CUMULUS

9 February 2021 – by J Malherbe, R Kuschke

Contents

Summary

Another tropical system approaching

The first few days of February saw more widespread rain over much of the summer rainfall region, but this time the highest falls occurred over the northeastern parts. The combination of tropical moisture, a tropical low over Botswana and some upper-air instability contributed by a trough moving through resulted in widespread rain, with more significant thunderstorms over the northern parts.

Somewhat drier conditions are now present, with only isolated to scattered thundershowers over the summer rainfall region and higher temperatures. The next few days are expected to remain somewhat drier over the central interior. Current weather forecasts indicate the possible landfall of yet another tropical system on the coast of Mozambique later this week. This system is expected to develop over the southern Mozambique Channel by Thursday and track westwards from there. Current projections favor a westward track into the southern Lowveld, with widespread rain expected, stretching down into northern and eastern KZN. As always with this type of system, forecasts for the track may change at any time, and most of the forecast information in this edition may become obsolete if the track changes significantly.

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

- **General:**
    - The main feature later this week and during the weekend will be cooler conditions and widespread rainfall over the Lowveld and surrounding areas while the remainder of the country will be warmer with isolated to scattered thundershowers in places.
    - If the expected tropical system moves significantly inland to a position west of the eastern escarpment, widespread rain and further flooding can occur over the interior. However, current forecasts limits the movement of the system to the region east of the escarpment, with heavy rain only expected from the escarpment eastwards.
    - The rainfall pattern over the country is expected to be typical to what is expected when a tropical low or depression makes landfall in the east:
        - Isolated to scattered thundershowers that currently (Tuesday, Wednesday 9th/10th) occur over the northeastern and eastern parts are expected to shift towards the western and southern interior during the week (Thursday – Saturday 11th/13th) while it will clear in the east. Some upper-air support may result in more widespread and intense thundershowers over the central to eastern Karoo.
        - Widespread rain and thundershowers are expected to move into the Lowveld and northeastern KZN as the system moves closer by Friday.
        - Cloudy, cooler and windy conditions may spread into the northeastern parts from Saturday onwards as the tropical system moves further inland. Scattered showers should spread further west into KZN, Mpumalanga and Limpopo.
        - Depending on the westward track following landfall, rainfall associated with the tropical system will spread further west into the northeastern interior. Current forecasts indicate scattered showers or thundershowers as far west as western Limpopo and Gauteng by Sunday and Monday.
    - Widespread heavy rain can be expected according to current forecasts over the Lowveld and northeastern KZN, based on the current expected landfall position and track of the tropical system later this week.
    - Cumulative rainfall totals over the next week will likely exceed 100 mm over the Loweveld and northeastn KZN. Significant daily totals are possible according to current forecasts from Friday to Monday.
    - The central interior will be warmer with near-normal to below-normal rainfall.
    - The northeastern and eastern parts are expected to receive normal to above-normal rainfall, related to the expected presence of the tropical low from the Indian Ocean later this week.
    - Parts of the Karoo are also expected to receive above-normal rainfall in the form of thunderstorms during the week.
    - The winter rainfall region should be dry.

- It will be very hot over the western to southern interior during the remainder of the week even though isolated to scattered thundershowers are possible, especially over the central to eastern Karoo.
- Temperatures over the main summer-grain production region will generally be supportive of crop production – with an increase in much-needed heat units relative to the previous week:
  - Maximum temperatures over the western maize production areas will be in the order of 30 – 33°C, with cooler, cloudy conditions concentrated towards the beginning of the period. Minimum temperatures will be in the order of 18 – 22°C.
  - Maximum temperatures over the eastern maize-production region will range between 18 and 28°C, with the cooler conditions expected by the weekend and associated with the expected tropical system causing cloudy conditions with showers. Minimums will be in the order of 13 – 17°C.

Seasonal overview

ENSO and seasonal forecasts

Due to the positive association with La Niña, rainfall over the southern African interior is expected to remain above normal through the rest of the summer according to the latest seasonal forecasts.

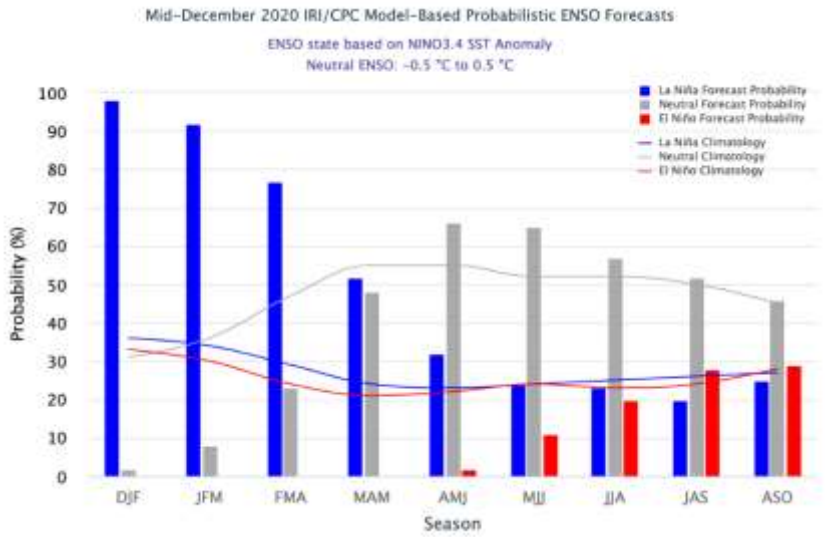
According to the Australian Bureau of Meteorology (Updated 2 February): The 2020–21 La Niña is likely to have peaked with respect to atmospheric and oceanic patterns in the tropical Pacific. However impacts associated with La Niña……., are expected to persist into early autumn. *(Seasonal forecasts for South Africa continue to lean towards wet conditions during the remainder of summer)*

Over the past fortnight the sea surface temperatures across Pacific Ocean basin have warmed by around 0.2 °C. The 90-day Southern Oscillation Index (SOI) has decreased slightly but continues to remain well above the La Niña threshold of +7, and trade winds have returned to near-average strength in the central tropical Pacific. Model outlooks indicate a return to neutral conditions (neither El Niño nor La Niña) during the late southern summer or early autumn.

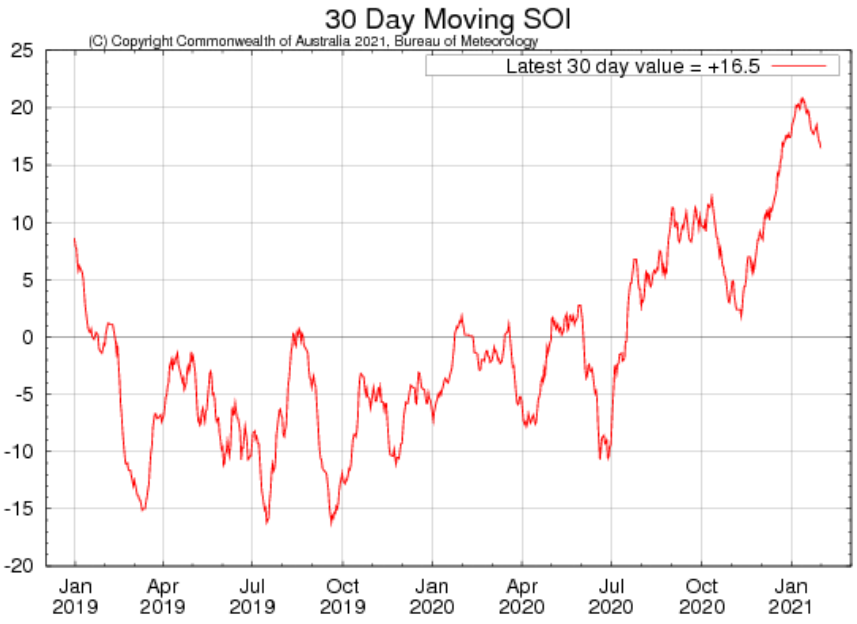
The Southern Annular Mode (SAM) is positive, but is expected to tend towards neutral values over the next fortnight. ……***Australian Bureau of Meteorology*** - http://www.bom.gov.au

(A positive SAM is usually indicative of relatively wet conditions over the summer rainfall region during mid-summer, with drier conditions over the winter rainfall region of South Africa)

According to the IRI (Updated 14 January): In mid-January, SSTs in the east-central Pacific are roughly 1.2 degree C below average, and all key atmospheric variables are consistent with La Niña conditions. A large majority of the model forecasts predict SSTs to be cooler than the threshold of La Niña SST conditions through the *SH summer*, dissipating during *SH autumn*. The new official CPC/IRI outlook issued earlier this month calls for a 95% chance of La Niña for the Jan-Feb-Mar season. A La Niña advisory is in effect…..***International Research Institute for Climate and Society***- http://iri.columbia.edu/



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



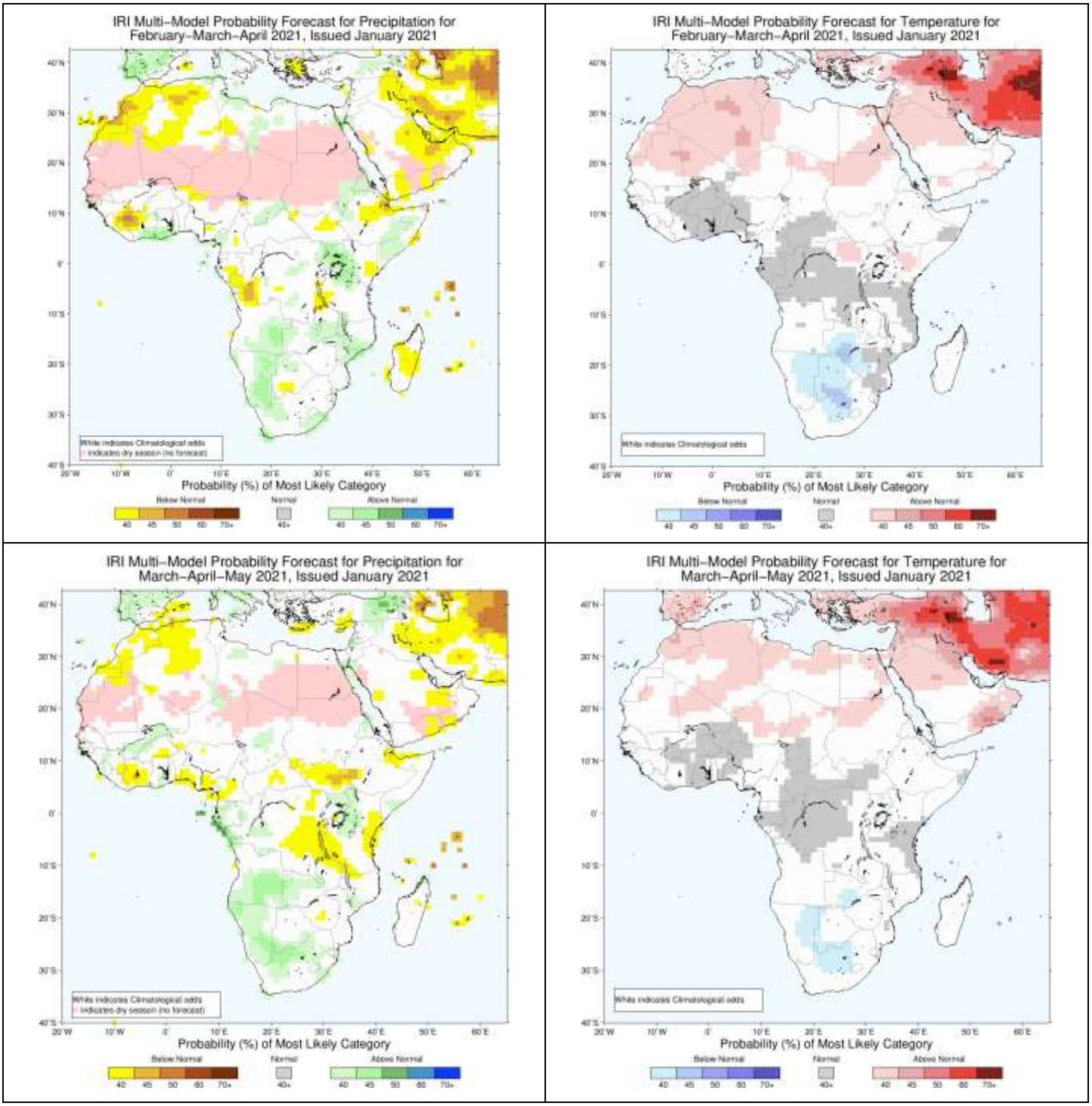
Australian Bureau of Meteorology - http://www.bom.gov.au

The Southern Oscillation Index is still high (+16.5), well above the La Niña threshold and generally upward trending. This is indicative of atmospheric circulation patterns consistent with La Niña conditions.

Seasonal forecasts issued by various international institutions

IRI

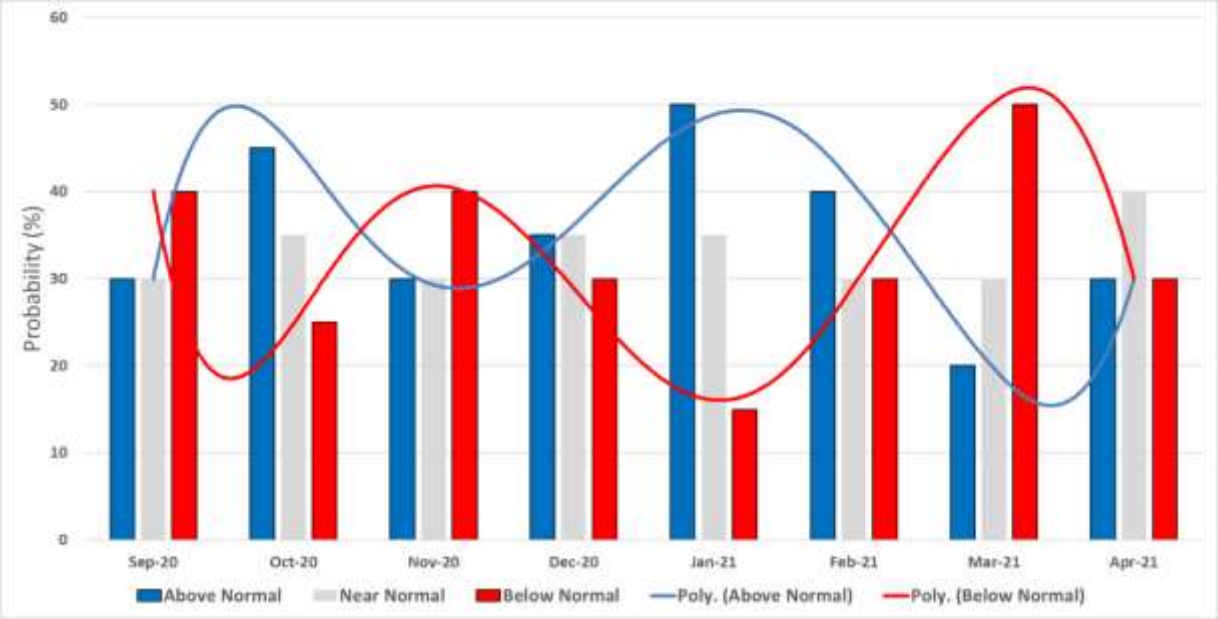
Given the current La Niña conditions, the seasonal forecast by the IRI still favours relatively wet and cool conditions to continue into autumn, with the largest anomalies over the central parts of the country.



Probabilistic forecasts for rainfall (left) and temperatures (right) for late-summer (February – April 2021; top) and autumn (March – May 2021; bottom) (Forecast issued in 2021-01 by the IRI - http://iri.columbia.edu/).

CUMULUS seasonal outlook, based on decadal variability

Based on the typical observed rainfall patterns over the northeastern half of the country (most of the summer rainfall region - from the central Free State north-eastwards), as associated with the cyclic variability of the global climate system, similar summers as 2020/21 more often experience a seasonal rainfall curve that differs from normal conditions as indicated in the bar graph below:

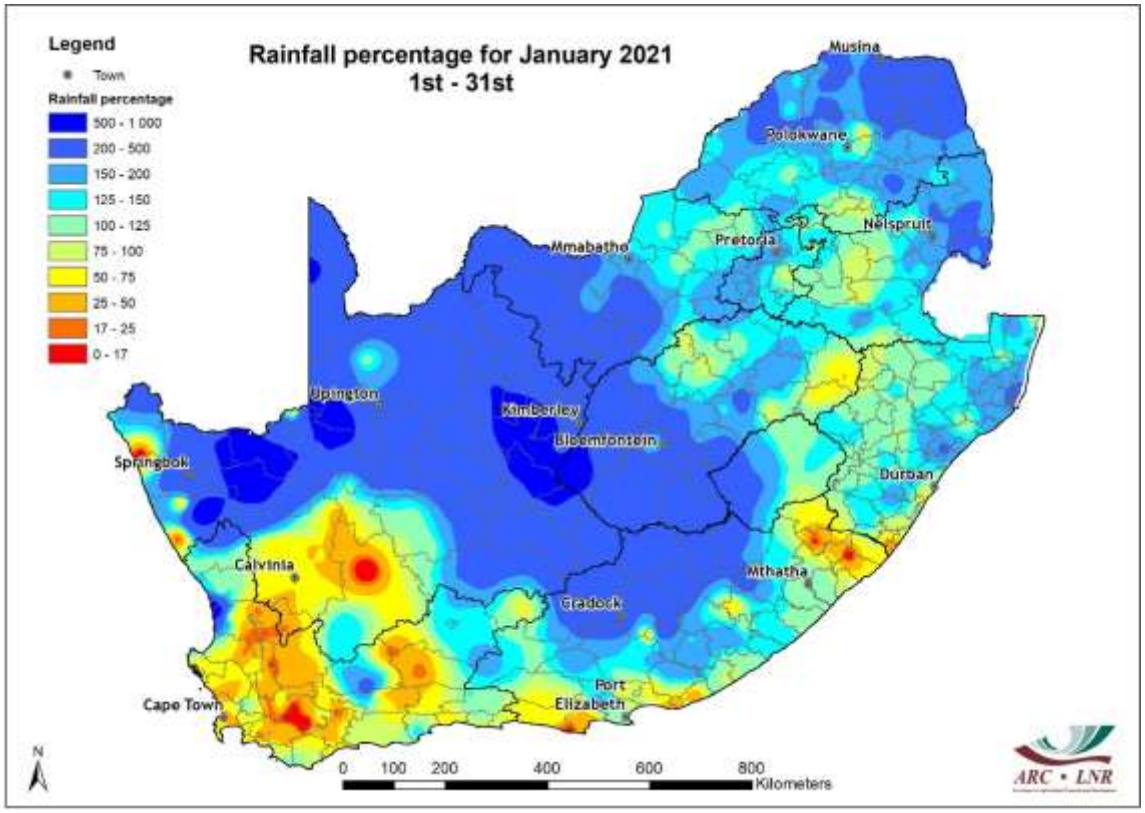


Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2020 – April 2021 (Forecast issued in 2020-09).

Typical patterns during similar summers are:

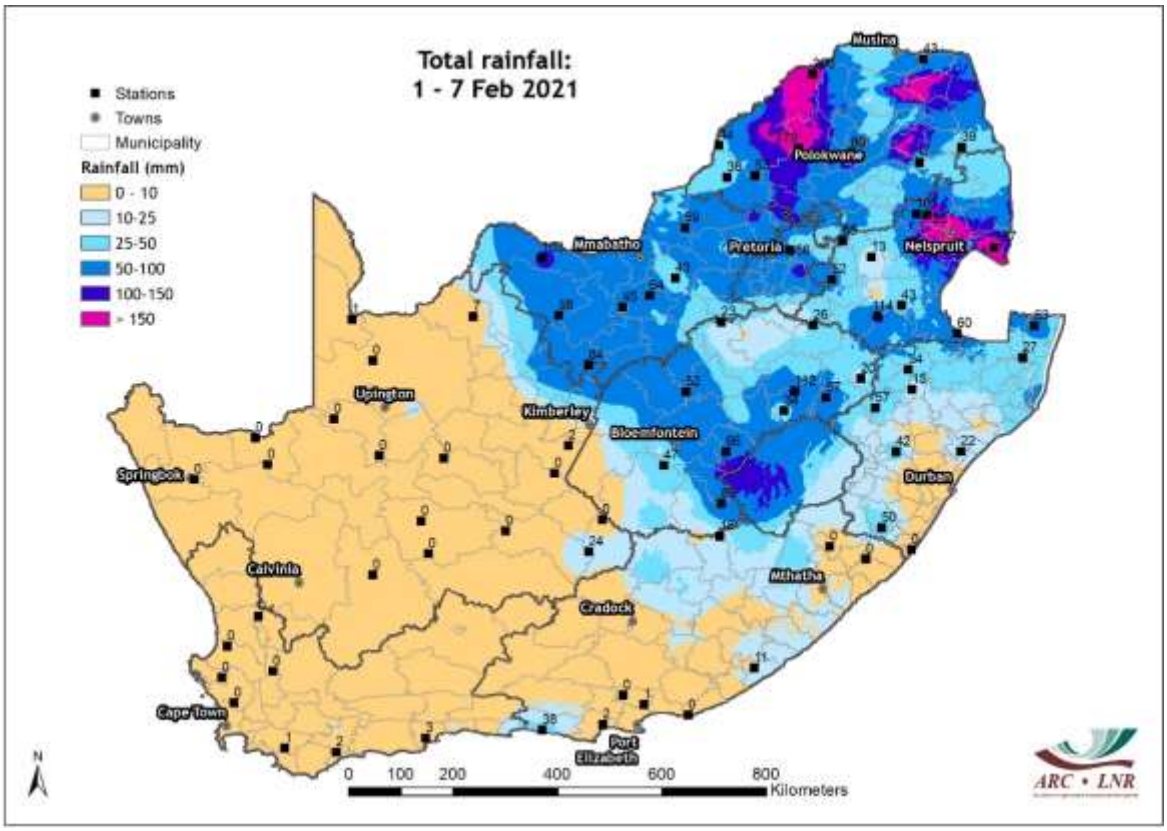
- Late September – 20 October: Relatively wet conditions over the summer rainfall region
- Late October – 20 November: Mostly drier than normal conditions
- Late November - December: Near-normal rainfall over the summer rainfall region
- January – late February: Normal to above-normal rainfall over the summer rainfall region
- Late February – March: Mostly drier than normal

Rainfall (% of long-term mean): January 2021



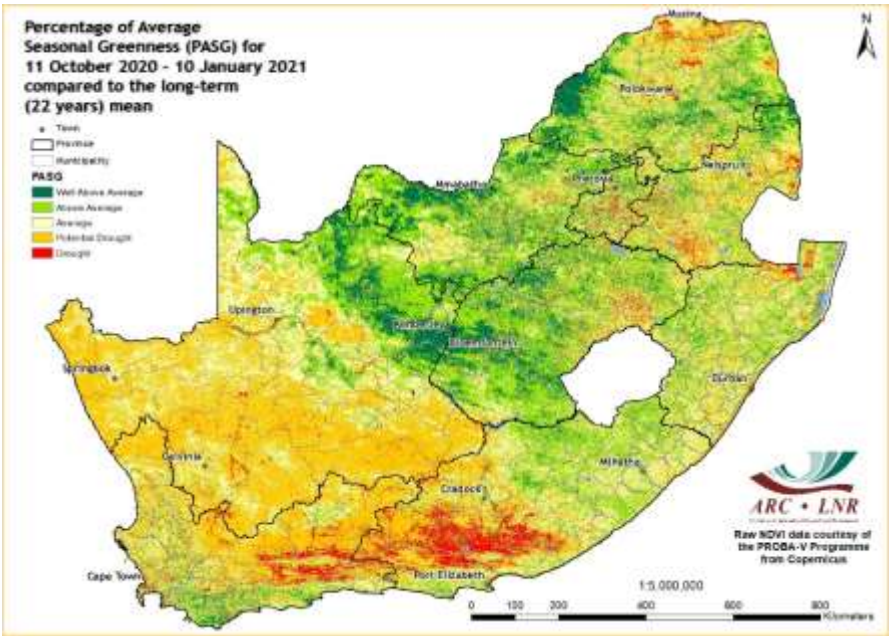
Most of the summer rainfall region received above-average rainfall during January, but the largest positive deviations in terms of the percentage of average occurred over the central interior as well as the northern parts of Limpopo and the Lowveld. The eastern maize-production region received near-normal rainfall while the western production region received well-above-normal rainfall.

Rainfall (mm): 1 – 7 February 2021



Widespread rain occurred over the central to northeastern parts, still in the aftermath of Tropical Cyclone Eloise. Extensive areas received more than 50 mm of rain and relatively large parts of Limpopo and Mpumalanga received more than 150 mm.

Percentage of Average Seasonal Greenness: 11 October – 10 January 2021



Above-normal rainfall over the summer rainfall region during the current and previous summer, especially over the central to northern parts of the country, had a very positive effect on vegetation activity during this period. Parts of the Karoo still show the effect of relatively dry conditions.

Overview of expected conditions over South Africa during the next few days

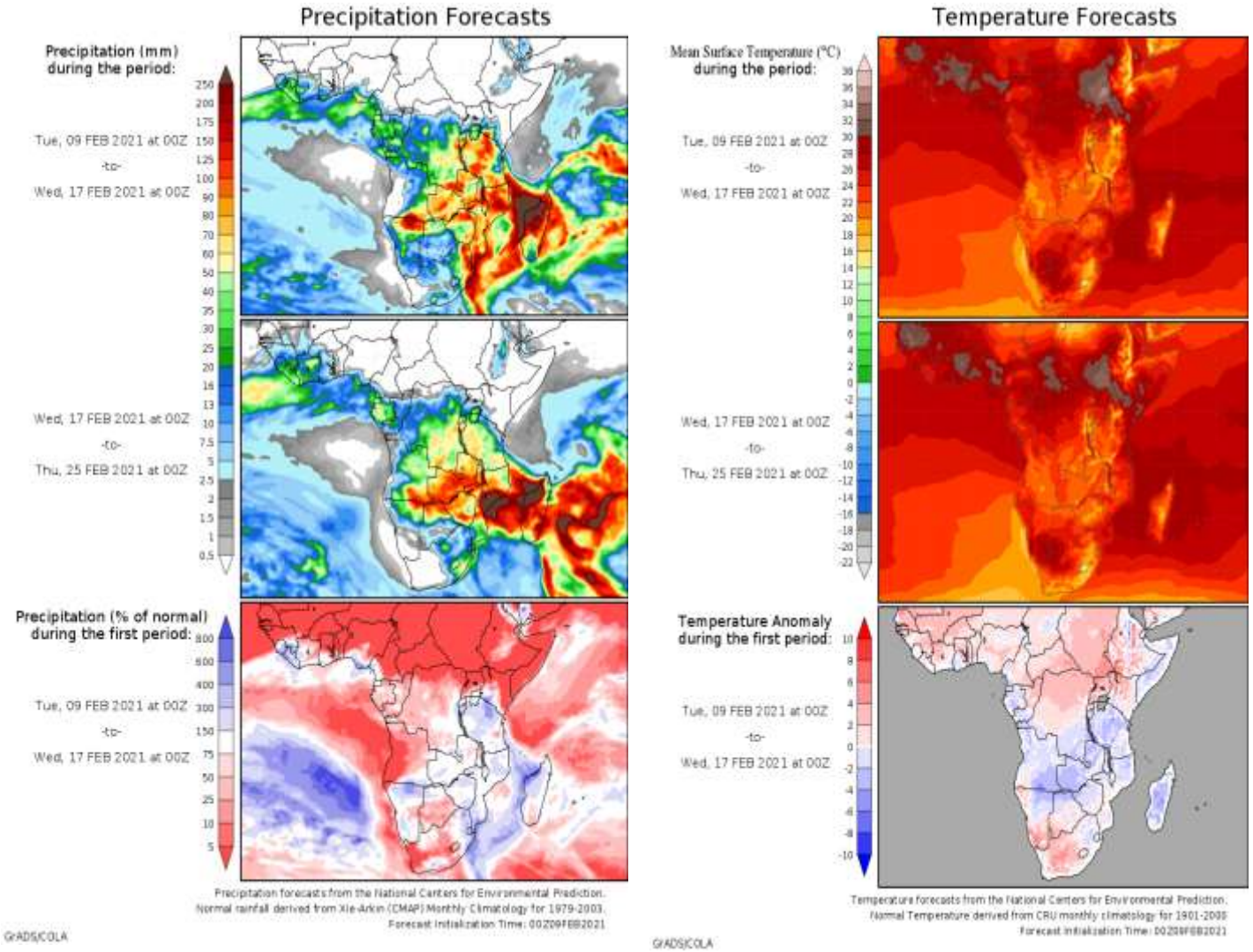
The tropical system expected to develop over the Mozambique Channel and expected to track towards the Lowveld will dominate weather events especially during the second half of the period. As thundershowers shift to the western interior during the week, an upper-air through to the southwest will give further support for more significant thundershowers over parts of the Karoo.

Conditions in main agricultural production regions (9 - 15 February)

Maize production region: Rainfall during this period should be normal to above normal over the astern parts, but below normal over the western parts where temperatures will be relatively high. It will be partly cloudy and warm at first. Isolated to scattered thundershowers will occur over the eastern parts on Tuesday and Wednesday (9th, 10th). These will shift to the western parts from Thursday (11th). By the weekend it will become cloudy, windy and cooler with widespread showers and thundershowers over the eastern areas while it should be partly cloudy to sunny and warm with only isolated thundershowers in the west.

Temperatures over the region will generally be supportive of crop production – with an increase in much-needed heat units relative to the previous week: Maximum temperatures over the western maize production areas will be in the order of 30 – 33°C, with cooler, cloudy conditions concentrated towards the beginning of the period. Minimum temperatures will be in the order of 18 – 22°C. Maximum temperatures over the eastern maize-production region will range between 18 and 28°C, with the cooler conditions expected by the weekend and associated with the expected tropical system causing cloudy conditions with showers. Minimums will be in the order of 13 – 17°C.

Cape Wine Lands and Ruens: It will be sunny to partly cloudy and warm for the most part. Very little is expected in the way of rain according to current forecasts except for light showers from time to time along the Garden Route and possible thundershowers towards the east by the weekend. The wind will be from a southerly direction for the most part, with strong southeasterlies expected in the southwest until Thursday (11th).



Center for Ocean-Land-Atmosphere Studies (COLA) and Institute of Global Environment and Society (IGES) – http://Wxmaps.org

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 9 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:

- Significant falls (>50 mm in 24 hours) are possible over the Lowveld and KZN during the weekend and on Monday 15th). Where soils are saturated and river systems full, this may result in flooding.
- High cumulative rainfall totals are possible over the Lowveld and northeastern KZN according to current forecasts from Saturday (13th) to Monday (15th). Where soils are saturated and river systems full, this may result in flooding.
- If the expected tropical system moves significantly inland to a position west of the eastern escarpment, widespread rain and further flooding can occur over the interior. However, current forecasts limits the movement of the system to the region east of the escarpment, with heavy rain only expected from the escarpment eastwards.
- Cloudy and wet conditions over the eastern grain production region by the weekend may result in the occurrence of fungal pathogens.
- Thundershowers over the central to eastern Karoo may become severe by Thursday to Saturday (11th – 13th) according to current forecasts and may also produce heavy downpours.
- It will be warm to hot over the central to western Northern Cape and the Karoo from Tuesday (9th) to Friday (12th).
- Fresh to strong south-easterlies are expected over the southwestern parts during the first few days of the period. Where vegetation is dry, this may be conducive to the development and spread of wild fires.

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:
CSIR NRE (National Resources and the Environment)
"CSIR NRE produces forecasts on an experimental basis, doesn't guarantee the accuracy of the daily forecasts and cannot be held accountable for the results of decisions taken based on the forecasts"

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
"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.