



26 January 2018

Seasonal forecasts under the current drought conditions in the Western Cape

Most rain in the Western Cape Province falls during winter months (April to September), and very little rainfall is received during summer months (**Figure 1**). Rainfall in the Western Cape Province is often modulated by the passage of cold fronts. These cold fronts are systems that develop over the Southern Ocean, and the cross-continental passage of these fronts are important for Cape Town's rainfall. As global weather systems propagate northwards during winter months, more fronts pass over the southern continental tip of Africa. Since cold fronts form part of a highly variable eastward propagating wave pattern of air flow over the Southern Ocean, the frequency of the cross-continental passage of cold fronts across the Western Cape province is currently difficult to predict at a seasonal time range (one to three months in advance), and more research is required. This is in contrast to South African summer rain that is modulated by the flow of moist tropical air from the equatorial regions, and which is significantly influenced by the El Niño Southern Oscillation (ENSO) – note that ENSO events have very little influence on the rainfall of the Western Cape Province. The predictability of the phase of the ENSO (El Niño or La Niña), which is characterized by changes in sea-surface temperatures in the equatorial Pacific Ocean, makes seasonal predictions more reliable for the summer rainfall region than for the winter rainfall region, where rainfall is influenced by highly variable Southern Ocean circulation.

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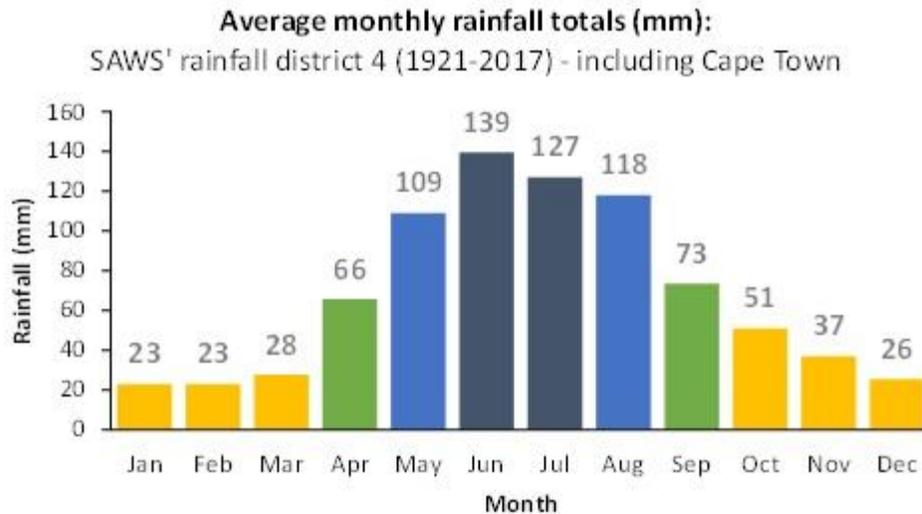


Figure 1. Average monthly rainfall totals (mm) as calculated for the period 1921 to 2017 for SAWS' rainfall district 4 (including Cape Town area).

According to the South African Weather Service (SAWS) observations since 1921, the average rainfall in SAWS' rainfall district 4 (this rainfall area includes Cape Town area) is 820 mm per year. Over the past three years, annual rainfall totals of 549 mm for 2015 (2nd driest year since 1921), 634 mm for 2016 (14th driest year since 1921) and 499 mm for 2017 (driest year since 1921) were recorded (**Figure 2**). This implies that two of the driest years recorded since 1921 have occurred in the past three years, which makes the Cape Town drought exceptional. It should, however, be noted that these low rainfall totals are not necessarily indicative of a drying trend in the Cape Town area, since 1112 mm was recorded in 2013, making 2013 the 6th wettest year since 1921, while 853 mm of rainfall, which is above the average, was also recorded in 2014.

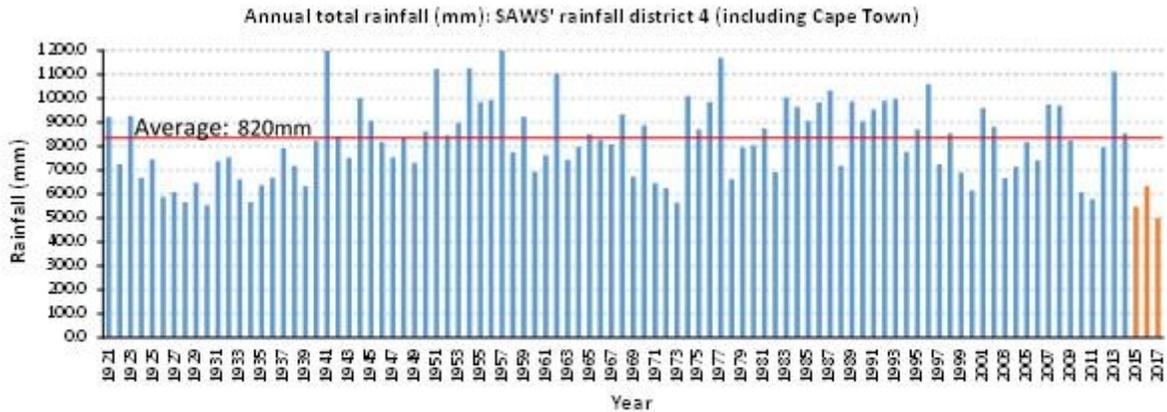


Figure 2. Annual total rainfall (mm) for the period 1921 to 2017, with the average of annual rainfall indicated as 820mm, for SAWS’ rainfall district 4 (including Cape Town area).

Historical statistics play an important role in defining averages, and in setting upper and lower thresholds for expected rainfall totals. According to the SAWS District Rainfall data record (1921 to 2017), SAWS’ rainfall district 4 area receives an average of 820 mm of rain per year. Most rain (77%) falls during the months April to September, with only 23% of the rain falling in the months October to March. The likelihood for summer rain in the Cape Town area is therefore slim. However, the monthly District Rainfall record could be used to estimate the probability for rain to occur in the summer months (Figure 3). For example, the District Rainfall record can provide a good estimation of what rainfall was observed in history, and which can then be used to establish the percentage likelihood of a certain rainfall total range to reappear in 2018, based on a 97-year historical record. For example, from the rainfall records it is extremely unlikely that rainfall totals will exceed 150 mm for the months January, February and March 2018, since it has never happened in history. For April 2018, however, there is a 44% possibility for the monthly rainfall total to fall in the 51-100 mm range, while there is a 58% possibility that rainfall totals for April 2018 will not be higher than 100 mm.

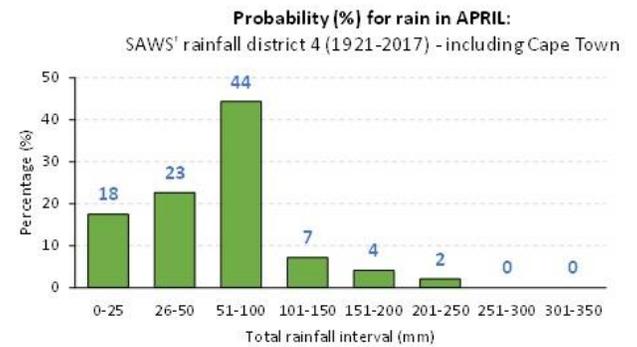
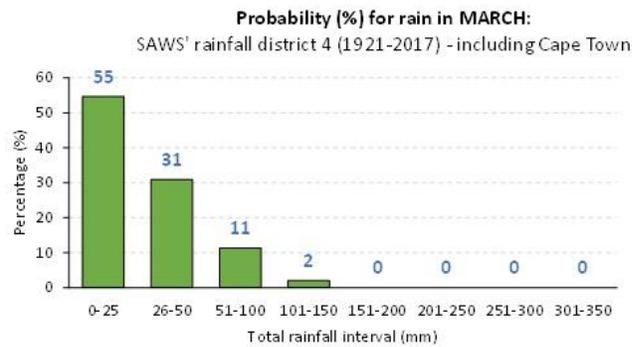
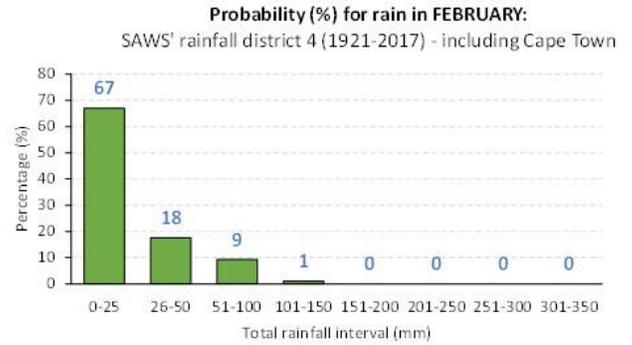
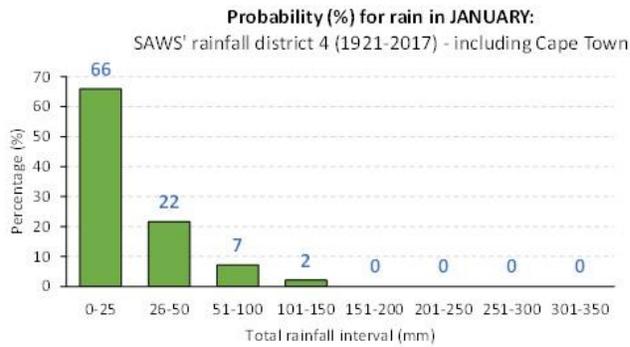


Figure 3. Percentage (%) probability of rainfall total intervals (mm) to occur in February, March and April 2017, according to statistics over the 97-year period 1921 to 2017, SAWS' rainfall district 4 (including Cape Town).

The SAWS seasonal prediction issued at the end of January 2018 does not indicate significant rainfall during the 2018 autumn season for the south western parts of the country. However, the far north eastern parts of South Africa is expected to receive above-normal rainfall during the 2018 immediate late summer and early autumn. It is important to note that informative seasonal predictions for the winter rainfall region will only become available in April and May. During this period, all factors will be considered to formulate the best possible outlook for the winter rainfall regions.

The Western Cape Province will remain dry for the next two weeks, with the exception of some periods of light rain in areas along the south coast. Further, the next two weeks may see better rainfall conditions developing over the summer rainfall regions (central and eastern parts) of the country as the atmospheric conditions have become favourable (see Figure 4).

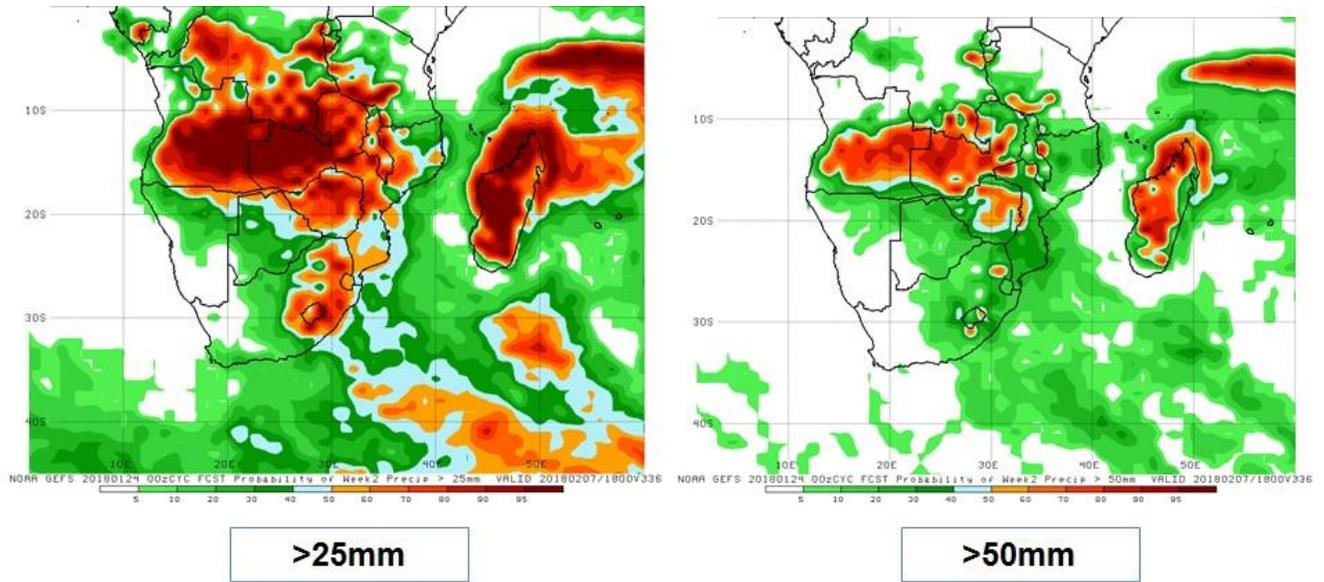


Figure 4. Probability of rainfall accumulation exceeding 25mm and 50mm for week ending 6th February, 2018.

In the short term, the south-western parts of the Western Cape (including Cape Town) are expected to remain rain-free for the remainder of this and next week. The eastern parts of the Western Cape do however stand a chance of some precipitation during Friday (26 January 2018) and Saturday (27 January 2018) as shown in figure 5. Elsewhere, there are good rainfall prospects over the central and eastern parts of South Africa during the next 7 days. Please note that there will be a risk of localized flooding in places where good rainfall is expected.

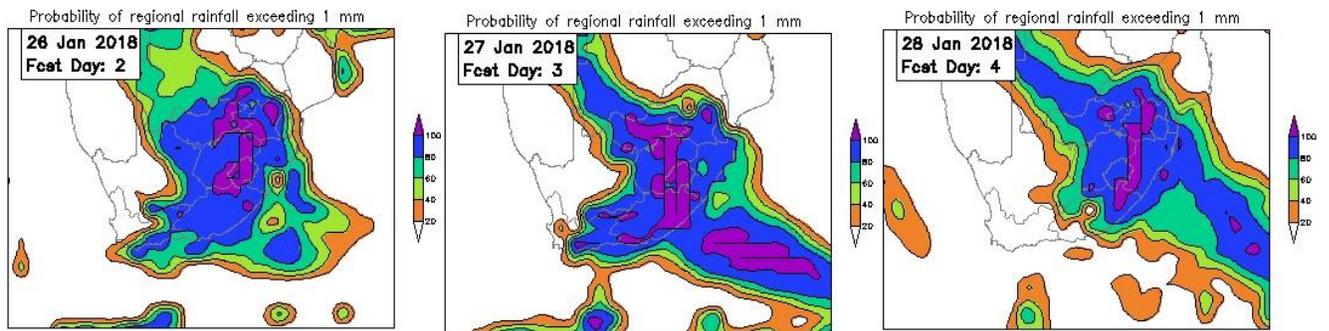


Figure 5. Probability of rainfall forecasts for 26, 27 and 28 January 2018.