

CUMULUS



8 December 2020 – by J Malherbe, R Kuschke



Contents

- Summary.....2
- Seasonal overview3
 - ENSO and seasonal forecasts3
- Seasonal forecasts issued by various international institutions4
 - IRI, ECMWF, NCEP, UKMO4
- CUMULUS seasonal outlook, based on decadal variability7
- Rainfall (% of long-term mean): November 20208
- Rainfall (mm): 1 – 7 December 20209
- Percentage of Average Seasonal Greenness: 21 August – 20 November 2020.....10
- Overview of expected conditions over South Africa during the next few days11
 - Conditions in main agricultural production regions (8 – 14 December)..... 11
 - Possible extreme conditions - relevant to agriculture..... 13
- Sources of information14

Summary

Favourable weather conditions remain in place

The situation with regards to weather will remain largely supportive of agricultural activities over the main summer-grain production region during the next few days. Scattered thundershowers will occur on most days over the central to eastern interior. Partly cloudy conditions will dominate with temperatures on average near normal to slightly above normal. In most areas this should support summer grain production. The continued presence of a tropical low-pressure system towards the north over the subcontinent will maintain a source of tropical moisture that will support rainfall over the summer-rainfall region.

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

- **General:**

- The summer-grain producing areas should continue to experience weather conditions supportive of crop production.
- Most of the summer rainfall region, except for Limpopo, should receive normal to above normal rainfall.
- Some rain is expected over the winter rainfall region, Garden Route and initially also the far-western interior according to current forecasts, but totals should remain below normal for this time of the year.
- The Garden Route may experience several days of mild to cool, windy conditions during the remainder of the week.
- Thundershowers will initially occur over the western to central summer rainfall region, but will relocate northeastwards during the week before expanding westwards again during the weekend.
- Temperatures will be near normal to slightly above normal on average over most of the summer rainfall region. It will be cooler than normal on average over the winter rainfall region and along the Garden Route.
- The western to central and southern interior will again be windy on some days.
- Temperatures over the main summer-grain production region will be slightly higher than last week:
 - Maximum temperatures over the western maize production areas will be in the order of 28 – 35°C, with highest values to be reached later this week. Minimum temperatures will be in the order of 17 – 22°C.
 - Maximum temperatures over the eastern maize-production region will range between 26 and 33°C, with highest temperatures during the remainder of the week. Minimums will be in the order of 11 – 16°C.

- **Detailed:**

- Tuesday (8th): Partly cloudy to cloudy and warm with scattered to widespread showers and thundershowers over the central to eastern parts of the Northern Cape, Free State, eastern half of the Western Cape, Eastern Cape and North West. The northeastern interior should be cloudy to partly cloudy and mild with little to no rain. It will be windy with showers also over the southwestern parts of the Western Cape.
- Wednesday (9th): Cool and windy over the southwestern parts. The interior should be mostly dry except for isolated to scattered thundershowers over the Free State, stretching southeastwards towards KZN and northern Eastern Cape. The northeast will become somewhat warmer.
- Thursday and Friday (10th, 11th): Partly cloudy, windy and cool conditions remain in place over the southern and southwestern interior and Garden Route, with isolated showers in some places (mostly Western- and Eastern Cape). It will become warm and windy over the central interior, spreading into the Karoo on Friday. Thundershowers will shift towards the northeast and become scattered over northern KZN, but most of Limpopo, where it will be very hot over the Limpopo River Valley and Lowveld, should remain outside the band of thundershowers. It will become hot in the northeast.
- Saturday (12th): Southerly winds will cool down the southern parts again while it will remain warm to hot over the central and northeastern parts. Thundershowers will expend somewhat westwards and may include the central parts of the country. According to current forecasts, thundershowers will be more concentrated over the northeastern Free State into KZN, while the far-northeast should remain hot and dry.

- Sunday (13th): Thundershowers should remain in place over the central to southeastern parts while the rest of the country will remain mostly dry. It may become hot and windy over the central to western interior.
- Monday (14th): The area of thundershowers over the interior may expand and the distribution will also be somewhat enhanced. The far northeast should remain mostly dry. Hot and windy conditions over the interior will likely focus more towards the south and southeast, with very hot and windy conditions possible over the Upper Karoo according to current forecasts. The winter rainfall region and Garden Route may become cooler with westerly winds during the day as a frontal system may influence the region. This forecast is associated with a long lead time and therefore uncertain.

Seasonal overview

ENSO and seasonal forecasts

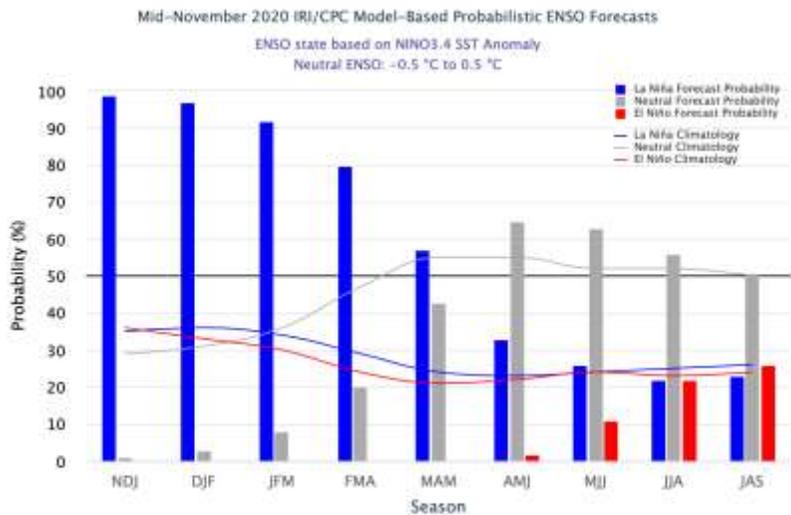
Due to a positive association with La Niña, rainfall over the southern African interior is expected to be above normal through the summer according to seasonal forecast models.

According to the Australian Bureau of Meteorology (Updated 8 December): Oceanic and atmospheric indicators reflect a mature La Niña with little variation over last fortnight. Model outlooks suggest the event will peak at moderate levels during December, returning to a neutral phase during the late summer or autumn.

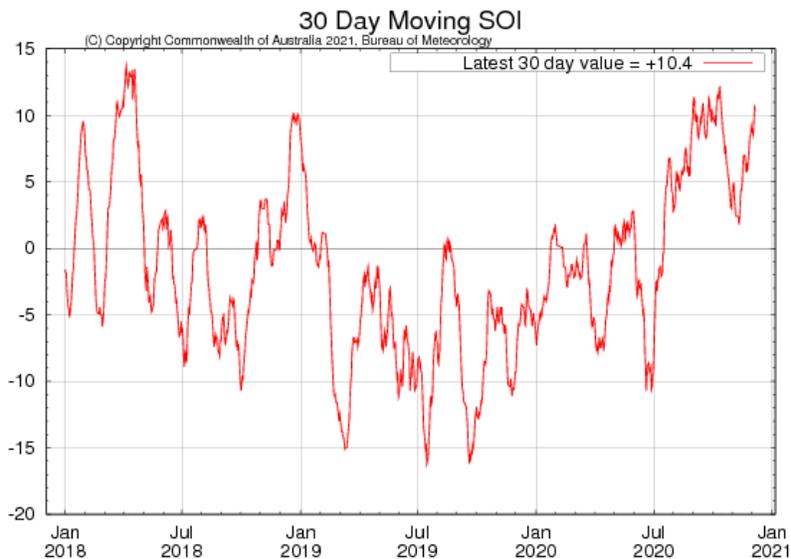
The Southern Annular Mode (SAM) is expected to increase to strongly positive values over the coming week. This is driven in part by the La Nina influence, and in part by a stronger than average polar vortex over Antarctica. Positive values are expected at least into early 2021.....**Australian Bureau 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 19 November): In mid-November, SSTs in the east-central Pacific are roughly 1 degree C below average, and all key atmospheric variables are consistent with La Niña conditions. A large majority of the model forecasts exceeds 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 is similar to these model forecasts, calling for a 95% chance of La Niña for the *next few months*. 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/>



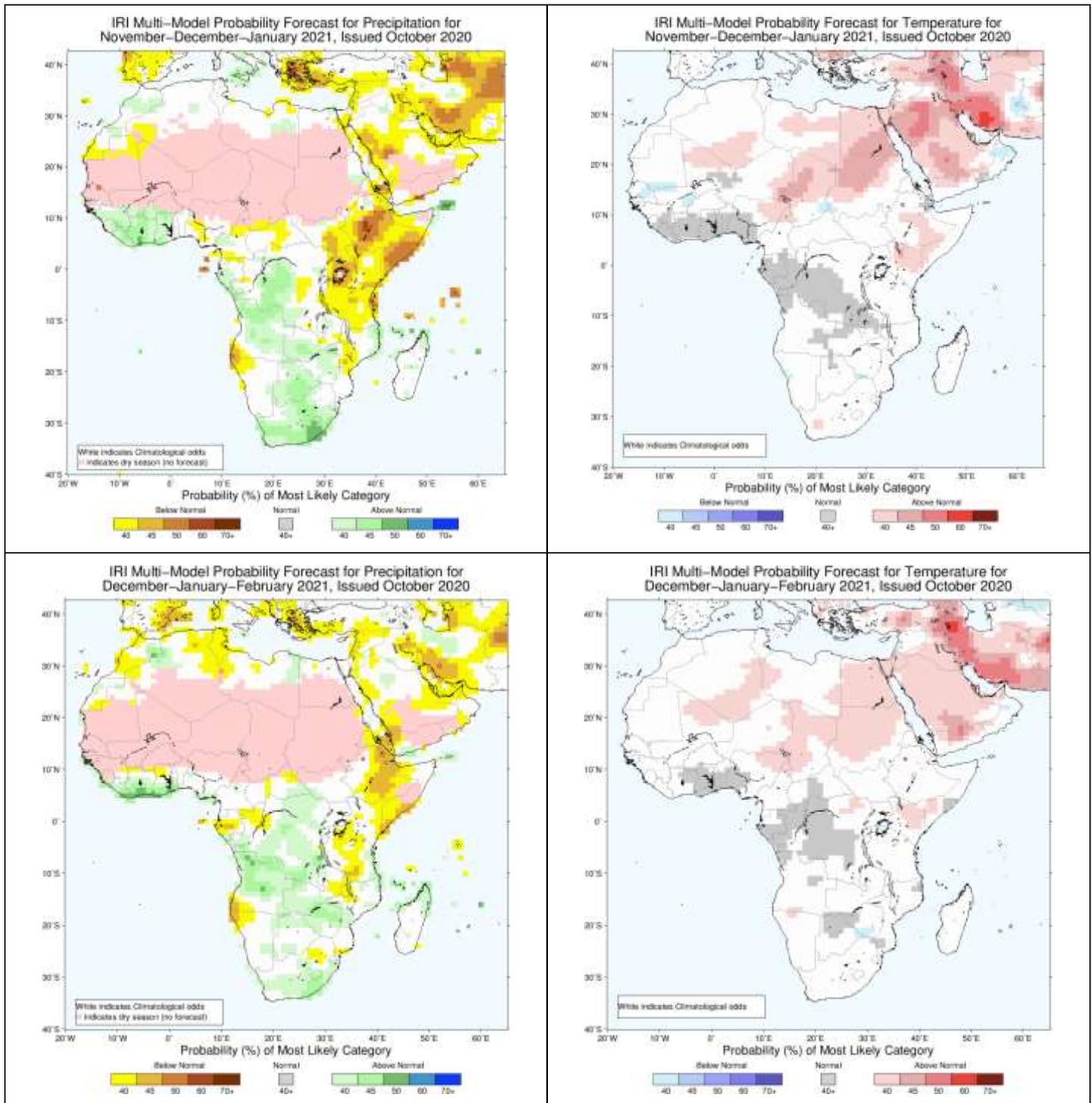
Australian Bureau of Meteorology - <http://www.bom.gov.au>

The Southern Oscillation Index remains positive, now 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

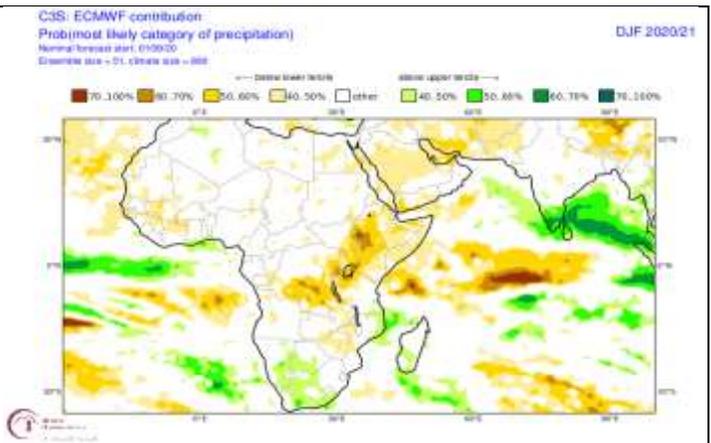
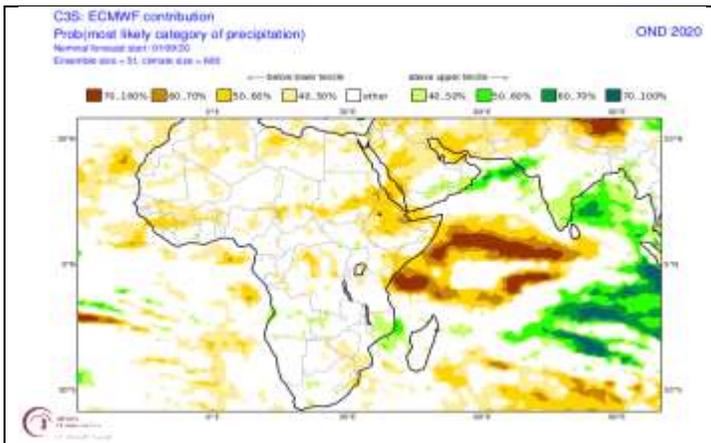
IRI, ECMWF, NCEP, UKMO

The seasonal forecast by the IRI for Africa favours relatively wet conditions for both early and late summer 2020/21 over South Africa. Coupled with the relatively wet conditions expected over the interior, temperatures are expected to remain near normal.

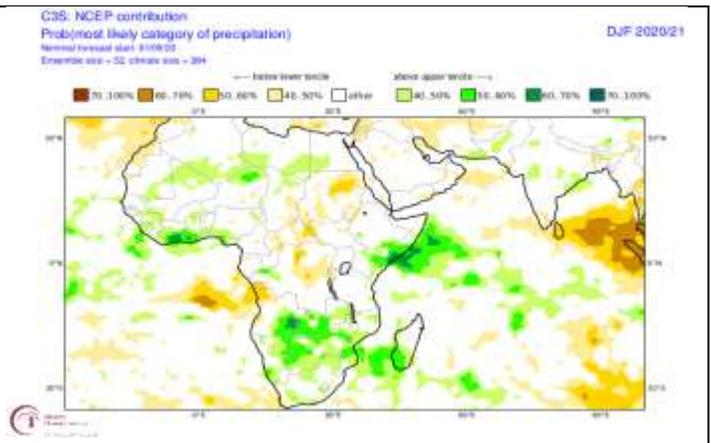
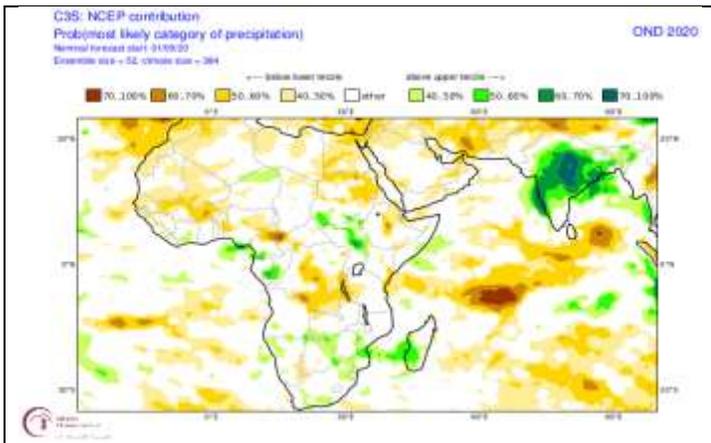


Probabilistic forecasts for rainfall (left) and temperatures (right) for mid-summer (November – January 2020/21; top) and mid-to-late summer (December – February 2020/21; bottom) (Forecast issued in 2020-10 by the IRI - <http://iri.columbia.edu>).

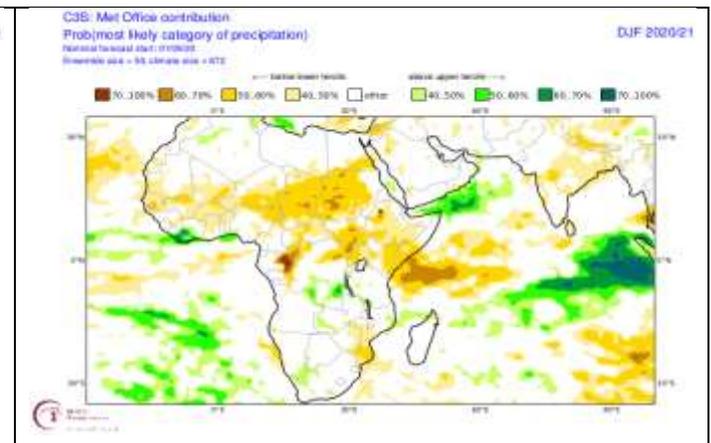
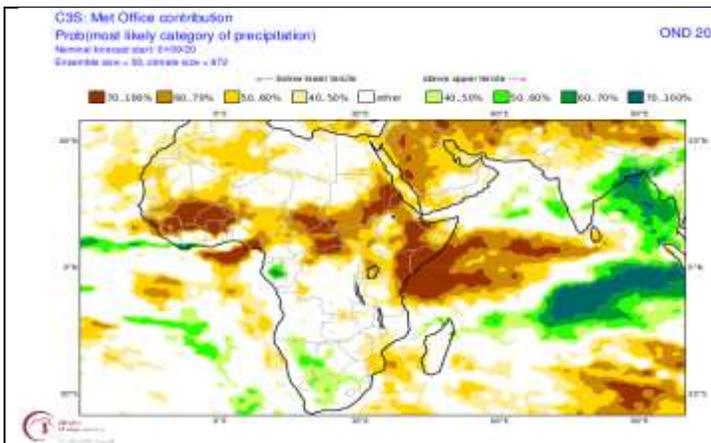
Seasonal forecasts by the ECMWF, NCEP, UKMO, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) for both early and mid-summer, reflect similar patterns with regards to rainfall for southern Africa as those by the IRI. The signal for relatively dry conditions over the summer rainfall region of South Africa is somewhat stronger for mid-summer to late summer (DJF) for most of these. This is probably associated with the weak negative Indian Ocean Dipole the developing and expected La-Niña-like conditions.



Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for early-summer (October – December 2020; left) and mid-to late summer (December – February 2020; right) (Forecasts issued in 2020-09).



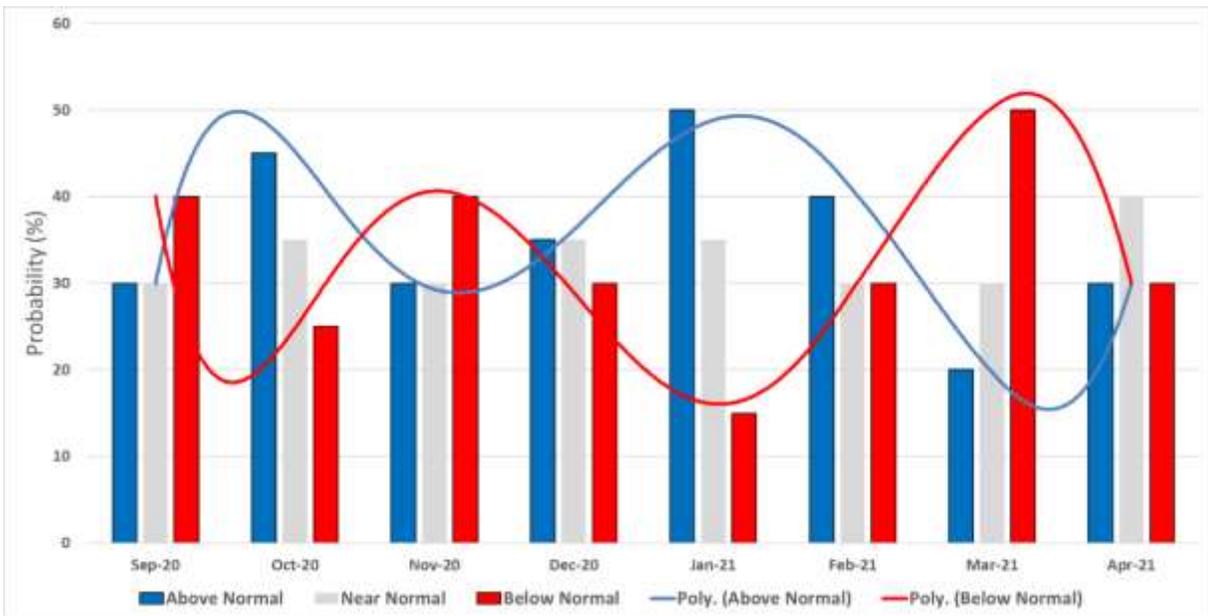
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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

CUMULUS seasonal outlook, based on decadal variability

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:

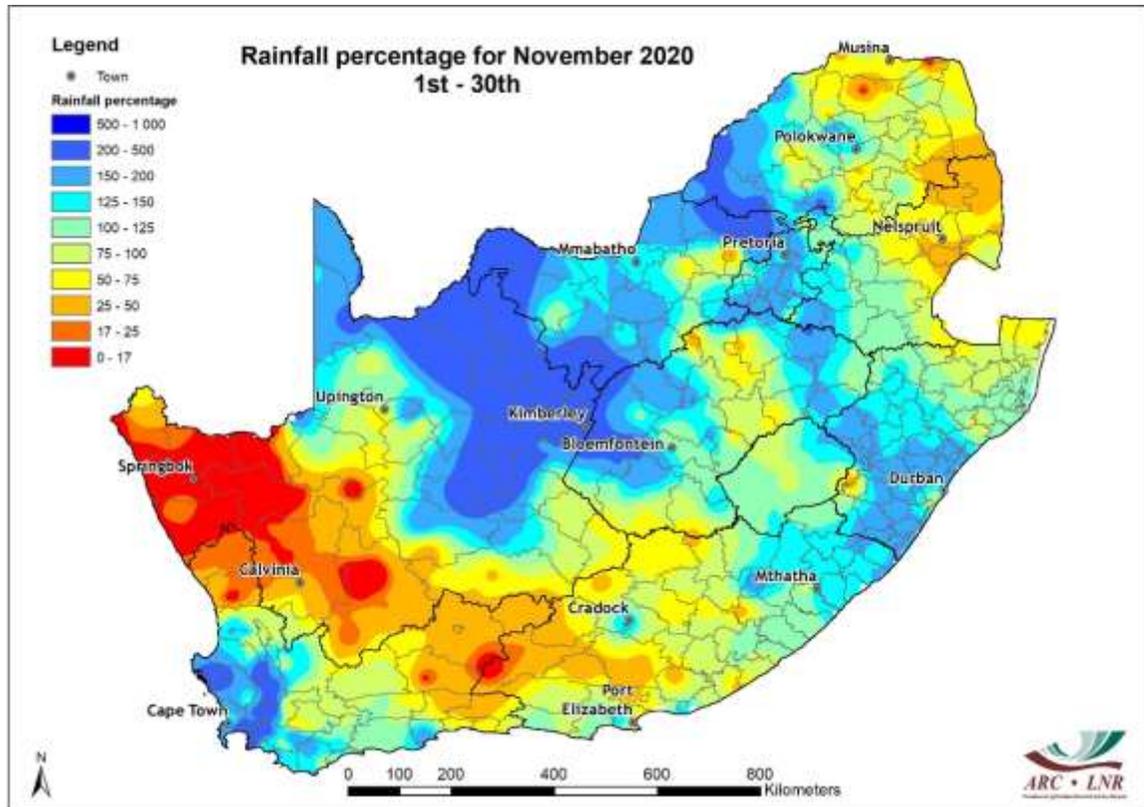


Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2020 – April 2021 (Forecast issued in 2020-09).

Typical patterns during similar summers are:

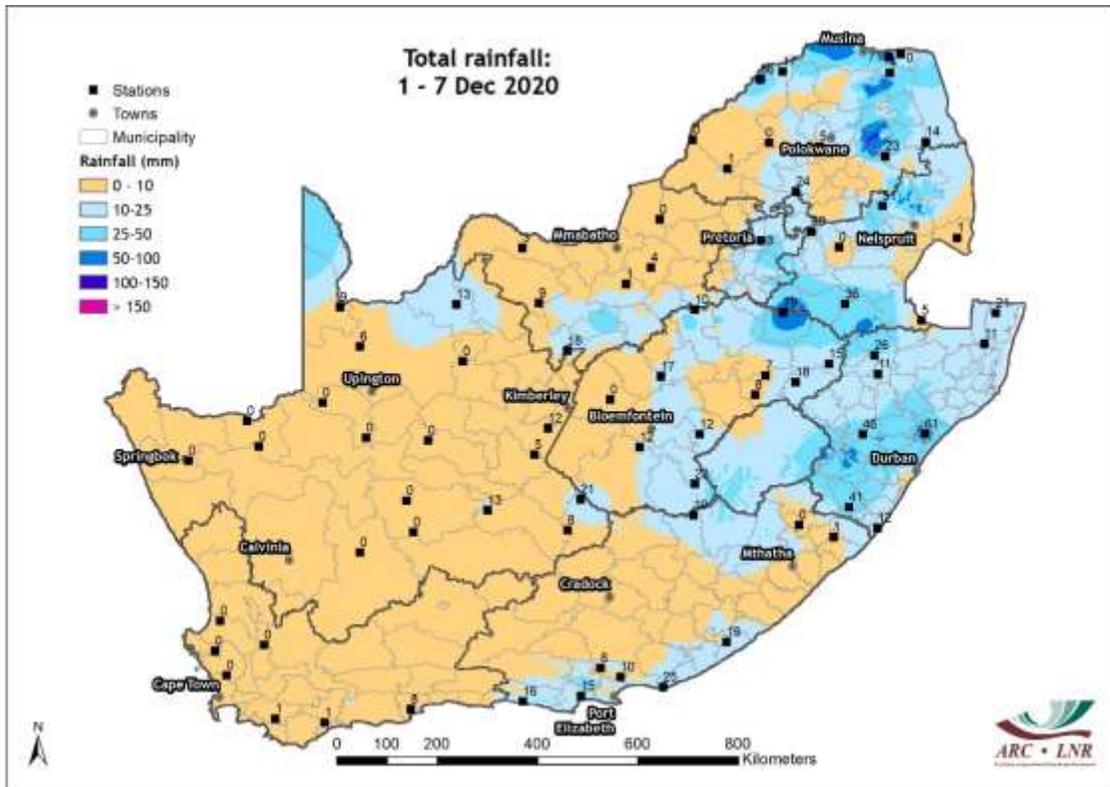
- Late September – 20 October: Relatively wet conditions over the summer rainfall region
- Late October – 20 November: Mostly drier than normal conditions
- Late November - December: Near-normal rainfall over the summer rainfall region
- January – late February: Normal to above-normal rainfall over the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

Rainfall (% of long-term mean): November 2020



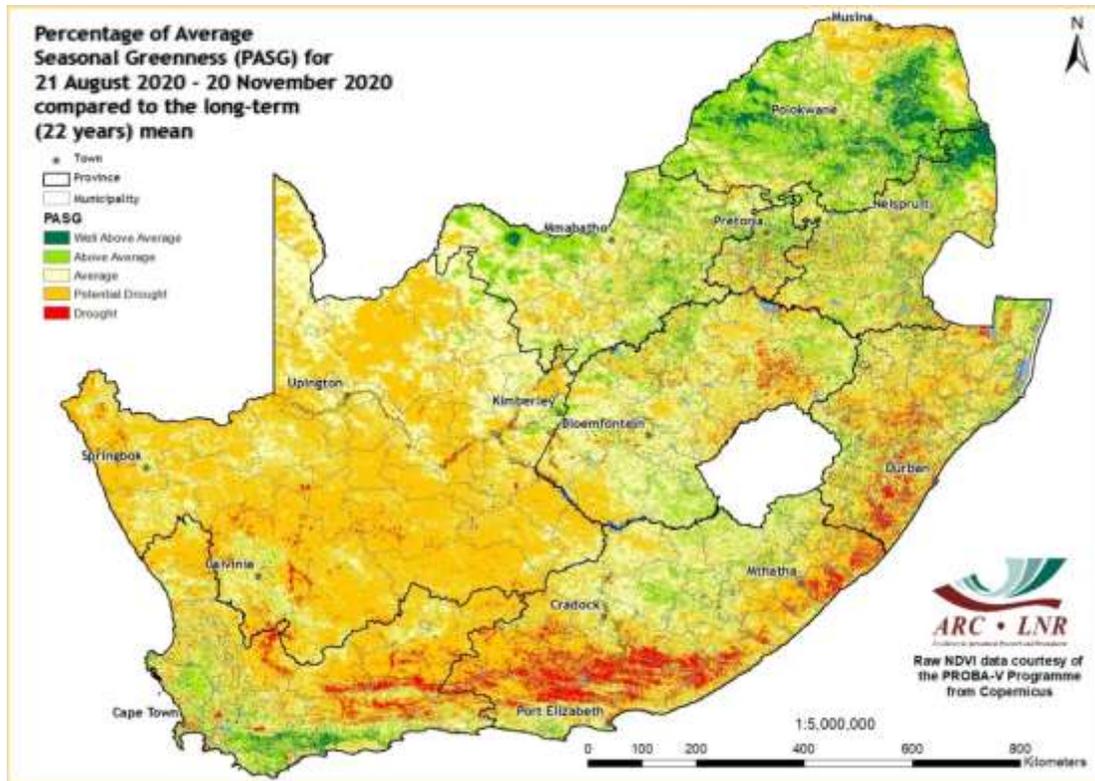
Most of the summer and winter rainfall region received normal to above-normal rainfall during November. The northern half of the West Coast and southwestern interior together with the extreme northeast were drier than normal.

Rainfall (mm): 1 – 7 December 2020



Most of the central to northeastern parts of the country received some rain during the first few days of December. The highest totals were recorded over central to southern KZN, southern Mpumalanga and the northern to eastern parts of Limpopo. The Garden Route also received some rain, but falls were generally light.

Percentage of Average Seasonal Greenness: 21 August – 20 November 2020



Cumulative vegetation activity for 11 August to 10 November is above normal over the winter grain-production region following widespread above-normal rainfall during most of the winter. Cumulative vegetation activity is also above normal over the northeastern parts of the summer rainfall region where above-normal rainfall occurred late September into early October. Parts of the Karoo still experience below-normal activity due to relatively dry conditions during the winter and spring.

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

Two weak upper-air troughs will move over the southern half of the country during the period while surface circulation over the Indian Ocean will be largely anticyclonic. To the north, a tropical low will move from northern Zimbabwe to southern Angola. The combination of the systems will result in an influx of moisture over the country with some upper-air support for thundershowers over much of the interior on any given day. Frontal systems and a ridging high-pressure system will contribute to cooler, windy conditions in the south where isolated showers are possible from time to time as far inland as parts of the Karoo.

Conditions in main agricultural production regions (8 – 14 December)

Maize production region: Once again, conditions will remain generally favourable for production over this entire area, with temperatures near normal and thundershowers expected on several days. Total rainfall should be near normal for this time of the year over most of the region.

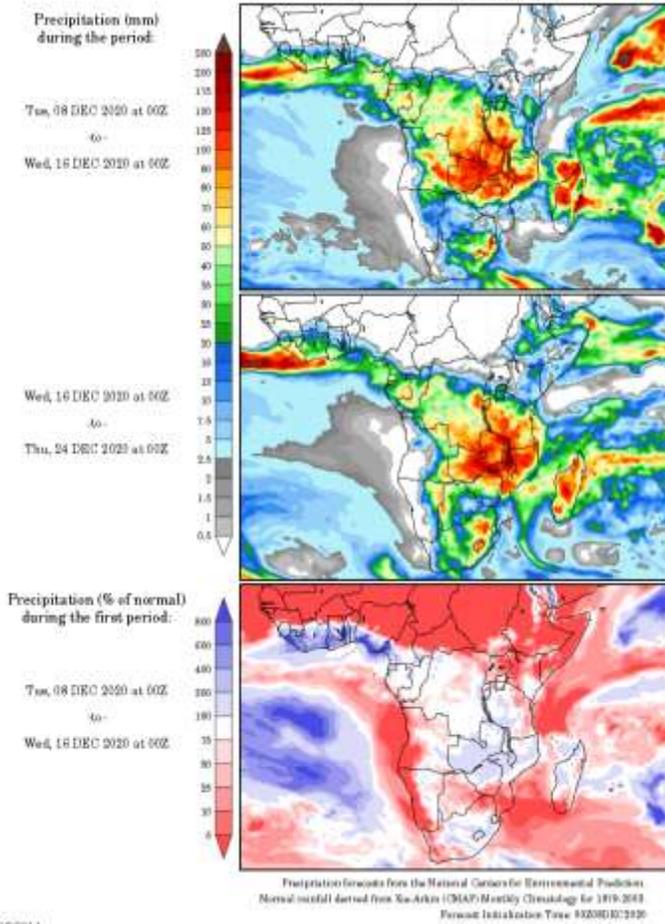
Thundershowers will at first focus on the western parts of the region. From Thursday to Saturday thundershowers will focus on the central to eastern parts of the region. From here it will once again expand westward, to be confined to the western parts by the end of the period according to current forecasts. Current forecasts don't seem to indicate a widespread tendency for storms to become severe over the region.

Maximum temperatures over the western maize production areas will be in the order of 28 – 35°C, with highest values to be reached later this week. Minimum temperatures will be in the order of 17 – 22°C. Maximum temperatures over the eastern maize-production region will range between 26 and 33°C, with highest temperatures during the remainder of the week. Minimums will be in the order of 11 – 16°C.

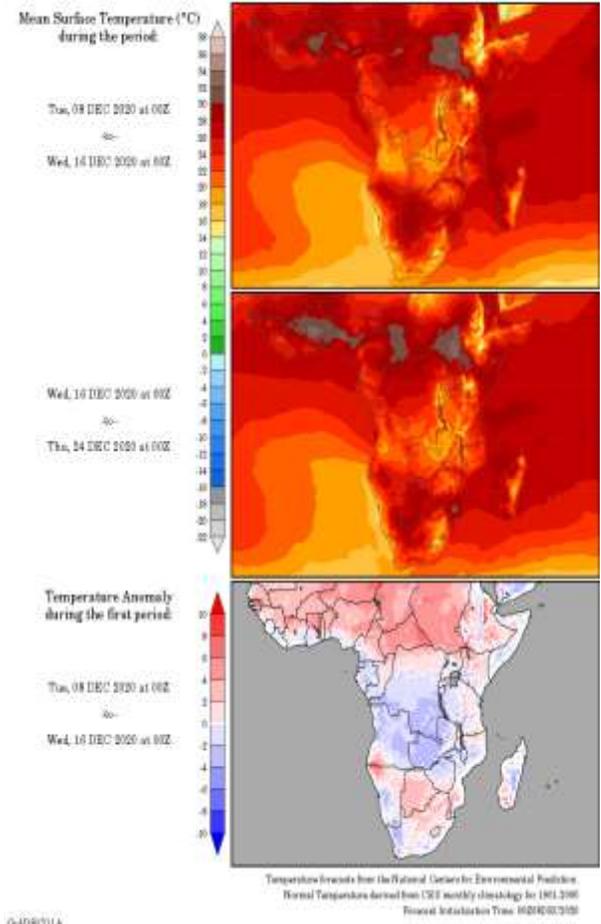
Cape Wine Lands and Ruens: The period will be dominated by a westerly to southerly flow that will result in cooler conditions, favoring the southern parts for light showers at times.

Thundershowers are expected initially over the eastern parts of the region. Light showers are possible over the western parts too as a frontal system associated with an upper-air low in the region results in instability. From Wednesday to Saturday it will remain largely cool along the Garden Route with light showers associated with an on-shore flow. These conditions will initially be associated with a strong southwesterly wind in the south. It will remain mild to cool over much of the region with a westerly to southerly flow until the weekend. A frontal system with a ridging high will result in more showers in the south on Saturday. It will become warm to hot over much of the region by Sunday, ahead of a possible cold front to the southwest.

Precipitation Forecasts



Temperature Forecasts



GrADS/COLA

GrADS/COLA

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 8 December) 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:

- Thundershowers may in some cases become severe, producing strong winds and hail:
 - Tuesday (8th): Eastern parts of the Northern Cape, northwestern Free State and western North West.
- It will be very hot and humid over the Limpopo River Valley and Lowveld from Thursday (10th) to Saturday (12th).

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.