

CUMULUS

**WE GET
AGRICULTURE'S
♥ BEAT**



16 February 2022

by J Malherbe, R Kuschke

Contents

Summary.....	3
Overview of expected conditions over the main agricultural production areas.....	4
Daily summary of expected conditions.....	5
Medium term rainfall and temperature summary.....	7
Possible extreme conditions - relevant to agriculture.....	8
Seasonal forecast	9
Seasonal forecasts issued by various international institutions	11
CUMULUS seasonal outlook, based on decadal variability	12
Observed conditions	13
Heat Units: 1 November 2021 – 10 February 2022.....	13
Rainfall (% of long-term mean): January 2022.....	14
Rainfall (mm): 1 – 15 February 2022	15
Percentage of Average Seasonal Greenness: October 2021 – 9 January 2022.....	16
Sources of information	17



Photo credit: R Pienaar

Summary

Isolated to scattered thundershowers while drying trend continues

Isolated to scattered thundershowers occurred during the last few days over the central to western parts of the country, with somewhat more widespread (and in cases severe) thundershowers towards the south. Over the summer-grain production region, thundershowers concentrated on the southern to central parts, mostly from the southeastern Free State into southern North West and occurred for the most part on Monday (14th). Thundershowers that were expected over the Mpumalanga didn't materialize, a sign of a trend towards drier conditions that has been present through much of the period since January.

Generally speaking, most of the summer rainfall region remains under the influence of an upper-air high pressure system. Upper-air systems in support of rainfall currently focus on the western and southern parts of the country. Isolated to scattered thundershowers are expected to remain in place over the interior for the most part during the next few days, with little to no indication of widespread rainfall or long cloudy spells, due to the unfavorable large-scale pattern. While it is expected to remain relatively warm over the interior, there are no indications currently of heat-wave conditions in the near future over the summer-grain production region, except possibly the far western parts of the region by next week.

The unfavorable large-scale atmospheric circulation pattern is expected to continue into next week, and should keep the tropical cyclone present in the southwest Indian Ocean towards the east of the subcontinent according to current forecasts, enhancing the very welcome drier, warmer conditions.

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

- **General:**

- Temperatures will be near normal to slightly above-normal for this time of the year.
- Rainfall will be below normal over most of the country, but near normal over the Eastern Highveld and KZN according to current forecasts.
- Isolated to scattered thundershowers are expected over the interior at times, with distribution reaching a maximum by the weekend. Current forecasts indicate drier conditions by early next week.
- The summer-grain production region should receive isolated thundershowers on most days, becoming scattered over the central to eastern parts of the region, clearing early next week.
- Strong to gale-force southeasterlies are expected in the southwest, especially early in the period.
- Temperatures over the summer-grain production area will remain somewhat higher than earlier this summer:
 - Maximum temperatures over the eastern maize-production areas will be in the order of 25 – 31°C. Minimums will be in the order of 12 – 16°C.
 - Maximum temperatures over the western maize-production region will range between 29 and 35°C, with a warming trend and highest temperatures towards the southwest. Minimums will be in the order of 14 – 18°C.

Overview of expected conditions over the main agricultural production areas

With a high-pressure system present in the upper air for most of the time, it is expected to be relatively dry over most areas. Isolated to scattered thundershowers are expected in many areas, but cloudy spells with general rains should be absent during the period. Temperatures should gradually increase during this period over the interior.

Maize production region: Sunny to partly cloudy and warm conditions with isolated to scattered thundershowers on most days are expected, with drier conditions expected early next week according to current forecasts:

- Maximum temperatures over the eastern maize-production areas will be in the order of 25 – 31°C. Minimums will be in the order of 12 – 16°C.
- Maximum temperatures over the western maize-production region will range between 29 and 35°C, generally becoming warmer through the period, especially in the southwest. Minimums will be in the order of 14 – 18°C.
- **Wednesday (16th):** Partly cloudy and mild. Isolated to scattered thundershowers are expected over the southern and western parts, and over the Eastern Highveld.
- **Thursday to Sunday (17th to 20th):** Partly cloudy and warm with scattered thundershowers.
- **Monday and Tuesday (21st, 22nd):** Partly cloudy and warm to hot in the west. Current forecasts favour relatively dry conditions, with only isolated thundershowers towards the north and east.

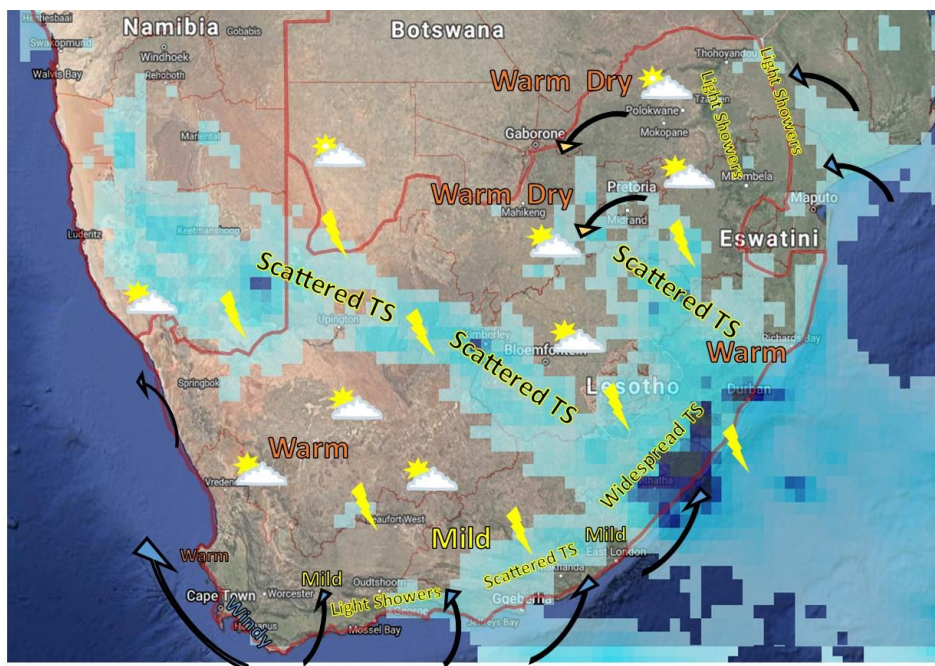
Cape Wine Lands and Ruens: Very hot conditions initially will make way for cooler conditions towards the weekend and next week according to current forecasts. It will be dry for the most part, but some thundershowers may occur especially towards the interior especially by Saturday according to current forecasts:

- Strong south-easterlies to easterlies are expected in the south until **Friday (18th)**.
- It will be hot over the Swartland, West Coast and western Karoo until **Saturday (19th)**.
- It will be cool along the garden Route, with showers initially. There will be a warming trend through the period.
- Isolated thundershowers may occur especially over the northern parts (and West Coast) into the Karoo on **Saturday (19th)** according to current forecasts.

Daily summary of expected conditions

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

Wednesday, 16 February



Scattered thundershowers in a band from southern Namibia to the Eastern Cape, including the southern Free State.

Scattered thundershowers over the Eastern Highveld.

Light showers along the Garden Route

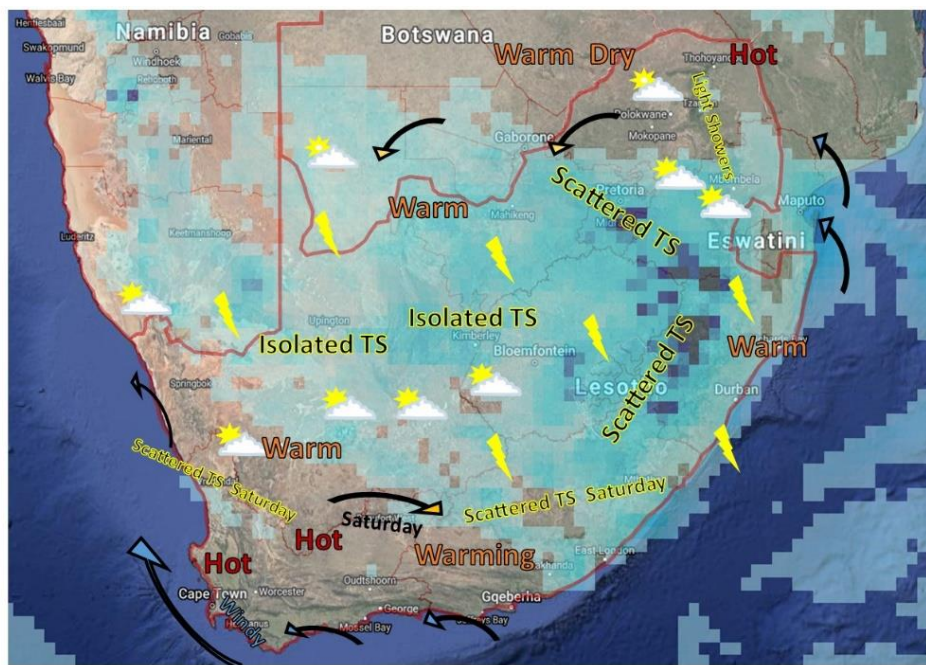
Showers over the mountainous southern parts of the Eastern Cape.

Scattered to widespread thundershowers over the northeastern Eastern Cape, moving into KZN.

It will be partly cloudy and warm over most parts, but mild in the south.

Strong southeasterlies in the southwest.

Thursday to Saturday, 17 - 19 February



Warm with isolated to scattered thundershowers over most areas.

Scattered thundershowers over the eastern areas, especially Eastern Highveld and Drakensberg.

Scattered thundershowers over the northern parts of the Western Cape and most of the Eastern Cape by Saturday.

It should be dry over much of Limpopo.

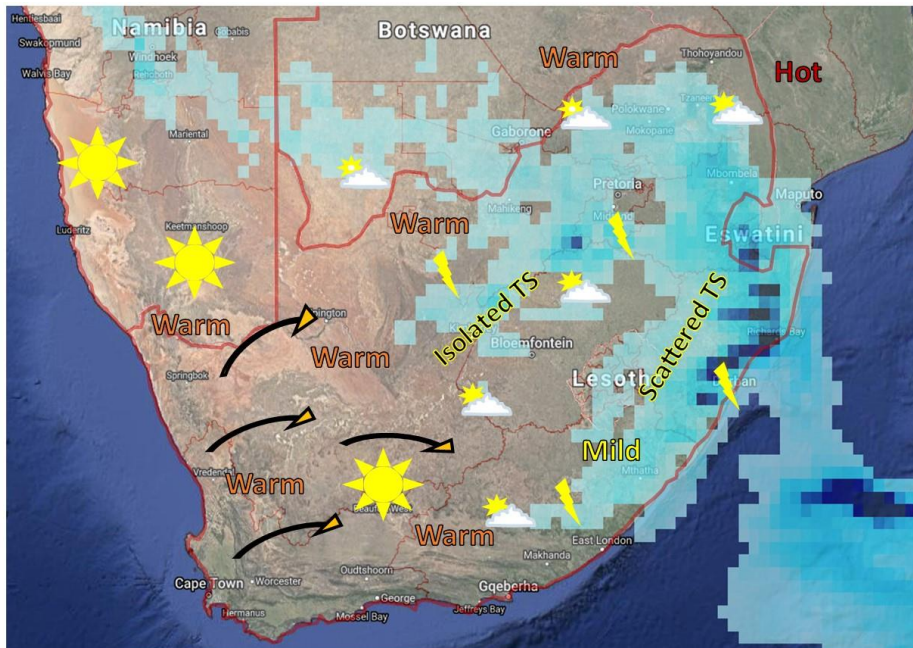
It will become hot over the southwestern to southern interior.

It will be hot in the Lowveld of Limpopo.

It will become windy over the southern interior by Saturday.

Strong southeasterlies in the southwest until Friday.

Sunday, 20 February



Warm over most areas

Isolated to scattered thundershowers should shift to the northeastern half of the country, clearing over the southwestern half.

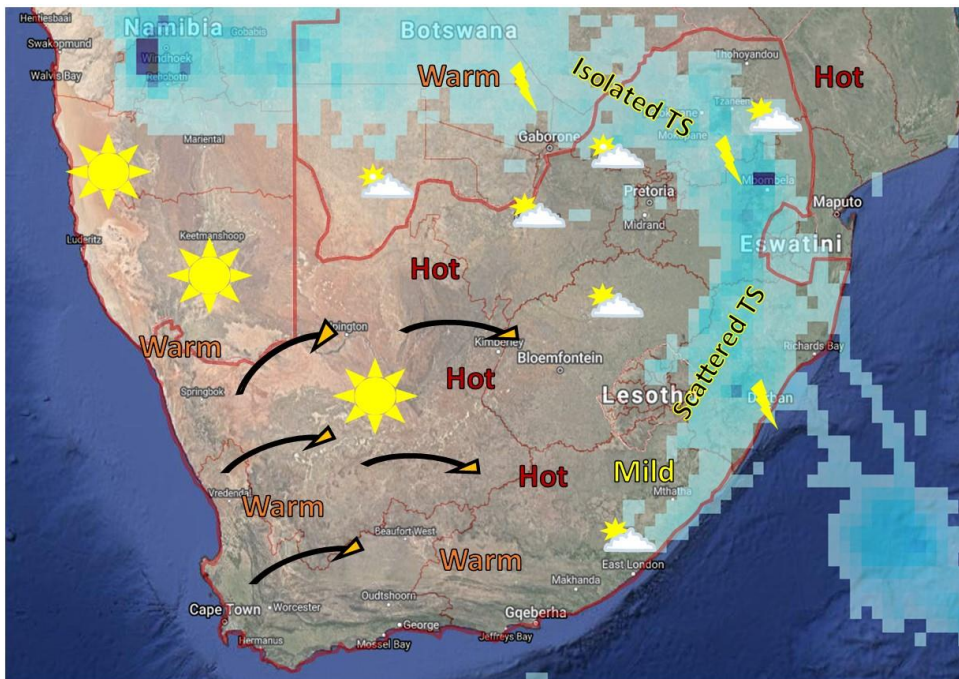
Scattered thundershowers expected over KZN and southern Mpumalanga.

Sunny and dry over the western to southern interior, with westerly winds.

The southwestern parts will be somewhat cooler.

It will be hot in the Lowveld.

Monday – Tuesday, 21-22 February



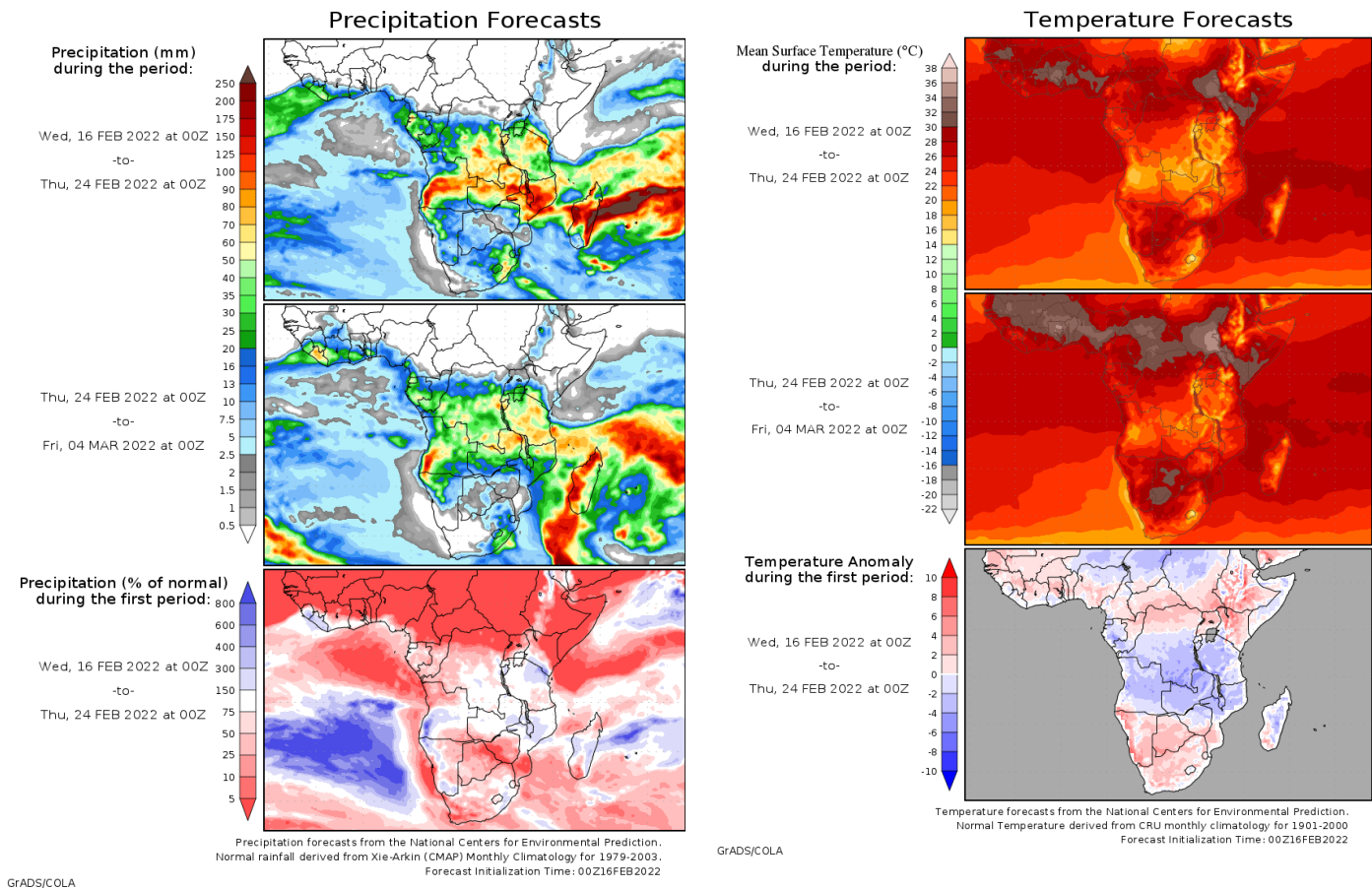
Isolated thundershowers should contract to the far northern and eastern parts, with very isolated activity possible towards the central parts.

Sunny, dry and warm over much of the southern to western and central parts, with westerly winds.

It may become hot over the central to northwestern interior.

It will be hot over the Lowveld.

Medium term rainfall and temperature summary



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 16 February) 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 the Lowveld **most of the time**, especially the northern areas.
 - Over the western Karoo and southwestern parts, especially the Swartland, **Thursday to Saturday (17th -19th)**.
 - Over the southern interior, especially on **Friday and Saturday (18th, 19th)**.
- Thundershowers may become severe, especially:
 - Eastern Cape and southern KZN (**Wednesday, 16th**).
- Hot, dry and windy conditions over the southwestern parts **on most days until Saturday (19th)** may be conducive to the spread of wild fires where vegetation is dry.

Seasonal forecast

Because seasonal forecast systems consider Sea Surface Temperatures (SSTs) as a major factor to predict coming conditions, it is worthwhile to take note of current SST anomalies. In general, current patterns reflect anomalies usually associated with higher rainfall than the norm over southern Africa – and lower rainfall over Equatorial East Africa. Most importantly, these include:

- Anomalously cool SSTs over the central to eastern equatorial parts of the Pacific Ocean. These are at La Niña thresholds and indicative of a weak La Niña in progress.

Given the current SST anomaly patterns across the Globe, seasonal forecasts from most international institutions favor La-Niña-like rainfall patterns over sub-Saharan Africa. These include anomalously wet conditions expected over the summer rainfall region of South Africa for most of the summer, with the temperature outlook calling for normal to below-normal maximum temperatures, associated with the expected wetter conditions and more extensive cloud cover than normal.

More recently, seasonal forecasts for southern Africa for the remainder of summer have drifted towards a drier outlook.

The Australian Bureau of Meteorology points out that La Niña conditions are present.

(Updated 15 February): Climate models and observations suggest the 2021–22 La Niña has peaked, and will most likely return to neutral El Niño–Southern Oscillation (ENSO) (neither La Niña nor El Niño) during the southern hemisphere autumn.

Atmospheric and oceanic indicators remain at La Niña levels, but have likely peaked in strength. While eastern tropical Pacific sea surface temperatures remain cooler than average, beneath the surface, waters in the central and eastern Pacific are now warming. These changes in the sub-surface typically foreshadow a breakdown in a La Niña event, which normally occurs in the southern autumn. In the atmosphere, decreased cloudiness along the Date Line, strengthened trade winds in the western Pacific and a positive Southern Oscillation Index (SOI) reflect a mature La Niña.

The Southern Annular Mode (SAM) is neutral, and is forecast to remain neutral over the coming three weeks. A neutral SAM has little influence on Australian climate.

.....*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.

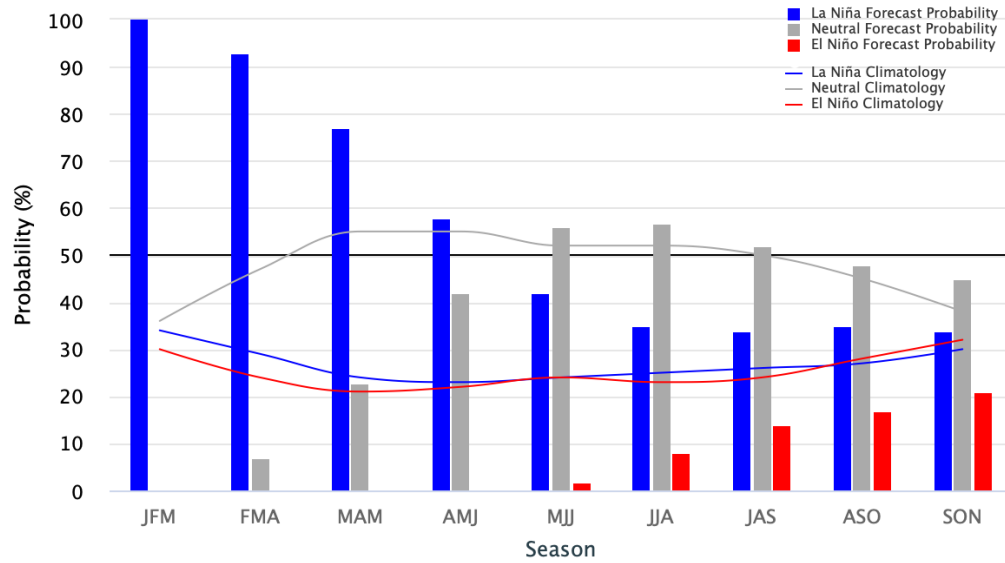
The International Research Institute for Climate and Society (IRI) also expects La Niña conditions to strengthen.

According to the IRI (Updated 10 February): In mid-January, Sea Surface Temperatures remain below-normal in the central-eastern equatorial Pacific. The evolution of key oceanic and atmospheric variables is consistent with weak La Niña conditions, and therefore, a La Niña Advisory remained in place for Jan 2022.

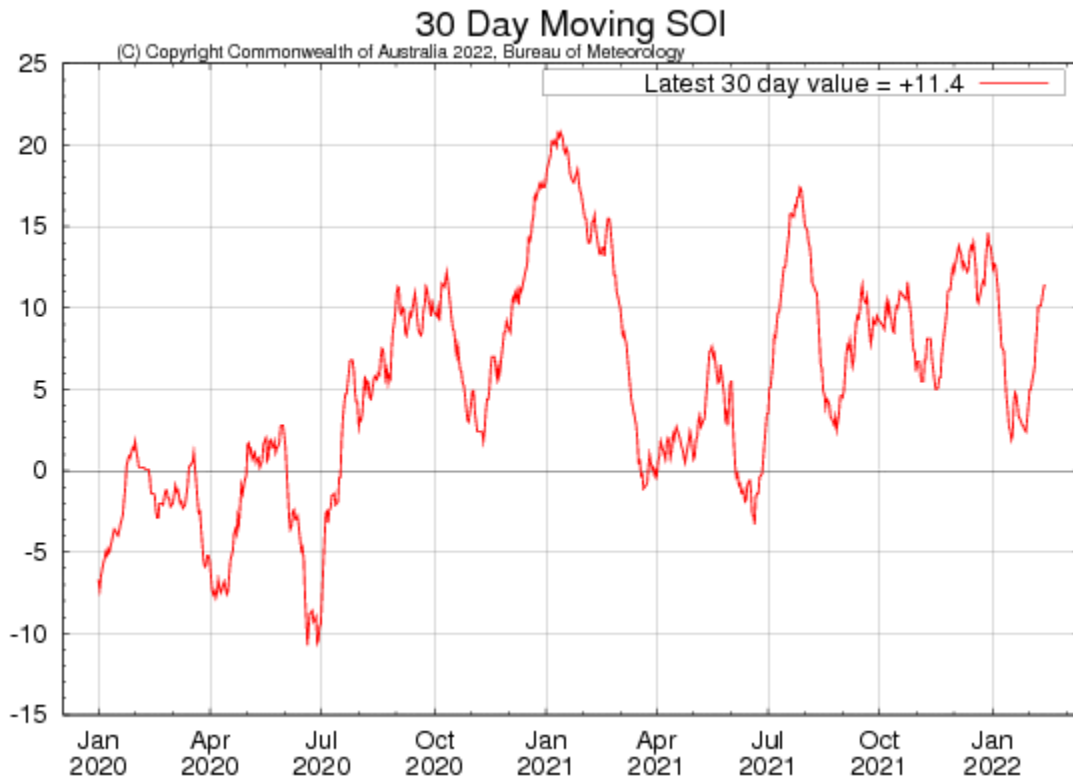
A large majority of the models in the plume predict SSTs to stay below-normal to the level of a La Niña till Mar-May, and then return to ENSO-neutral levels. Similar to the most-recent official CPC/IRI ENSO Outlook issued on January 13, 2022, this objective model-based ENSO outlook also predicts a continuation of the weak La Niña event with high probability during Jan-Mar and Feb-Apr..... *International Research Institute for Climate and Society*- <http://iri.columbia.edu/>

Early-February 2022 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: -0.5°C to 0.5°C



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

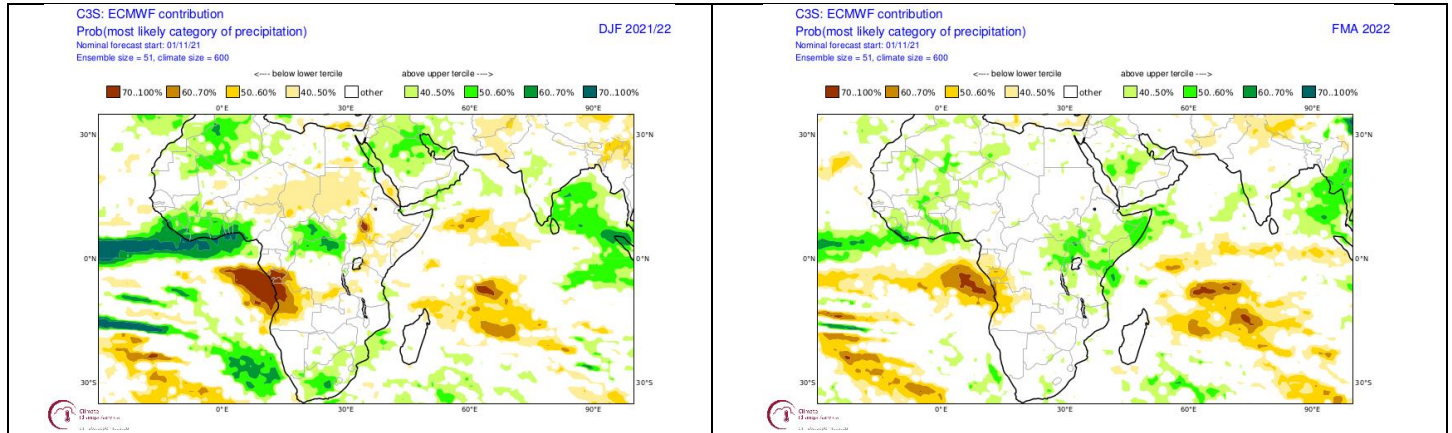


Australian Bureau of Meteorology - <http://www.bom.gov.au>

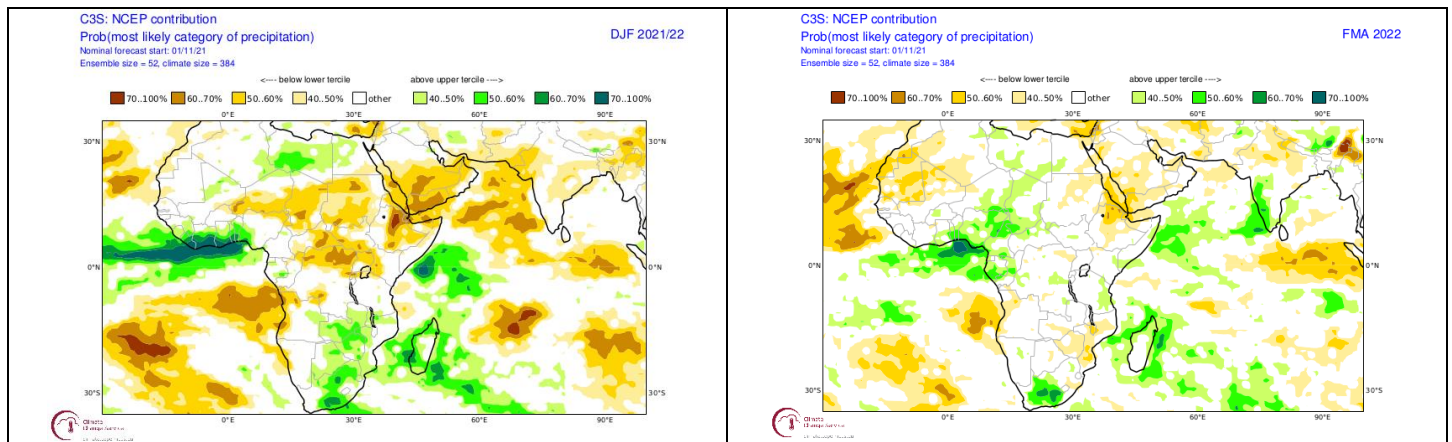
The Southern Oscillation Index is in positive territory (+11.4). This is indicative of atmospheric circulation patterns reflecting La Niña conditions.

Seasonal forecasts issued by various international institutions

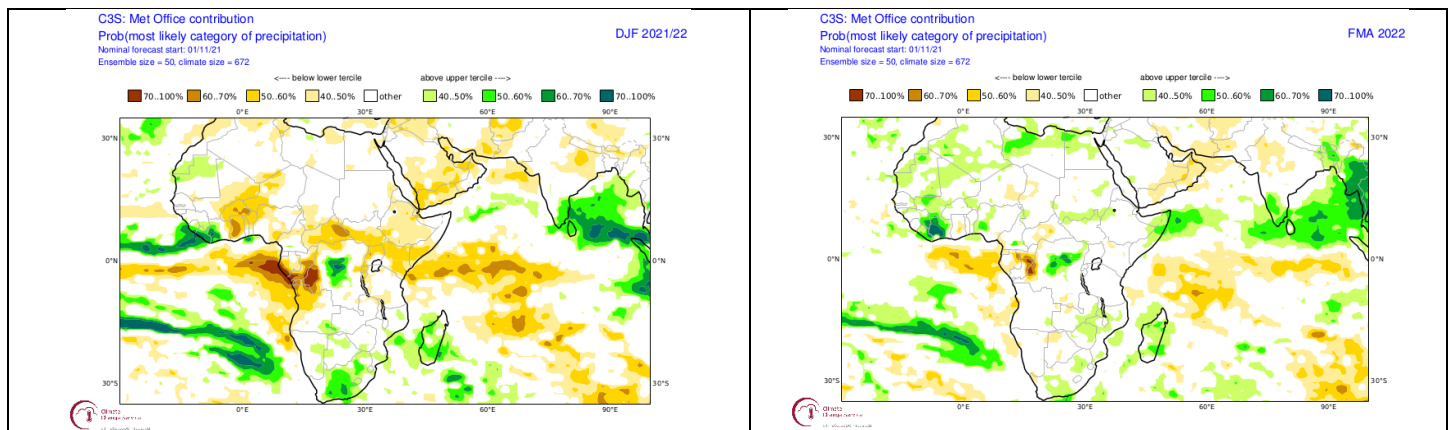
Seasonal forecasts by these institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) for both mid-summer and late summer, reflect similar patterns with regards to rainfall for southern Africa as those by the IRI. The signal for relatively wet conditions 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).



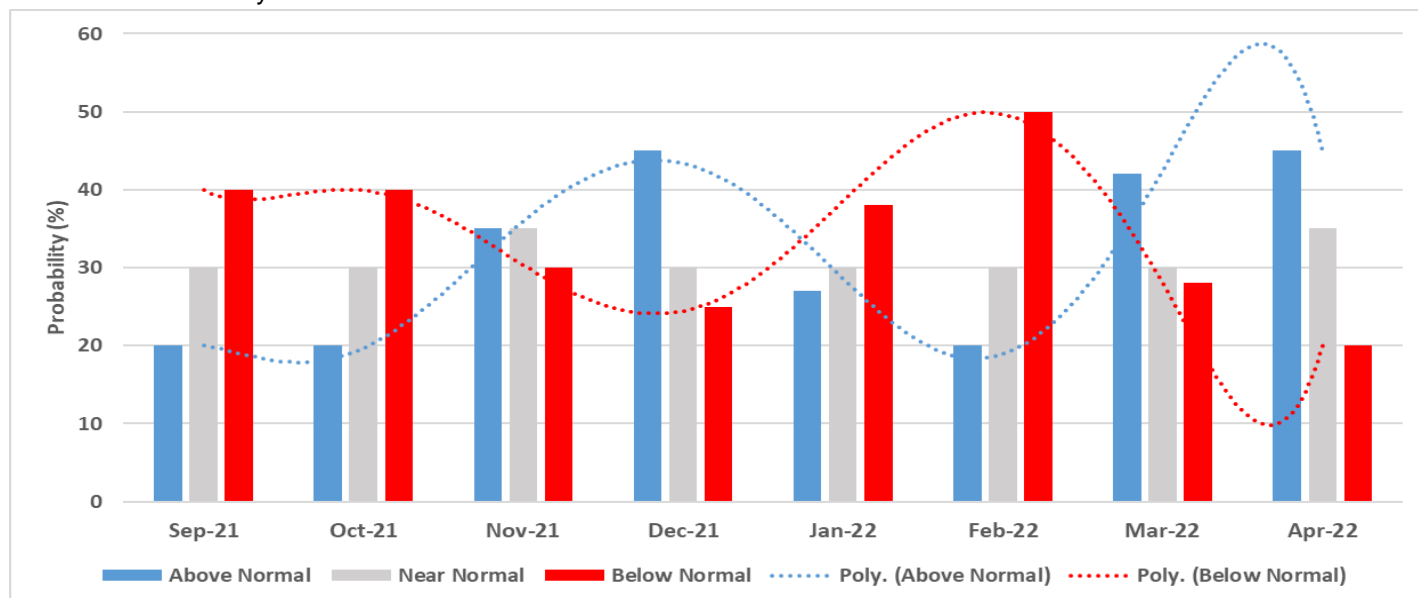
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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

CUMULUS seasonal outlook, based on decadal variability

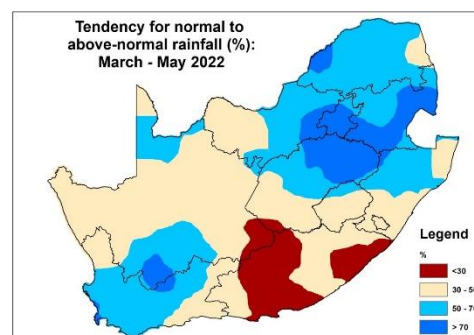
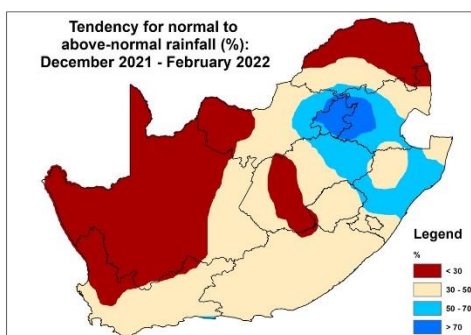
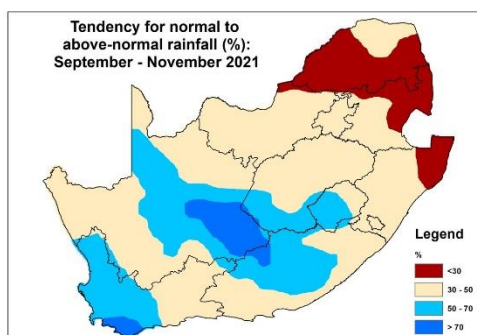
This outlook is based on the typical observed rainfall patterns over the **north-eastern half** of the country (including most of the summer grain production region), as associated with the cyclic variability of the global climate system. Summers that are similar to 2021/22 more often experience a seasonal 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:

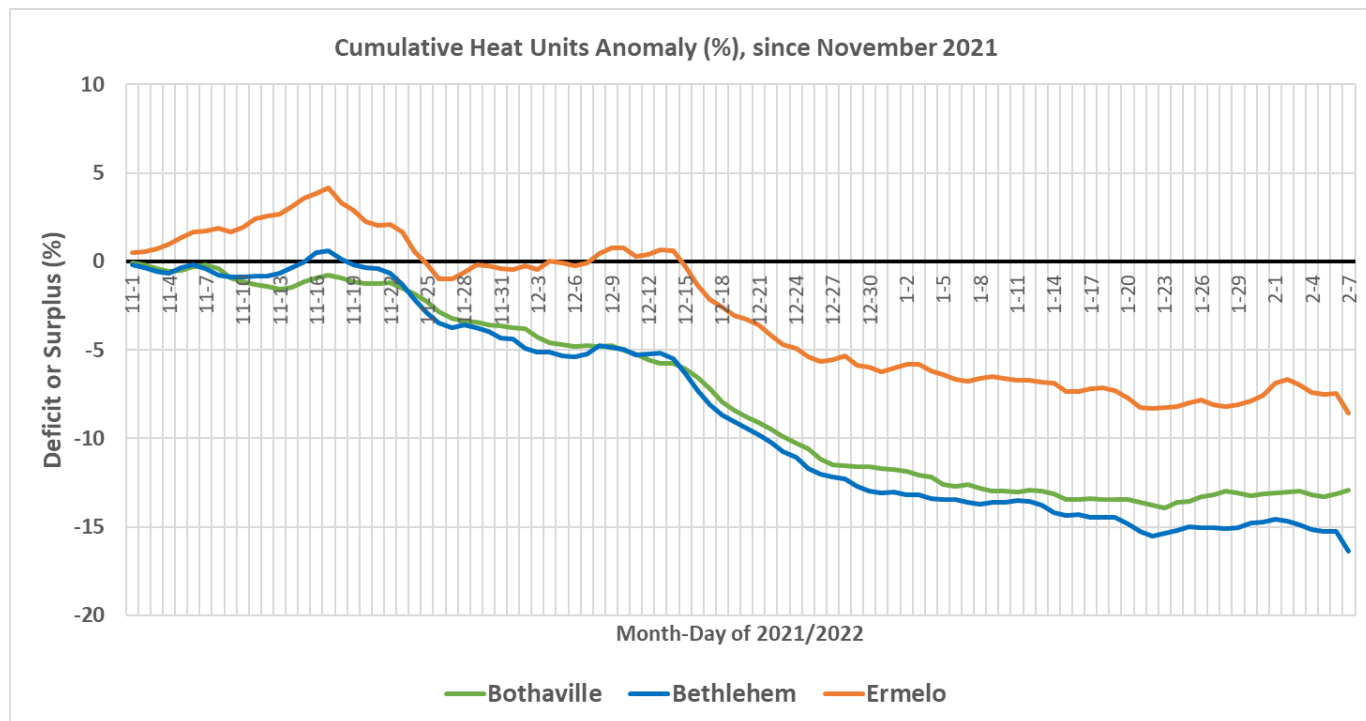
- **September – 20 October:** Relatively dry conditions over the north-eastern half of the summer rainfall region
- **20 October – 20 November:** Near-normal rainfall over the north-eastern half of the summer rainfall region
- **20 November – 15 January:** Near-normal to above-normal rainfall over the 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.

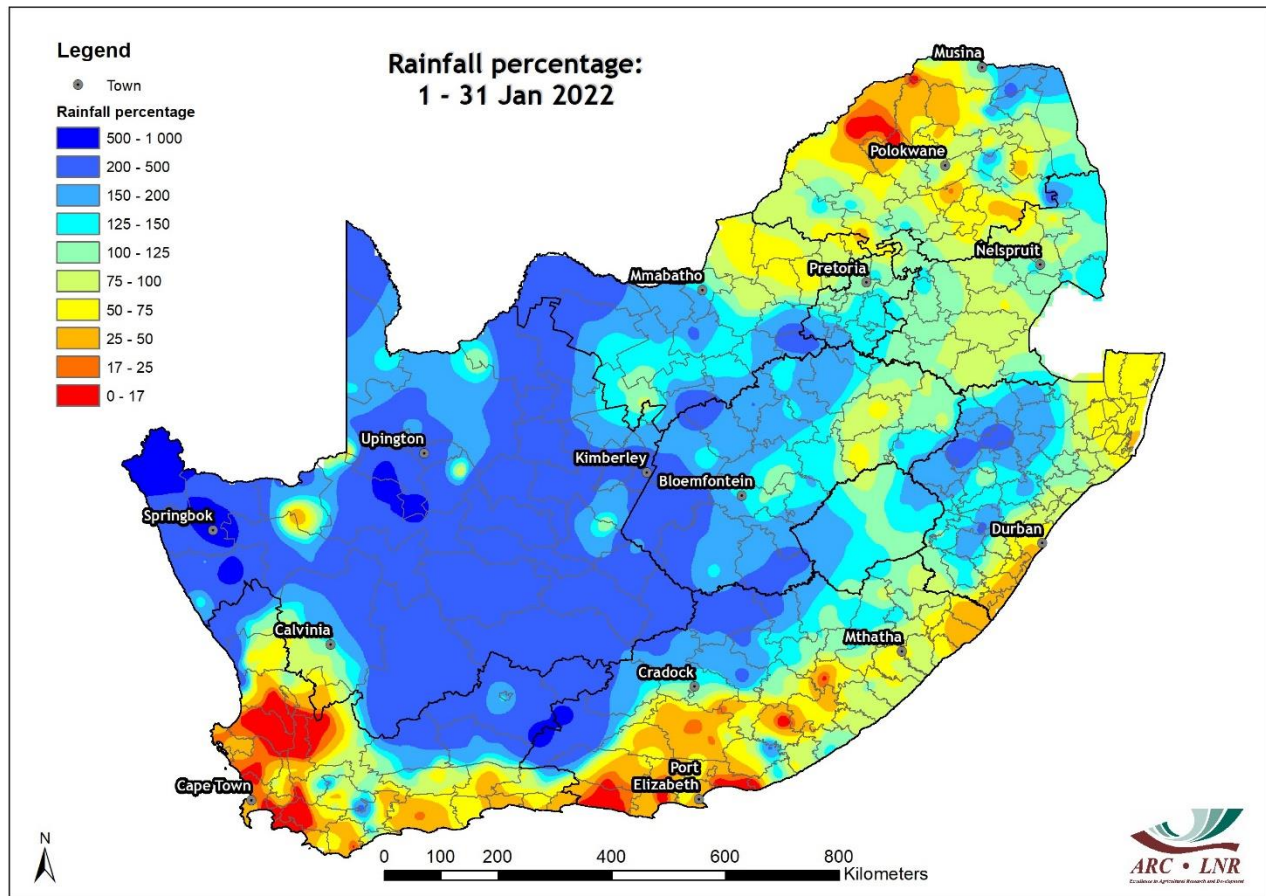
Observed conditions

Heat Units: 1 November 2021 – 10 February 2022



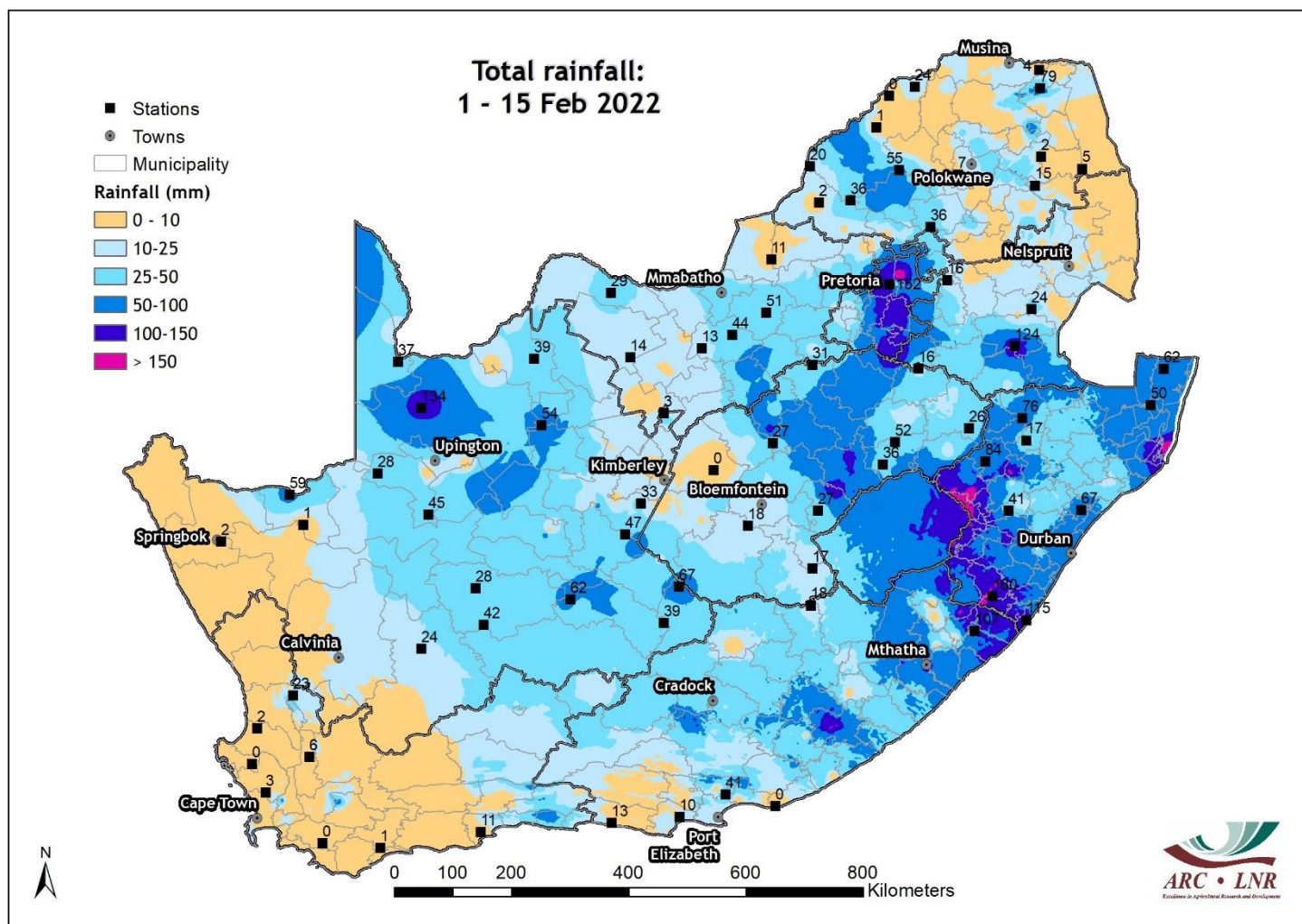
Heat units have been less than the 2014 – 2020 norm the November – early February period over the summer-grain production region due to long cloudy and rainy spells. The graph shows the accumulated heat units during November 2021 until February 2022, compared to the median value calculated over the 2014 – 2020 period, expressed as a percentage of the median value. 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): January 2022



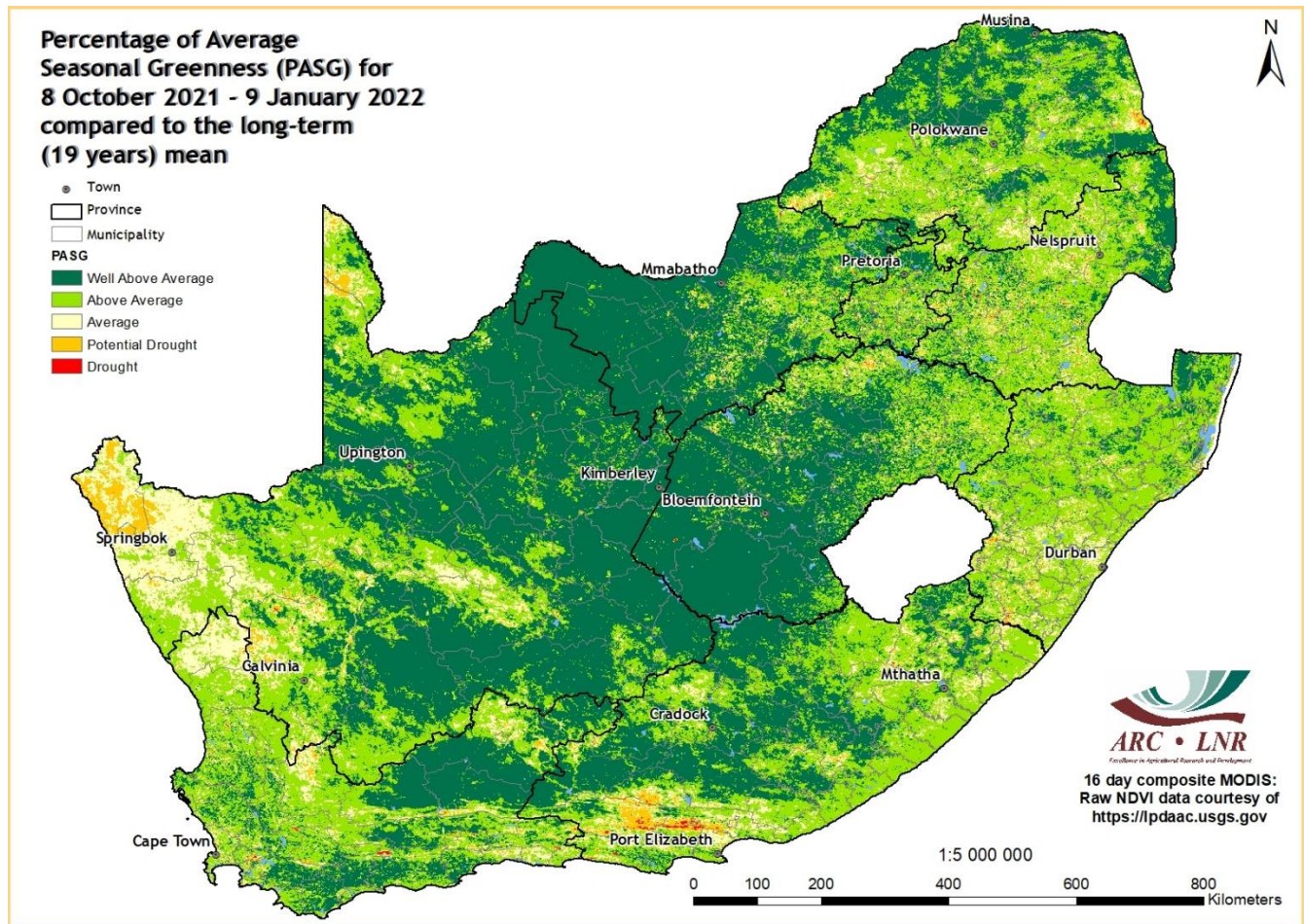
Rainfall was above average over especially the central to western interior during January, with relatively dry conditions over the winter rainfall region and Garden Route through to the coast of KZN as well as the northeastern parts.

Rainfall (mm): 1 – 15 February 2022



Rainfall during the first 15 days of February was unevenly spread, with rainfall exceeding 100 mm in isolated areas over Gauteng, southern Mpumalanga, along the Drakensberg and coast of KZN together with the northern parts of the Northern Cape. The northern and western parts of North West and most of Limpopo received less than 25 mm of rain.

Percentage of Average Seasonal Greenness: October 2021 – 9 January 2022



Cumulative vegetation activity since late October 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/dontom/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.