CUMULUS

2 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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Contents

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Summary

Wetter conditions returning to the interior

February turned out to be generally drier over many areas. Precipitation was mainly in the form of thundershowers, sometimes severe, while the long cloudy and rainy spells of earlier this summer was largely absent during the month. While upper-air high-pressure systems dominated the circulation across the interior during most of February, a significant upper-air trough is expected to develop over the western parts during the rest of the week, bringing much more favorable conditions for widespread rainfall and cloudy, cool spells over especially the central to southeastern parts. The next few days will therefore see a return of somewhat more widespread rainfall to the interior, focusing on the central parts, with more abundant cloud cover. Scattered to widespread showers and thundershowers are expected over these parts until the weekend. Rainfall however should be largely absent over the northeastern parts, including the eastern parts of the maize production region, while the western production areas should see relatively high rainfall totals.

The cloudy, cooler conditions will result in below-normal temperatures over the summer-grain production areas, but the northeastern and western parts of the country will be relatively warm.

There will be some frontal activity initially over the southwestern parts, with showers especially towards the south. Through the period, the southwestern interior should become warmer to hot, event though thundershowers may spread into the western interior during the weekend.

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

- **General:**
  - Temperatures will be normal to below normal over the central parts, including the western summer-grain production areas.
  - Temperatures will on average be normal to above normal over the western and northeastern parts of the country, including the eastern summer-grain production areas in Mpumalanga.
  - Rainfall will be above-normal over the central to southeastern and eastern parts of the country.
  - Below-normal rainfall is expected over most of Limpopo and Mpumalanga.
  - Below-normal rainfall is also expected over much of the western to southwestern interior.
  - Widespread showers and thundershowers are expected over the central to southeastern parts during the remainder of the current week, associated with cloudy and mild to cool spells.
  - A cold front will bring some precipitation to the southern parts of the winter rainfall region initially.
  - Current forecasts indicate drier conditions dominating from the west by early next week, with some thundershowers possible in the northeast.
  - Strong to gale-force southeasterlies are expected in the southwest on most days from Friday (4th) onwards.
  - Temperatures over the summer-grain production area will be somewhat lower than during late February, especially during day time:
    - Maximum temperatures over the eastern maize-production areas will be in the order of 24 – 31°C. Minimums will be in the order of 10 – 18°C.
    - Maximum temperatures over the western maize-production region will range between 20 and 32°C, with coolest conditions during the rainy conditions on Friday and Saturday. Minimums will be in the order of 15 – 19°C.

Overview of expected conditions over the main agricultural production areas

With the upper-air trough over the western parts during the remainder of the week, a significant period will see cloudy and cooler conditions with scattered to widespread showers or thundershowers over the central to southeastern parts of the country. A frontal system, associated with the developing upper-air trough in the west, will initially make its presence felt over the winter rainfall region. It should clear from the west early next week, when anti-cyclonic circulation will once again start to dominate.

Maize production region: Cloudy spells with widespread showers and thundershowers will occur over the central to western parts until the weekend. The northeastern parts should be mild to warm with only isolated thundershowers. It wil clear from the west early next week, when some thundershowers are possible in the northeast:

- Maximum temperatures over the eastern maize-production areas will be in the order of 24 – 31°C. Minimums will be in the order of 10 – 18°C.
- Maximum temperatures over the western maize-production region will range between 20 and 32°C, with coolest conditions during the rainy conditions on Friday and Saturday. Minimums will be in the order of 15 – 19°C.

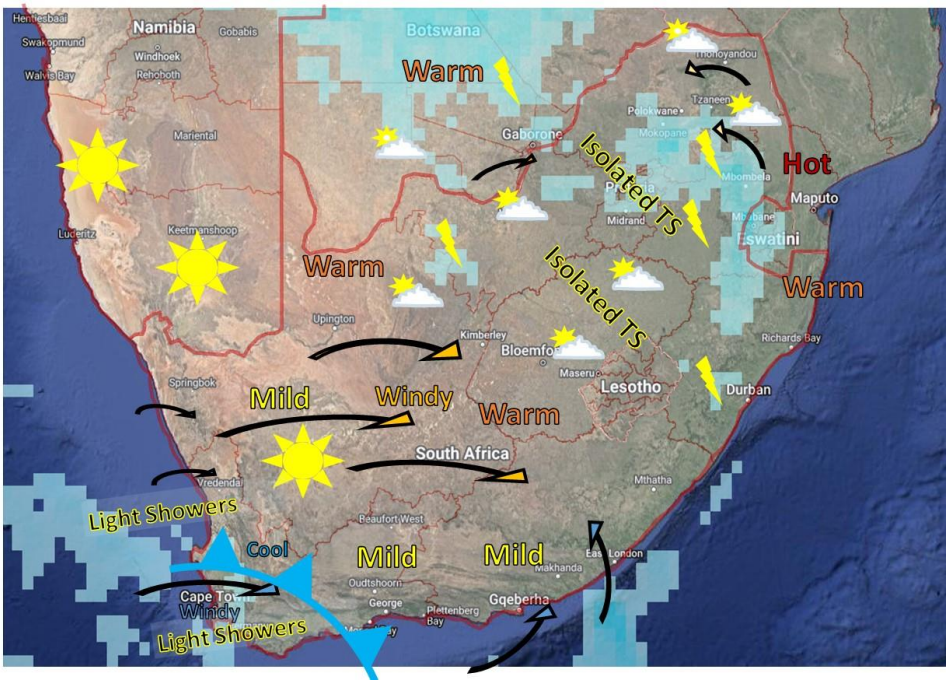
- **Wednesday (3rd)**: Partly cloudy and warm. Isolated thundershowers are expected over the central to eastern areas.
- **Thursday - Saturday (3rd – 5th)**: Partly cloudy to cloudy and mild with widespread showers and thundershowers over the central to western parts. The north-eastern parts will be partly cloudy to cloudy and mild to warm, with only isolated thundershowers expected.
- **Sunday - Monday (6th – 7th)**: Partly cloudy with scattered thundershowers over the central to western parts. It will be sunny to partly cloudy and warm over the eastern parts with little to no rain according to current forecasts.
- **Tuesday (8th)**: Dry in the west, but partly cloudy and warm with isolated thundershowers over the central to eastern parts.

Cape Wine Lands and Ruens: The period will start out relatively cool, with light showers on **Wednesday (2nd)** due to a cold front moving through. A southerly on-shore flow will also result in light showers in the south along the Garden Route according to current forecasts by **Friday (4th)**. It will gradually become warmer over the region, with hot conditions dominating over most of the region from **Saturday (5th) until Monday (7th)** when it should become cooler in the south with light showers possible along the Garden route until **Tuesday (8th)**. Some thundershowers may move into the interior regions on **Sunday (6th)**, especially the northeastern parts. Except for westerly winds initially, strong south-easterlies are expected according to current forecasts on several days in the southwest.

Daily summary of expected conditions

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

Wednesday, 2 March



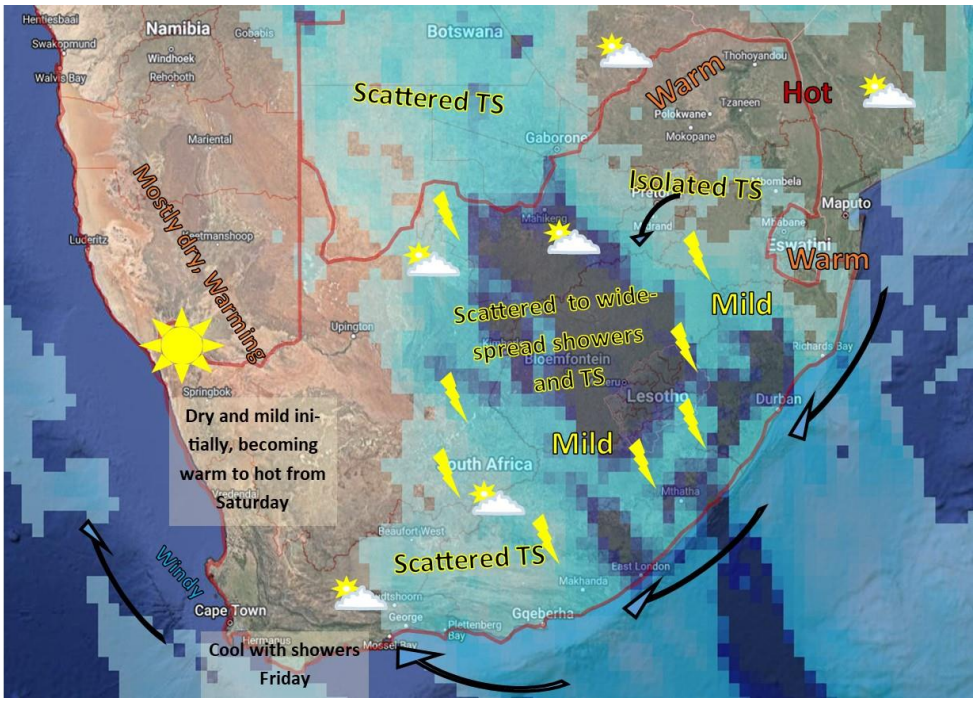
A cold front will bring showers to the southwestern parts.

Isolated to scattered thundershowers are possible over the eastern to northeastern parts.

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

It will be hot over the Lowveld and into northern KZN.

Thursday to Saturday, 3 - 5 March



Scattered to widespread showers and thundershowers are expected over the central to southeastern parts where it will be mild to cool.

Isolated thundershowers are expected further east, but most of Limpopo and northern Mpumalanga will see little in the way of precipitation according to the forecast.

Light showers are expected along the Garden Route on Friday.

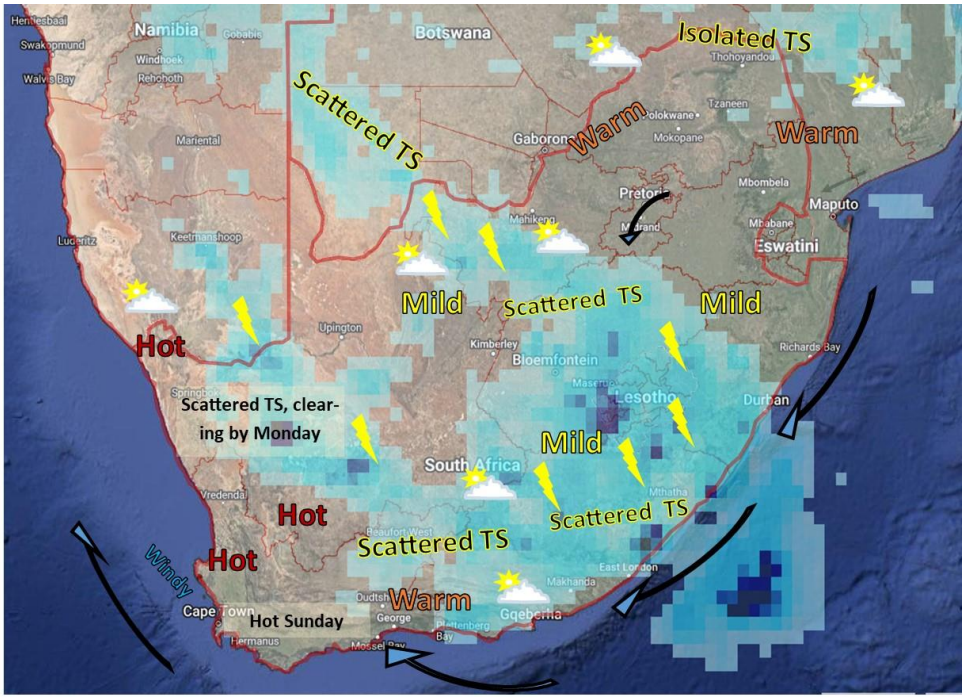
The western parts of the country will become warm to hot.

It will be hot over the Lowveld.

It will be mild over the central to southeastern parts.

Strong south-easterlies in the southwest until Saturday.

Sunday to Monday, 6 – 7 March



Scattered thundershowers are still expected over the central to southeastern and southern parts.

Scattered thundershowers will also spread to the western interior, clearing by Monday according to current forecasts.

Isolated thundershowers are also expected over the far northeastern areas.

The northeast will be largely dry according to current forecasts.

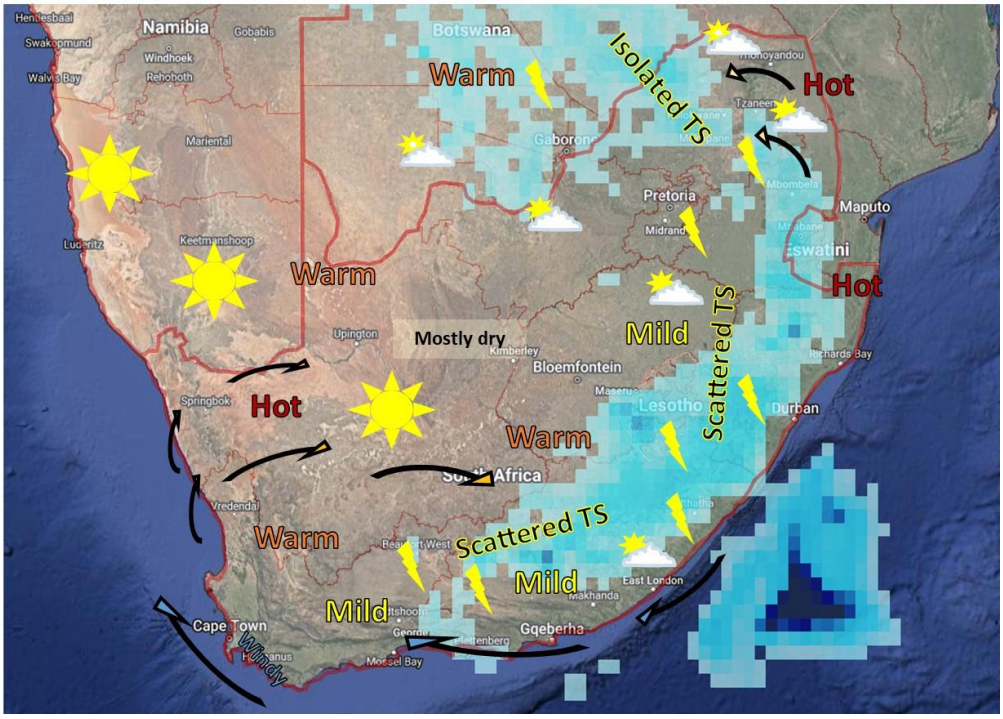
It will be hot in the west and southwest, becoming cool over the southern areas by Monday.

It will be mild over the central to southeastern parts.

It will be warm in the northeast.

Strong south-easterlies in the southwest.

Tuesday, 8 March



Isolated thundershowers are expected over the northeastern parts.

Scattered thundershowers are expected along the Drakensberg, into KZN and the Eastern Cape.

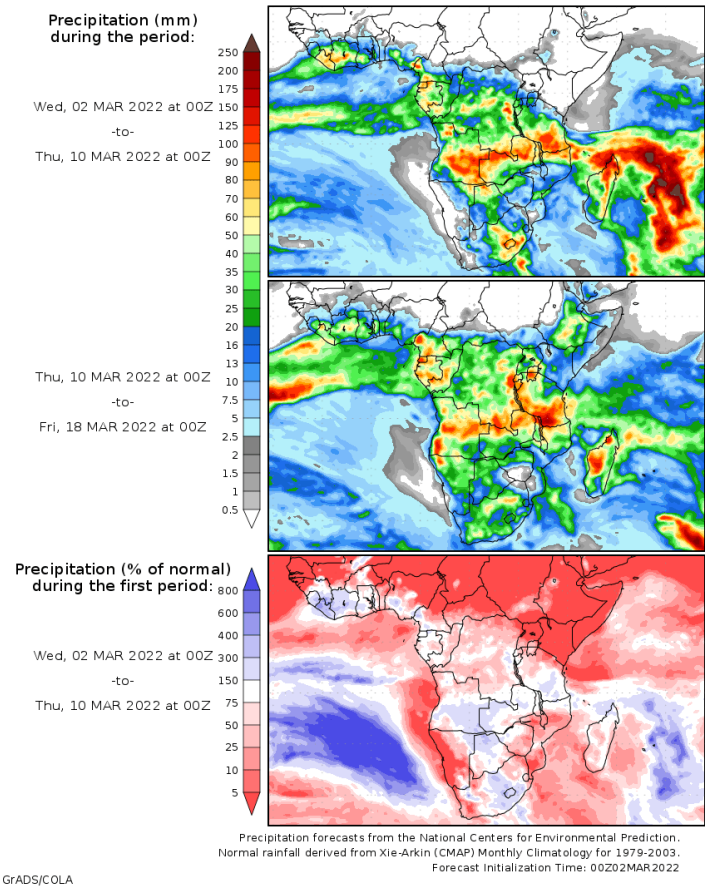
It will be mild to warm and dry over the interior, but hot in the west.

It will be hot in the Lowveld and into northern KZN according to current forecasts.

Strong south-easterlies in the southwest.

Medium term rainfall and temperature summary

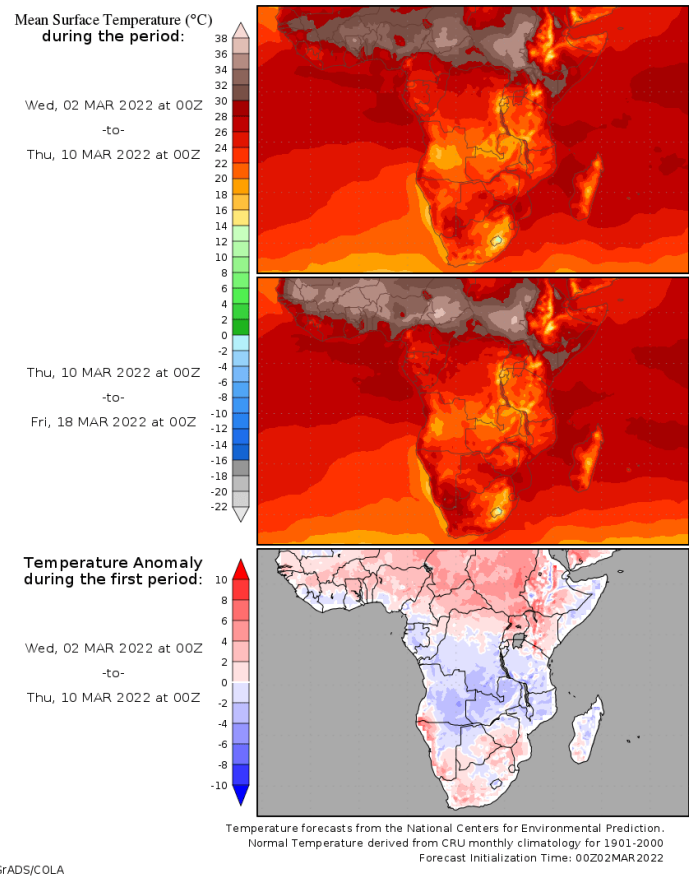
Precipitation Forecasts



Precipitation forecasts from the National Centers for Environmental Prediction.
Normal rainfall derived from Xie-Arkin (CMAP) Monthly Climatology for 1979-2003.
Forecast Initialization Time: 00Z02MAR2022

GrADS/COLA

Temperature Forecasts



Temperature forecasts from the National Centers for Environmental Prediction.
Normal Temperature derived from CRU monthly climatology for 1901-2000
Forecast Initialization Time: 00Z02MAR2022

GrADS/COLA

Possible extreme conditions - relevant to agriculture

The South African Weather Service issues warnings for any severe weather that may develop, based on much more information (and in near-real time) than the output of one single weather model (GFS atmospheric model - *Center for Ocean-Land-Atmosphere Studies (COLA) and Institute of Global Environment and Society (IGES)* – http://Wxmaps.org) considered here in the beginning of a week-long (starting 2 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 the Lowveld **most of the time**.
  - Over northeastern KZN **Thursday (3rd) to Saturday (5th).**
  - Over the western Karoo and southwestern parts, especially the Swartland, **Saturday and Sunday (5th and 6th)**.
  - Over the southern parts, including the Karoo, **Sunday (6th)**.
- Thundershowers may become severe:
  - Over the western to central parts of North West, central, southern and western Free State and northern to eastern parts of the Eastern Cape, including the southern Drakensberg, **Thursday (3rd)**.
  - Over the central to southern parts of the Northern Cape and northern parts of the Karoo on **Sunday (6th)**.
- Significant 24-hour rainfall totals are possible:
  - Over the central to southern parts of North West and western to northern parts of the Free State**, Friday (5th).**
- Dry and windy conditions over the southwestern parts **on several days from Thursday (3rd) until Tuesday (26th)** 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 1 March): The 2021–22 La Niña is past its peak, with outlooks indicating a return to neutral El Niño–Southern Oscillation (ENSO) levels—neither La Niña nor El Niño—during the southern hemisphere autumn. As La Niña weakens, it will continue to influence global weather and climate.

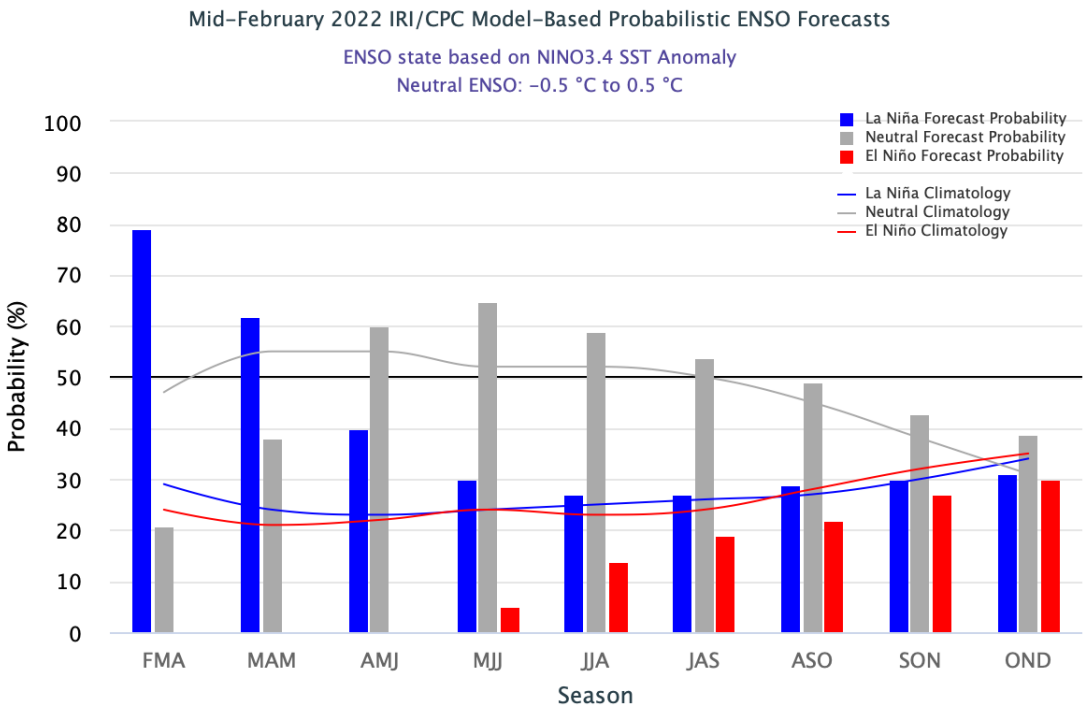
Atmospheric and oceanic indicators over the Pacific remain at La Niña levels. Eastern tropical Pacific sea surface temperatures remain cooler than average despite a slow warming of deeper waters. Warming below the surface of the Pacific Ocean typically foreshadows a breakdown in La Niña, and typically occurs in the southern autumn. In the atmosphere, several indicators remain at La Niña levels, including 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 neutral and is forecast to remain neutral over the coming three weeks.....*Australian Bureau of Meteorology* - http://www.bom.gov.au

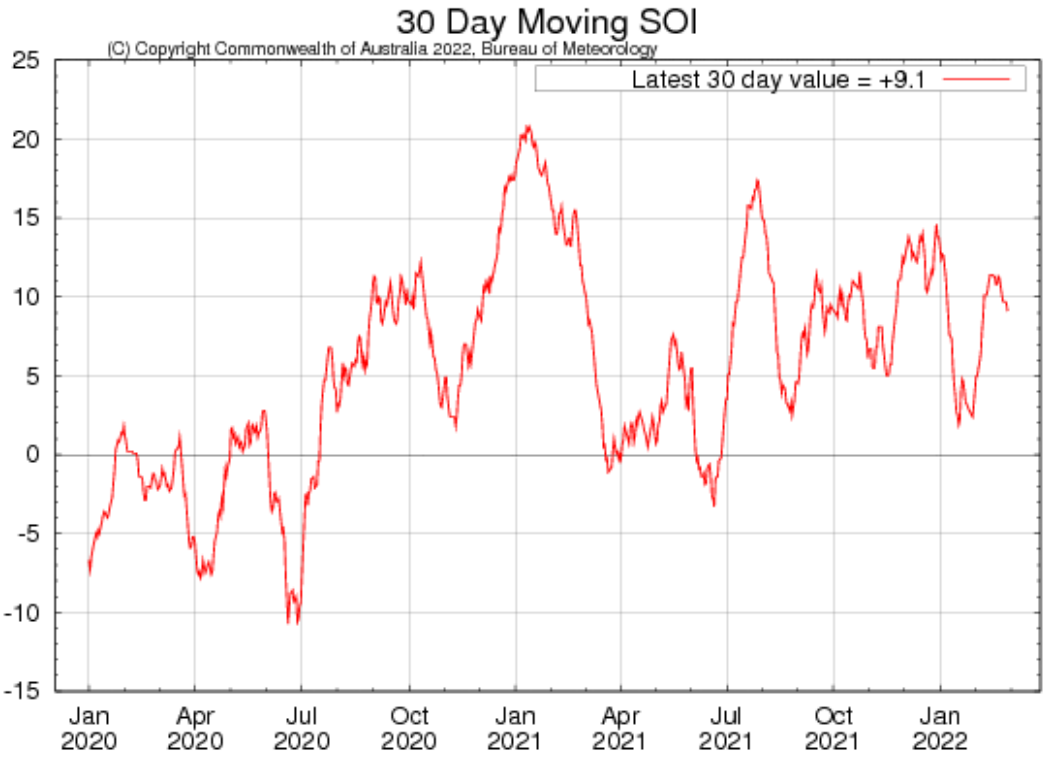
The Southern Annular Mode (SAM) was positive going into February. It has gradually weakened into negative or neutral territory during the last few days. A positive SAM during summer typically brings wetter weather to the summer rainfall region of South Africa.

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

According to the IRI (Updated 18 February): In mid-February, Sea Surface Temperatures remain below-average 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 remains in place for Feb 2022. A large majority of the models in the plume predict SSTs to stay below-normal at the level of a weak La Niña until Mar-May, and then return to ENSO-neutral levels in Apr-Jun 2022. Similar to the most-recent official CPC/IRI ENSO Outlook issued on February 10, 2022, this objective model-based ENSO outlook also predicts a continuation of the weak La Niña event with high probability during Mar-May. However, there is a slight disagreement between the two forecast methods on the dissipation of the current event. The objective model-based forecast shows transition to ENSO-neutral during Apr-Jun (60% chance), while subjective consensus indicates the same happening in May-Jul (56% chance)….*International Research Institute for Climate and Society*- http://iri.columbia.edu/



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

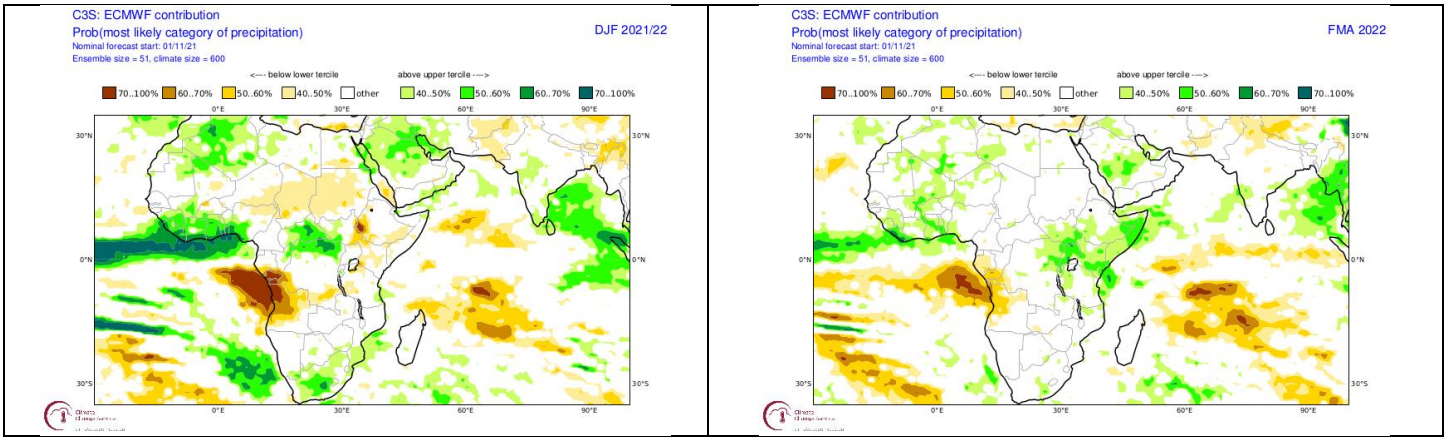


Australian Bureau of Meteorology - http://www.bom.gov.au

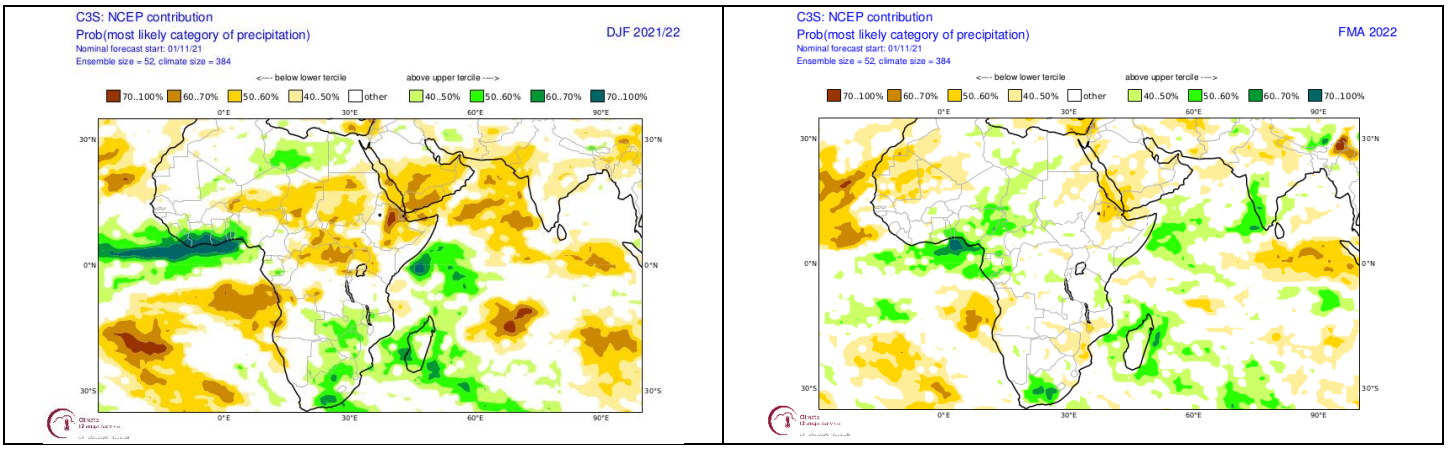
The Southern Oscillation Index is in positive territory (+9.1). This is indicative of atmospheric circulation patterns reflecting La Niña conditions.

Seasonal forecasts issued by various international institutions

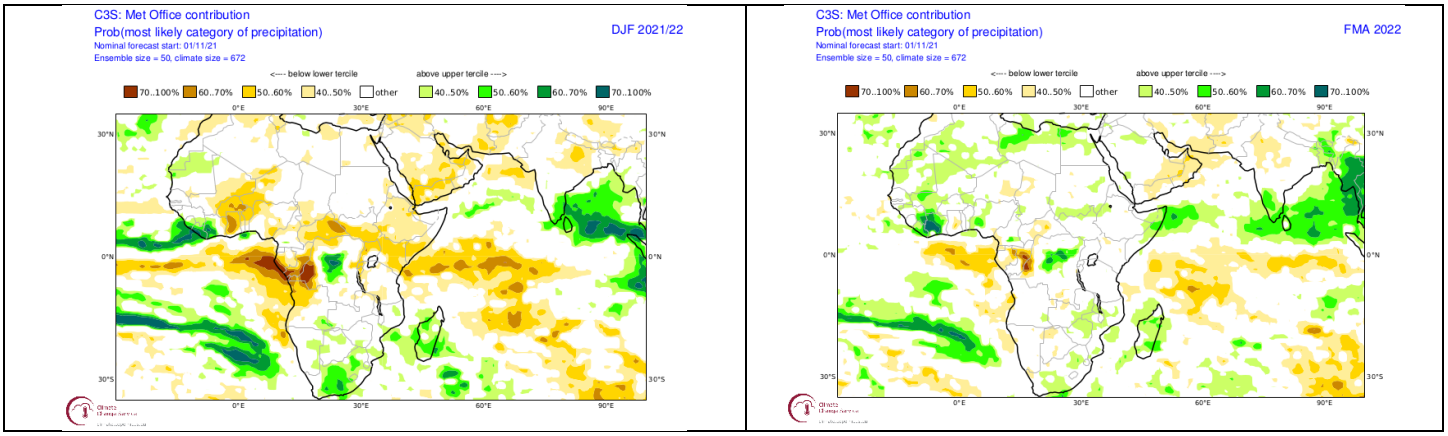
Seasonal forecasts by these institutions, as published by the COPERNICUS Programme (***https://climate.copernicus.eu/seasonal-forecasts***) for both mid-summer and late summer, reflect similar patterns with regards to rainfall for southern Africa as those by the IRI. The signal for relatively wet conditions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



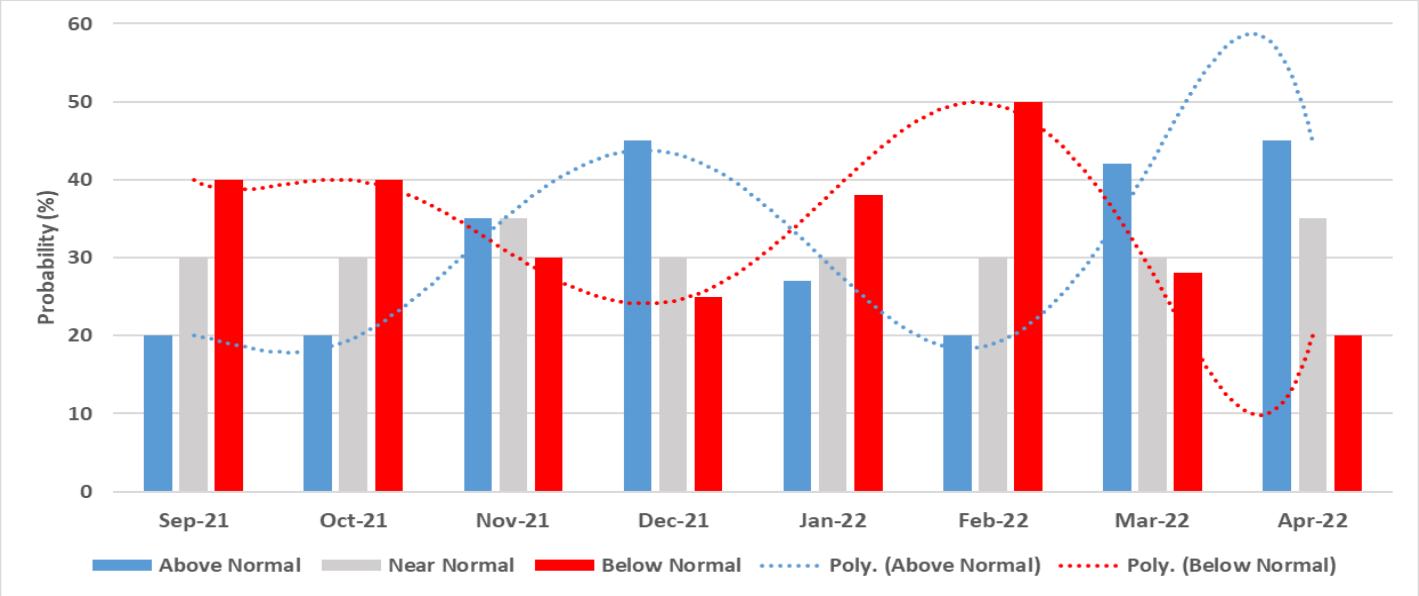
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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

CUMULUS seasonal outlook, based on decadal variability

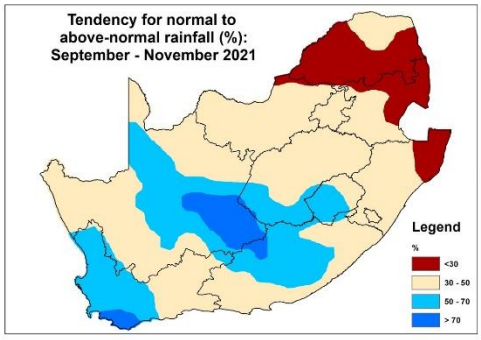
This outlook is based on the typical observed rainfall patterns over the ***north-eastern half*** of the country (including most of the summer grain production region), as associated with the cyclic variability of the global climate system. Summers that are similar to 2021/22 more often experience a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

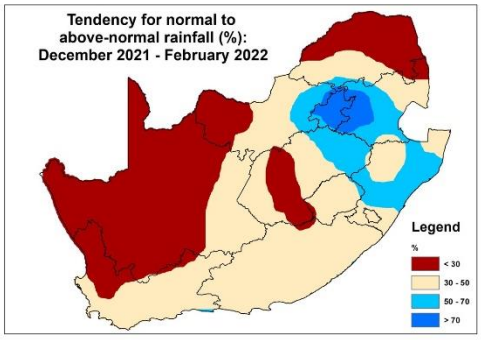


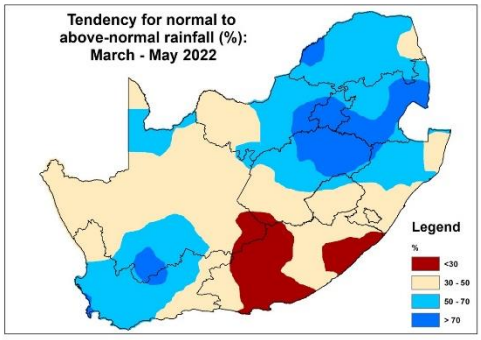
Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2021 – April 2022 (Forecast issued in 2021-09).

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



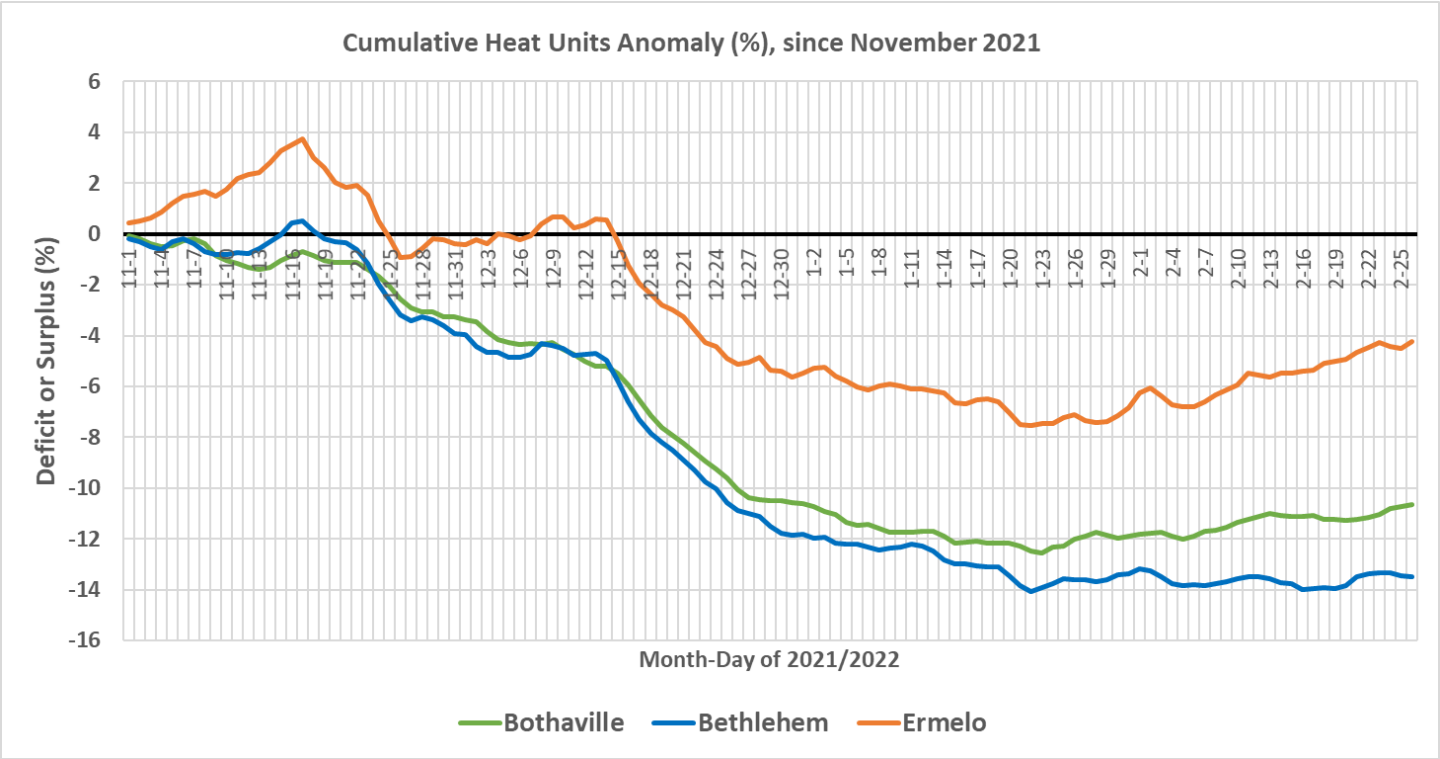




Typical patterns during summers analogous to 2021/22: Early summers during similar years tend to be relatively wet over the western parts of the country while drier than normal over the north-eastern parts of the country (map on the left). During December – February, relatively dry conditions tend to 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

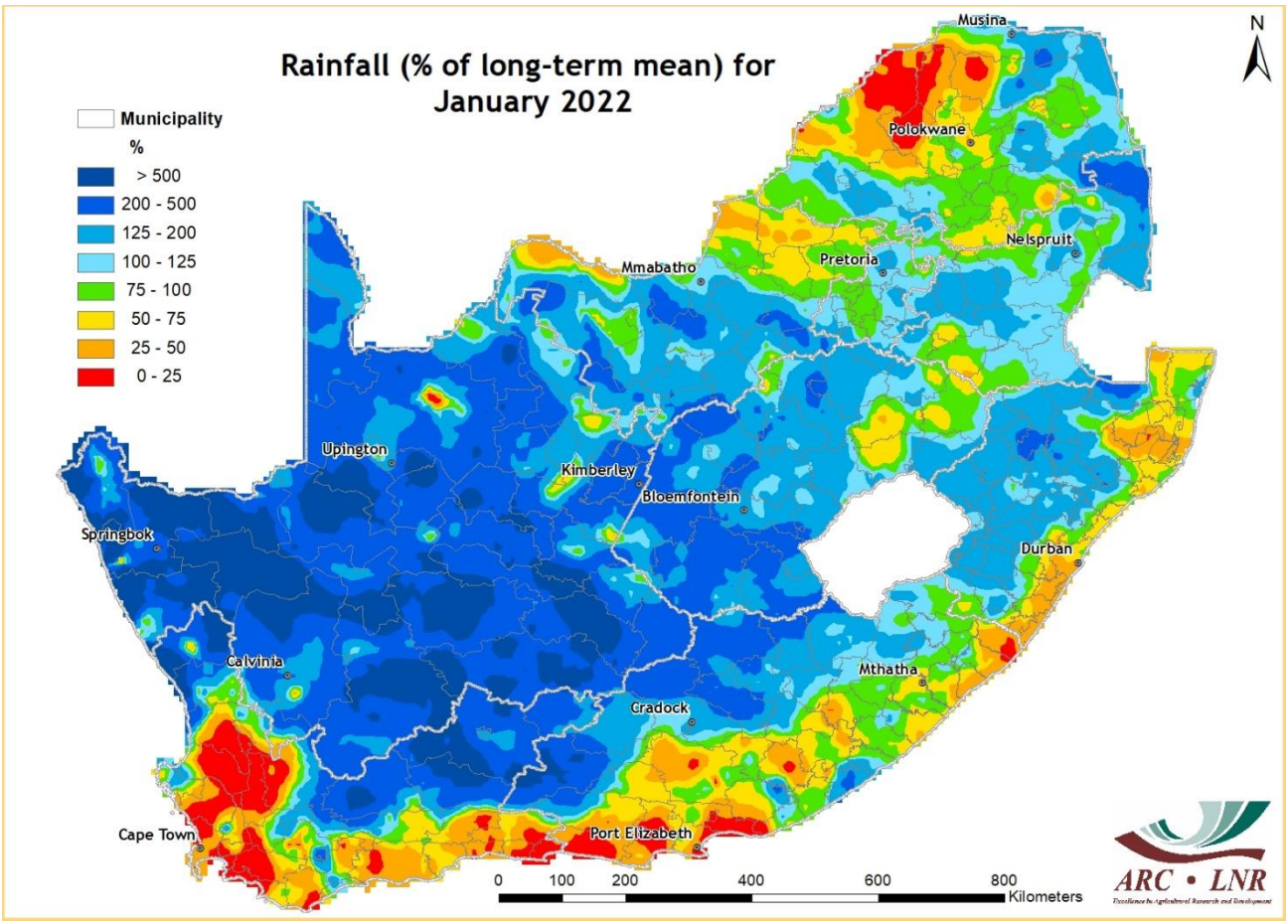
Heat Units: 1 November 2021 – 28 February 2022



Heat units have been less than the 2014 – 2020 norm the November – February 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 since mid-January, deficits have decreased slightly, especially towards the north-eastern parts of the maize-production region.

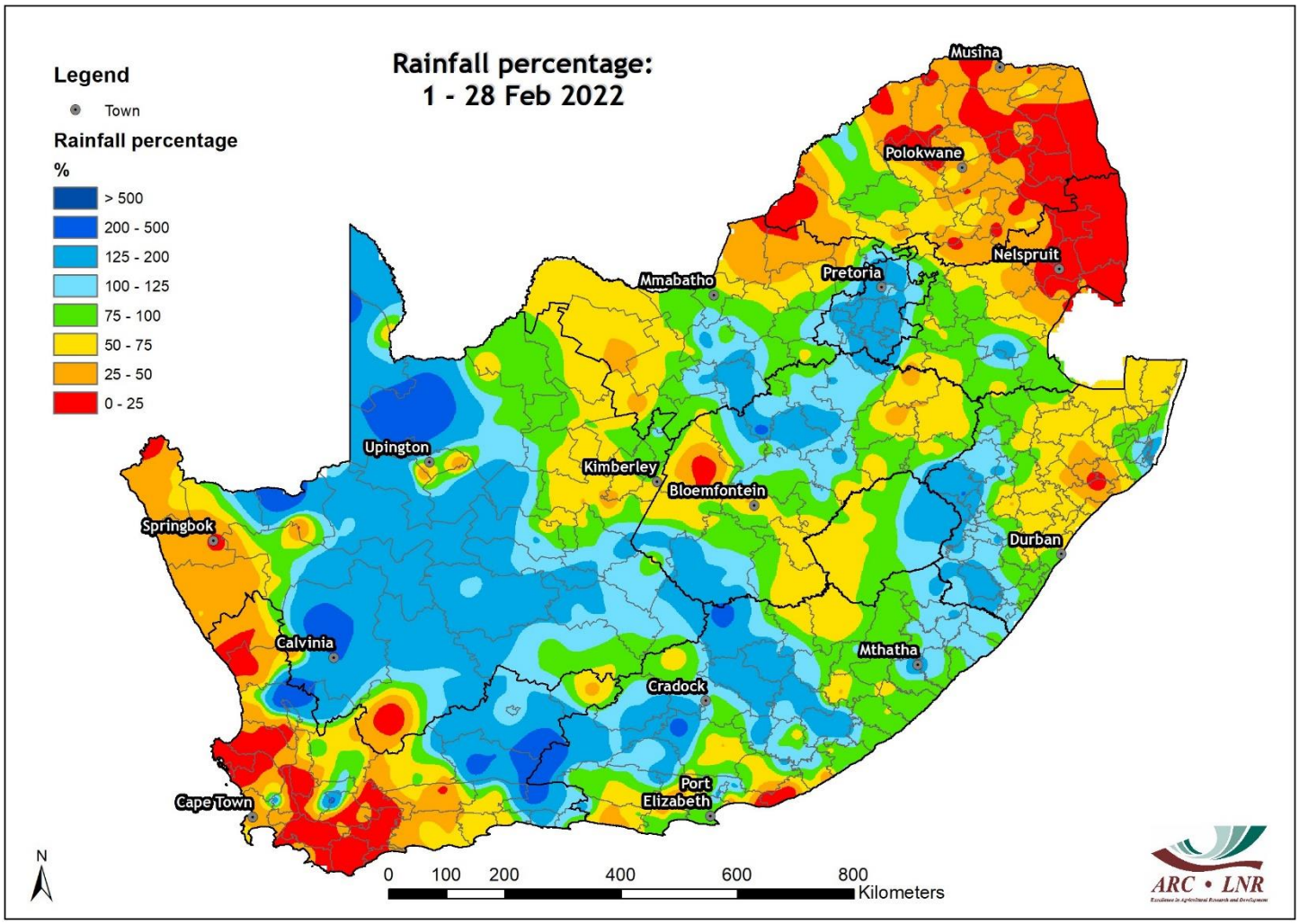
The graph shows the accumulated heat units during November 2021 until 28 February 2022, compared to the median value calculated over the 2014 – 2020 period, expressed as a percentage of the median value. Largest negative anomalies are seen over the southern to central and western parts (around 10 – 15 %), 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



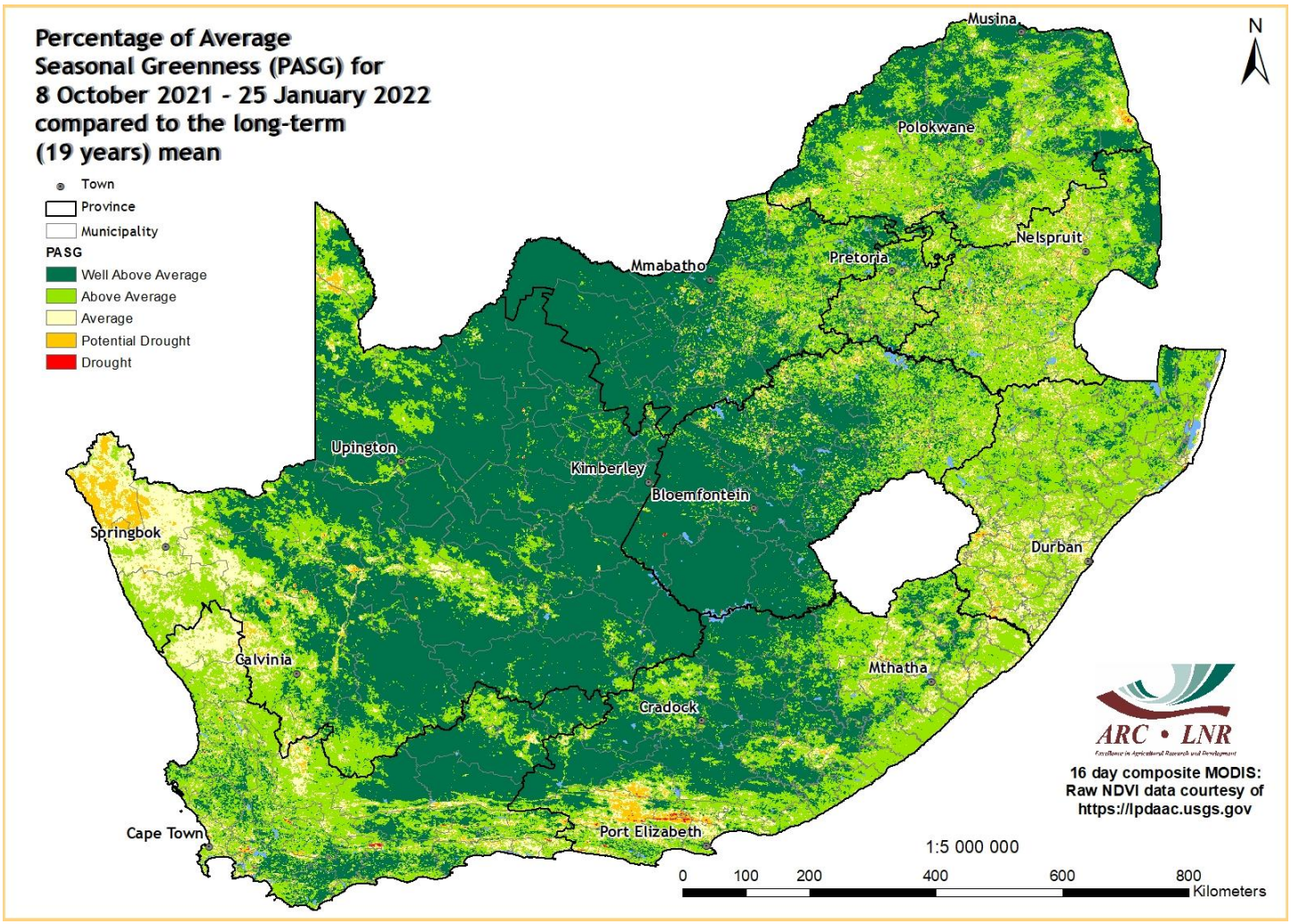
Rainfall was above average over especially the central to western interior during January, with relatively dry conditions over the winter rainfall region and Garden Route through to the coast of KZN as well as the northeastern parts.

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



Rainfall was largely below normal over the northeastern parts during February, including the northern parts of Mpumalanga and Northwest. The central to western parts of the country received mostly normal to above-normal rainfall.

Percentage of Average Seasonal Greenness: October 2021 – 25 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/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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