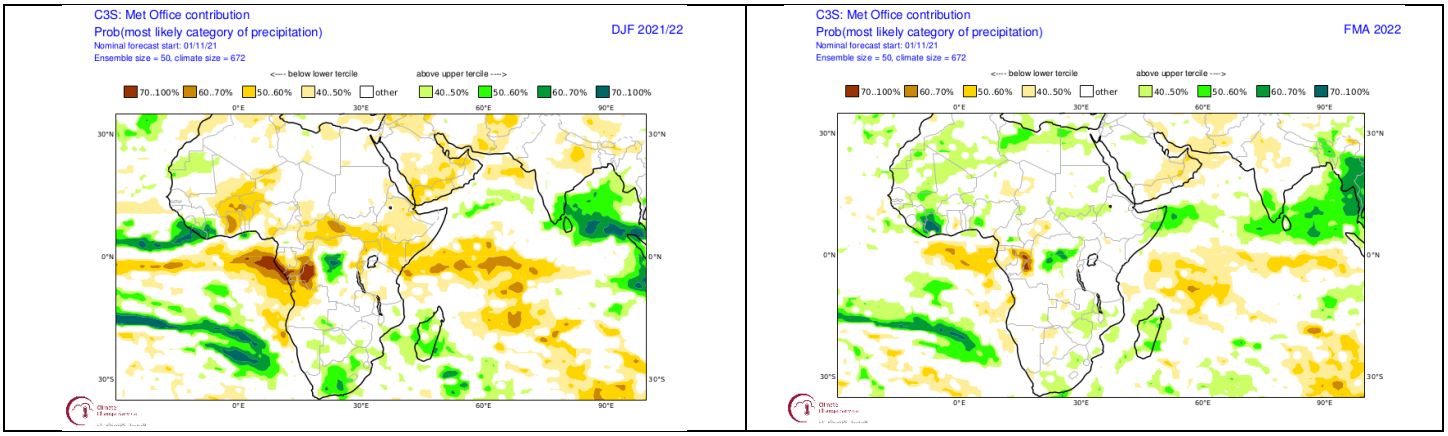
Seasonal forecasts by these institutions, as published by the COPERNICUS Programme (***https://climate.copernicus.eu/seasonal-forecasts***) for both mid-summer and late summer, reflect similar patterns with regards to rainfall for southern Africa as those by the IRI. The signal for relatively wet conditions over the summer rainfall region of South Africa is somewhat stronger for mid-summer than late summer (FMA). This is partly associated with the observed moderate La-Niña.



Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for mid-to-late-summer (December - February 2021/22; left) and late summer (February-April 2022; right) (Forecasts issued in 2021-11).



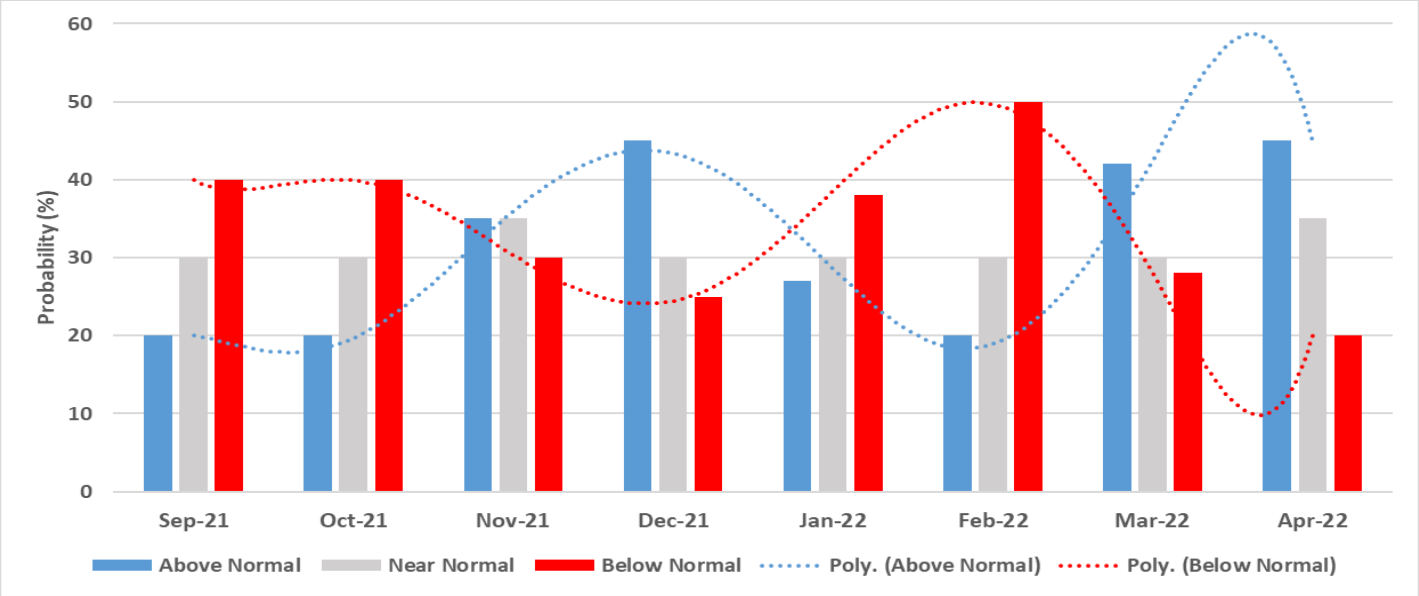
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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

CUMULUS seasonal outlook, based on decadal variability

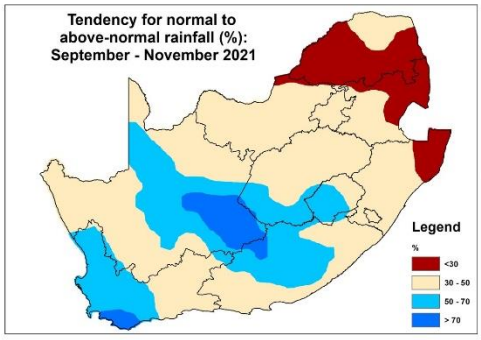
This outlook is based on the typical observed rainfall patterns over the ***north-eastern half*** of the country (including most of the summer grain production region), as associated with the cyclic variability of the global climate system. Summers that are similar to 2021/22 more often experience a seasonal rainfall curve that compares to normal conditions as indicated in the bar graph below, with wetter conditions focussing on December and March while drier than normal conditions focus on October and February:

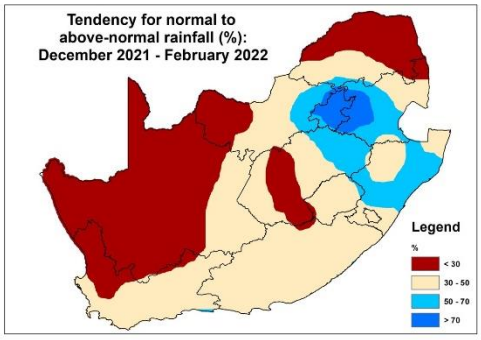


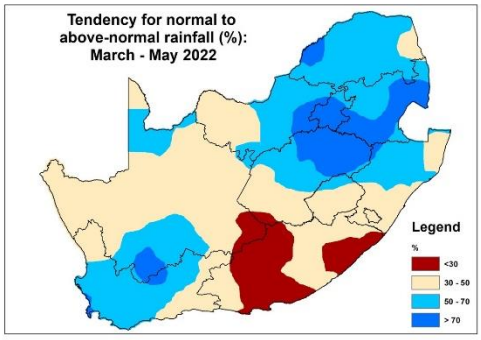
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2021 – April 2022 (Forecast issued in 2021-09).

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

- **September – 20 October:** Relatively dry conditions over the north-eastern half of the summer rainfall region
- **20 October – 20 November:** Near-normal rainfall over the north-eastern half of the summer rainfall region
- **20 November – 15 January:** Near-normal to above-normal rainfall over the north-eastern half of the summer rainfall region
- **15 January – late February:** Below-normal rainfall over the north-eastern half of the summer rainfall region
- **March - April:** Above-normal rainfall over the north-eastern half of the summer rainfall region



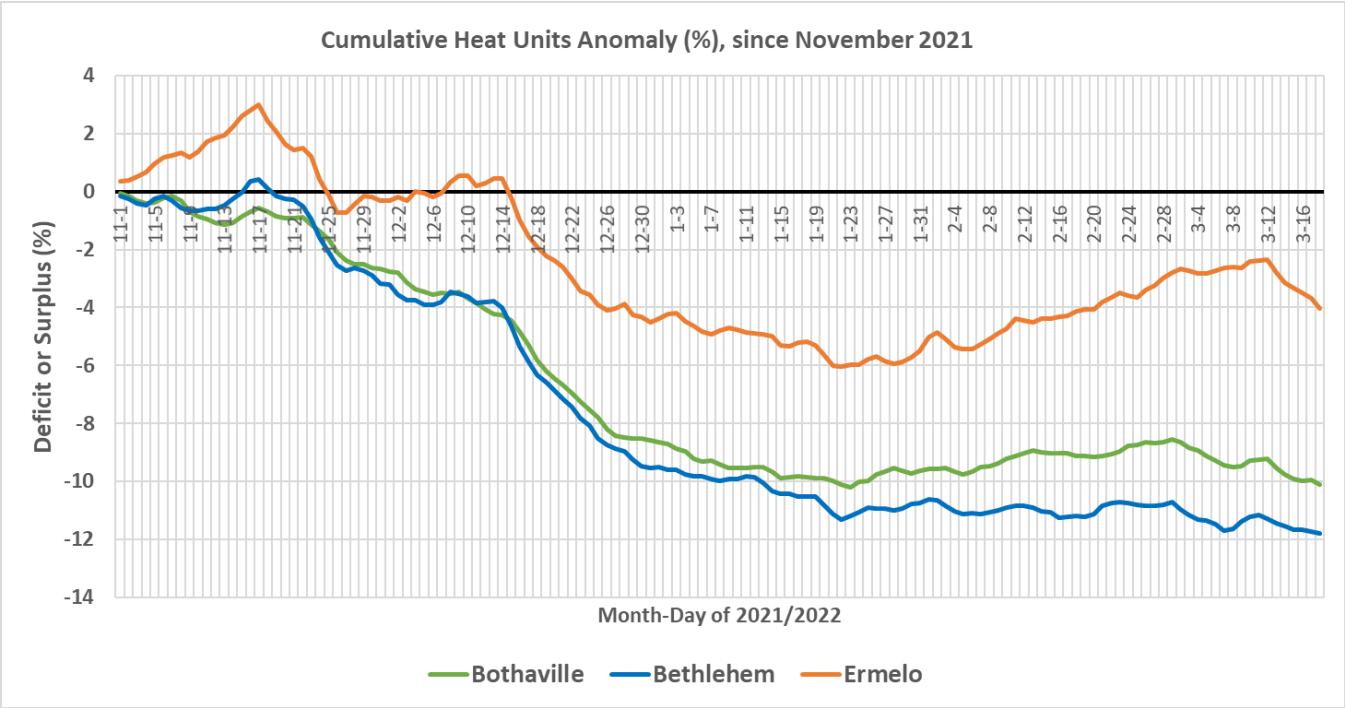




Typical patterns during summers analogous to 2021/22: Early summers during similar years tend to be relatively wet over the western parts of the country while drier than normal over the north-eastern parts of the country (map on the left). During December – February, relatively dry conditions tend to occur over the western and northern parts while rainfall tends to be above normal over parts of the eastern interior and into KZN (map in the centre). By late summer (March – May – map on the right), similar years tend to see above-normal rainfall over large parts of the summer rainfall region.

Observed conditions

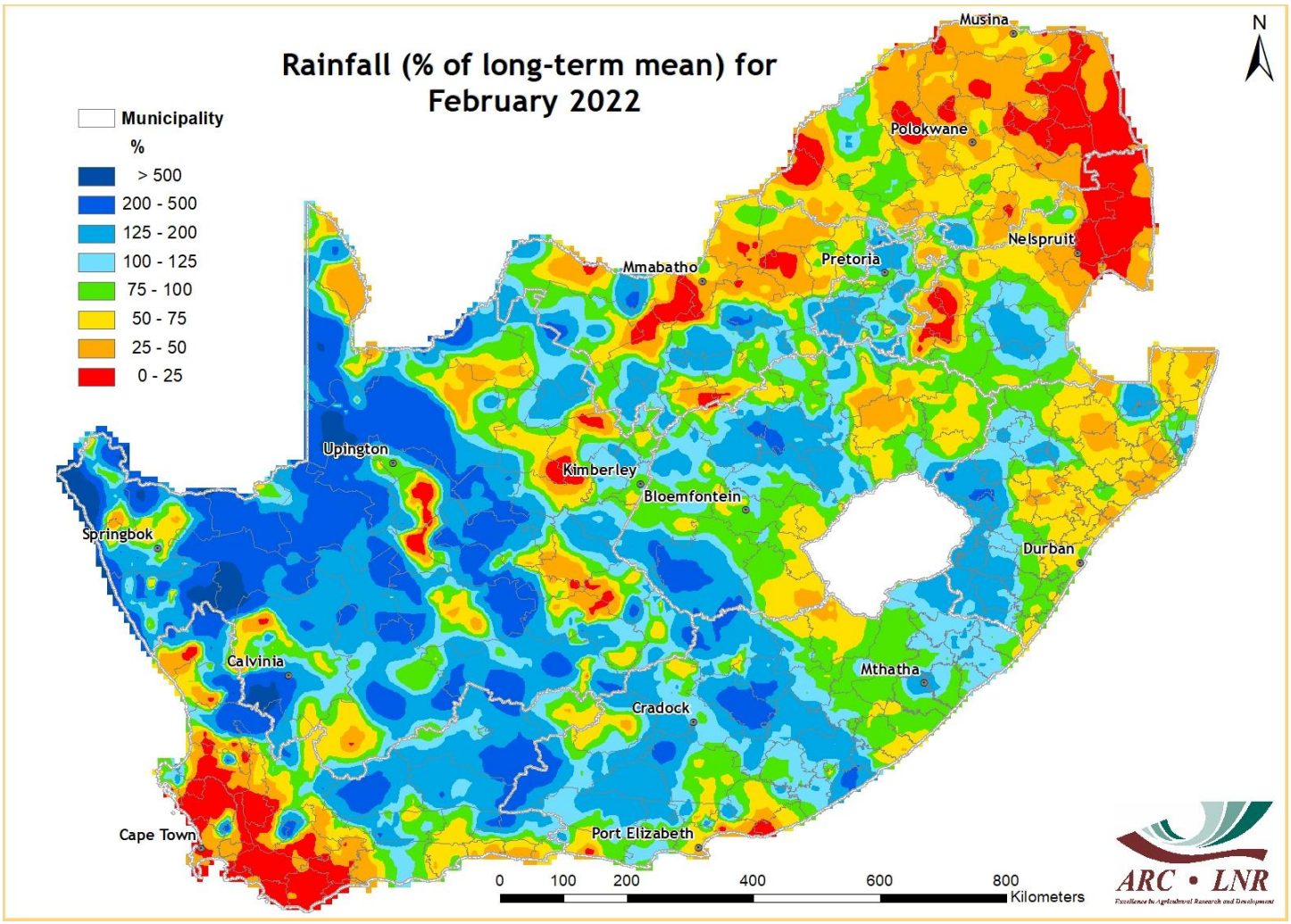
Heat Units: 1 November 2021 – 21 March 2022



Heat units have been less than the 2014 – 2020 norm the November – March period over the summer-grain production region due to long cloudy and rainy spells especially during December and early January. Given somewhat drier and warmer conditions during mid-January to February, deficits have decreased slightly, especially towards the north-eastern parts of the maize-production region. Since early March, cooler, wetter conditions have resulted in a further cumulative deficit over the entire production area.

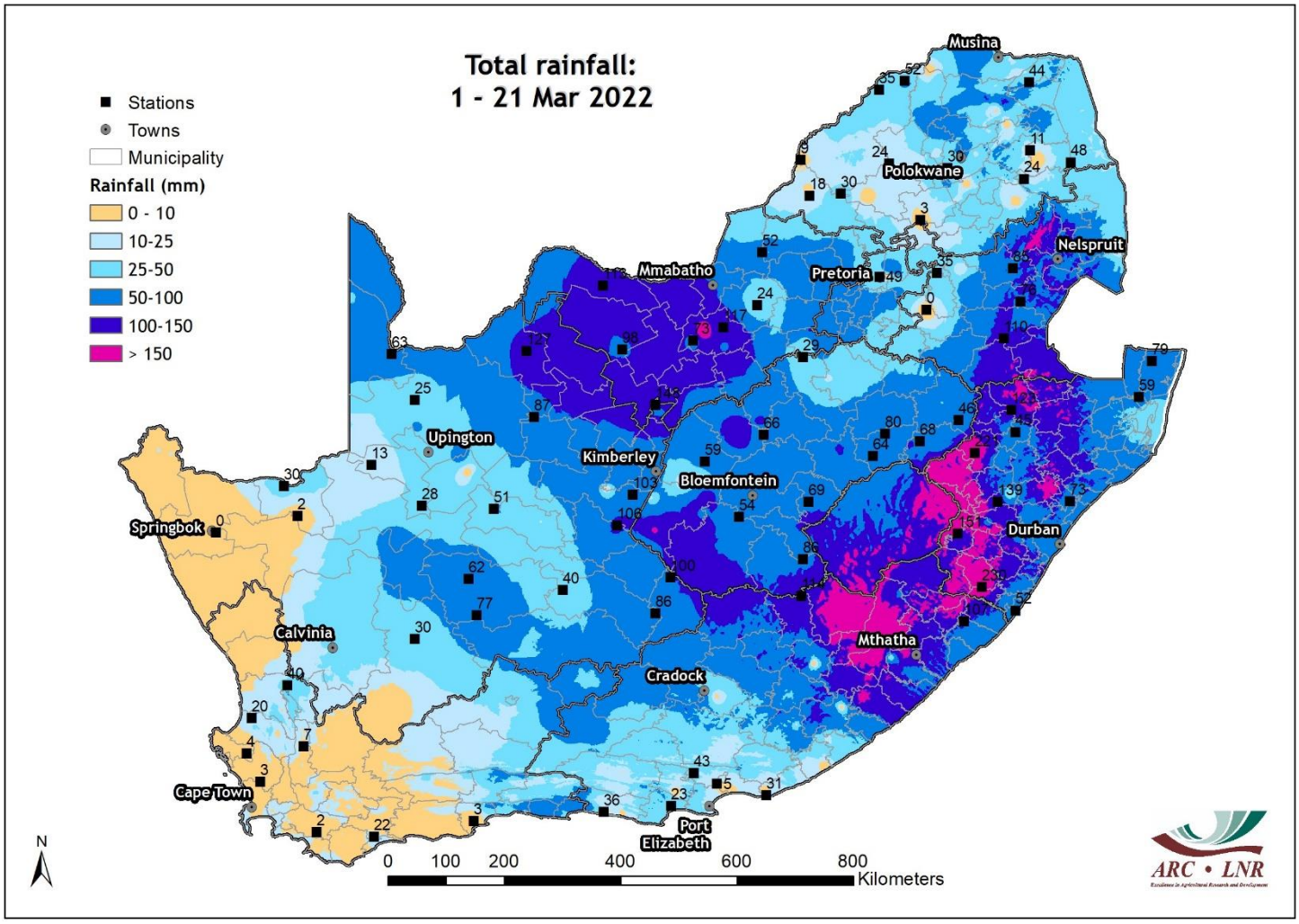
The graph shows the accumulated heat units during November 2021 until 21 March 2022, compared to the median value calculated over the 2014 – 2020 period, expressed as a percentage of the median value over the entire period. Largest negative anomalies are seen over the southern to central and western parts (around 10 – 15 %), with smaller deficits towards the northeast (Ermelo). The largest deficits occurred, at all three locations, during the mid-December to mid-January period, shown by the steeper downward slope in the graph. These deficits exceed 2 standard deviations for the same period during 2014 – 2020 at Bethlehem and Bothaville, and 1 standard deviation at Ermelo according to the recorded data.

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



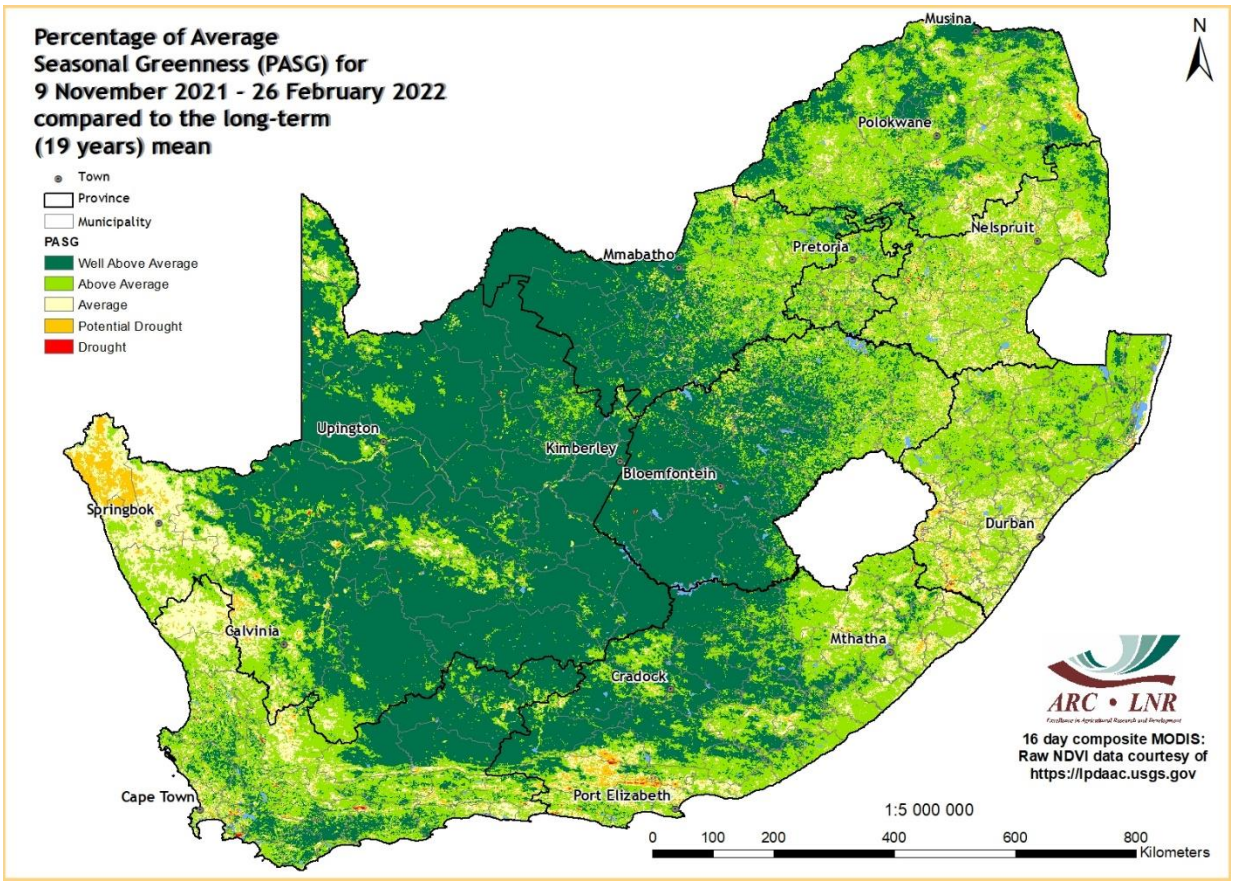
Rainfall was above average over the central to western interior during February, with relatively dry conditions over the winter rainfall region and Garden Route through to the coast of the Eastern Cape. The northeastern parts were relatively dry.

Rainfall (mm): 1 – 21 March 2022



Large of North West, the southern Free State, southeastern half of Mpumalanga and KZN received more than 100 mm of rain during the first 21 days of the month.

Percentage of Average Seasonal Greenness: November 2021 – 26 February 2022



Cumulative vegetation activity since November is largely above normal, especially over the central interior, reflecting the excellent weather conditions in support of 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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