South African Weather Service

Seasonal Climate Watch

April to July 2024

Date issued: 28 March 2024

1. Overview

The El Niño-Southern Oscillation (ENSO) is currently in a strong El Niño state, which is predicted to rapidly decline into a neutral state by early winter. However, as the summer has ended, we expect minimal influence from the current El Niño event that is still in effect.

We are now in the transition from summer to autumn. This is also the time of the year when the occurrence of cut-off low weather systems (from March to May) climatologically has the highest frequency of occurrence. These systems typical have the largest impact along the southern to southeastern coastal areas. It is therefore strongly recommended that the short-term weather forecasts of SAWS are routinely consulted in addition to the seasonal forecast.

The South African Weather Service (SAWS) multi-model rainfall forecast indicates mostly below-normal rainfall over most of the country during Apr-May-June (AMJ), May-Jun-Jul (MJJ) and Jun-Jul-Aug (JJA), except for some parts over KwaZulu-Natal, Eastern Cape and Free State for AMJ where above-normal rainfall is expected.

Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period.

The SAWS will continue to monitor the weather and climate conditions and provide updates on any future assessments that may provide more clarity on the current expectations for the coming season.

2. South African Weather Service Prediction System

2.1. Ocean-Atmosphere Global Climate Model

The SAWS is currently recognised by the World Meteorological Organization (WMO) as a Global Producing Centre (GPC) for Long-Range Forecasts (LRF). This is owing to its local numerical modelling efforts, which involve coupling of both the atmosphere and ocean components to form a fully interactive coupled modelling system, named the SAWS Coupled Model (SCM), the first of its kind in both South Africa and the region. Below are the third season (April-May-June) predictions for rainfall (Figure 1) and average temperature (Figure 2).

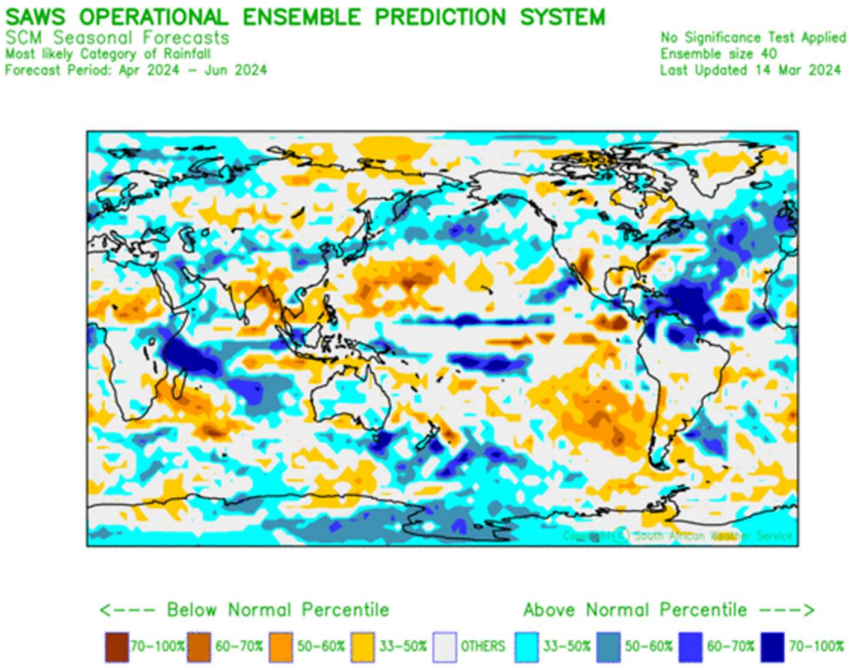

Figure 1: April-May-June, AMJ (2024) global prediction for total rainfall probabilities

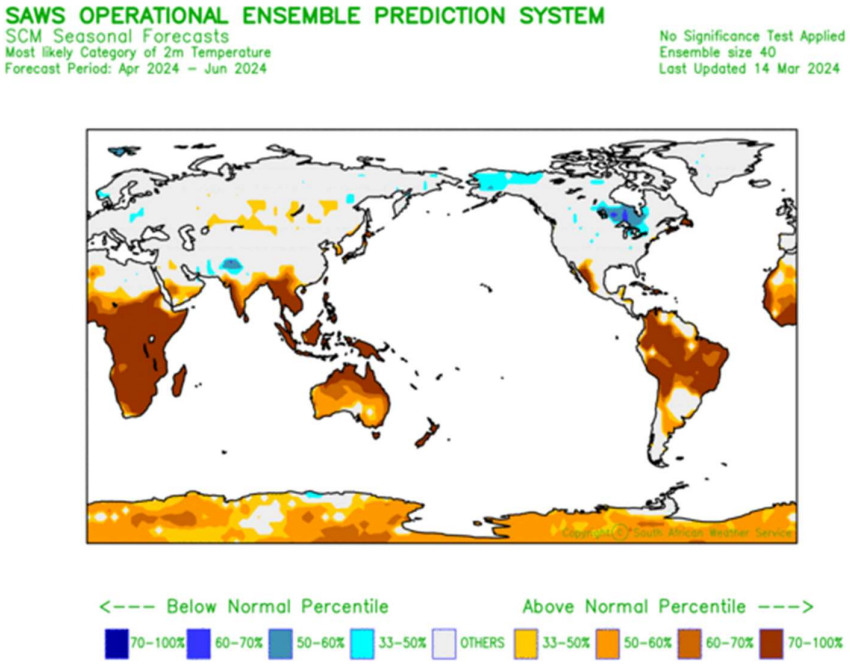

Figure 2: April-May-June, AMJ (2024) global prediction for average temperature probabilities

2.2. Seasonal Forecasts for South Africa from the SAWS seasonal prediction system

The above-mentioned global forecasting systems' forecasts are combined with the GFDL-SPEAR and COLA-RSMAS-CCSM4 systems (part of the North American Multi-Model Ensemble System) for South Africa, as issued with the March 2024 initial conditions, and are presented below:

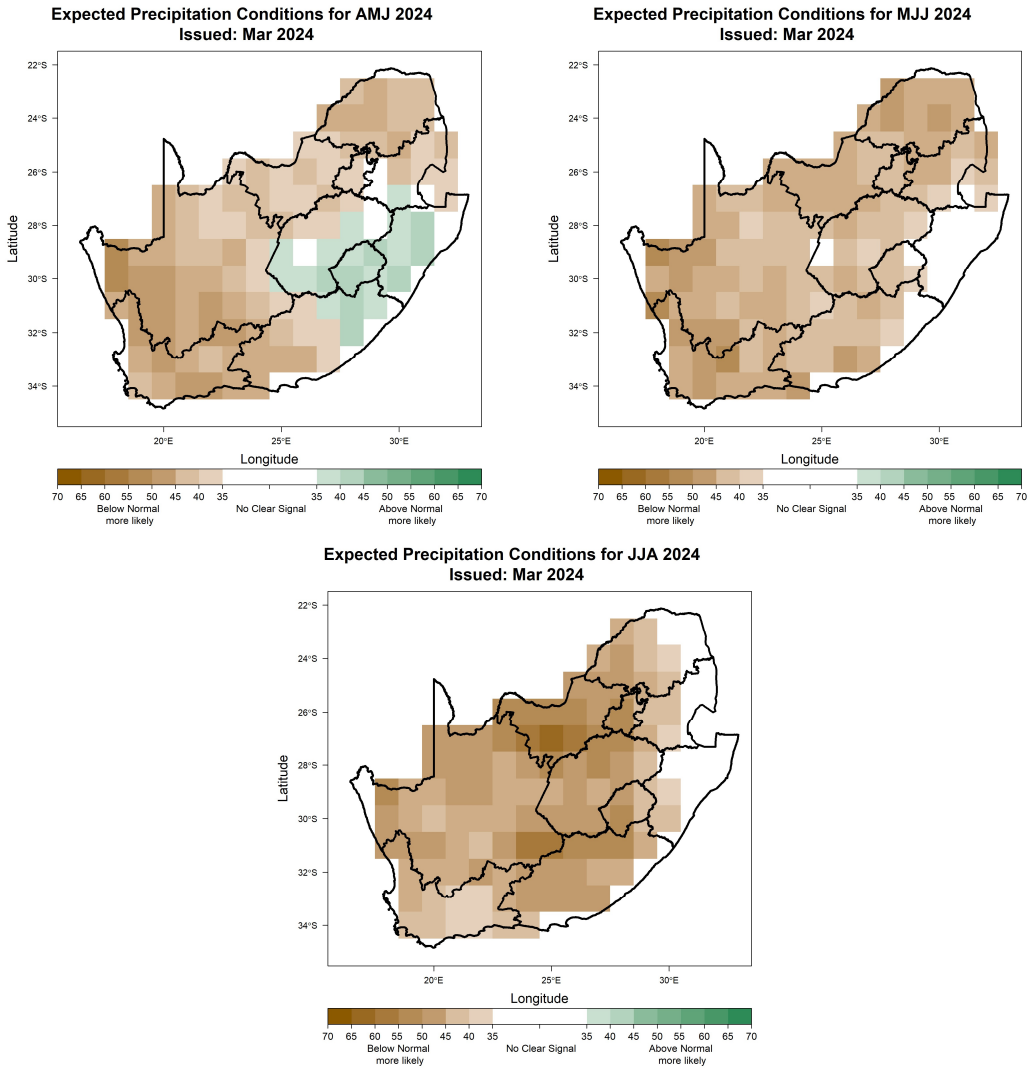

Figure 3: April-May-June 2024 (AMJ; left), May-June-July 2024 (MJJ; right), June-July-August 2024 (JJA; bottom) seasonal precipitation prediction. Maps indicate the highest probability of the above-normal and below-normal categories. Please refer to appendix figure A1 for forecast skill levels.

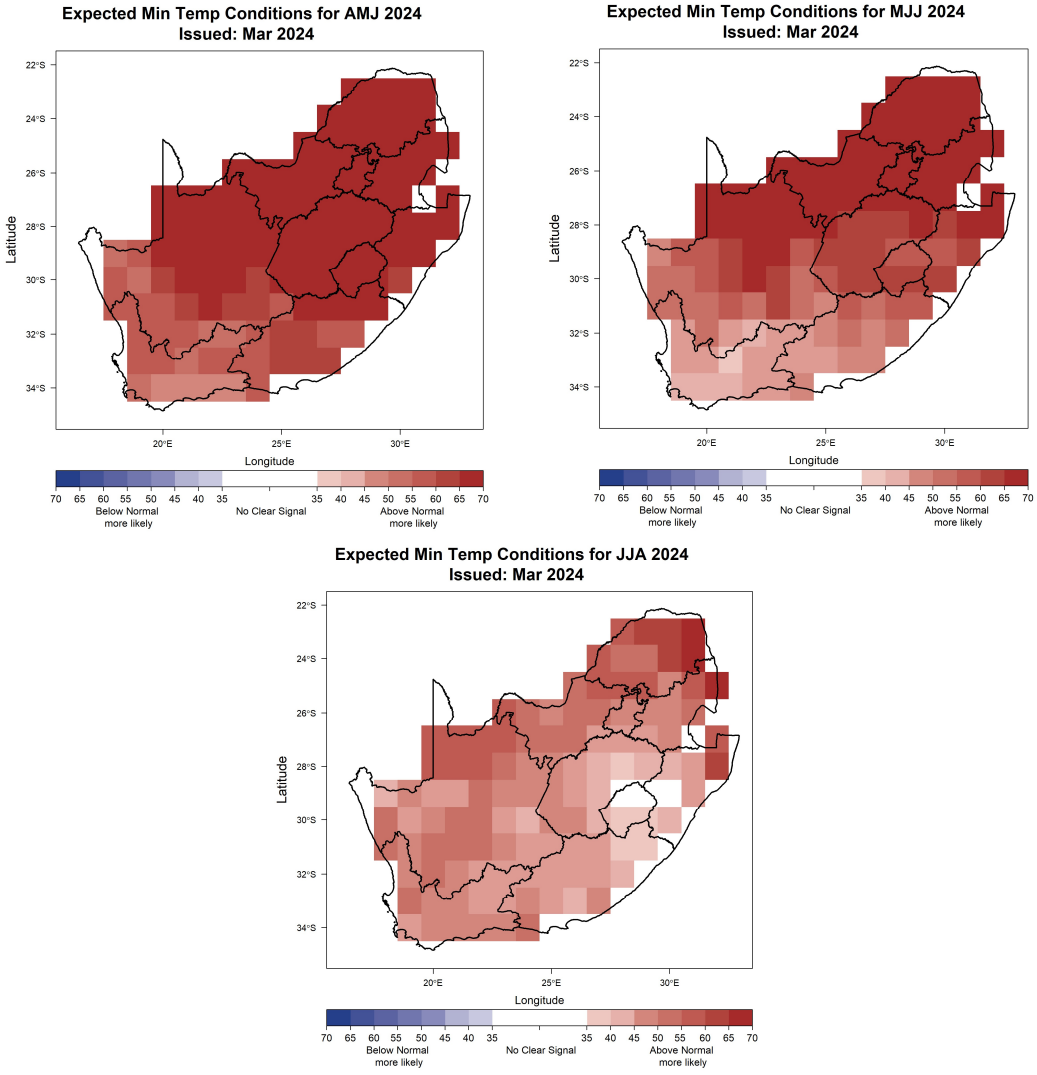

Figure 4: April-May-June 2024 (AMJ; left), May-June-July 2024 (MJJ; right), June-July-August 2024 (JJA; bottom) seasonal minimum temperature prediction. Maps indicate the highest probability of the above-normal and below-normal categories. Please refer to appendix figure A2 for forecast skill levels.

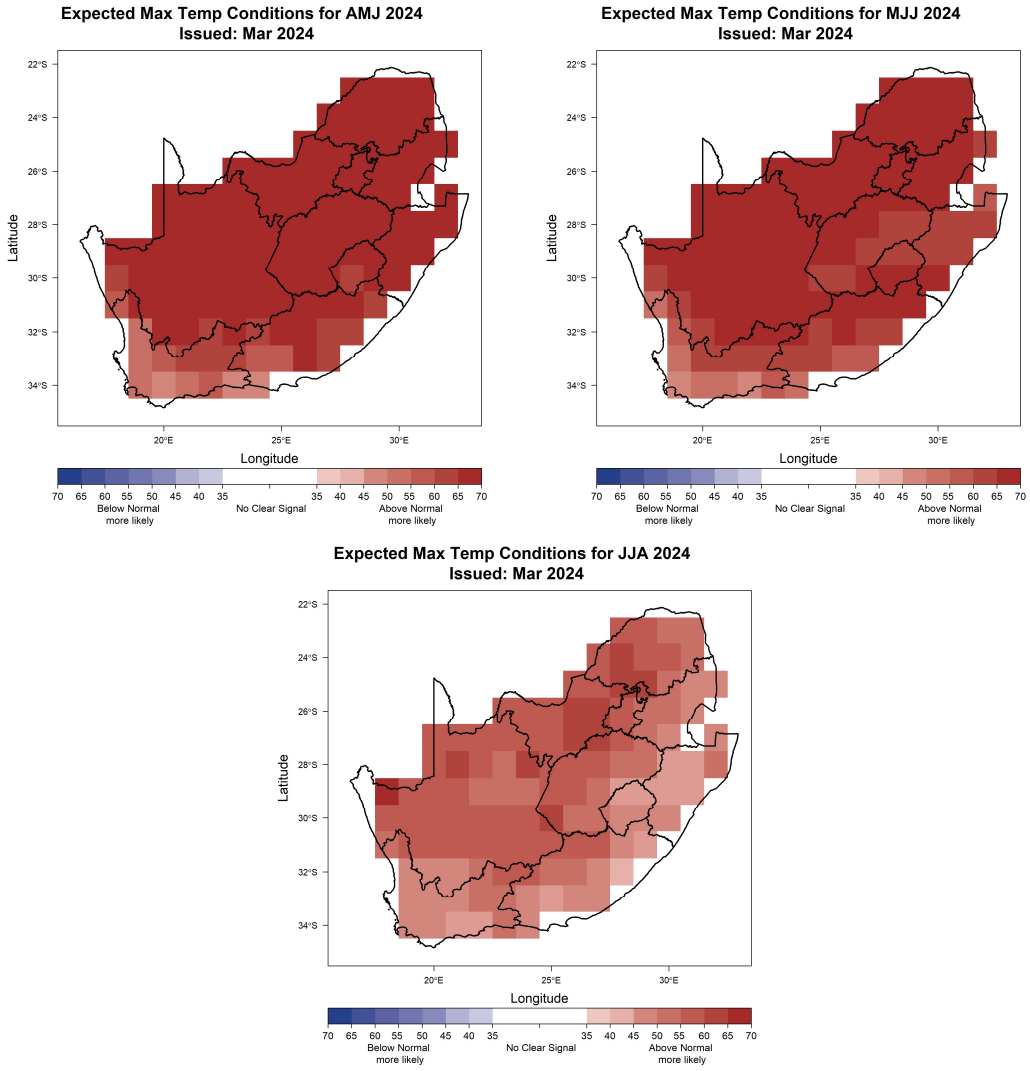

Figure 5: April-May-June 2024 (AMJ; left), May-June-July 2024 (MJJ; right), June-July-August 2024 (JJA; bottom) seasonal maximum temperature prediction. Maps indicate the highest probability of the above-normal and below-normal categories. Please refer to appendix figure A3 for forecast skill levels.

2.3. Climatological Seasonal Totals and Averages

The following maps indicate the rainfall and temperature (minimum and maximum temperature) climatology for the April-May-June, May-June-jUly and June-July-August seasons. The rainfall and temperature climates are representative of the average rainfall and temperature conditions over a long period of time for the relevant 3-month seasons presented here.

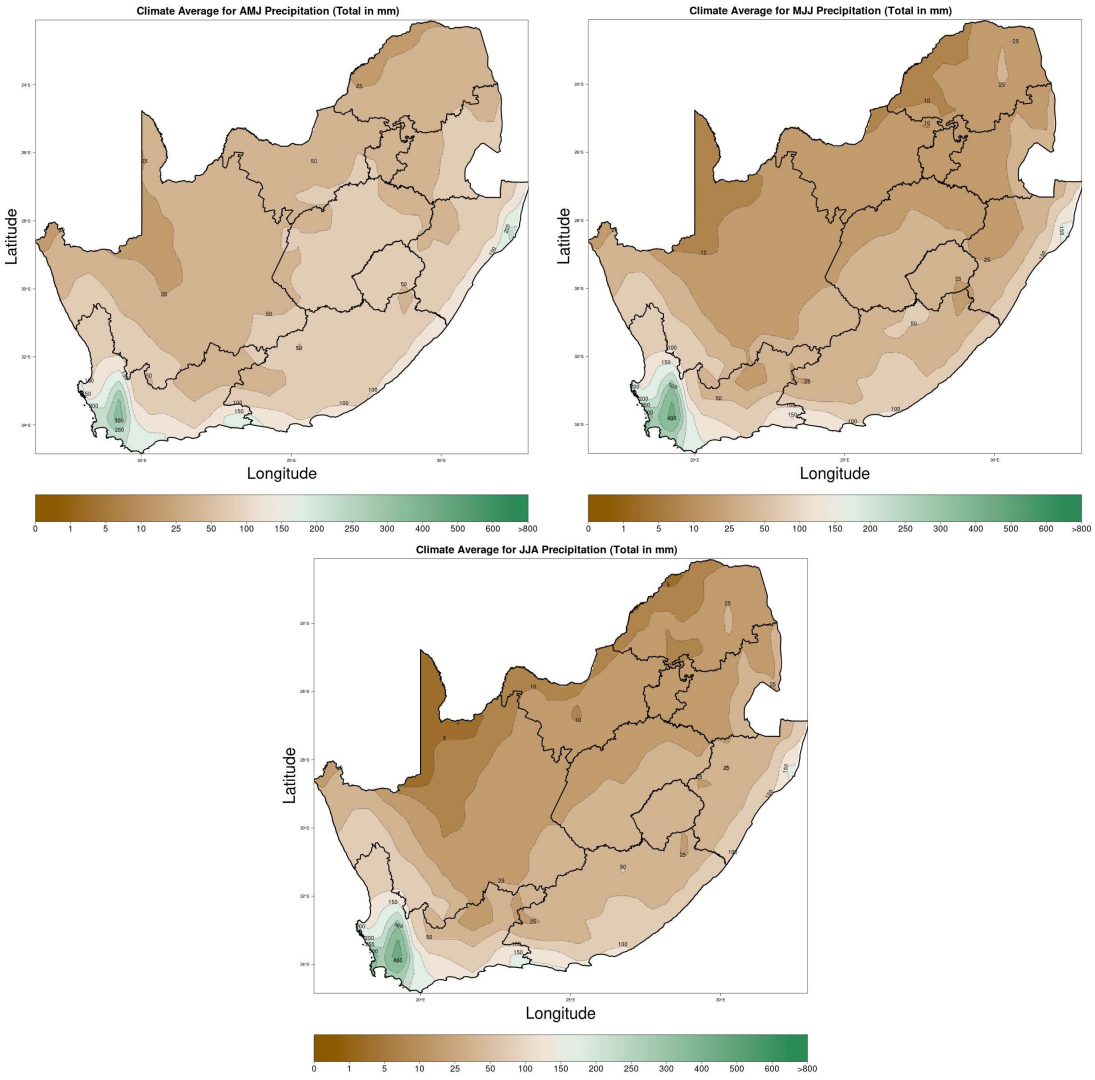

Figure 6: Climatological seasonal totals for precipitation during April-May-June (AMJ; left), May-June-July (MJJ; right) and June-July-August (JJA; bottom).

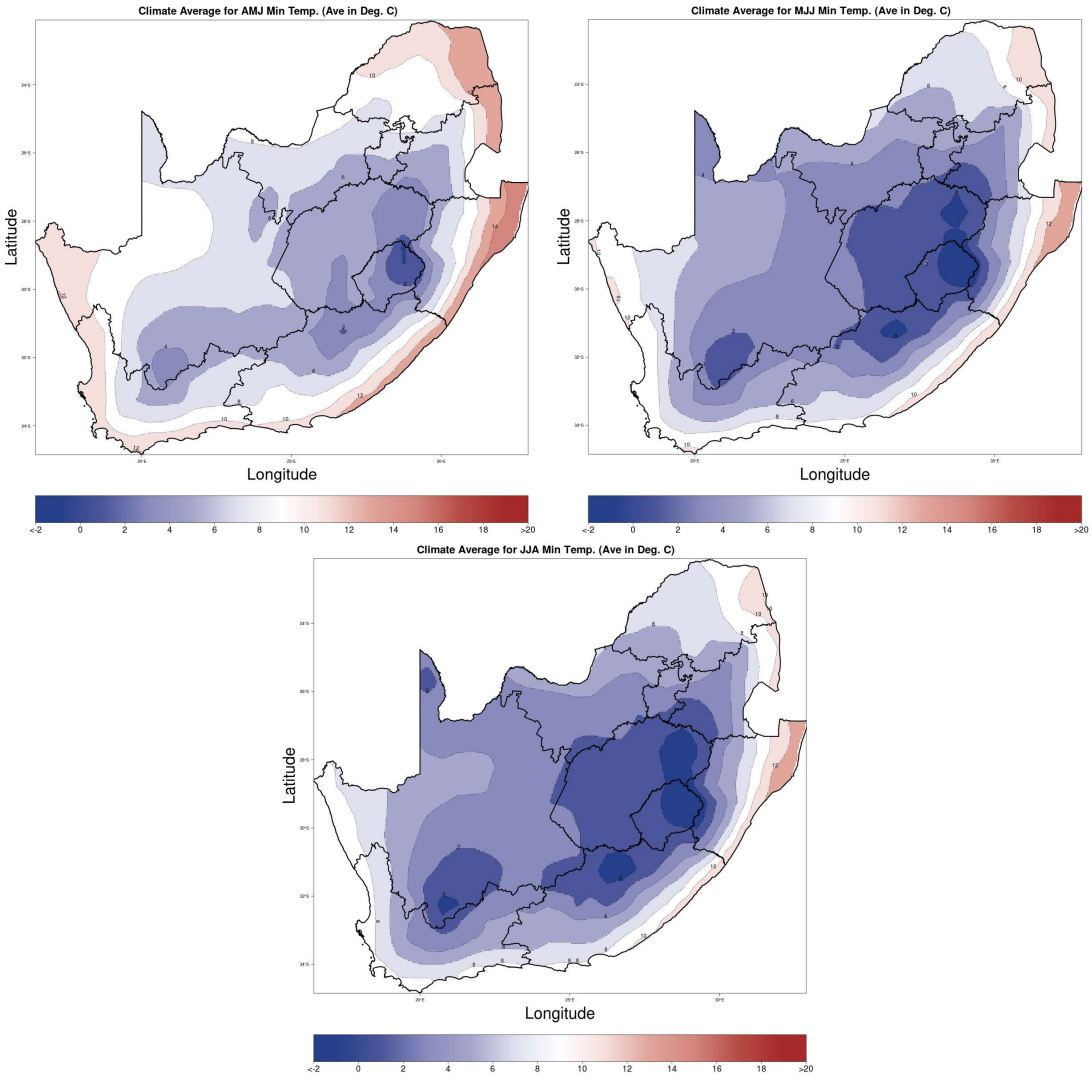

Figure 7: Climatological seasonal averages for minimum temperature during April-May-June (AMJ; left), May-June-July (MJJ; right) and June-July-August (JJA; bottom).

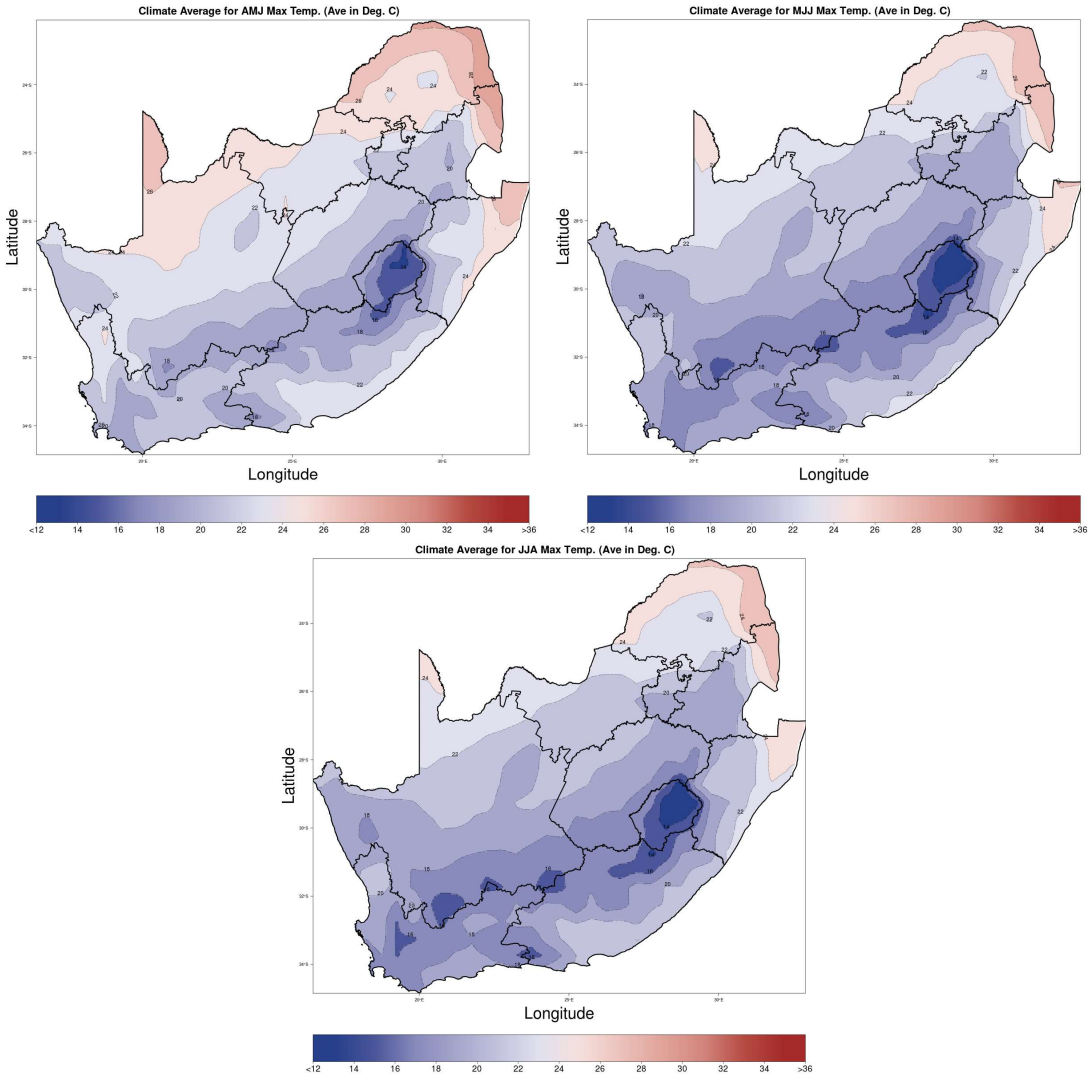

Figure 8: Climatological seasonal averages for maximum temperature during April-May-June (AMJ; left), May-June-July (MJJ; right) and June-July-August (JJA; bottom).

3. Summary implications to various economic sector decision makers

Water and Energy

Below-normal rainfall and above-normal temperatures are expected for most parts of the country across the seasons (with exceptions to parts of KwaZulu-Natal, Eastern Cape, and Free State during AMJ) and countrywide, respectively. Such conditions are likely to exacerbate water losses through evapotranspiration and drought, among other factors, resulting in reduced water storage levels. Furthermore, maximum and minimum temperatures are expected to be mostly above normal countrywide during the forecast period, except for the period June-July–August, which is expected to experience slightly lower temperatures. An increased demand for space heating will be expected mostly during June-July-August. Relevant decision-makers are encouraged to take note of these possible outcomes and communicate with affected businesses and communities

Health

The anticipated above-normal minimum and maximum temperatures may result in a heightened risk of prolonged UV exposure, potentially exceeding level 3 on the World Meteorological Organization's UV Index. Such elevated UV levels increase the likelihood of sunburn and other related health concerns. The public is advised to follow local guidelines. The below-normal rainfall predicted over most of the country during April-May-June (AMJ), May-Jun-Jul (MJJ), and Jun-Jul-Aug (JJA) may lead to water scarcity, especially in areas dependent on rainwater for drinking and sanitation. This scarcity can result in poor hygiene conditions, increasing the risk of waterborne diseases such as cholera, typhoid fever, and diarrheal illnesses. The above-normal forecast in some parts of KwaZulu-Natal, the Eastern Cape, and the Free State for AMJ may result in flooding, especially in flood-prone areas with poor drainage. The public is urged to take precautionary measures and heed the advice of local authorities. Local authorities should monitor these risks, develop mitigation strategies, and enhance public health surveillance and response systems.

Agriculture

Below-normal rainfall is forecasted for most parts of the country during the late-autumn and early-winter seasons, with the exception of some parts of KwaZulu-Natal, the Eastern Cape, and the Free State during the late-autumn season (AMJ), where above-normal rainfall is expected. There is an increased risk for water logging in areas receiving excessive rainfall that can cause crop damage. However, the south-western part, which normally receives significant rainfall during early-winter season, is expected to receive mostly below-normal rainfall during this period. Therefore, the relevant decision- makers are encouraged to advise farmers in these regions to practice soil and water conservation, proper water harvesting and storage, and other appropriate farming practices.

This forecast is updated monthly, and users are advised to monitor the updated forecasts, as there is a possibility for them to change, especially the longer lead-time forecasts. Moreover, farmers are advised to keep monitoring the weekly and monthly forecasts issued by the SAWS. Farmers are also advised to keep on monitoring advisories from the Department of Agriculture and make changes as required.

4. Contributing Institutions and Useful Links

All the forecasts presented here are a result of the probabilistic prediction based on the ensemble members from the coupled climate model from the SAWS and two models from the NMME. Other useful links for seasonal forecasts are:

- http://www.weathersa.co.za/home/seasonal (Latest predictions from the SAWS for the whole of SADC)
- https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/ (ENSO predictions from various centres)
- https://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/ (Copernicus Global forecasts)

Appendix – Verification

The following three figures show the Relative Operating Characteristic (ROC) scores for the relevant multi-model forecasts in the main document. The ROC scores are commonly used in seasonal forecasts to determine the areas where the forecasts perform well, so that the user can make more informed decisions on using the given forecast. As a general guideline, a score over 0,5 is technically better than chance, however, scores around and higher than 0,6 are considered to have significant skill to add confidence to the forecast.

From the figures there will be two ROC scores per season per variable, which indicates the score when a certain rainfall or temperature category is favoured. For example, if an area is favoured to receive above-normal rainfall, then the ROC score to look at would be the one calculated for the above-normal category (right side of the figures below). Also make sure to look at the correct corresponding seasons indicated in the title of each map.

The aim of these maps is to add (or remove) confidence of a particular forecast over certain areas for specific seasons. Seasonal model skill over South Africa can be highly variable, highlighting the importance of knowing exactly where the forecasting system generally performs well or where it may struggle. It is important to note that the maps do not indicate where the current forecast will be correct or incorrect, but rather highlights confidence levels in the forecasting system.

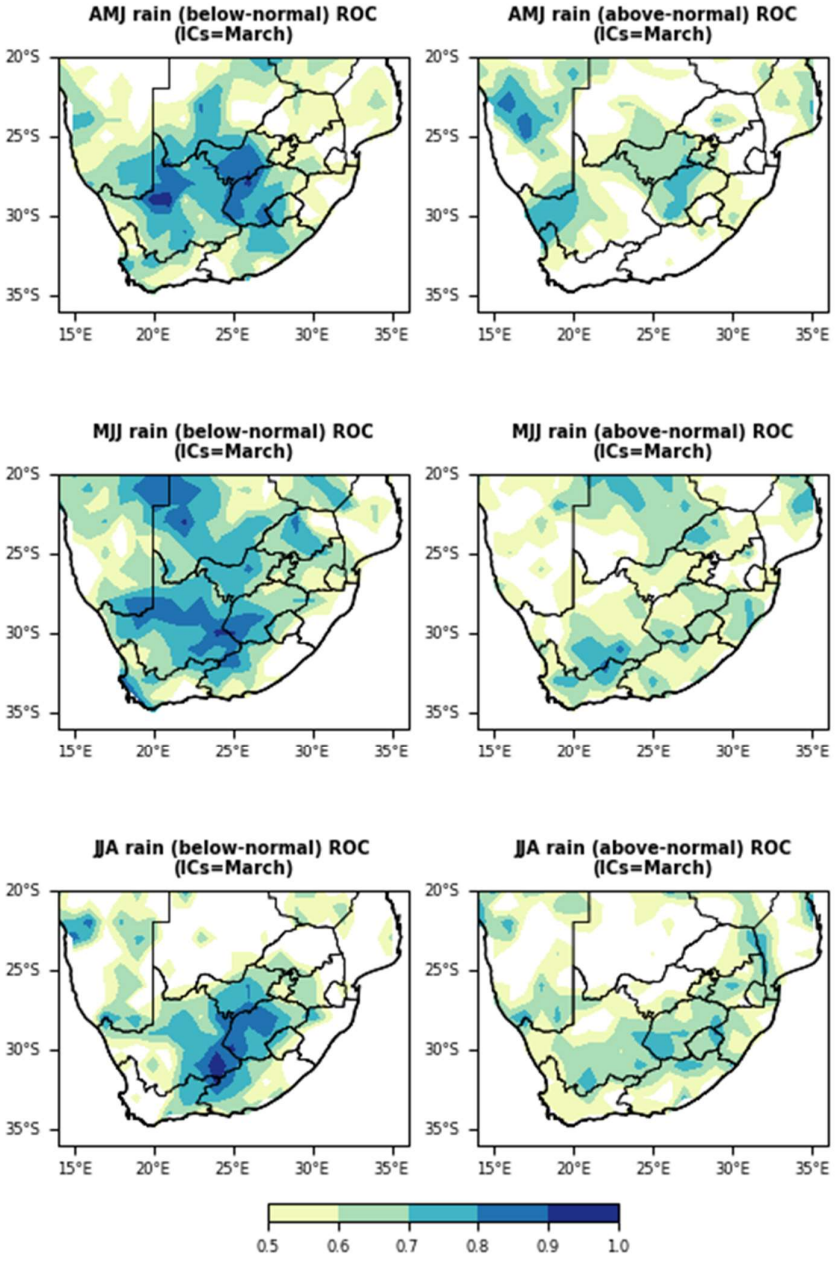

Figure A1: ROC scores for rainfall relevant to the current forecasts in figure 3.

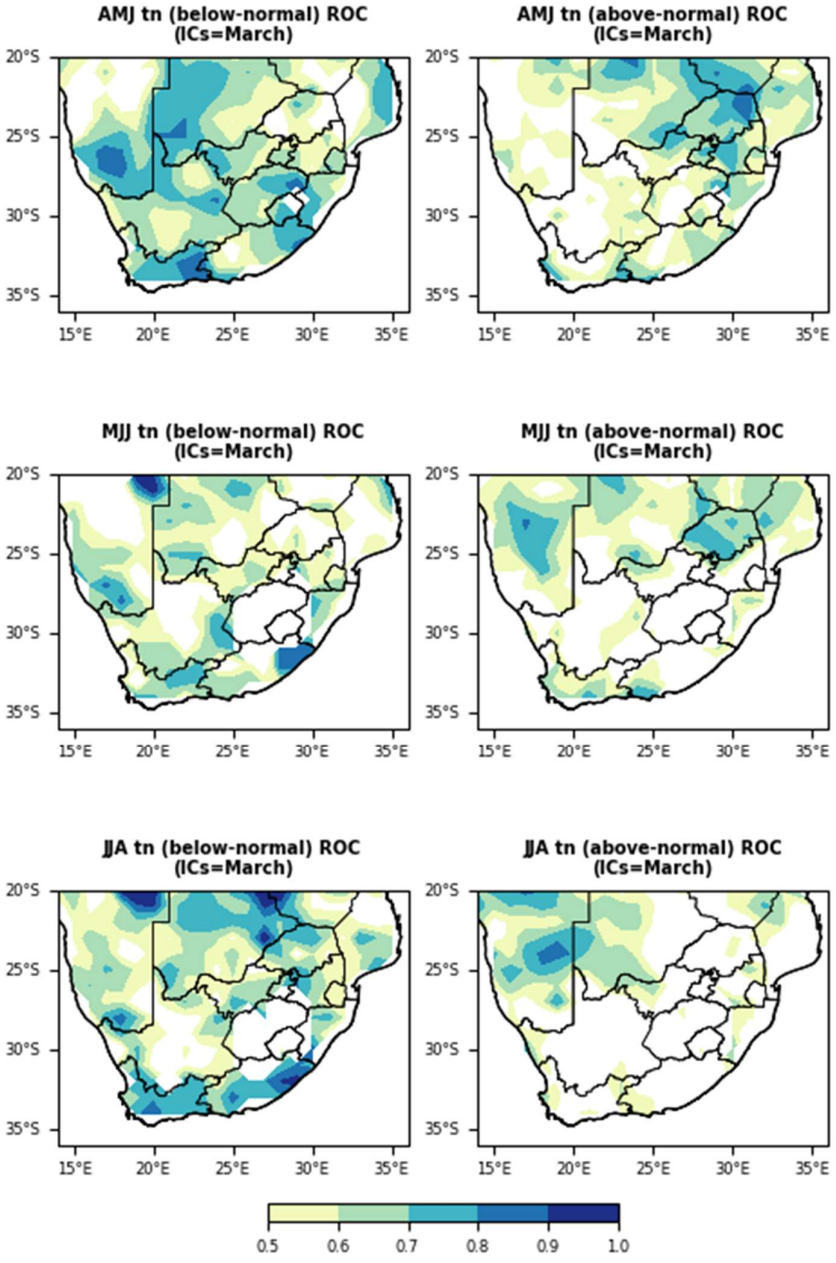

Figure A2: ROC scores for minimum temperatures relevant to the current forecasts in figure 4.

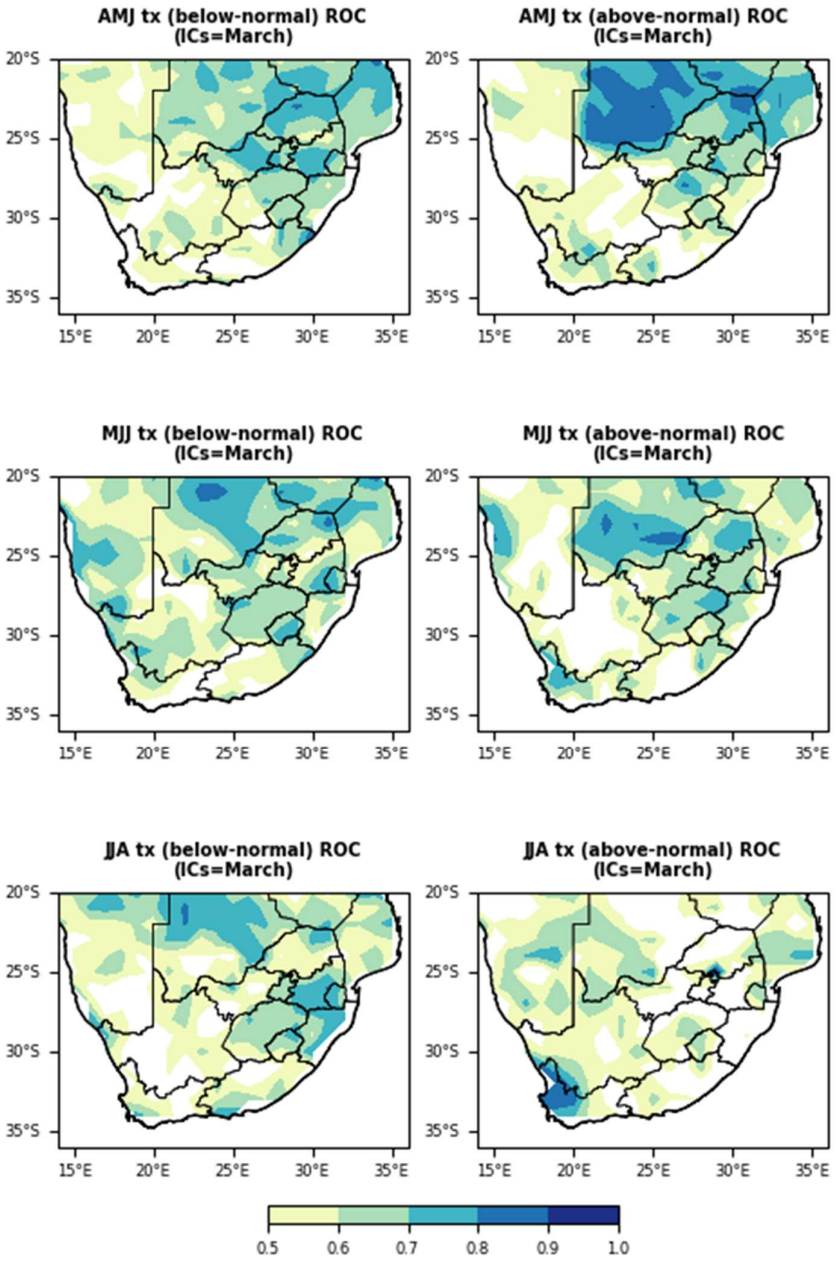

Figure A3: ROC scores for maximum temperatures relevant to the current forecasts in figure 5.