South African Weather Service

Seasonal Climate Watch

August to December 2019

Date issued: July 30, 2019

1. Overview

The El Niño-Southern Oscillation (ENSO) remains in a moderate El Niño state and the forecast indicates that it will remain in at least a weak El Niño state throughout early- and mid-summer. Caution is advised however, as ENSO forecasts are less skilful during the winter and spring periods.

There is an indication of above-normal rainfall conditions during early-spring (Aug-Sep-Oct) for parts of the winter-rainfall region. Below-normal rainfall, however, is expected over parts of the south coast throughout early-, mid- (Sep-Oct-Nov) and late-spring (Oct-Nov-Dec). The eastern coastal areas are expected to receive above-normal rainfall during late-spring. Forecasts for the central interior indicate a higher chance of increased rainfall intensity (>15mm per rainfall day) during mid-spring.

With regards to temperatures, mostly higher than normal temperatures are expected for the northern most parts of the country from early- through mid- to late-spring.

The South African Weather Service will continue to monitor and provide updates of any future assessments that may provide more clarity on the current expectations for the coming seasons.

2. South African Weather Service Prediction Systems

2.1. Ocean-Atmosphere Global Climate Model

The South African Weather Service (SAWS) is currently recognised by the World Meteorological Organization (WMO) as the 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 first season (August-September-October) predictions for rainfall (Figure 1) and average temperature (Figure 2).

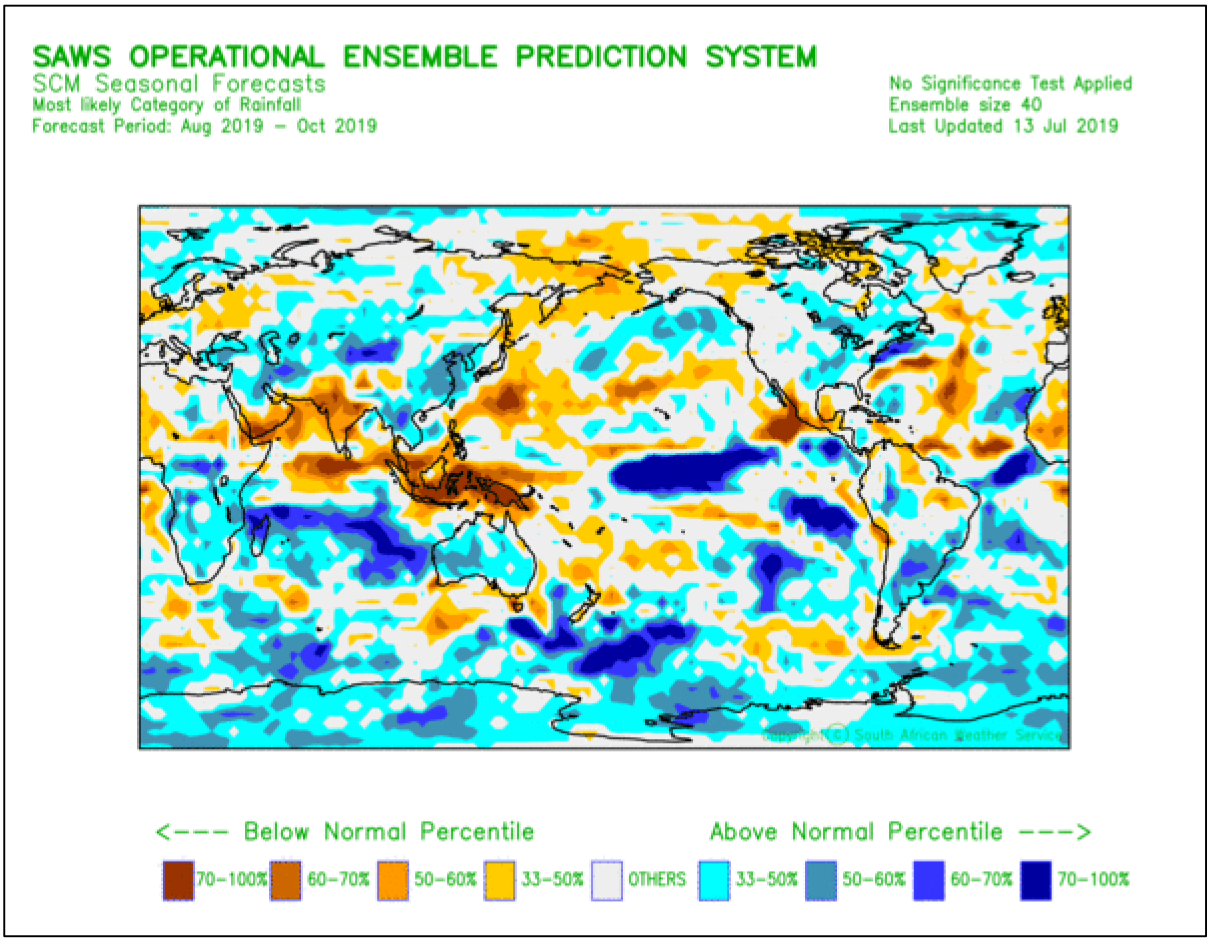

Figure 1: August-September-October global prediction for total rainfall probabilities.

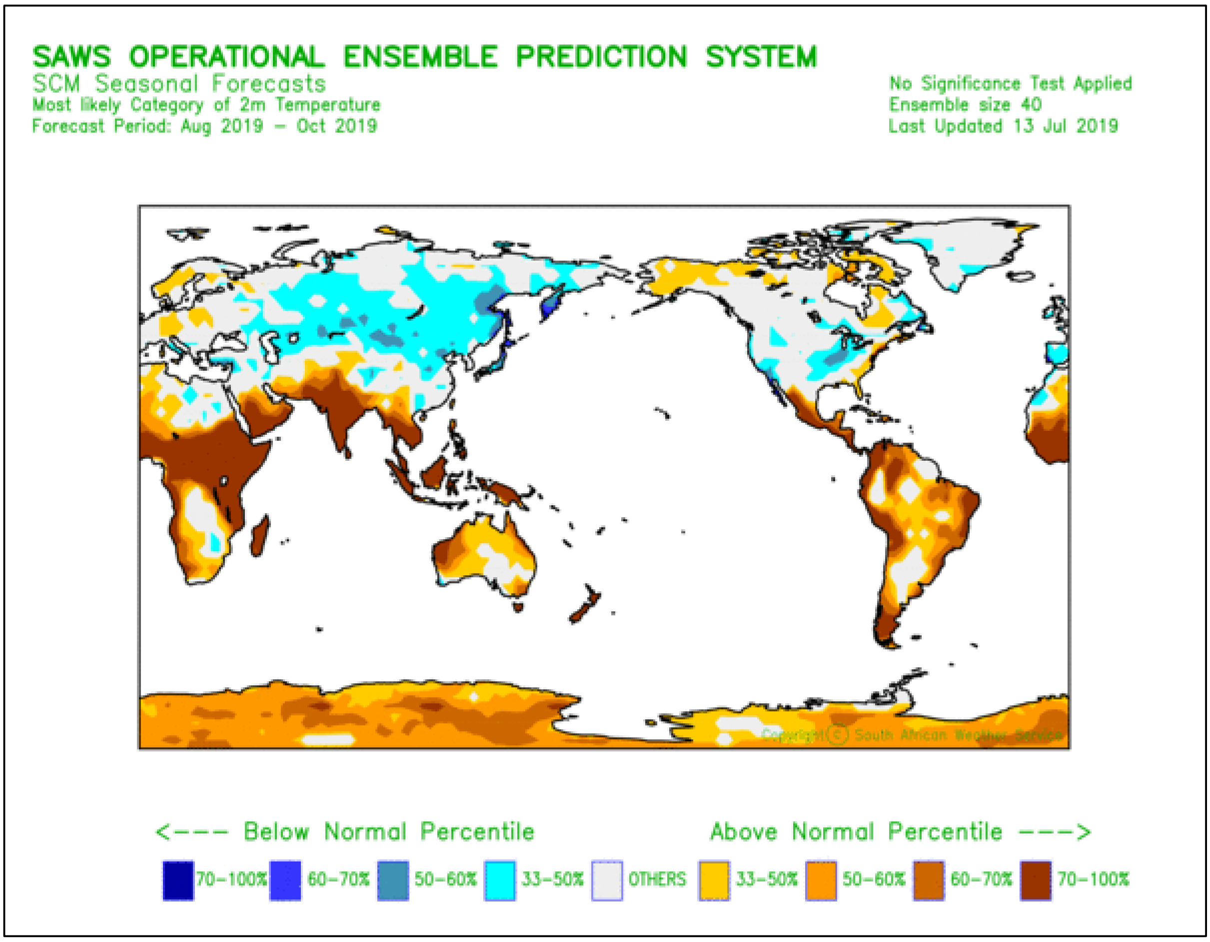

Figure 2: August-September-October global prediction for average temperature probabilities.

It is worth mentioning that the SCM levels of skill for the Niño 3.4 region (where ENSO information is sourced) are very much comparable to other state-of-the-art coupled models which are administered by other international centres. Therefore, the following Sea-Surface Temperature (SST) forecast (Figure 3) emanates from the SST Prediction System which is purely based on the SCM.

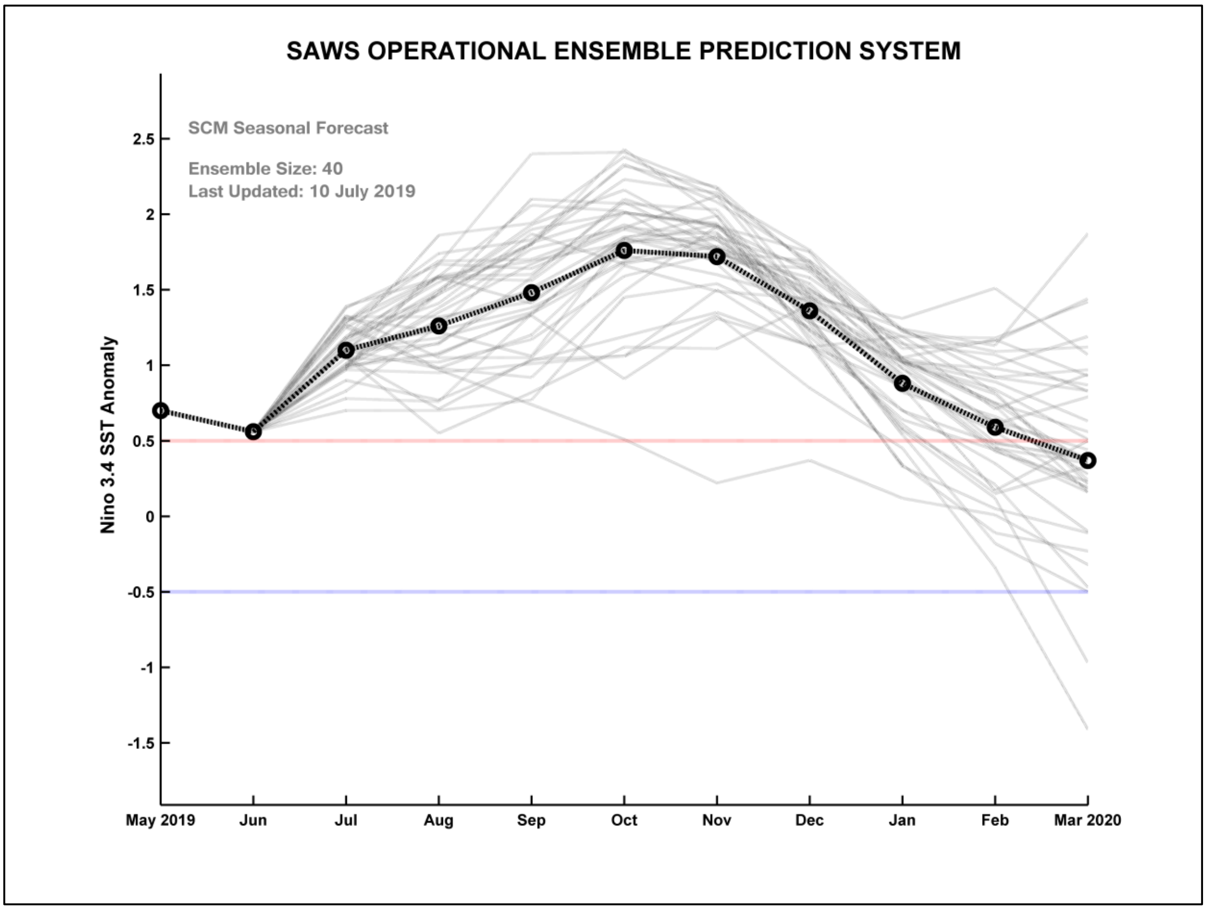

Figure 3: Niño3.4 SST anomaly forecasts produced by the SST forecast system administered by the SAWS. It comprises 40 ensemble members (marked in grey colour). The mean of the ensemble is marked in black.

2.2. Multi-Model Statistical Downscaling System

2.2.1. Seasonal Totals and Averages

In an effort to improve the predictions made by the SCM, which struggles to produce reliable rainfall and temperature forecasts at a local scale, the Multi-Model System (MMS) has been implemented to statistically downscale various global forecasts, including the SCM and the Climate Forecasting System version 2 (CFSv2) administered by the National Oceanographic and Atmospheric Administration (NOAA).

Below are the current three-season forecasts issued in July 2019. Three maps are shown for each season which include the raw MMS probabilistic prediction (left), the probabilistic prediction with skill masked out (middle) and the climatological average (right) for the specific season. *The user is advised to consider the skill masked map (middle) as the official SAWS forecast, however, the two additional maps may be used as tools in such a case where skill for a specific area is deemed insufficient.*

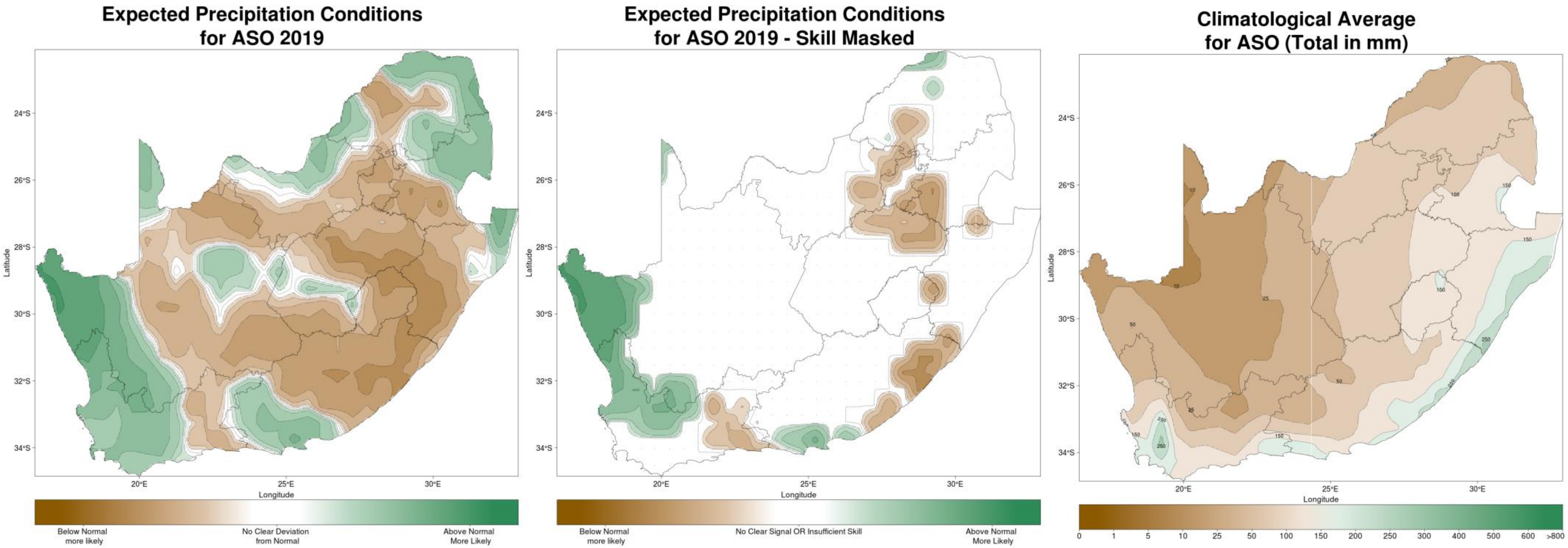

Figure 4: August-September-October (ASO) 2019 seasonal precipitation prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for ASO (right, in mm) calculated over the period 1979-2009.

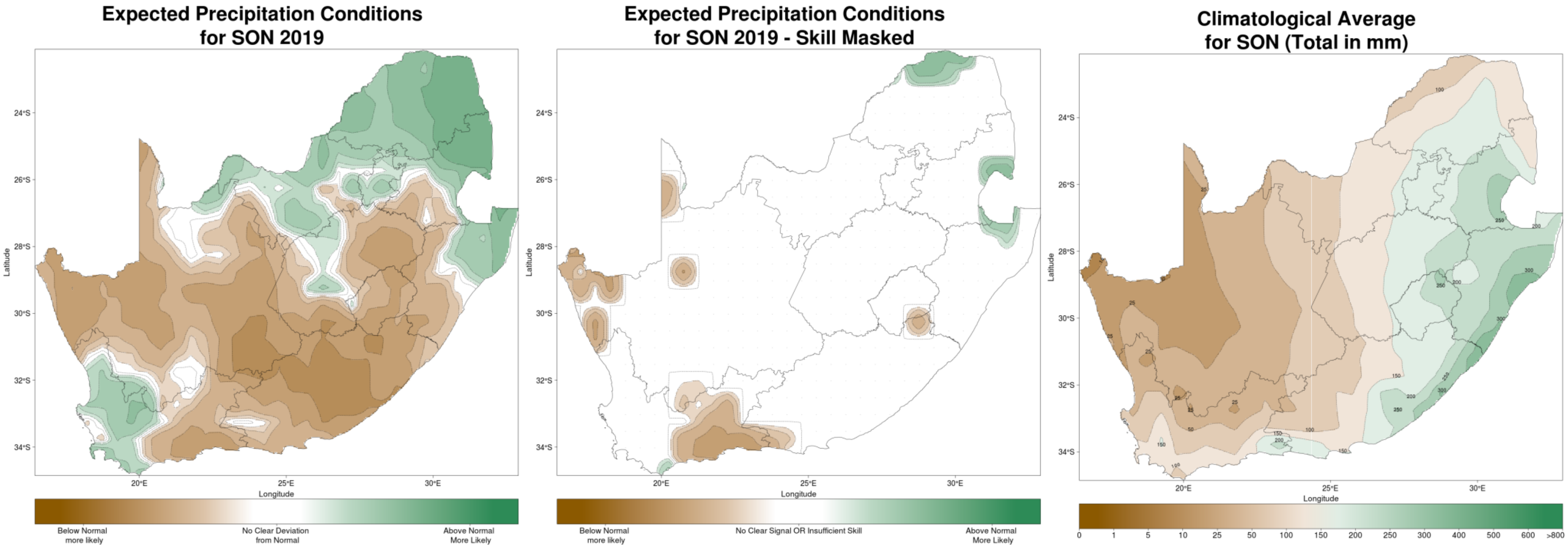

Figure 5: *September-October-November (SON) 2019 seasonal precipitation prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for SON (right, in mm) calculated over the period 1979-2009.*

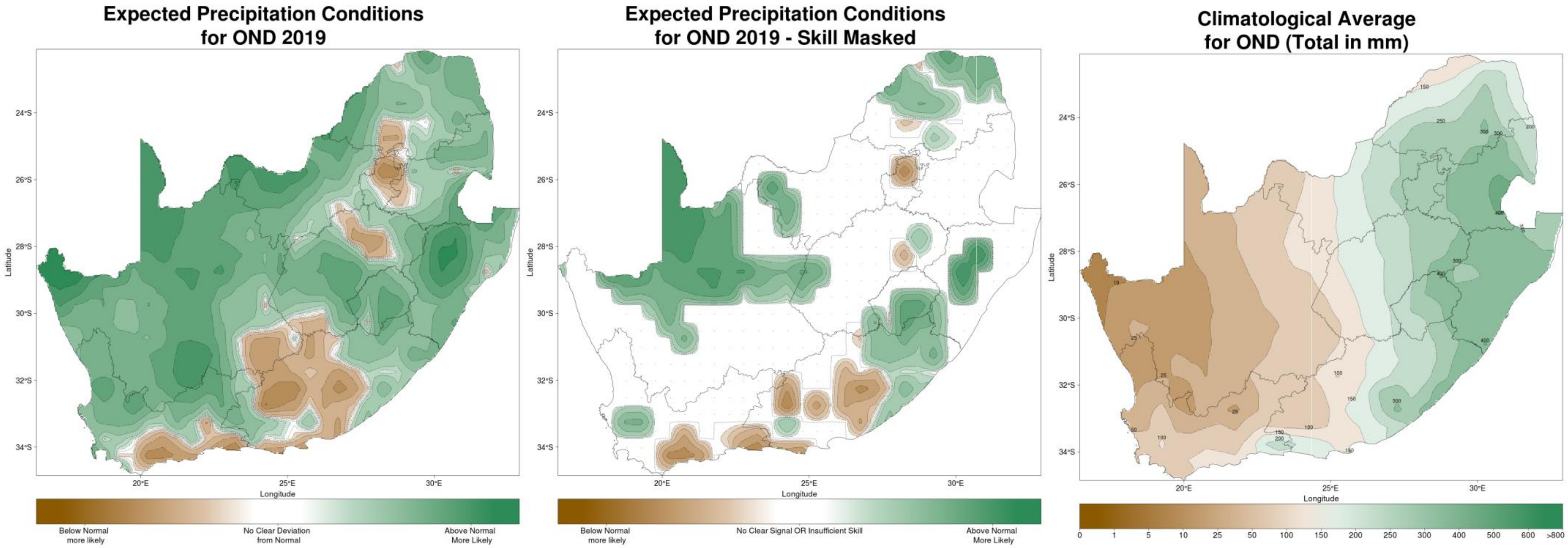

Figure 6: *October-November-December (OND) 2019 seasonal precipitation prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for OND (right, in mm) calculated over the period 1979-2009.*

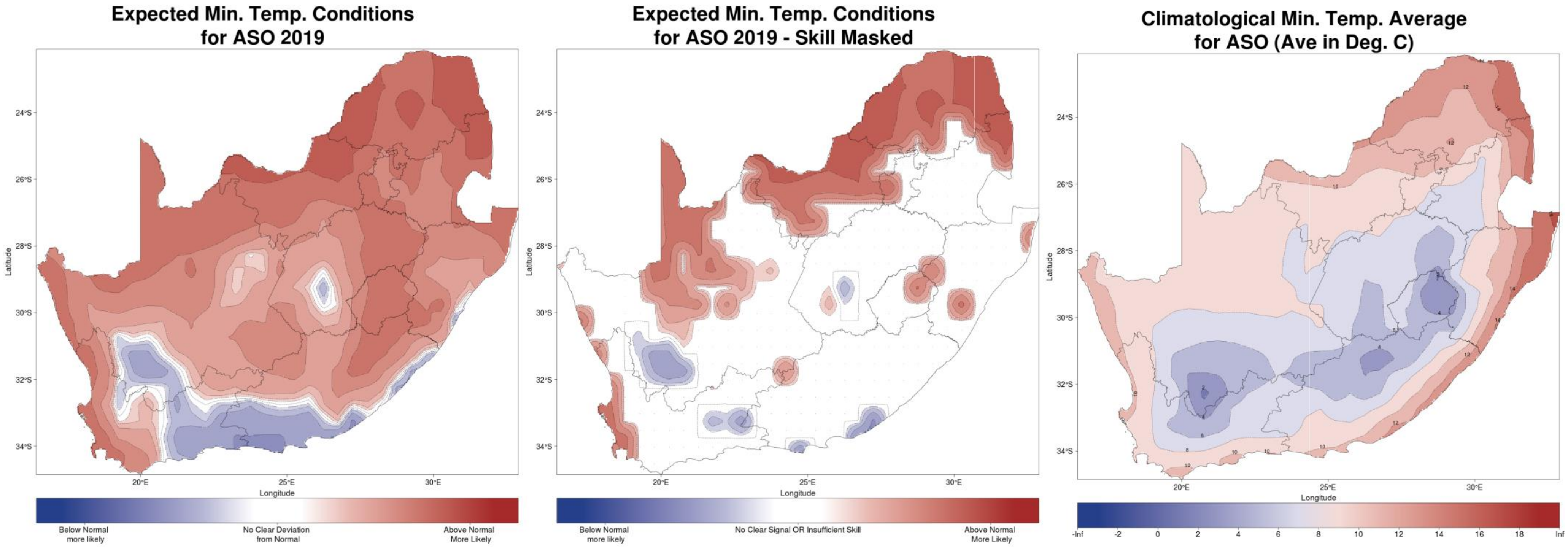

Figure 7: August-September-October (ASO) 2019 seasonal minimum-temperature prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for ASO (right) calculated over the period 1979-2009.

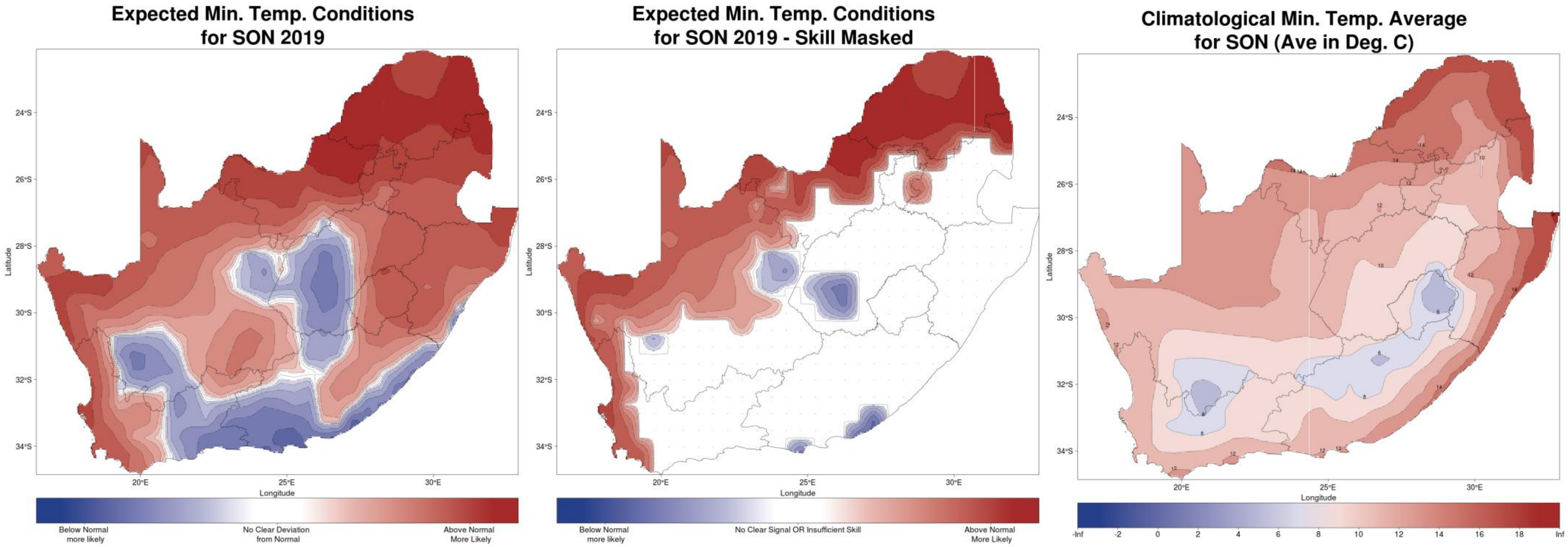

Figure 8: *September-October-November (SON) 2019 seasonal minimum-temperature prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for SON (right) calculated over the period 1979-2009.*

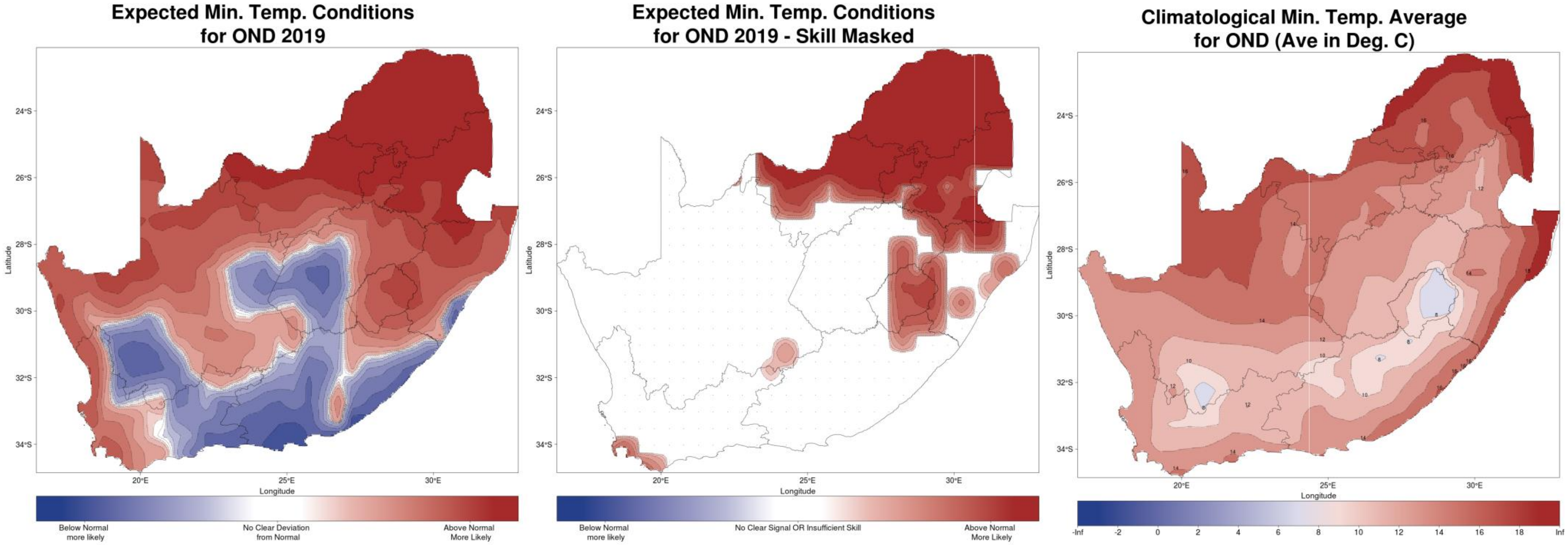

Figure 9: October-November-December (OND) 2019 seasonal minimum-temperature prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for OND (right) calculated over the period 1979-2009.

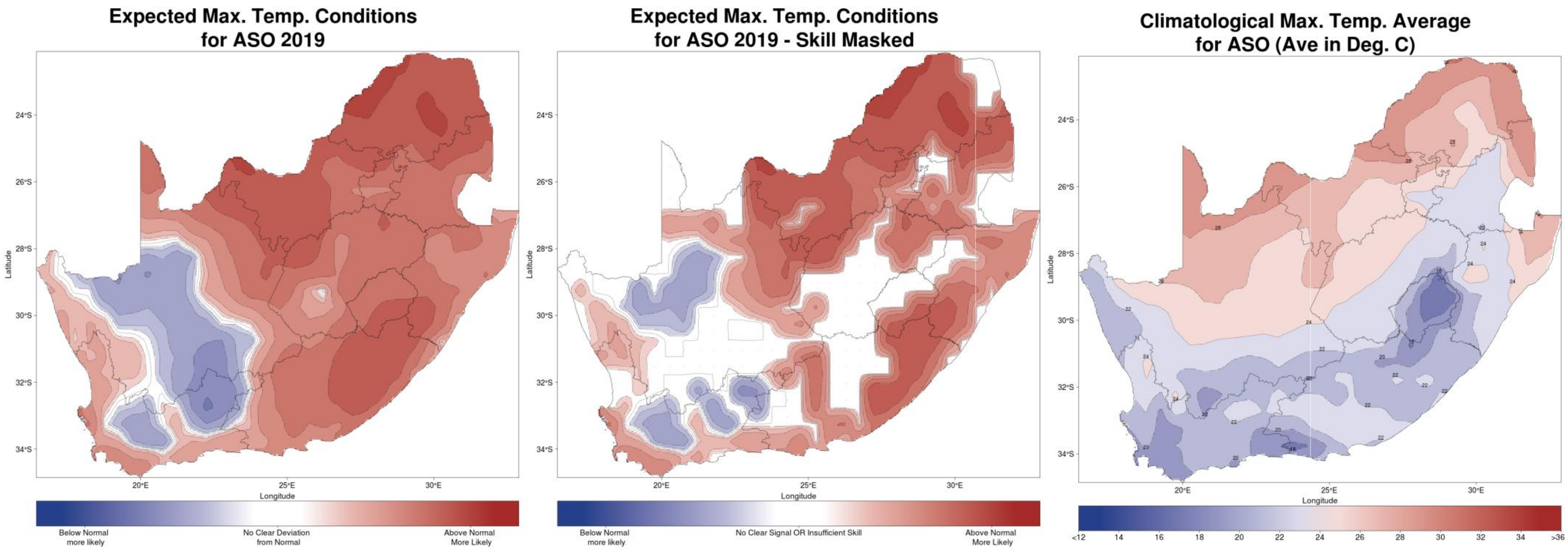

Figure 10: *August-September-October (ASO) 2019 seasonal maximum-temperature prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for ASO (right) calculated over the period 1979-2009.*

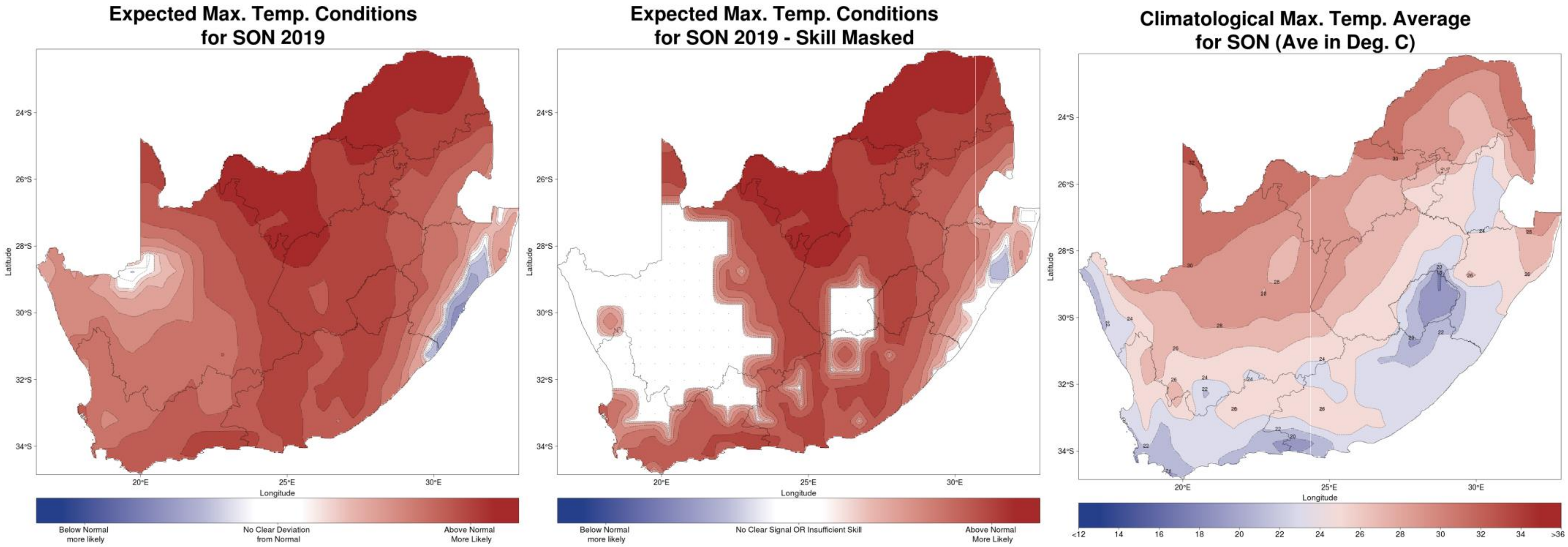

Figure 11: *September-October-November (SON) 2019 seasonal maximum-temperature prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for SON (right) calculated over the period 1979-2009.*

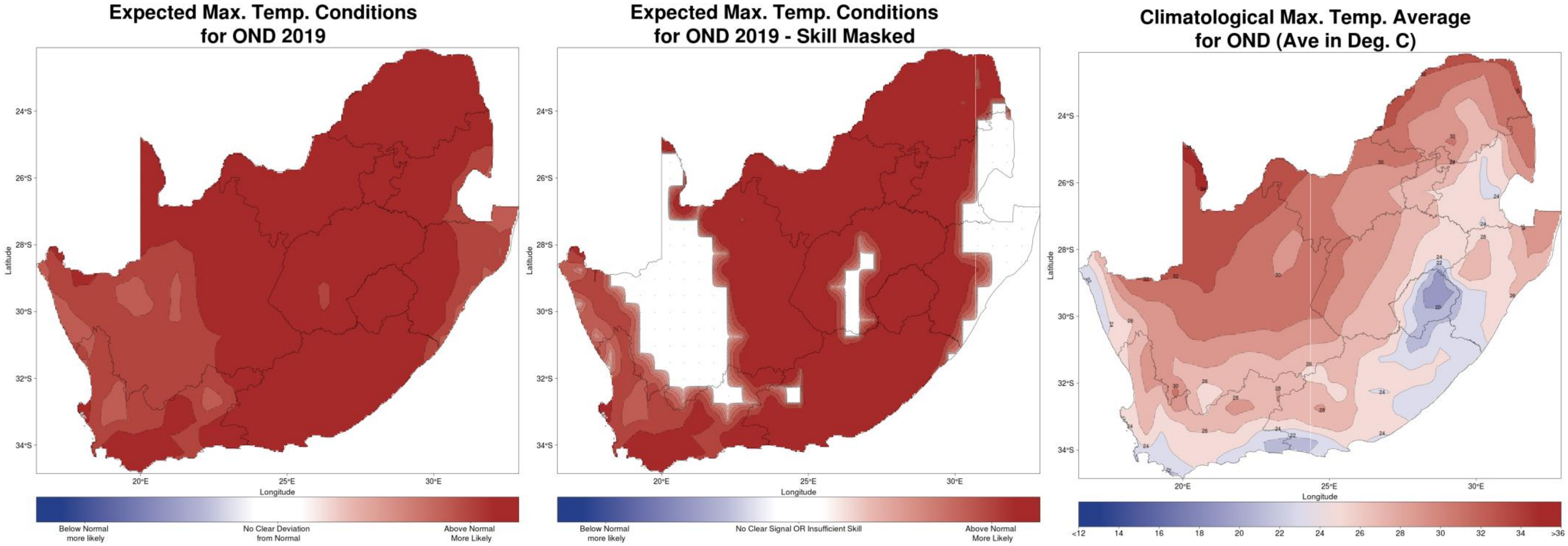

Figure 12: *October-November-December (OND) 2019 seasonal maximum-temperature prediction without skill taken into account (left), as well as skill masked out (middle). Also included is the climatological average for OND (right) calculated over the period 1979-2009.*

2.2.2. Rainfall Frequency Predictions

This product is a result of the SAWS operational multi-model system (MMS) where the 850-hPa geopotential heights hindcast outputs are first statistically recalibrated and downscaled to observed number of rainfall days exceeding desired thresholds (derived from high resolution 0.1 X 0.1 degree (ARCv2) African Rainfall Climatology version 2 rainfall dataset) within seasons of interest over South Africa by using model output statistics (MOS). The 850-hPa geopotential heights are used here because they are found to be the best predictor of rainfall over southern Africa.

These forecasts can be used together with the traditional seasonal rainfall total forecasts in that it can indicate the frequency of rainfall days where seasonal rainfall forecast areas expect below- or above-normal conditions.

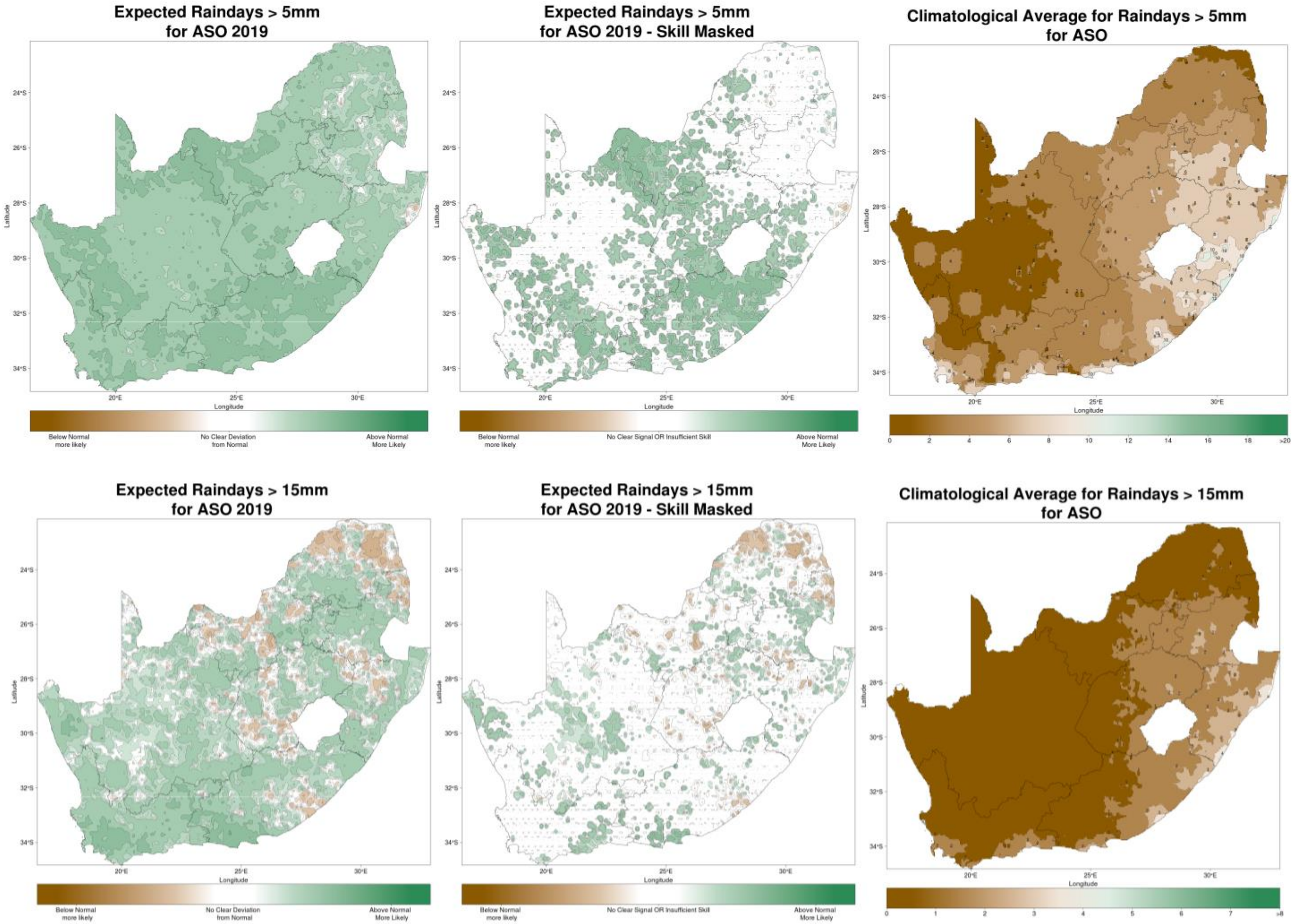

Figure 13: August-September-October 2019 rainfall-days forecast. Forecast for high and low number of rainfall days exceeding 5 and 15mm without skill taken into account (left) and with skill taken into account (middle). Also included is the climatology for rainfall days (right) exceeding 5 and 15mm calculated over the period 1983-2009.

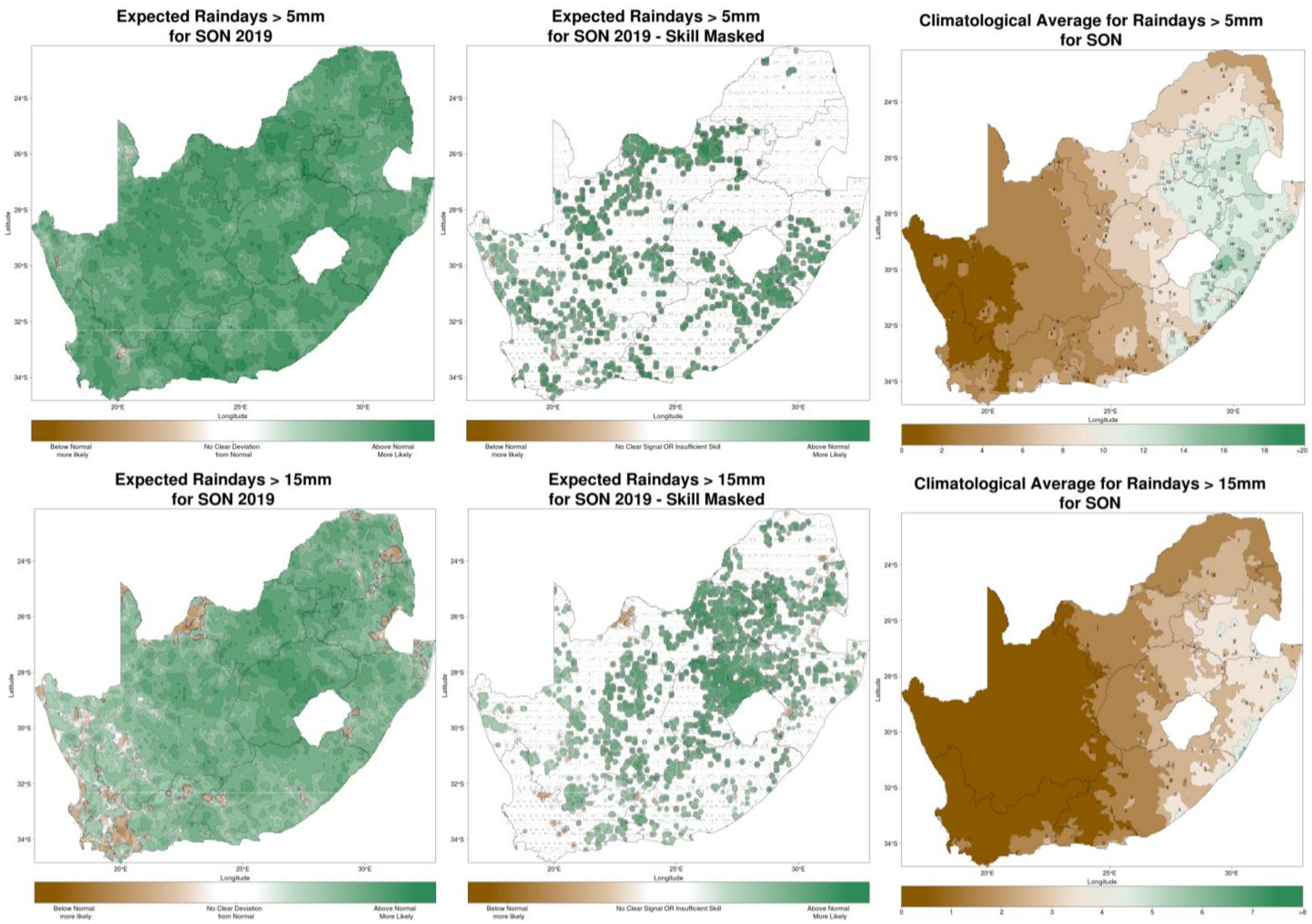

Figure 14: September-October-November 2019 rainfall-days forecast. Forecast for high and low number of rainfall days exceeding 5 and 15mm without skill taken into account (left) and with skill taken into account (middle). Also included is the climatology for rainfall days (right) exceeding 5 and 15mm calculated over the period 1983-2009.

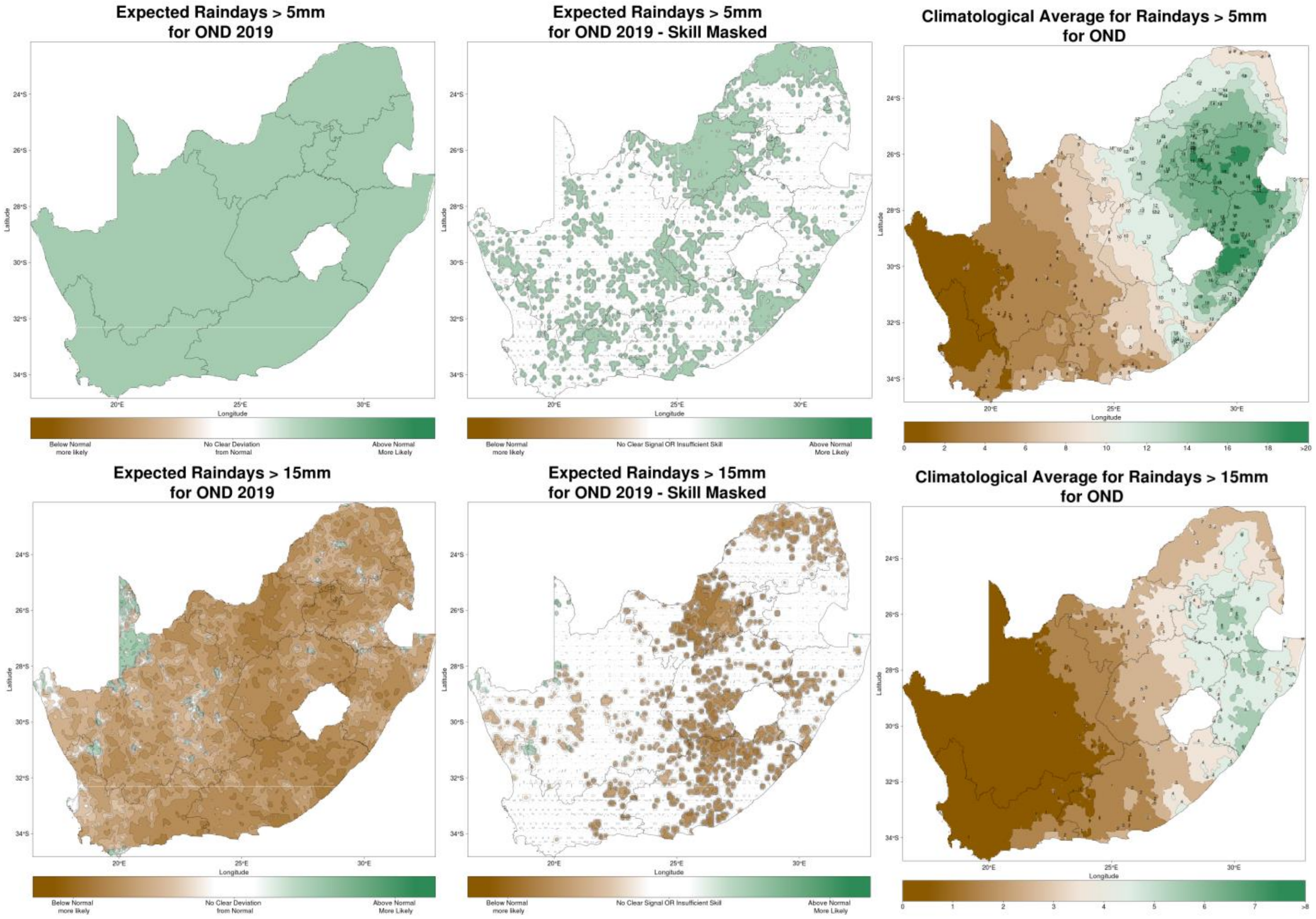

Figure 15: *October-November-December 2019 rainfall-days forecast. Forecast for high and low number of rainfall days exceeding 5 and 15mm without skill taken into account (left) and with skill taken into account (middle). Also included is the climatology for rainfall days (right) exceeding 5 and 15mm calculated over the period 1983-2009.*

3. Contributing Institutions and Useful links

All the forecasts are a result of an objective multi-model prediction system developed at the South African Weather Service. This system consists of long-range forecasts produced by the following institutions:

http://www.weathersa.co.za/home/seasonal (Latest predictions including maps for the whole of SADC)

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/ (ENSO predictions from various centres)