CUMULUS

12 January 2021 – by J Malherbe, R Kuschke

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Summary

More rain expected – especially over the central interior

The presence of a tropical low to the north during late December maintained a source of abundant tropical moisture over the southern subcontinent. Relatively favorable upper-air and surface circulation patterns resulted in widespread rain and thundershowers especially over the central parts of South Africa, including the western maize-production areas. Yet another tropical system (Tropical Storm Chalane) moved in from the Mozambique Channel through Mozambique and Zimbabwe, Botswana and finally Namibia during early January. The presence of this low over Namibia was yet another source of tropical moisture, fed over the western to central interior and resulting in widespread rain over much of South Africa, especially the northwestern to central interior. High multi-day rainfall totals again occurred over especially the western maize-production region. Widespread flooding was reported in the vicinity of the Low, covering much of central to southern Namibia. The area of most significant rainfall during the last few weeks covers much of the western maize-production region, with some stations recording 300 – 400 mm of rain from December to early January 2021.

The rest of this week will see a continuation of widespread thundershowers over the central to western interior. However, by the weekend, the rain will shift to the northeastern parts while the west is expected to experience sunny and dry conditions for the first time in a while. The central to western parts will experience cloud and rainfall during the first few days of the period, becoming warm and dry by the weekend. The northeastern parts will experience warm and dry conditions during most of the remainder of the week, with cloud cover and rainfall becoming more frequent towards the weekend. Temperatures will on average be near normal across the country while rainfall will be normal to above normal in most areas, but near normal to below normal over the northeastern parts.

There are early indications of the intensification of a tropical low near the coast of Mozambique towards early next week. This type of pattern is usually associated with somewhat drier conditions over the interior of southern Africa.

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

- **General:**
    - Conditions will remain largely favorable for crop production over the summer rainfall region with near normal rainfall and -temperatures expected over most of the summer-grain-production areas. Rain during the first few days over the western production areas may lead to excessively wet conditions in some places.
    - Most of the summer rainfall region should see normal to above-normal rainfall but near normal in the northeast. Rain is also expected along the Garden Route and over the winter rainfall region during the period.
    - It should become drier over the interior from the weekend onwards.
    - Temperatures over the main summer-grain production region will be supportive of crop growth:
        - Maximum temperatures over the western maize production areas will be in the order of 26 – 31°C, warming towards the weekend. Minimum temperatures will be in the order of 17 – 21°C.
        - Maximum temperatures over the eastern maize-production region will range between 24 and 30°C, with lowest temperatures by the weekend. Minimums will be in the order of 14 – 18°C.

- **Detailed:**
    - Tuesday (12th): Cloudy and mild conditions over the central parts with widespread rain and thundershowers initially. Thundershowers will develop later over the Eastern Highveld as well as over the Karoo and Garden Route. It will be hot over the western interior and the Swartland. Strong southeasterlies are expected in the southwest.
    - Wednesday (13th): Scattered thundershowers will continue over much of the central, southern and eastern interior, including the entire maize-production region. It will remain hot over the western interior and into the Swartland. Strong southeasterlies will continue in the southwest.

- Thursday (14th): Scattered to widespread thundershowers remain in place over the central interior, expanding westwards and also moving southeastwards into the Eastern Cape. Light showers are expected over the southern parts of the winter rainfall region as a cold front brushes the area. It will remain hot over the western parts initially, but cooler air will invade the region from the west later. The northeastern parts will be mostly dry.
- Friday (15th): Scattered to widespread thundershowers and rain remain in place over the central to southeastern parts, with showers also along the Garden Route and further west over parts of the winter rainfall region. Dry air will invade the western interior where it will clear and be cooler. Scattered showers and thundershowers will also invade Limpopo from the northeast as a tropical low to the north moves somewhat south.
- Saturday (16th): Dry air will invade most of the interior from the southwest, but thundershowers will still be active over the northeastern parts. A few severe storms may occur over parts of Mpumalanga.
- Sunday and Monday (17th, 18th): Dry over most of the interior, but isolated thundershowers are possible over the northeastern parts. The western to central interior will become warmer.

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 5 January): The 2020–21 La Niña is likely to have peaked in terms of sea surface temperatures in the Pacific Ocean. However, impacts associated with La Niña…….are expected to persist …

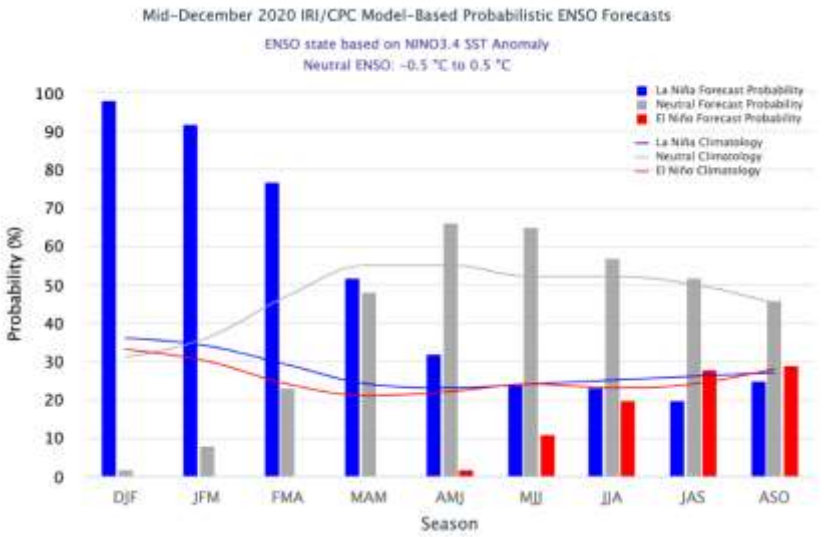
Over the past fortnight here has been little change in sea surface temperatures across the central Pacific Ocean, which have been close to the La Niña threshold of 0.8 °C below average since early December. However, the Southern Oscillation Index has risen sharply and is currently at +18.8, well above the La Niña threshold of +7.

Model outlooks indicate the strength of La Niña is likely to ease in the coming weeks with a likely return to neutral conditions during the late southern summer or early autumn.

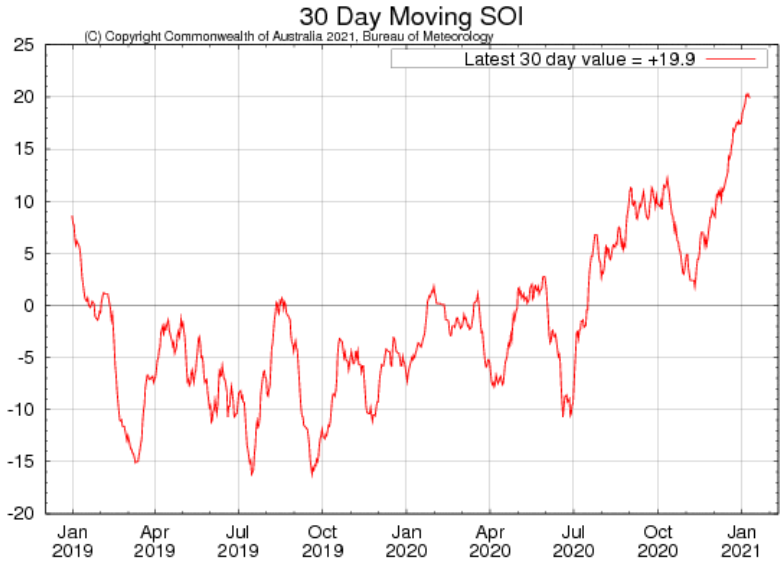
The Southern Annular Mode (SAM) continues to be strongly positive. While positive SAM often occurs during La Niña, the current event is also being driven by an exceptionally strong polar vortex over Antarctica. Positive SAM values are expected until late January 2021. …...***Australian Bureau of Meteorology*** - 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 18 December): In mid-December, 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 is similar to these model forecasts, calling for a 95% chance of La Niña for winter. 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/



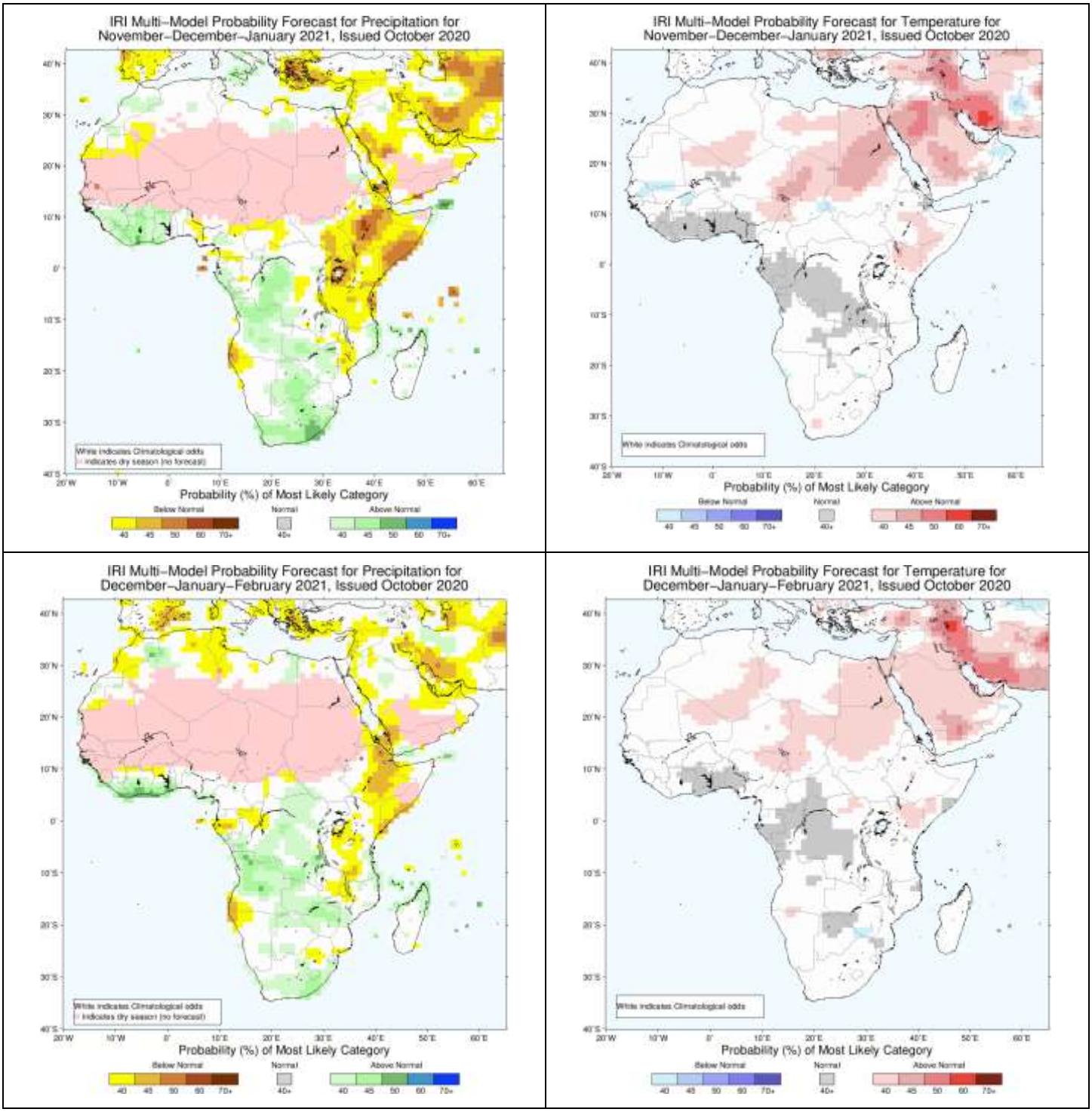
Australian Bureau of Meteorology - http://www.bom.gov.au

The Southern Oscillation Index has risen sharply to +19, 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

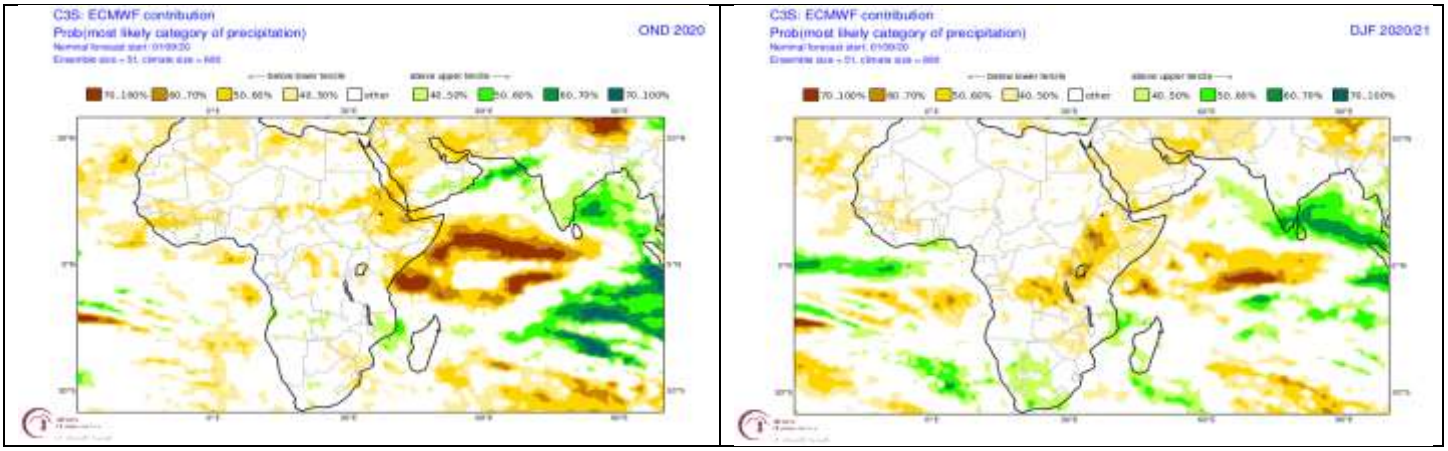
IRI, ECMWF, NCEP, UKMO

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.

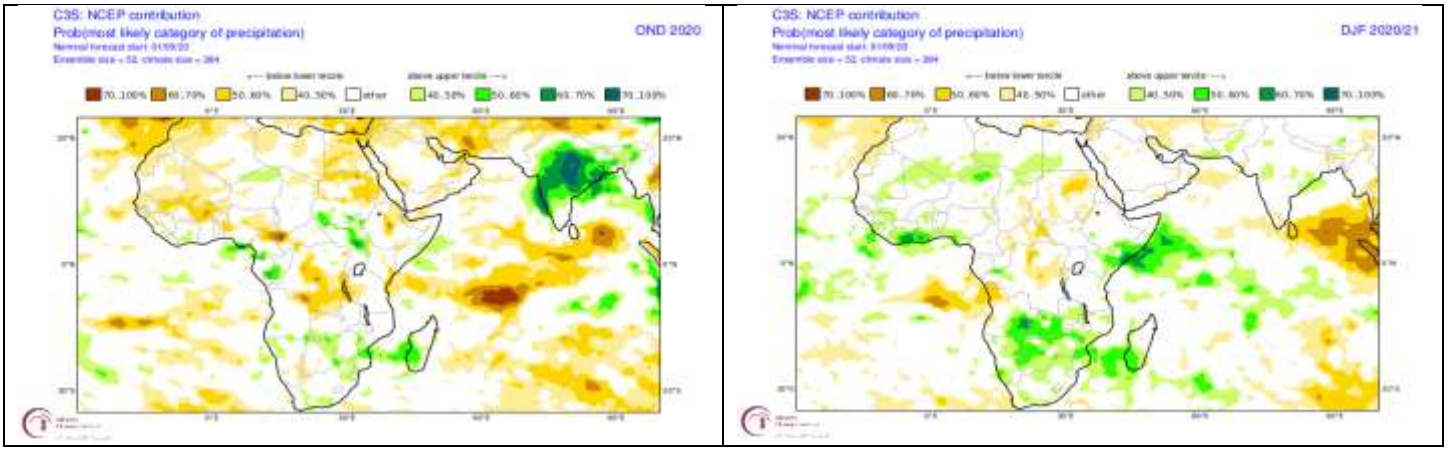


Probabilistic forecasts for rainfall (left) and temperatures (right) for mid-summer (November – January 2020/21; top) and mid-to-late summer (December – February 2020/21; bottom) (Forecast issued in 2020-10 by the IRI - http://iri.columbia.edu/).

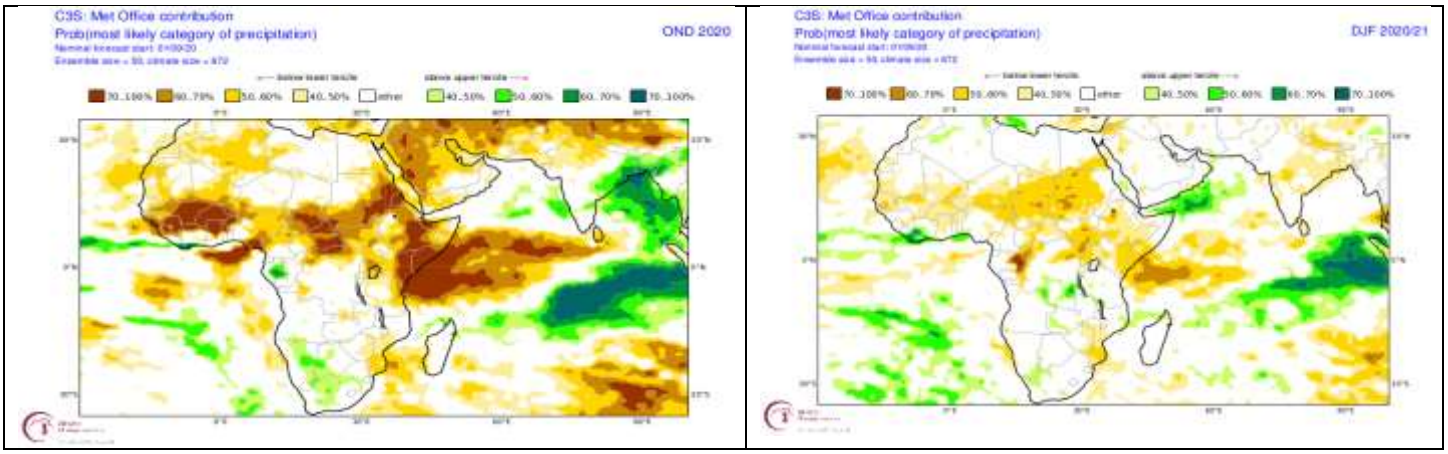
Seasonal forecasts by the ECMWF, NCEP, UKMO, as published by the COPERNICUS Programme (***https://climate.copernicus.eu/seasonal-forecasts***) for both early and min-summer, reflect similar patterns with regards to rainfall for southern Africa as those by the IRI. The signal for relatively dry conditions 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).



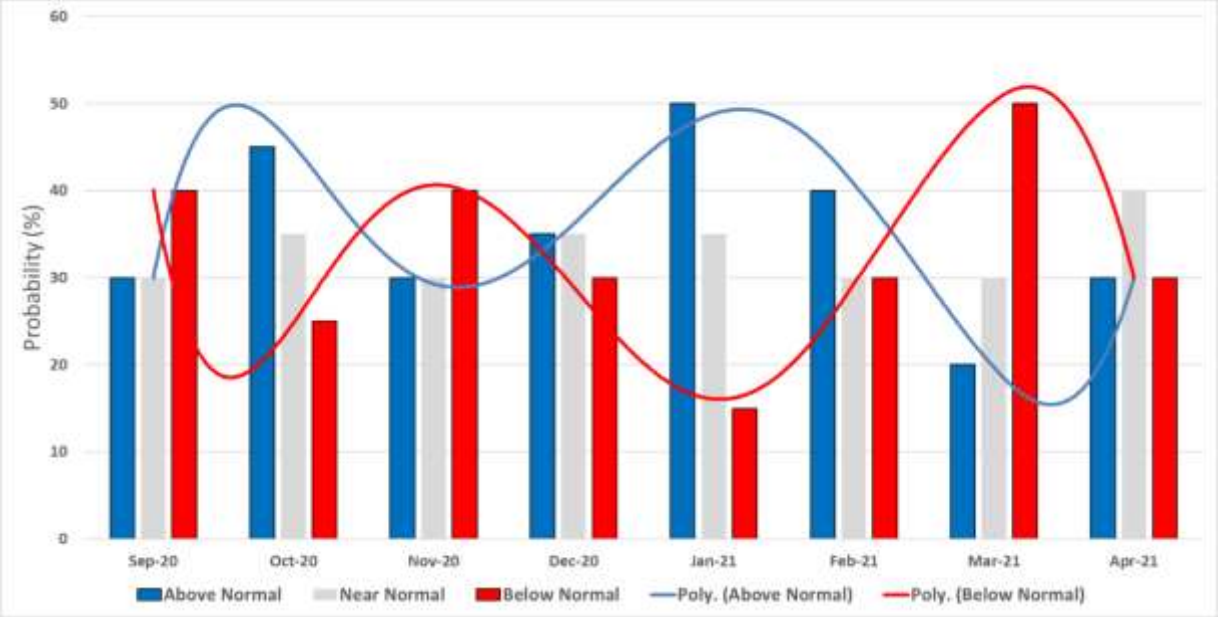
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



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:

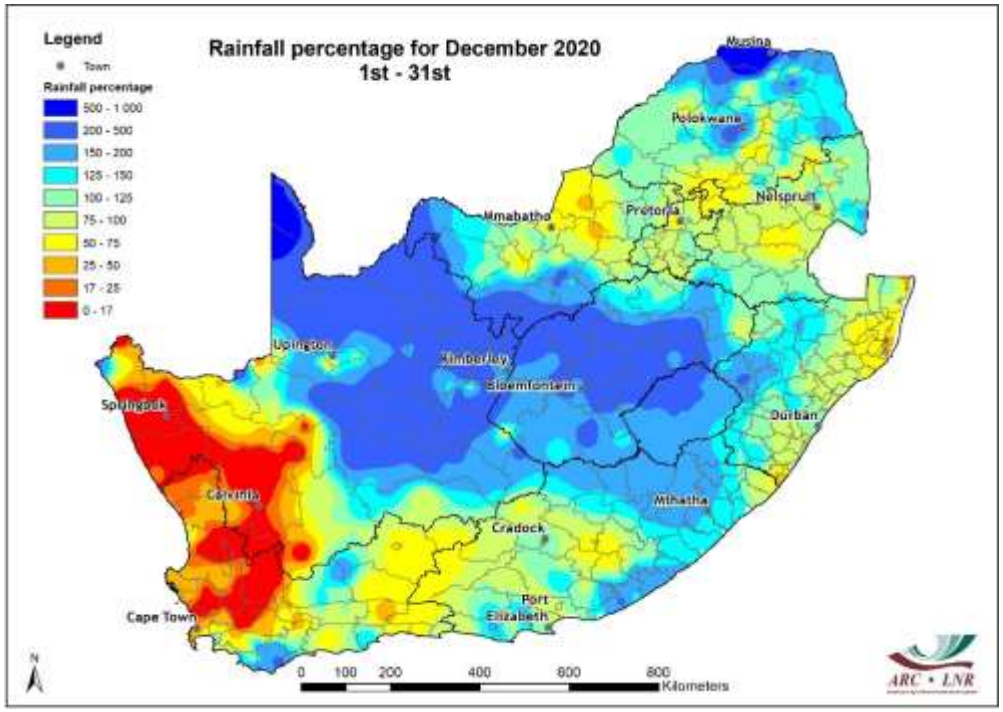


Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2020 – April 2021 (Forecast issued in 2020-09).

Typical patterns during similar summers are:

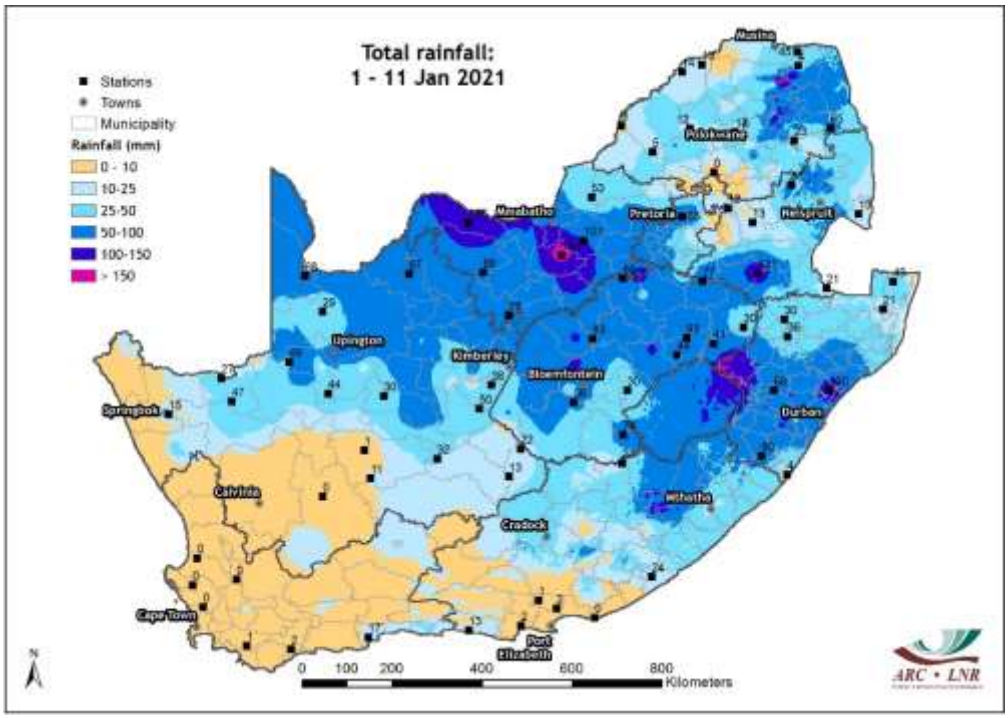
- Late September – 20 October: Relatively wet conditions over the summer rainfall region
- Late October – 20 November: Mostly drier than normal conditions
- Late November - December: Near-normal rainfall over the summer rainfall region
- January – late February: Normal to above-normal rainfall over the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

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



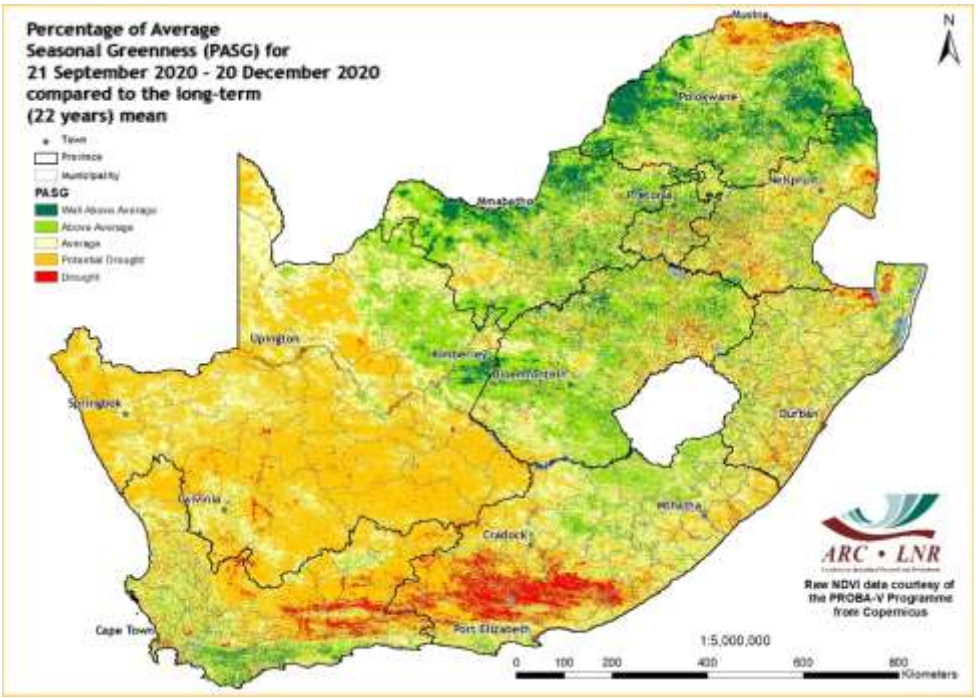
Most of the summer rainfall region and Garden route received above-average rainfall during December, but the largest positive deviations in terms of the percentage of average occurred over the central interior. The eastern maize-production region received near-normal rainfall while the western production region received well-above-normal rainfall.

Rainfall (mm): 1 – 11 January 2020



Much of the central interior and further east into KZN received between 50 and 150 mm of rain during early January, with higher totals over the central parts of North West.

Percentage of Average Seasonal Greenness: 21 September – 20 December 2020



Cumulative vegetation activity for 21 September to 20 December is above normal over the winter grain-production region and further east along the Garden Route following widespread above-normal rainfall during most of the winter and further rain during spring and summer along the Garden Route. Cumulative vegetation activity is also above normal over the central to northeastern parts where above-normal rainfall occurred late September into early January. 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

Tropical moisture from a low situated over Namibia together with the impact of an upper-air trough moving through will result in widespread rainfall over much of the central to western parts during the first few days. As the trough moves eastwards over the central parts on Friday, widespread showers will occur over these areas, shifting eastwards and southeastwards during the day. A frontal system associated with the trough will also result in some showers over the winter rainfall region.

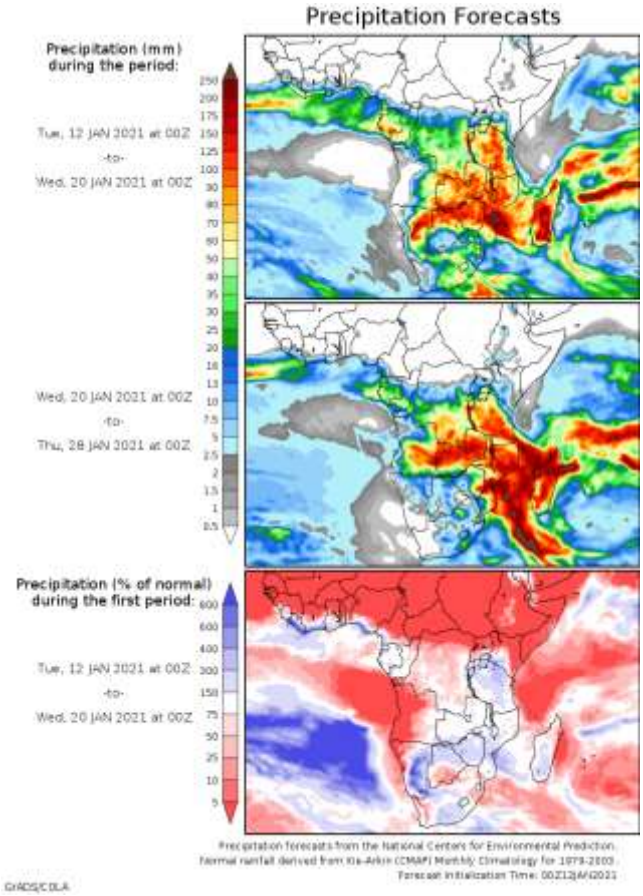
Another tropical low to the north will also result in some showers and thundershowers over Limpopo on Friday and into the weekend. Dry air will invade the western to central parts from Friday onwards as the surface high will ridge across the interior. This will lead to thundershowers being confined to the northeastern parts during the weekend and into early next week. Current forecasts indicate the deepening of a tropical low in the vicinity of central Mozambique by early next week – these forecasts are still uncertain – but such a pattern is usually associated with somewhat drier conditions over South Africa.

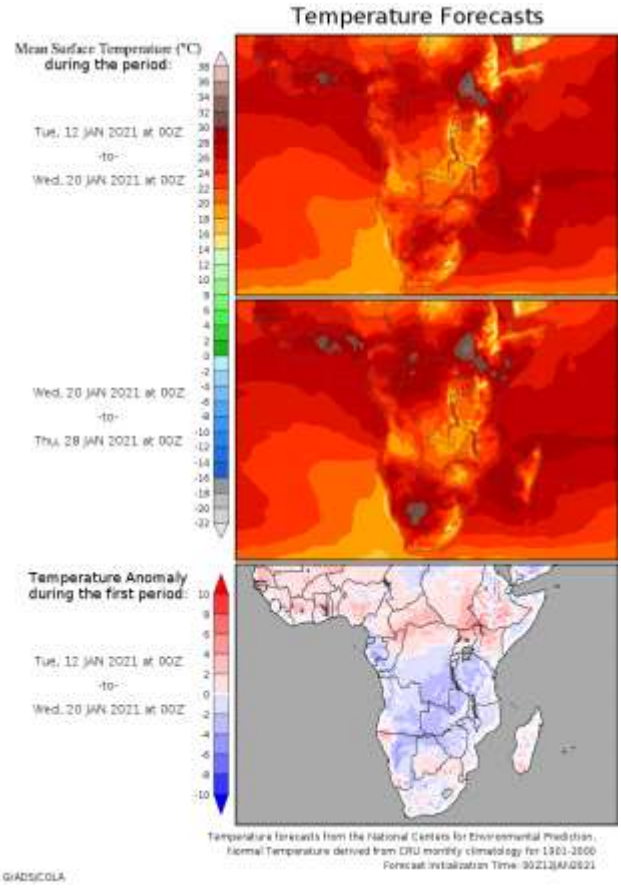
Conditions in main agricultural production regions (12 – 18 January)

Maize production region: The western parts of this region should remain mostly cloudy to partly cloudy and mild until Friday with scattered rain and thundershowers. Somewhat more widespread rain is expected by Thursday and Friday when significant totals may occur especially towards the southwest according to current forecasts. It should be sunny and warm from Saturday onwards over this area. The eastern parts should experience scattered thundershowers on Tuesday and Wednesday (12th, 13th), with drier conditions afterwards until later Friday. Scattered thundershowers may occur on Saturday with severe storms possible especially towards the escarpment. Isolated thundershowers are still possible on Sunday and Monday (17th, 18th) over these eastern areas of the production region.

Temperatures over the entire region will be near the long-term average, with a cool bias in maximum temperatures. Maximum temperatures over the western maize production areas will be in the order of 26 – 31°C, warming towards the weekend. Minimum temperatures will be in the order of 17 – 21°C. Maximum temperatures over the eastern maize-production region will range between 24 and 30°C, with lowest temperatures by the weekend. Minimums will be in the order of 14 – 18°C.

Cape Wine Lands and Ruens: A southeasterly flow will keep the southern parts relatively cool at first while it will be hot to very hot over the Swartland, West Coast and western parts of the Karoo until Thursday (14th) when isolated thundershowers are possible especially towards the east and along the Garden Route. As the wind turns westerly by Friday, cooler conditions will invade especially the western parts until Saturday (16th). Frontal activity will result in light showers over the southern and western parts at times from Thursday to Saturday. The period is expected to end with sunny and mild conditions dominating.





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 12 January) 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 are possible according to current forecasts over the western to southern Free State and into the Eastern Cape on Thursday (14th) and Friday (15th). This may be conducive to flooding where soils and river systems are saturated.
- Cloudy and moist conditions until Friday (15th) over the central parts may result in the occurrence of fungal pathogens.
- It will be very hot over the southwestern parts, including the Swartland, from Tuesday (12th) to Thursday (14th).
- Strong to gale-force southeasterlies are possible over the southwestern parts from Tuesday (12th) to Thursday (14th). Where vegetation is dry, this may result in the development and spread of wild fires.
- Severe thunderstorms are possible on Saturday (16th) over the central to eastern parts of Mpumalanga according to current forecasts.

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
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