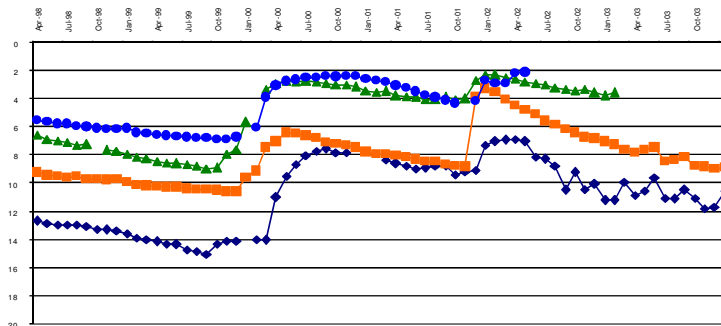


LIMPOPO REGION

DIRECTORATE WATER REGULATION AND USE

STATUS REPORT ON GROUNDWATER LEVELS 30 AUGUST 2010 – 30 AUGUST 2011



**H VERSTER
SEPTEMBER 2011**

Data collection and processing* assisted by:

P F TSHELANE*

K MOREKGURE*

S C MUTHEIWANA

D A TLEANE

N F POOPEDI

T P SEAKAMELA

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SUMMARY

Groundwater level fluctuations over the past year are generally less than 1m, both up or down. A greater percentage of boreholes indicate lower water levels than the same time last year than those with higher levels. It is not considered to be a reason for concern as long-term groundwater level data indicates that the current situation is still good and water levels are still well above the deepest recorded.

Forecasts by the South African Weather Services as well as some other local & international centres indicate a reasonable good chance that Limpopo may experience below normal rainfall over the next 3 months. This serves as reminder that resource management is essential, especially in arid regions such as ours.

1. BACKGROUND

The current status and trends of groundwater levels in the Limpopo Region over the past twelve months is discussed with comparison drawn between current levels and the corresponding time last year. Groundwater level behaviour however is characterised by seasonal as well as medium to long-term trends and better perspective is provided by a historic trend that is included. (GRAPH1)

Of the 179 network water level monitoring stations currently active, 151 have data for the period in question. Some stations are new, some were inaccessible due to wet conditions and some have been vandalized.

The distribution of Limpopo's groundwater level monitoring stations is depicted by (MAP1)

Monthly rainfall data were provided by the South African Weather Services (info@weathersa.co.za) and is acknowledged. The data is preliminary data and is not available for all stations for the last 1-2 months yet.

2. THE PERIOD 1 AUGUST 2010 TO 1 AUGUST 2011

2.1 RAINFALL (MAP 2)

The rainfall data used for this period is from the 1st of August 2010 to the 30th of September 2011.

Analysis of the data sets revealed that for the areas indicated with a total rainfall of below 100mm, the data strings were mostly not complete for the full year and is thus indicated on the map as "Scarce data". There are also a limited number of stations for those areas.

Most of the Province received above 300mm rainfall with a south west – north east trending area in the central part and southwards again into the lowveld of the Province receiving higher rainfall. Some stations in the >1000mm zones recorded more than 1500 and up to 1900mm for the year.

2.2 COMPARISON BETWEEN RAINFALL AND PATTERNS IN GROUNDWATER LEVEL BEHAVIOUR (MAP 3)

The groundwater level data used to determine the difference in water level over 12 months is the water level for the 1st of August, at 12H00 for both years.

The map indicating the spatial distribution of stations with higher or lower water levels includes all available data, irrespective of the magnitude in water level difference. Only those stations reflecting direct effects of pumping were ignored.

As can be expected, groundwater levels are generally higher in the higher rainfall areas but there are also some higher water levels in the western part associated with lower rainfall received. There is however only a few rainfall stations in the area and some local high rainfall incidents can easily be not recorded.

Using all data irrespective of the magnitude in difference, the following is the case over the past 12 months:

- Stations with data for the year: 151
- Lower water levels: 99 (65.6%) Average: -0.78m lower
- Higher water levels: 52 (34.4%) Average: 0.9m higher
- 151 Stations overall: Average: -0.20m lower

Although 65% of stations indicate somewhat lower water levels than the corresponding time last year, the difference is generally small and less than 1m. Of the lower water levels, 79.8 % differ less than 1m. Groundwater level trends currently display a cyclic declining trend and the lower water levels are seen as part of this normal cycle.

3. LONG-TERM PERSPECTIVE (GRAPH1)

The water level trend as displayed in graph 1 clearly show the declining period during the drought of the 80's to mid 90's. Since the aquifer was recharged in 2000 seasonal fluctuations in evident but is superimposed on a longer term trend of general decline again. The graph also indicates that, despite the declining trend, current water level is still in a favourable situation and well above the worst recorded. This trend is visible in other long-term data sets and is considered to give good reflection of the general overall situation.

Local deviations will always occur and can be related to the effects of abstraction. Over abstraction and poor or no aquifer management can alter the local situation drastically and boreholes may run dry due to poor management of the resource despite a good overall situation.

4. Forecasts

The following insert is an extract from a report by the South African Weather Services. Only the part on the immediate 3 month period has been included here

“Quote”

“SEASONAL (3-month seasons) Forecast Overview for SOUTH AFRICA Issued on Tuesday the 20th of September, 2011

1. ENSO Discussion (El Niño/La Niña-Southern Oscillation, or ENSO)

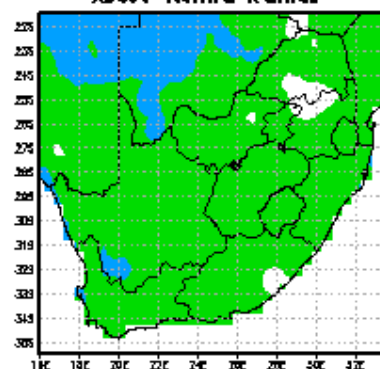
ENSO conditions have been shown to be the single most determining factor in South African summer rainfall which can also be effectively forecasted. Other local ocean basins such as those from the Atlantic and Indian oceans have also shown to have very strong influences to South African rainfall, but remain very difficult to forecast for various reasons. Because of this fact, we look at ENSO forecasts to give an indication of whether the seasons ahead would be abnormally wet (La Nina) or dry (El Nino). Below are some forecasts from international and local centres:

European Centre for Medium-Range Weather Forecasts (ECMWF)

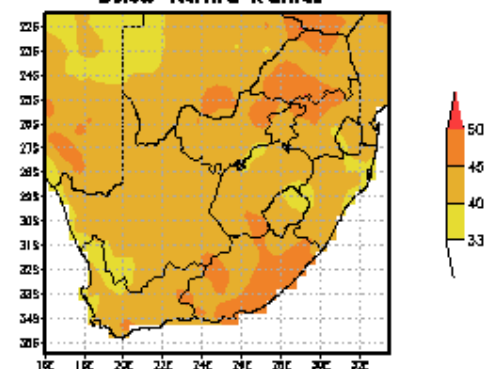
Climate Prediction Centres – National Centres for Environmental Prediction (CPC-NCEP)

International Research Institute Climate and Society (IRI)”

**OCTOBER–NOVEMBER–DECEMBER 2011
Above-Normal Rainfall**



**OCTOBER–NOVEMBER–DECEMBER 2011
Below-Normal Rainfall**



October-November-December

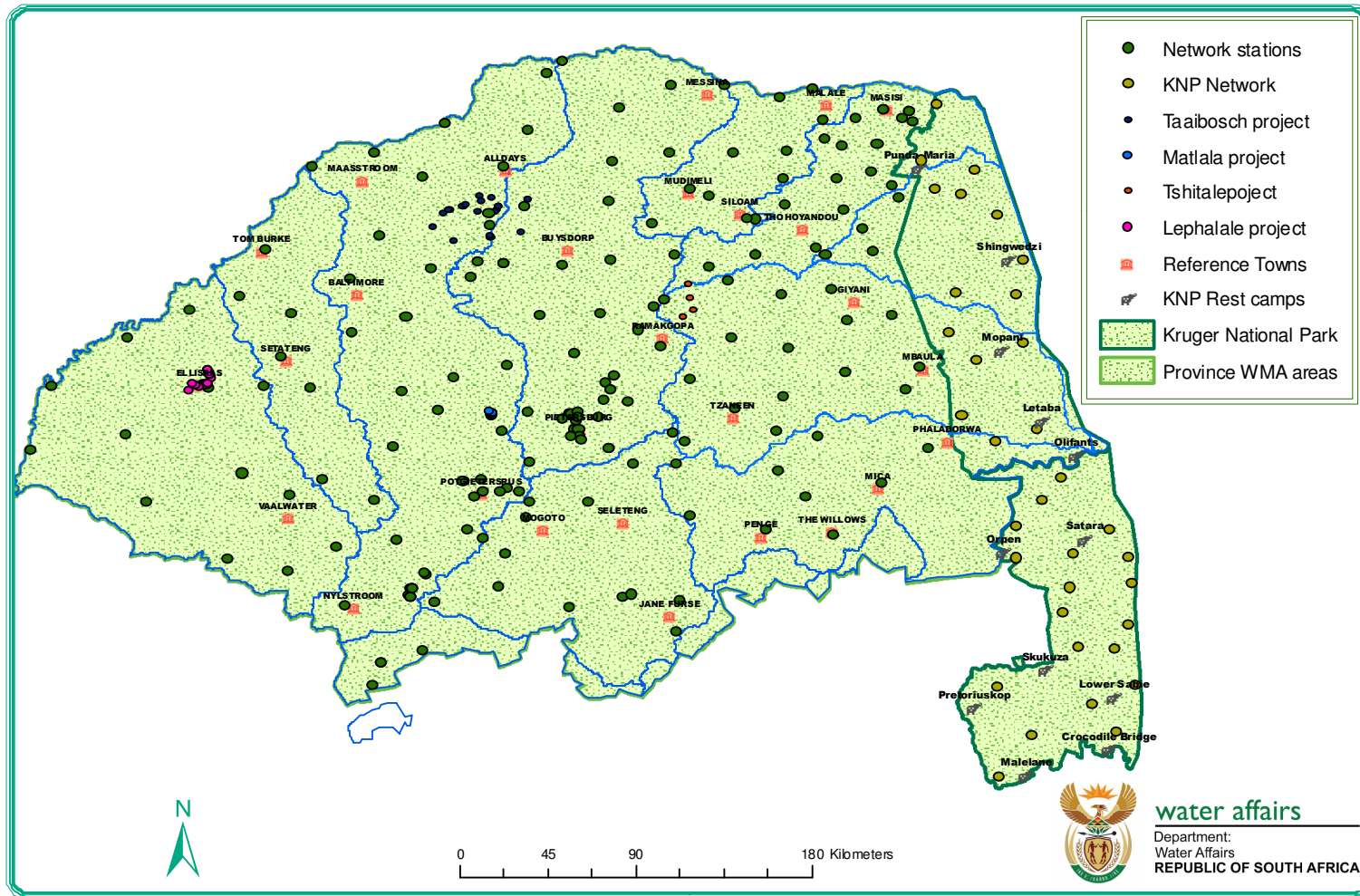
Enhanced probabilities for below-normal rainfall totals are expected for parts of Limpopo, North-West, Gauteng, Mpumalanga, Free State and Eastern Cape.

From the probability forecasts above the chances for above normal high rainfall in the next 3 months is very low, generally less than 33% while the chances for below normal rainfall is given as 45-50% for Limpopo. Although it is just a forecast it does serve as reminder that our water resources in this arid region is vulnerable and sound management will always be essential.

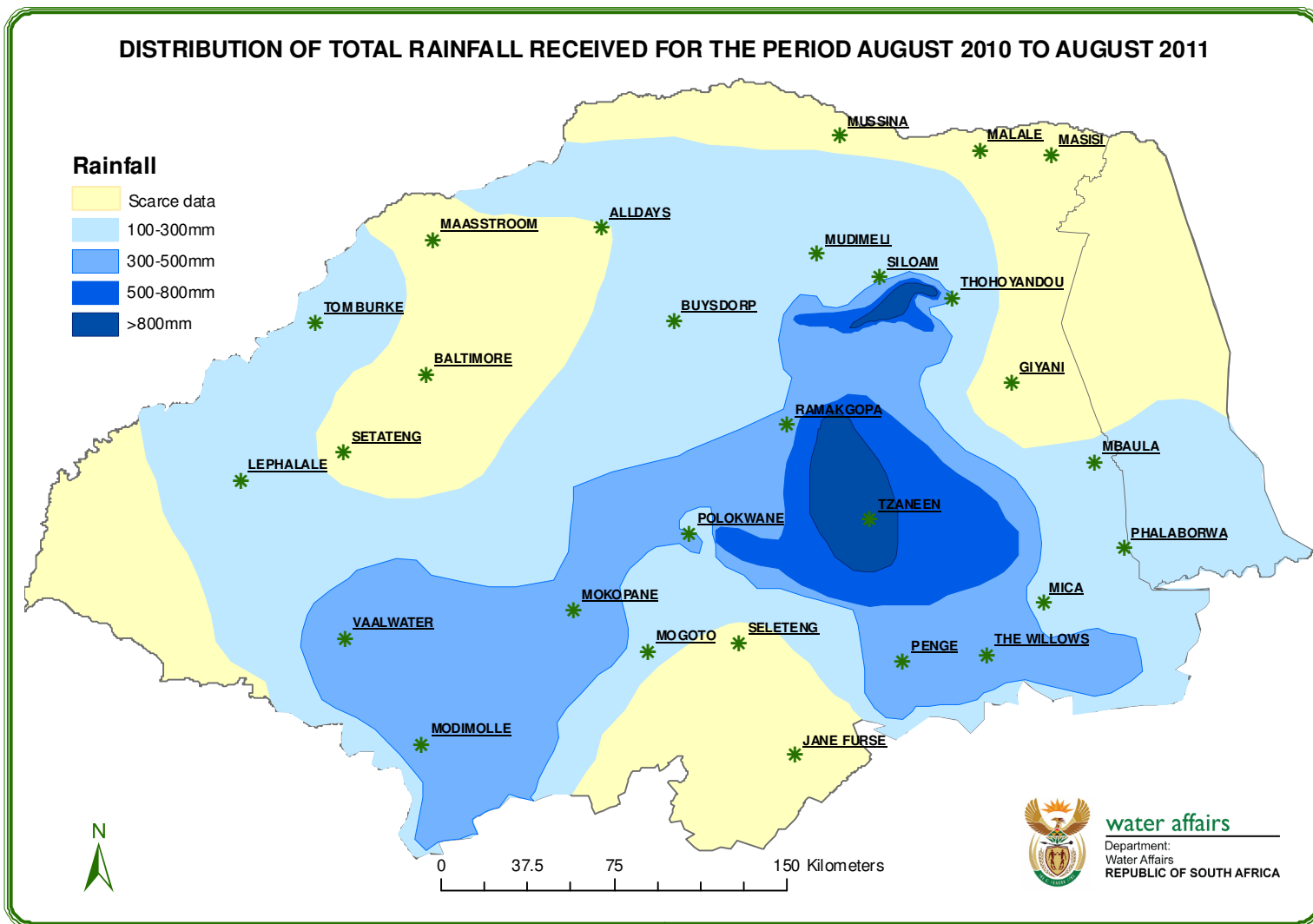
5. ACKNOWLEDGEMENTS

- 5.1. info@weathersa.co.za (Rainfall data for Limpopo Province)
- 5.2. www.weathersa.co.za/ **“SEASONAL (3-month seasons) Forecast Overview for SOUTH AFRICA Issued on Tuesday the 20th of September, 2011**

LIMPOPO GROUNDWATER MONITORING;
 POSITIONS OF ACTIVE GROUNDWATER LEVEL MONITORING STATIONS
 AUGUST 2011










MAP 1

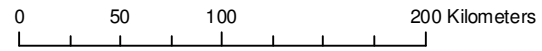
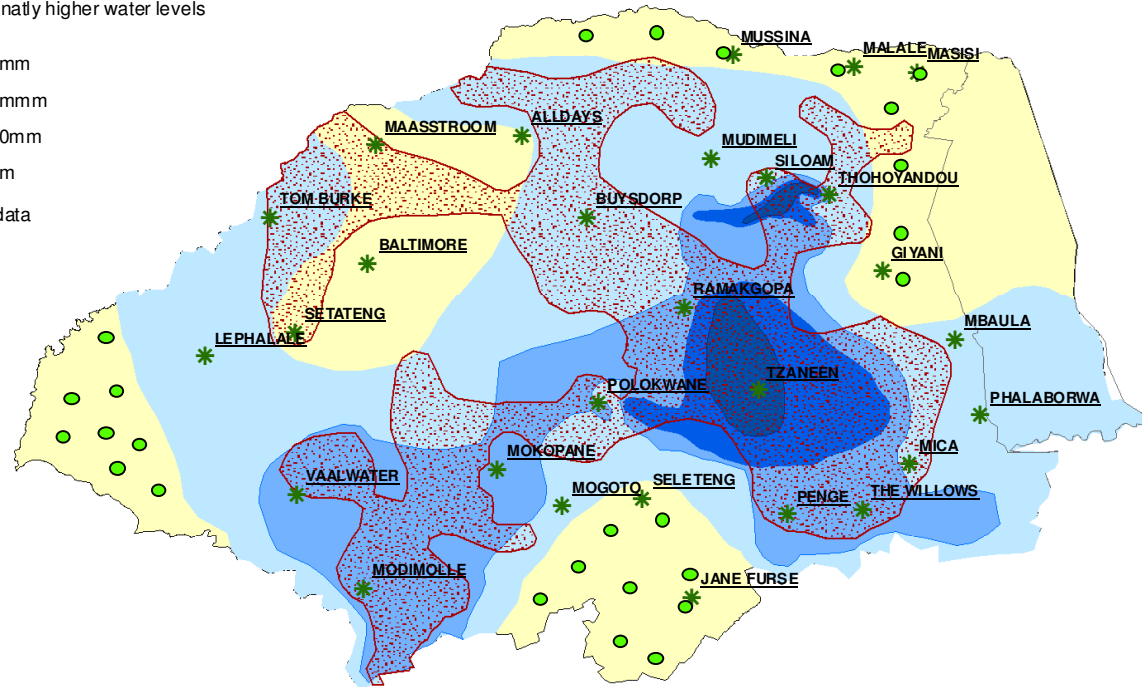


MAP 2

PATTERNS IN GROUNDWATER LEVEL BEHAVIOUR VERSUS TOTAL RAINFALL RECEIVED: AUGUST 2010 TO AUGUST 2011

RAINFALL

-  100-300mm
-  Predominantly higher water levels
-  300-500mm
-  500-800mm
-  800-1000mm
-  >1000mm
-  Scarce data

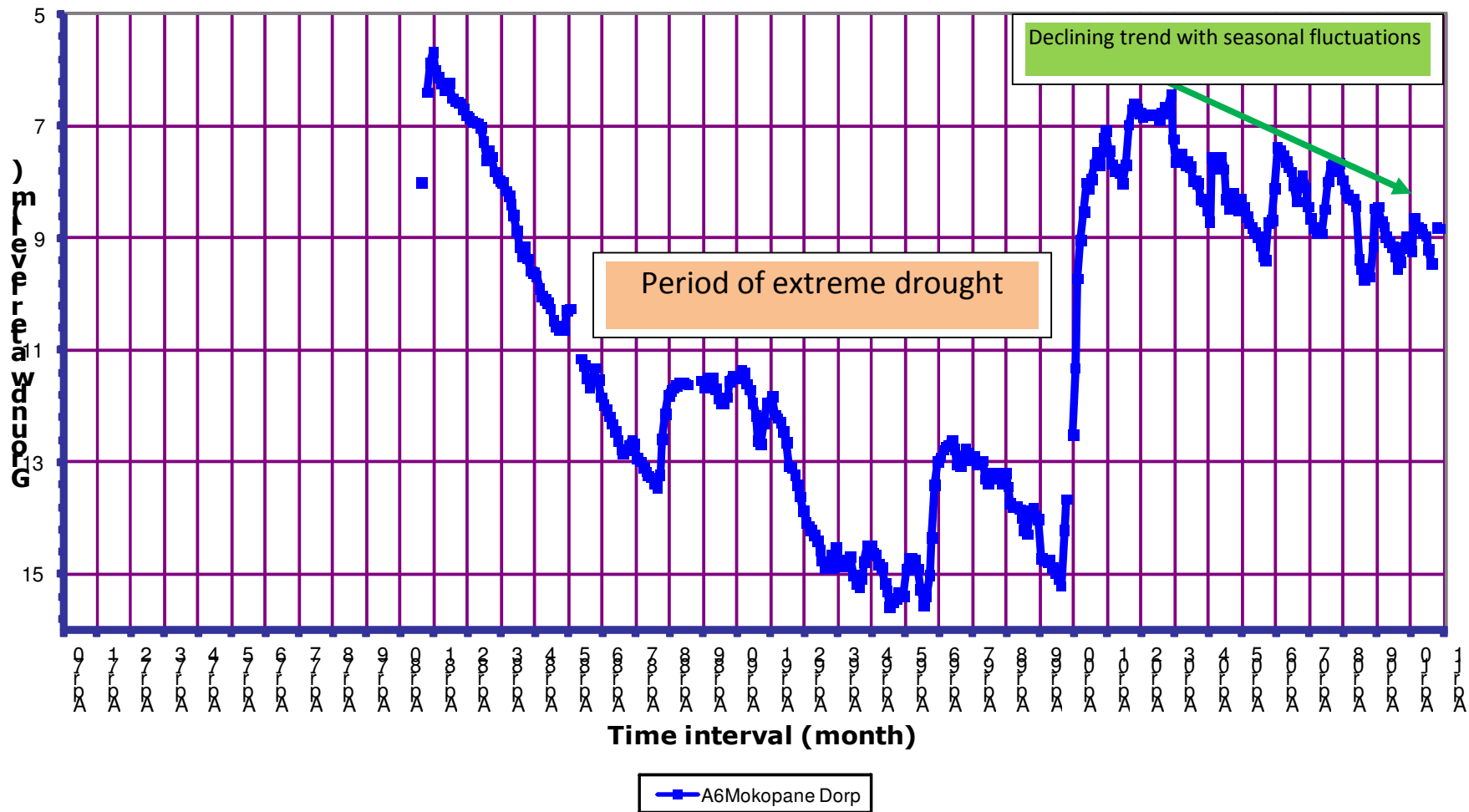


water affairs
 Department:
 Water Affairs
 REPUBLIC OF SOUTH AFRICA

MAP 3

LONG-TERM WATER LEVEL TREND A6 DRAINAGE

Groundwater level time serie of station A6N0044 (Mokopane Town)



GRAPH 1