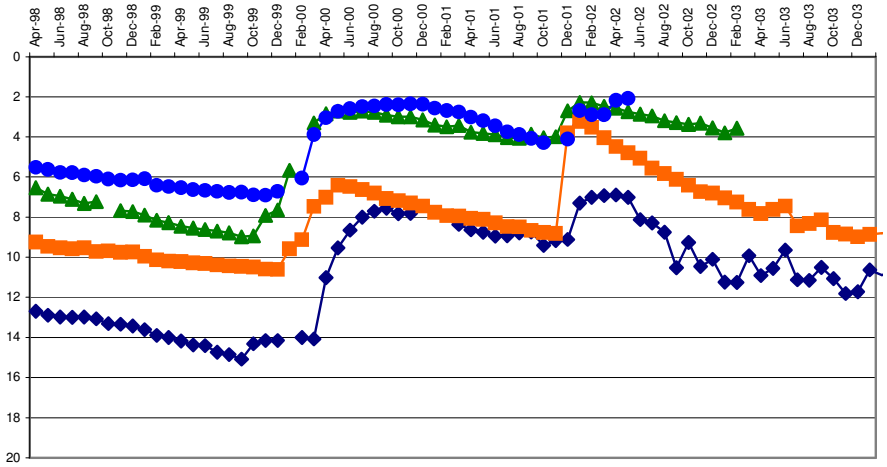
water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

LIMPOPO REGION

DIRECTORATE
WATER REGULATION AND USE

STATUS REPORT ON MONITORING & GROUNDWATER LEVEL TRENDS FEBRUARY 2009 – FEBRUARY 2010



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1) EXECUTIVE SUMMARY

Groundwater levels

Water level values for 1 February 2009 (corresponding time last year), 1 November 2009 (Start of the current wet season) and 1 February 2010 (Midway through the current wet season) are use for comparison in this report.

No new stations were added the past quarter and there are still 165 reference monitoring stations distributed across Limpopo.158 were visited and data downloaded during February 2010. 5 stations were inaccessible due to extreme wet conditions, 1 has caved in and still have to be re-drilled. The remaining 1 is on private property and access is not always possible due to a locked gate. The 30 Special purpose monitoring stations (Projects) must still visited and data downloaded (**MAPS 1 & 2)**

Only the data for stations on the permanent reference network located outside the Kruger Park is used for reporting.

- Active stations = 165
- Stations visited and included in this report = 158.
- Stations inaccessible due to wet conditions = 5
- Other access problems = 2
- Visited stations in A2 drainage not included in this report = 2

Comparison of water levels with the previous quarter: (November 200 to February 2010)

Stations with data for the whole period available = 147/158 (89.09%) of stations visited)

	No of stations	**% of stations With data**	**Average**
Water level down more than 1 m	1	0.68%	
Water level down less than 1m	47	31.97%	-0.13m
Water levels up more than 1m	28	19.05%	2.57
Water levels up less than 1m	71	48.3%	0.44
No difference in water level	0		
Total	**147**	**100%**	

The table above reflects the situation from the start to midway of the current wet season. A rise in water levels is seen at 99 stations (67.35% of stations) indicated some recharge thus far at these stations. The rise is mostly limited with an overall average of 1m. At the other 48 stations (32.65%) water levels are still declining very slightly with an average of around 15cm overall.

Comparison of water levels with the corresponding time last year: (February 2009 to February 2010)

Stations with data for the whole period available = 137/158 (83.03% of stations visited)

	No of stations	**% of stations**	**Average**
Water level down more than 1 m	13	9.49%	-1.86m
Water level down less than 1m	64	46.72%	-0.37m
Water levels up more than 1m	18	13.14%	3.14
Water levels up less than 1m	42	30.66%	0.42
No difference in water level			
Total	**137**	**100%**	

The current water level situation compared to the corresponding time last year indicate that there are more stations with lower water levels, 77 stations, than that with higher water levels, 60 stations. Despite a measure of recharge as indicated by the first table, there are still more stations with lower water levels than this time last year. The fluctuations up or down, are mostly not large and the overall situation indicates an insignificant 15cm improvement in water levels.

Looking at the overall picture is misleading as the number of lower and higher water levels is not spread evenly across the whole area. Some areas may indicate mostly higher levels while the lower water levels may be concentrated in another area.

Map 4 illustrates the data from November 2009 to February 2010. It can be seen that recharge, were mostly limited to the southern and eastern part of the Province.

Map 5 illustrates the data from February 2009 to February 2010, comparing the situation with last year. It is not possible to define areas with predominant lower or higher water levels per drainage area. Monitoring in the A4 and A5 drainages is fairly new and hardly any data for a whole year is available yet. The situation differs in different parts for the other drainage.

An Attempt was made to delineate water level behavior patterns and is depicted on **(Map 6)**
The northern part of the Province is mostly worse off than last year as indicated by the red hashed polygon. The polygon encloses 60 stations with data for the past year of which 54 have lower water levels. As is the case for the past couple of years, there is an area within the A9 drainage where water levels are constantly declining faster than elsewhere. The Blue hatched polygon encloses 58 stations of which 51 have higher water levels.

2) STATUS OF MONITORING NETWORK

No new stations were equipped and the Limpopo Province's Groundwater Level Monitoring Network still consists of 199 active monitoring stations, including 34 in the KNP. 2 Caved in boreholes still have to be re-drilled, 17 new boreholes are planned to be drilled additionally to fill gaps in the existing network and 7 existing boreholes are targeted for possible inclusion in the network. **(Maps 1 & 2)**

158 Reference monitoring stations were visited during February 2010 and the data downloaded from loggers. Data collected at these 158 were used for this report. Data for the 2 stations in the A2 drainage were not included.

Site preparation for the phase 2 upgrading of existing stations and delivering of concrete outer rings to stations continued and construction of the concrete structures were completed at 3 stations as trail run. Construction continues.

Regional and Head Office jointly service a total of 55 stations for the National Groundwater Quality Program in the Limpopo Province which is sampled bi-annually. Sampling to verify the suitability of selected sites for extension of the National Groundwater Quality Monitoring continues **(Map 3)**

3) DATA COLLECTION, EVALUATION AND REPORTING

Data was collected during February 2010. The water level used for 1 February 2010 represents midway into the current wet season. Comparisons were drawn between 1 February 2009, (Corresponding period the previous year) 1 November 2009 (Start of the wet season) and 1 February 20109 (Current situation, halfway into the wet season) **(Maps 4 & 5)**

4) LIMPOPO WATER MANAGEMENT AREA.

The area consists of secondary drainage areas A4, A5, A6, A7 and A8.

4.1 A4 Drainage Area. (Matlabas, Mokolo Rivers)

Very little fluctuations in water levels over the past year **(GRAPH 1)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
7 Of the 12 stations indicate declining water levels. **(GRAPH 2)**

Past year; February 2009 to February 2010
5 of the 6 Stations with data indicate lower levels over the past year (**GRAPHS 3 &4)**

4.2 A5 Drainage Area. (Lephalale River)

Groundwater levels slowly declining over the past year **(GRAPH 5)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
5 of the 7 stations indicate a small decline **(GRAPH 6)**

Past year; February 2009 to February 2010
6 Stations have data for the year with 5 indicating lower levels **(GRAPHS 7 & 8)**

4.3 A6 Drainage Area. (Nile, Sterk, Mogalakwena & Dorps Rivers)

Some recharge evident at most stations since the start of the wet season. **(GRAPH 9)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
Data is available for 30 stations. 14 Stations (46.67%) indicate lower and 16 stations (53.33%) higher water levels. Overall an average rise of 0.65m was recorded **(GRAPHS 10 & 11)**

Past year; February 2009 to February 2010
Data is available for 29 stations of which 12 Stations (41.38%) indicate lower water levels than last year and 17 stations (58.62%) indicate a rise in water levels. An overall rise of 0.13m was recorded over the past year. **(GRAPH 11 & 12)**

Current average water levels are just below the long-term average values but 2.66m higher than the maximum average recorded **(GRAPH 13)**

4.4 A7 Drainage Area. (Sand, Blood, Diep, Hout, Dwars & Brak Rivers)

Trends indicate little fluctuation in water levels but a measure of recharge can be noticed at some stations since the start of the wet season **(GRAPH 14)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
Data for all 38 stations is available. Only 7 Stations (18.4%) indicate lower, with 31 stations (81.6%) indicating higher water levels. Overall a rise of 0.46m was recorded over the last quarter **(GRAPHS 15&17).**

Past year; February 2009 to February 2010
Data is available for all 38 stations, 17 (44.7%) Indicate lower water levels, average -0.68m. 21 Stations (55.3%) indicate higher water levels, average 1.37m. Overall a rise of 0.46m was recorded for the period **(GRAPHS 16&17)**.

Current average water levels are above the long-term average and 3.31m above the lowest average recorded **(GRAPH 18).**

4.5 A8 Drainage Area ((Nwanedzi, Nzhelele Rivers)

Little fluctuation in water levels but some recharge can be noted (**GRAPH 19)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
All stations with data for the period indicate higher water levels, average 0.43m **(GRAPHS 20 & 22)**.

Past year; February 2009 to February 2010
5 Stations indicate lower and 3 higher water levels **(GRAPHS 21 & 22)**.

5) LEVHUVHU-LETABA WATER MANAGEMENT AREA.

The area consists of secondary drainage areas A9, B8 & B9.

5.1 A9 Drainage Area. (Mutale, Levhuvhu Rivers)

Hardy any fluctuation in water levels **(GRAPH 23).**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
Data is available for all stations, 9 of which indicate lower water levels and 9 higher (**GRAPHS 24 & 26)**.

Past year; February 2009 to February 2010
All 18 stations indicates declining water levels for the past year **(GRAPHS 25&26)**.

Overall an average decline of 0.72m was recorded over the area the past year.

5.2 B8 Drainage Area. (Groot, Middel & Klein Letaba Rivers)

Groundwater levels generally stable with little fluctuation the past year, **(GRAPH 27).**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
Data is available for all 14 stations with 3 indicating lower water levels, and 9 higher **(GRAPHS 28 & 30)**

Past year; February 2009 to February 2010
5 Stations indicate lower water levels, average -0.39m with 7 indicating higher levels, overall a rise of 0.03m was recorded (**GRAPHS 27& 30)**

5.3 B9 Drainage Area. (Shingwidzi, Mphongolo Rivers)

Hardly any fluctuations in water levels **(GRAPH 31)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
2 stations indicate some rise in water level **(GRAPHS 32 & 34).**

Past year; February 2009 to February 2010
All 3 stations have lower water levels than the same time last year; average -0.6m **(GRAPHS 33 & 34)**

6) OLIFANTS WATER MANAGEMENT AREA.

The part of this Water Management Area within the Limpopo Province mostly consists of the B3, B5 & B7 secondary drainage areas.

6.1 B3 Drainage Area. (Elands, Gotwane Rivers (Springbok flats area)

The water levels at Tuinplaas & Settlers kept recovered over the past year **(GRAPH 35)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
2 Of the 3 stations indicate higher levels **(GRAPH 36)**

Past year; February 2009 to February 2010
All 3 stations indicate higher water levels (**GRAPH 37)**

The water levels at Settlers and Tuinplaas are well above the worst recorded (**GRAPH 38)**

6.2 B5 Drainage Area. (Olifants, Nkumpi Rivers)

Some recharge evident over the last period **(GRAPH 39)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
All 7 Stations indicate higher water levels. The water level at B5Byzonderheid does not reflect natural conditions. **(GRAPHS 40 & 42)**

Past year; February 2009 to February 2010
3 Stations indicate lower water levels than the same time last year and 4 stations indicate higher levels **GRAPHS 41 & 42)**

Current average water levels compare very favorable with long-term average and the lowest average recorded at stations with long-term data **(GRAPH 43)**

6.3 B7 Drainage Area (Olifants, Selati, Klaserie, Makhutswi Rivers)

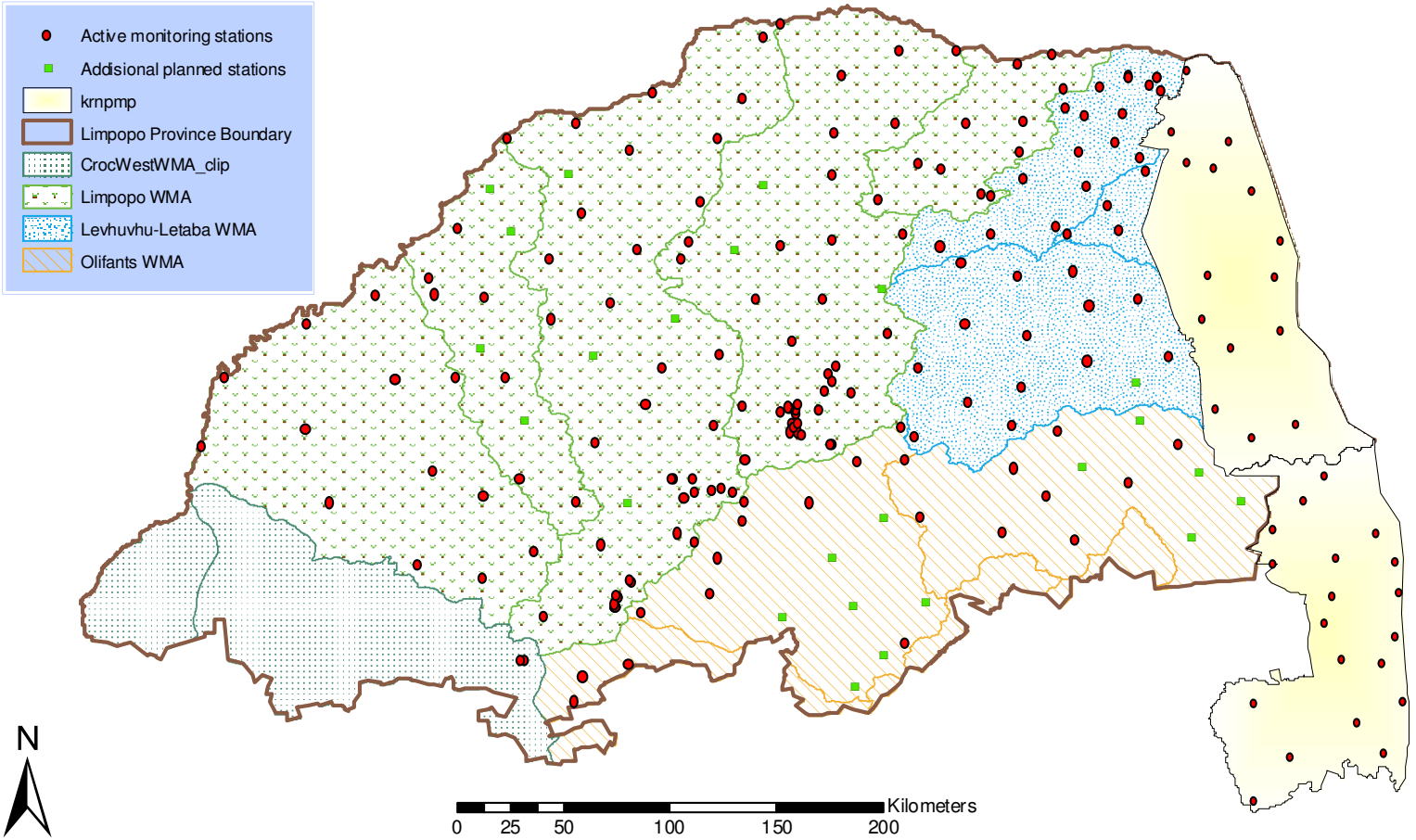
Stable conditions **(GRAPH 44)**

Comparison with previous levels:

Last quarter; November 2009 to February 2010 (Start to midway of the wet season)
6 Of the 7 stations with data indicate higher water levels **(GRAPHS 45 & 47)**

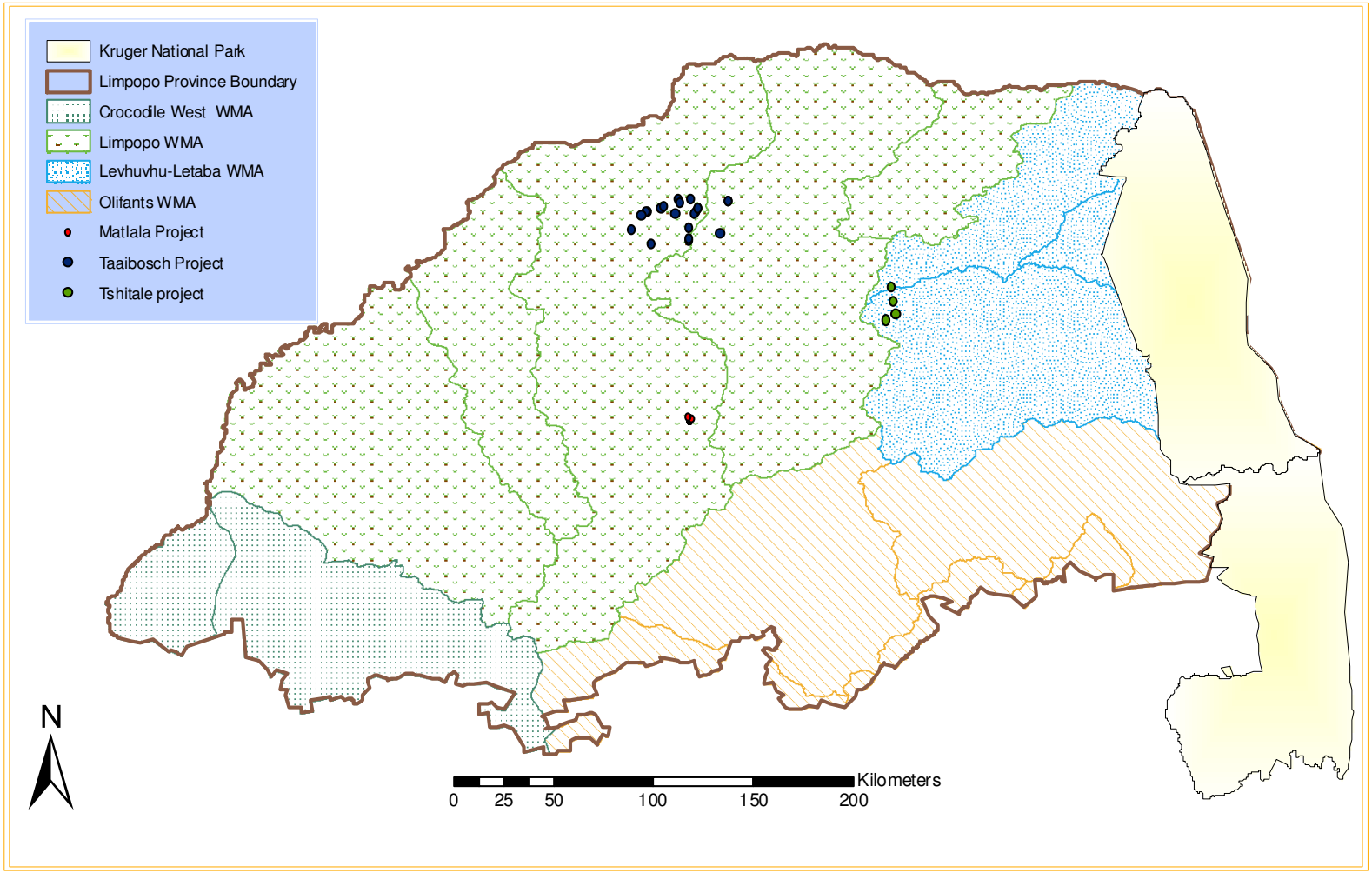
Past year; February 2009 to February 2010
3 Stations indicate higher water levels **(GRAPHS 46 & 47**).

LIMPOPO GROUNDWATER LEVEL MONITORING
POSITIONS OF ACTIVE AND PLANNED STATIONS



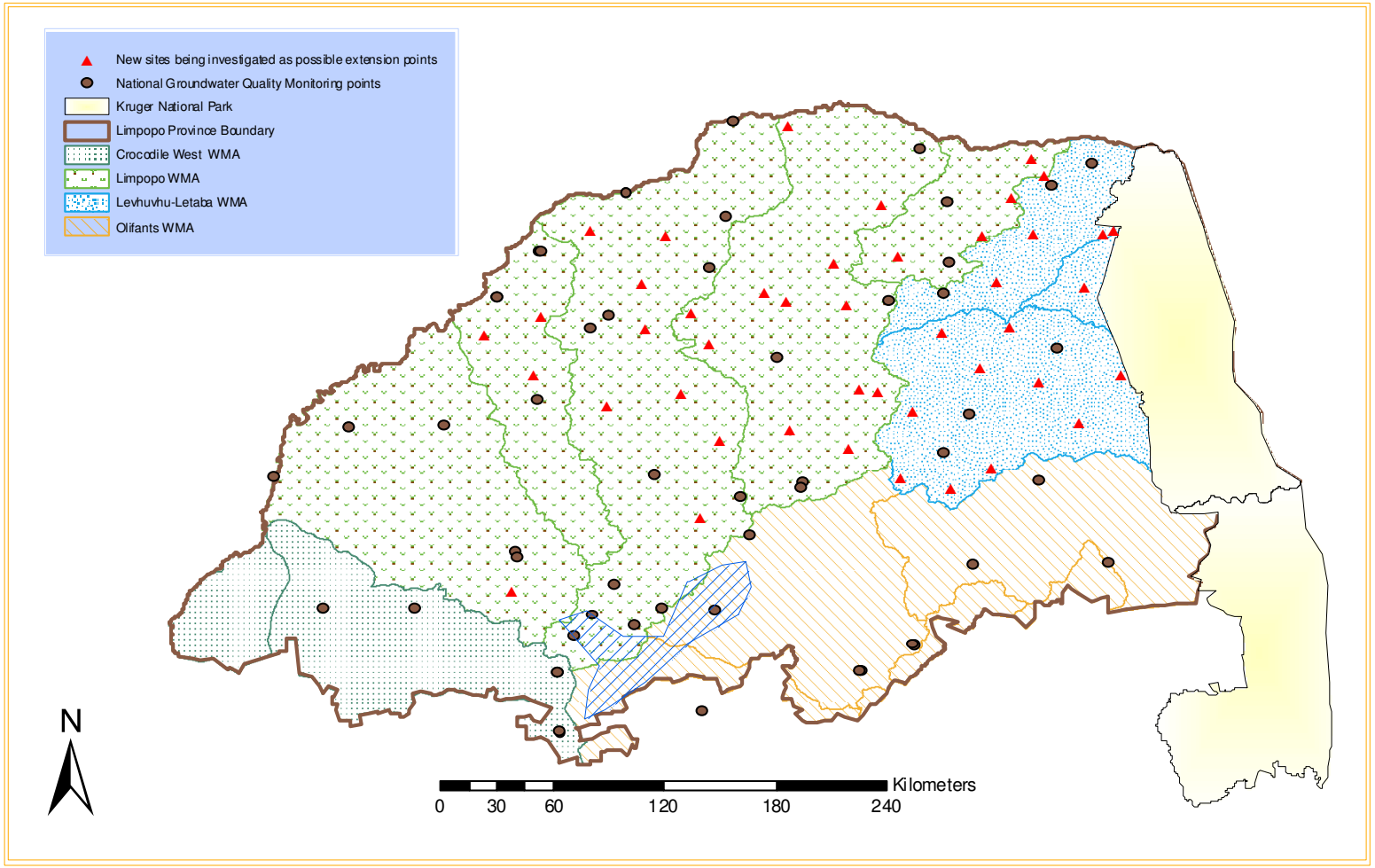
MAP 1

LIMPOPO GROUNDWATER LEVEL MONITORING
POSITIONS OF PROJECT MONITORING STATIONS



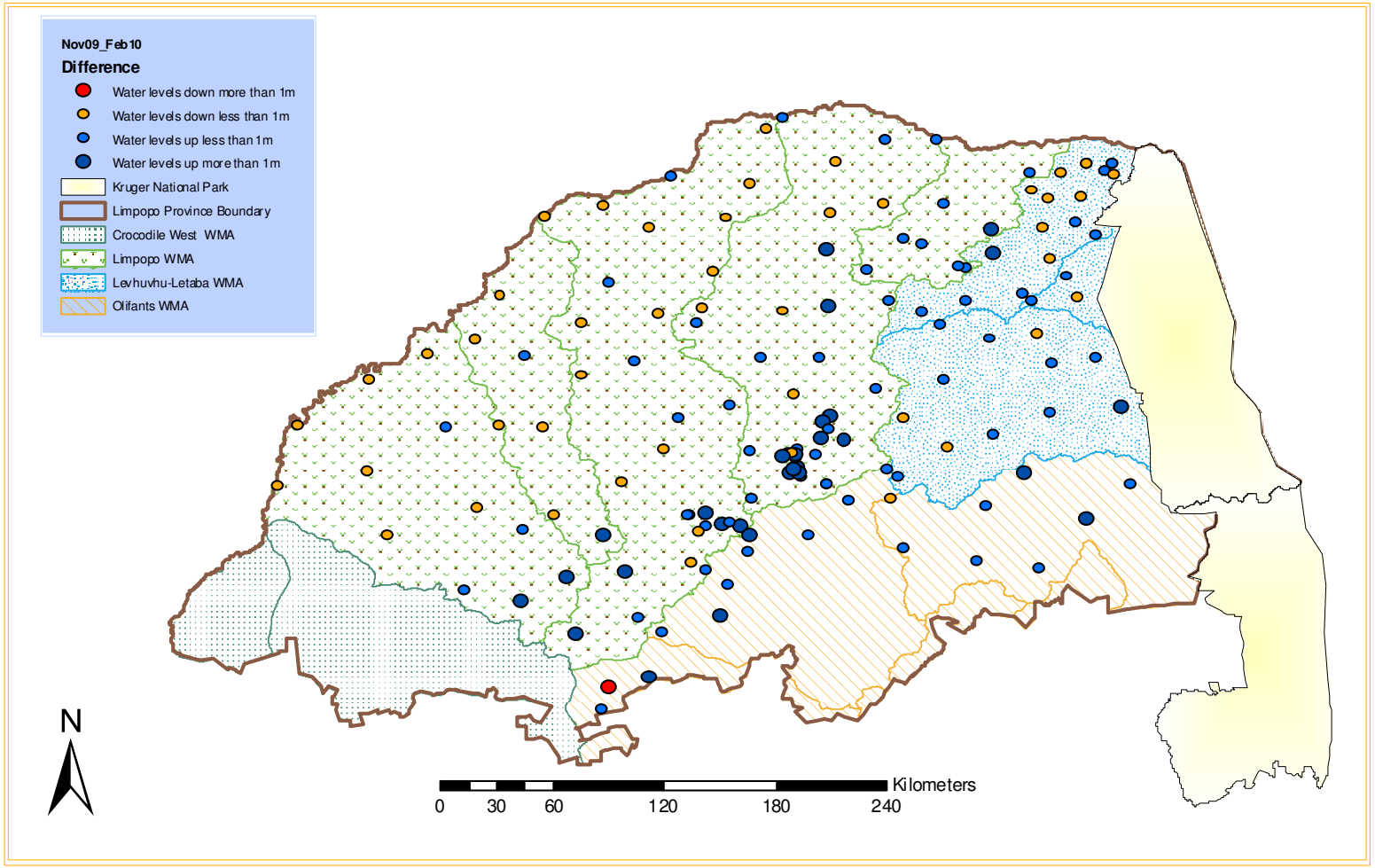
MAP 2

LIMPOPO GROUNDWATER MONITORING;
POSITIONS OF EXISTING GROUNDWATER QUALITY
MONITORING POINTS AND POSSIBLE NEW ADDDITIONAL
SITES BEING EVALUATED



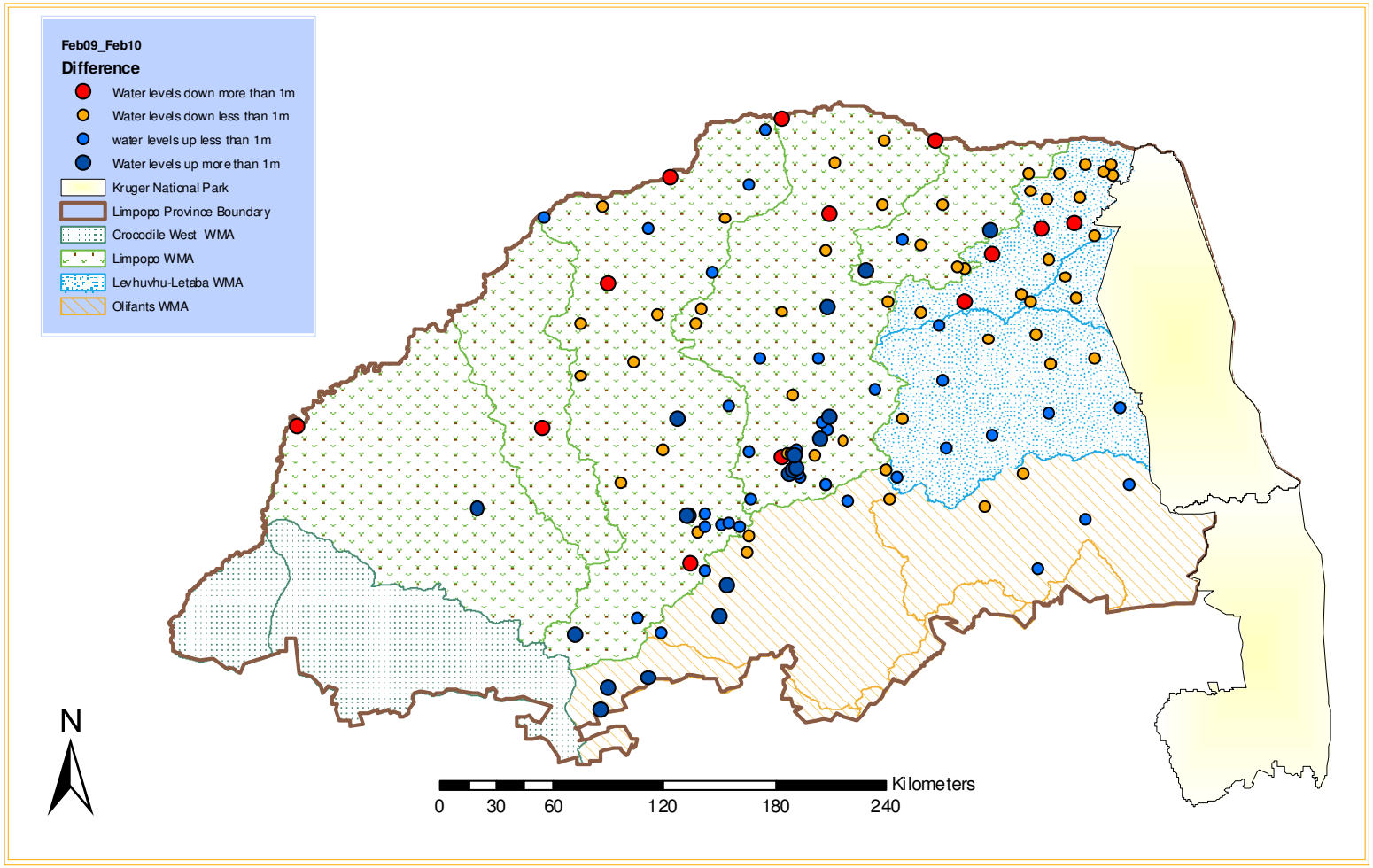
MAP 3

LIMPOPO GROUNDWATER MONITORING;
DIFFERENCE IN WATER LEVELS,
NOVEMBER 2009 TO FEBRUARY 2010



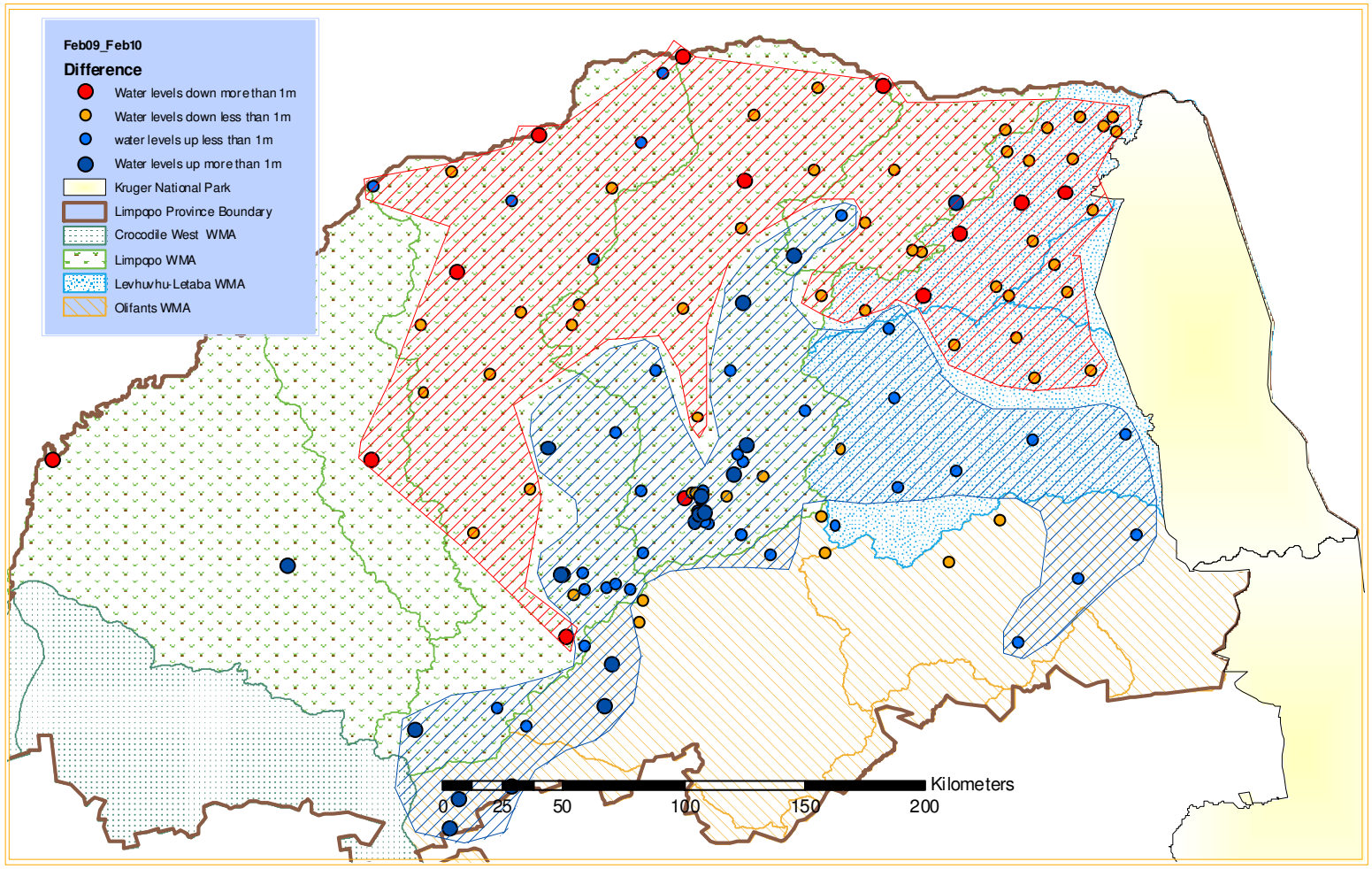
MAP 4

LIMPOPO GROUNDWATER MONITORING;
DIFFERENCE IN WATER LEVELS,
FEBRUARY 2009 TO FEBRUARY 2010

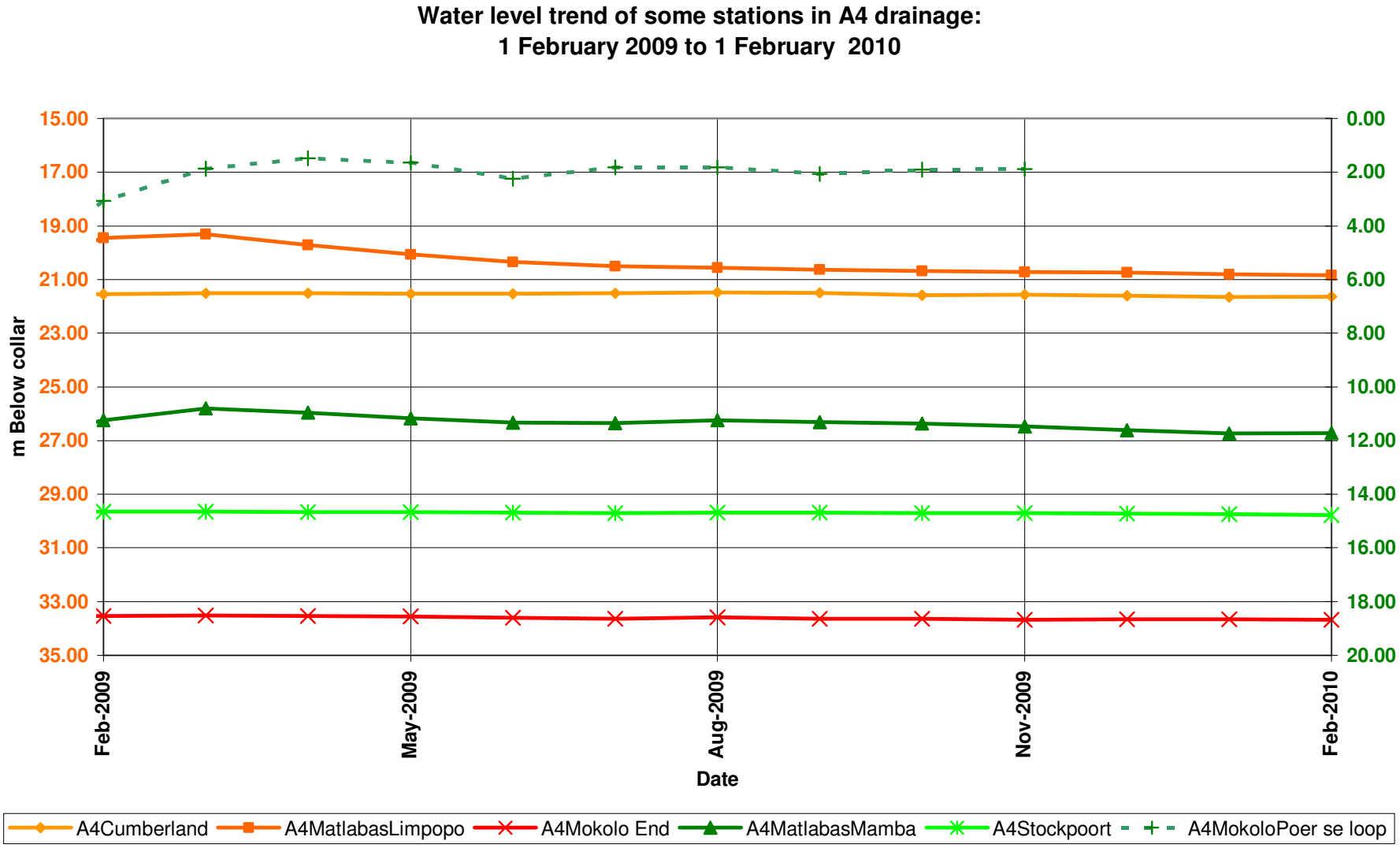


MAP 5

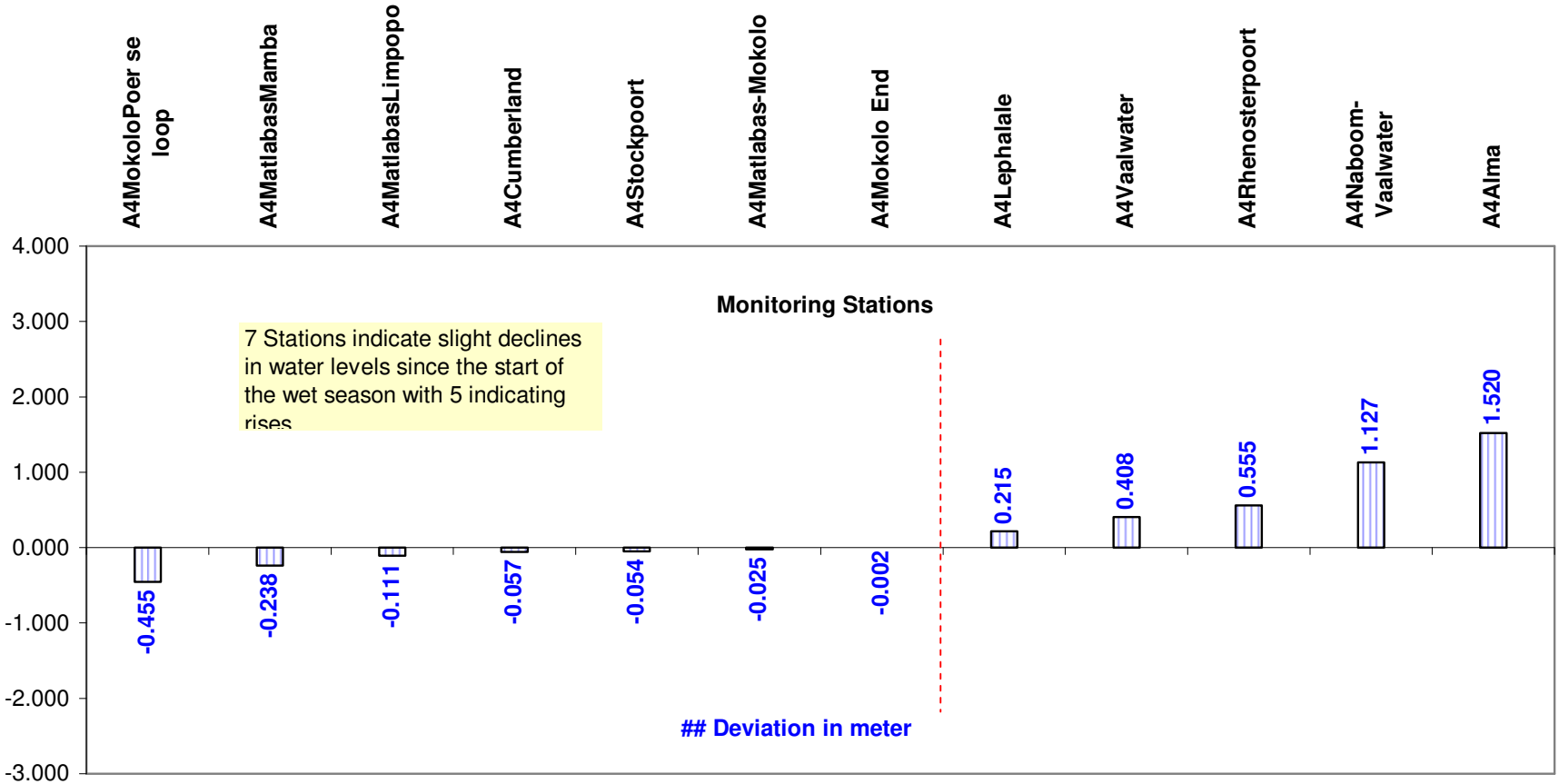
LIMPOPO GROUNDWATER MONITORING;
PATTERNS IN GROUNDWATER LEVEL BEHAVIOUR
FEBRUARY 2009 TO FEBRUARY 2010



MAP 6

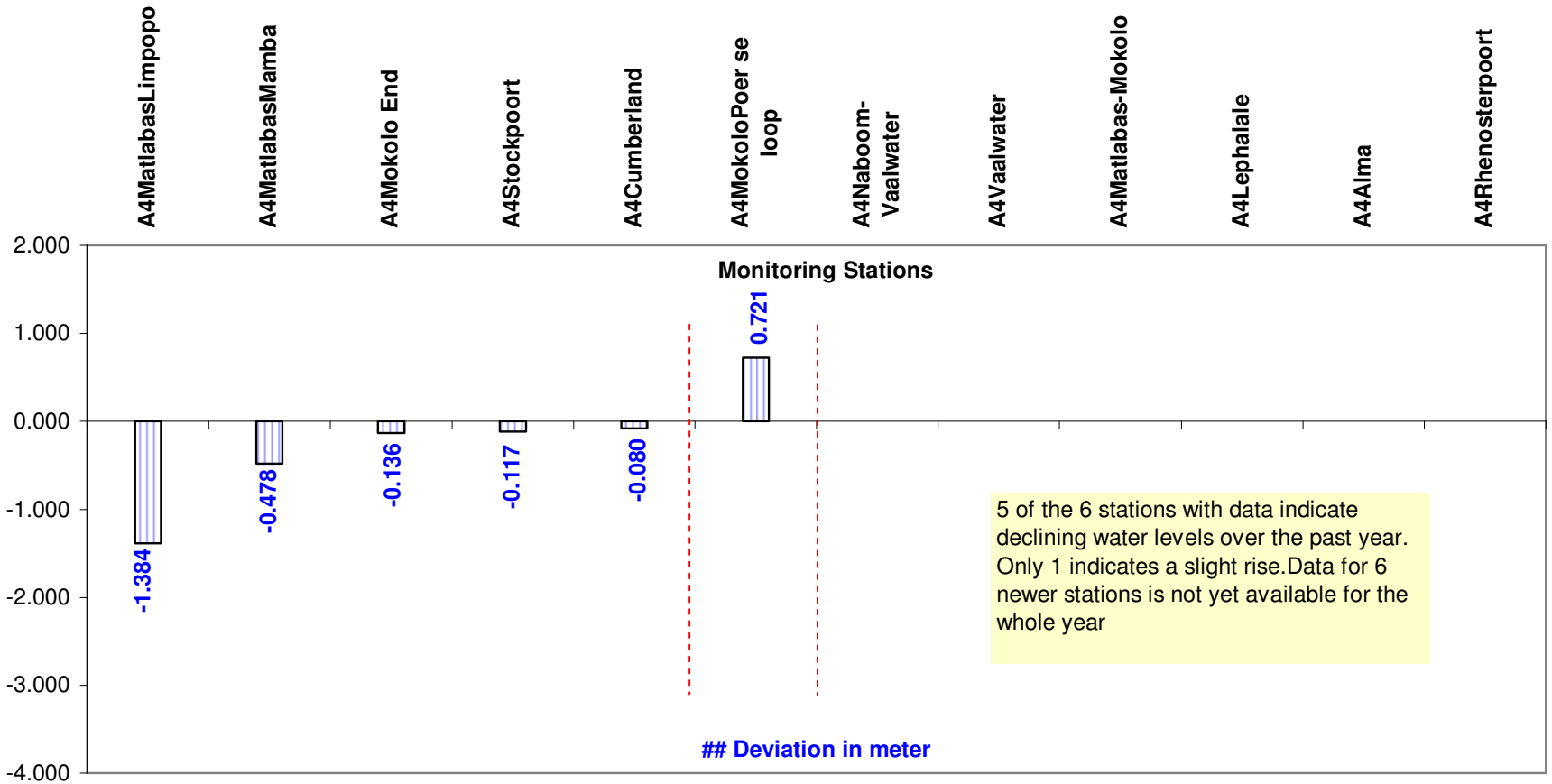

Water level trend of some stations in A4 drainage:
1 February 2009 to 1 February 2010
m Below collar
15.00
17.00
19.00
21.00
23.00
25.00
27.00
29.00
31.00
33.00
35.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
Feb-2009
May-2009
Aug-2009
Nov-2009
Feb-2010
Date
A4Cumberland
A4MatlabasLimpopo
A4Mokolo End
A4MatlabasMamba
A4Stockpoort
A4MokoloPoer se loop

GRAPH 1


A4 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
A4MokoloPoer se loop
A4MatlabasMamba
A4MatlabasLimpopo
A4Cumberland
A4Stockpoort
A4Matlabas-Mokolo
A4Mokolo End
A4Lephalale
A4Vaalwater
A4Rhenosterpoort
A4Naboom-Vaalwater
A4Alma
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
Monitoring Stations
7 Stations indicate slight declines in water levels since the start of the wet season with 5 indicating rises
-0.455
-0.238
-0.111
-0.057
-0.054
-0.025
-0.002
0.215
0.408
0.555
1.127
1.520
Deviation in meter

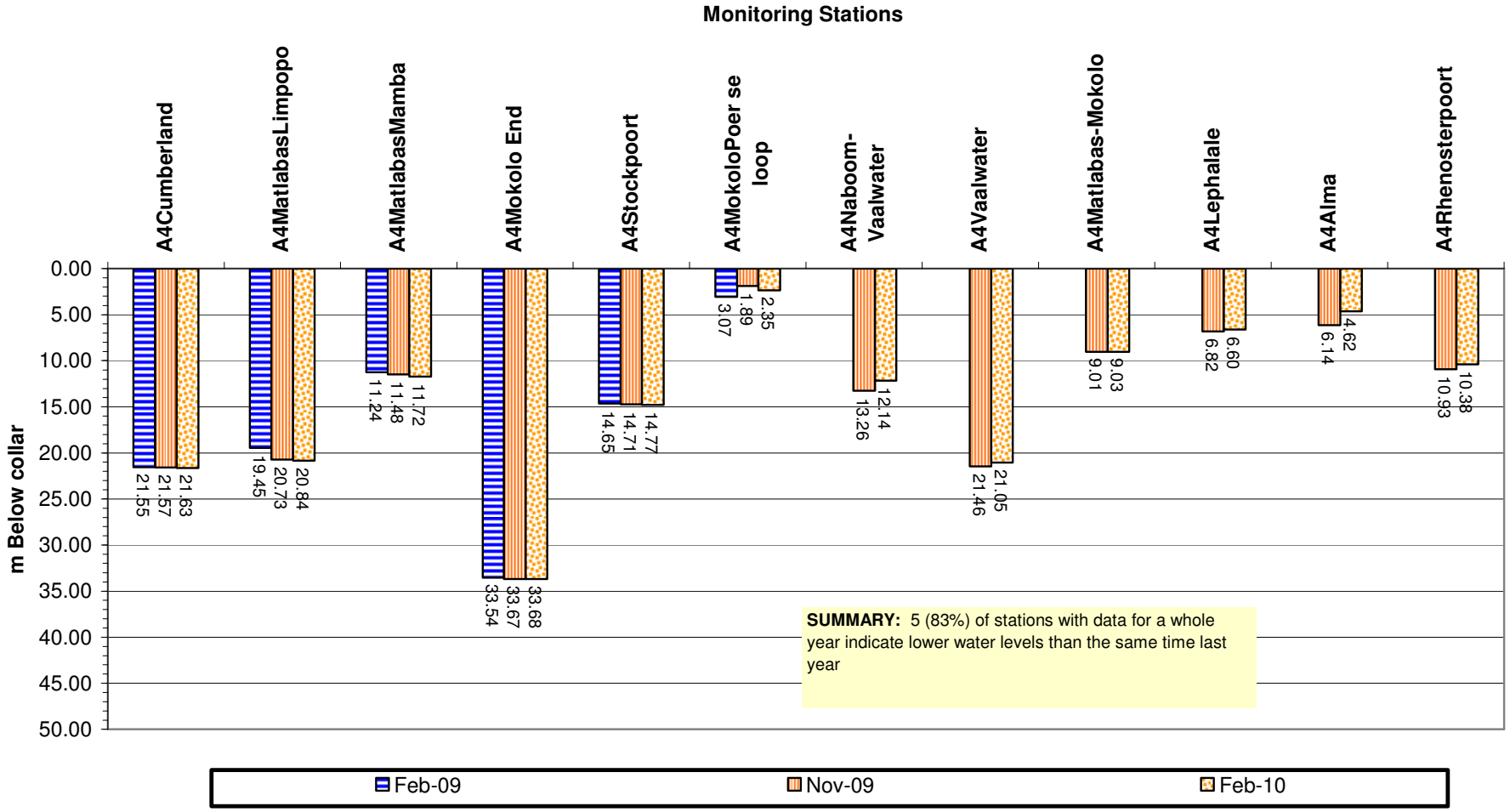
GRAPH 2

A4 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010



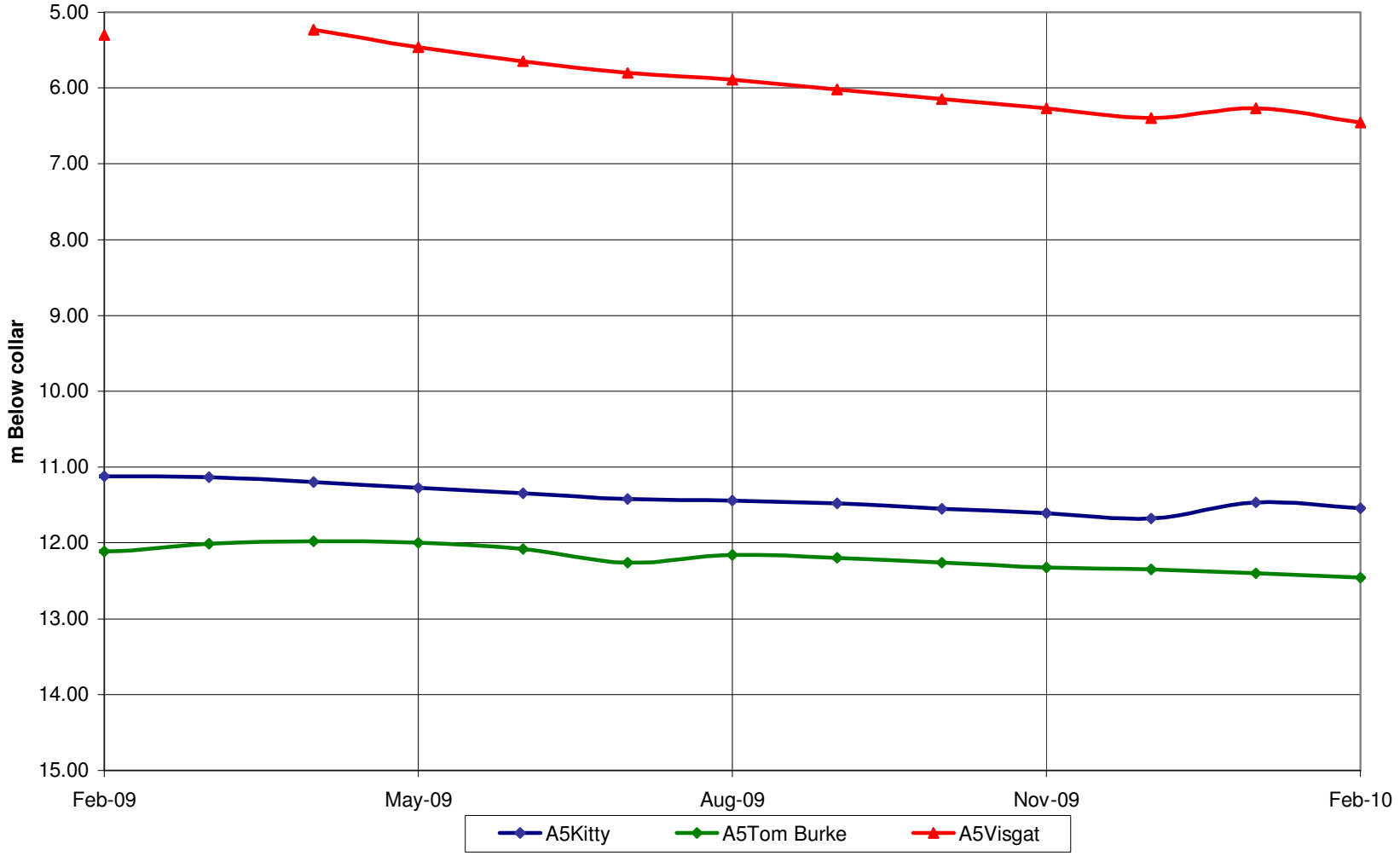
GRAPH 3

A4 DRAINAGE AREA
Comparison between water levels: 1 February 2009, 1 November 2009 and 1 February 2010



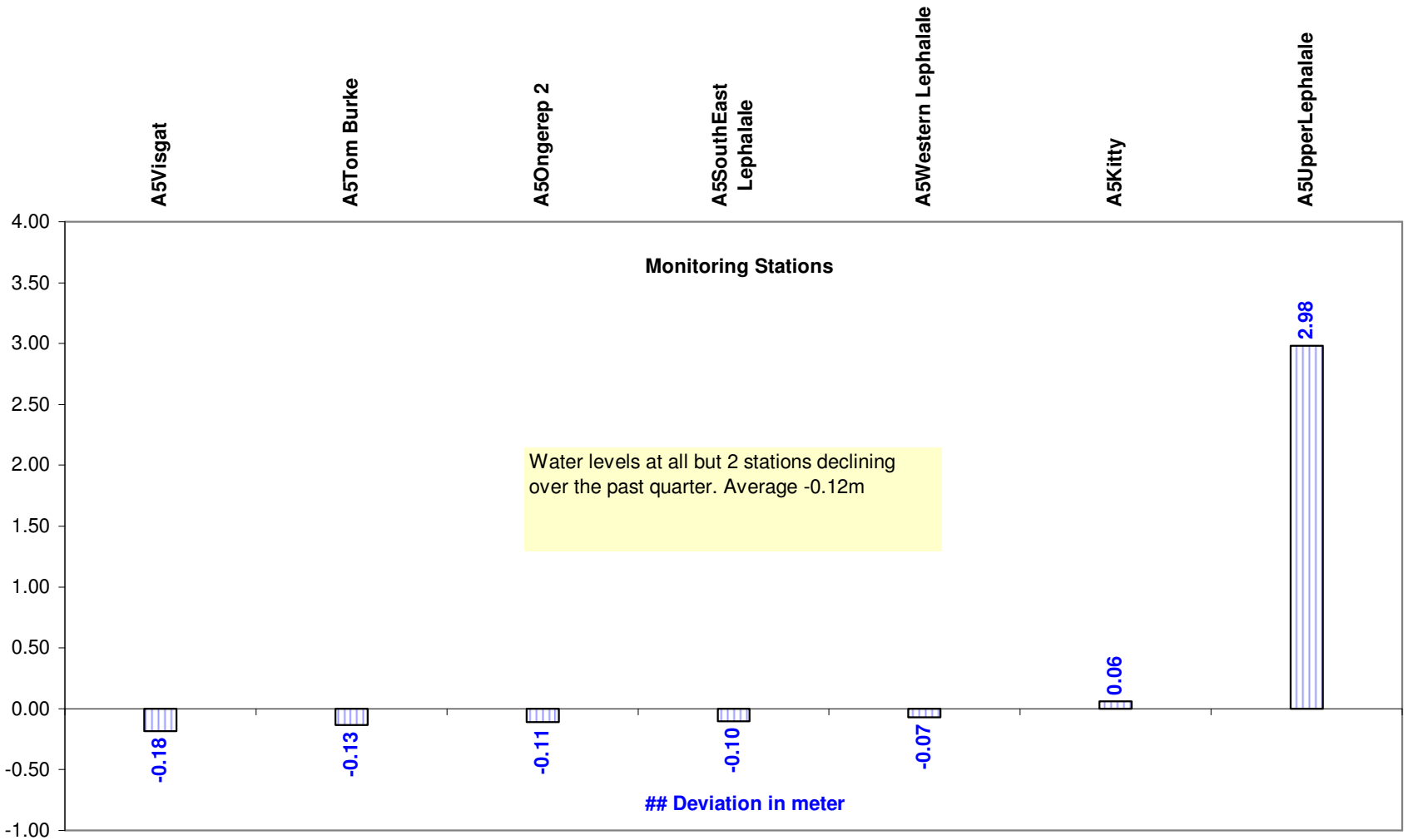
GRAPH 4

Comparison of water level trends at some stations in A5 drainage: 1 February 2009 to 1 February 2010



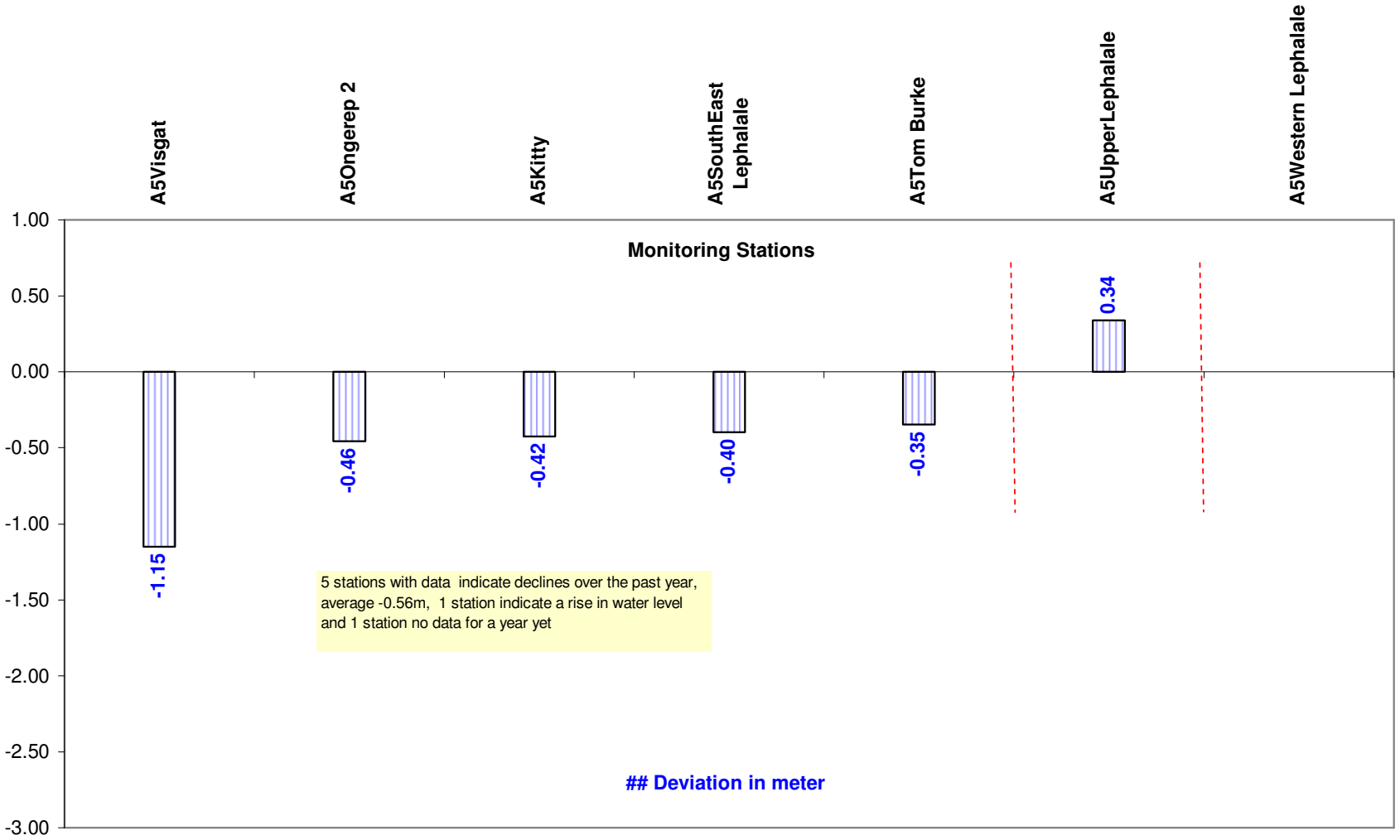
GRAPH 5

A5 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010

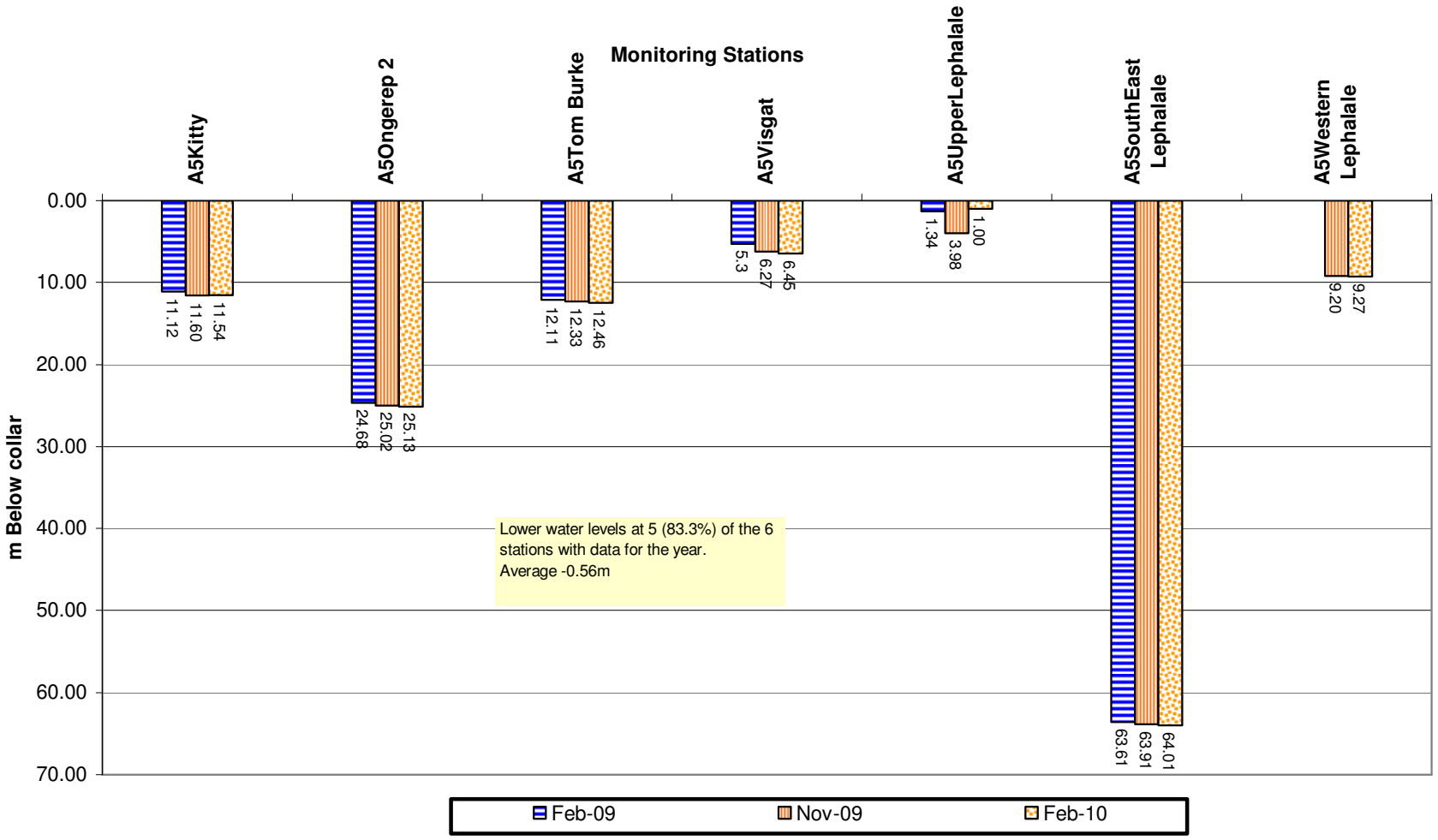


GRAPH 6

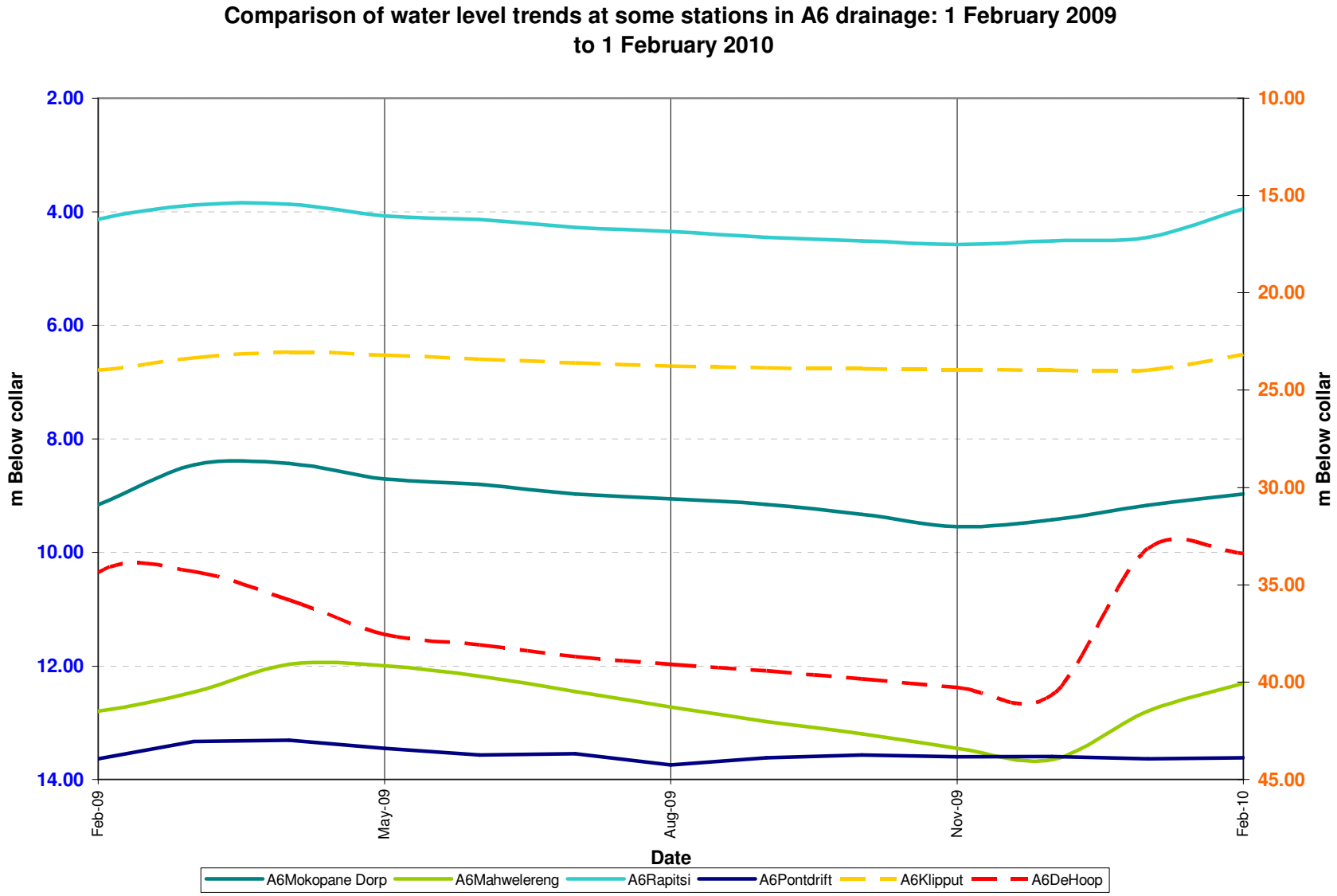
A5 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010



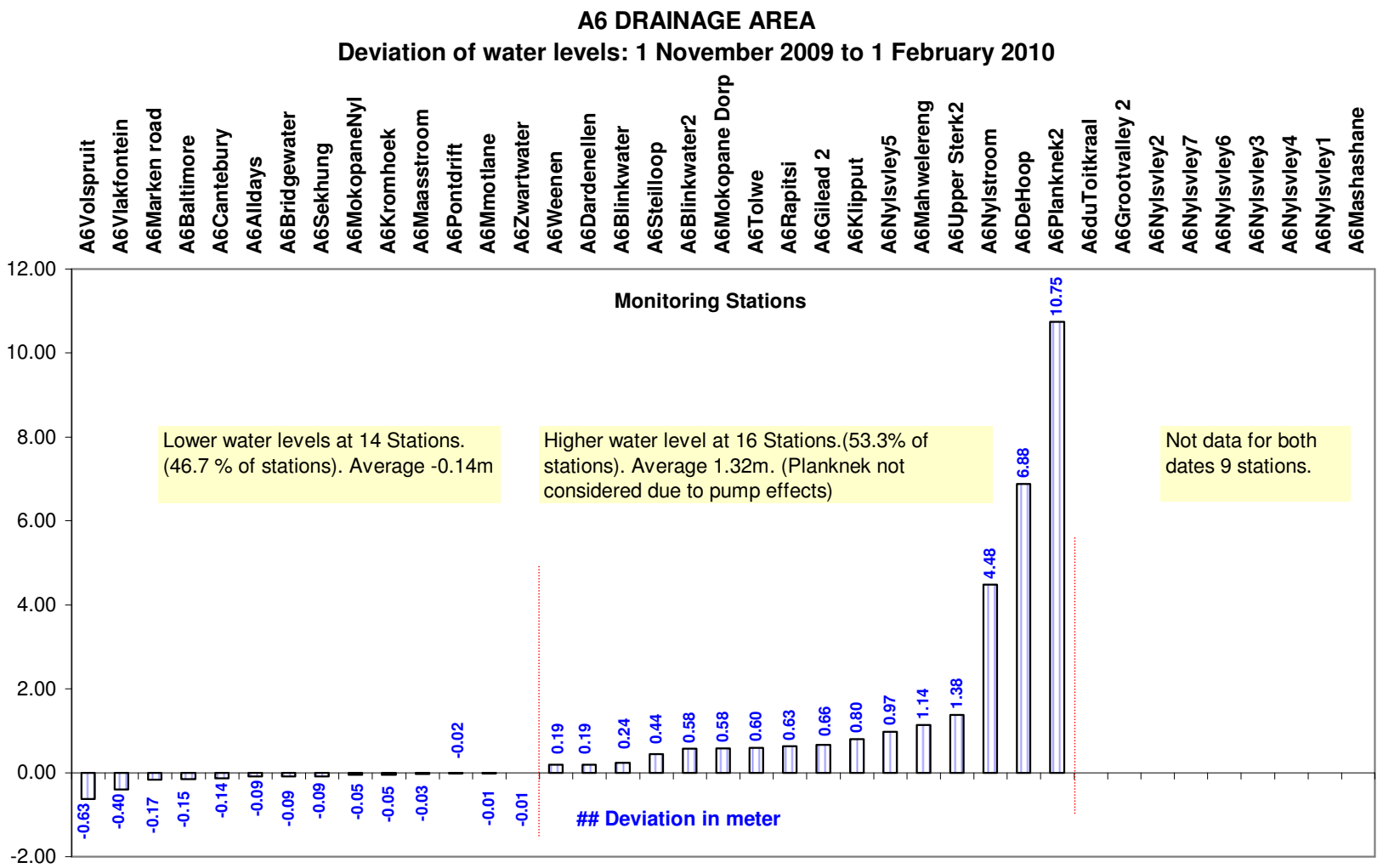
GRAPH 7


A5 DRAINAGE AREA
Comparison between water level depths : 1 February 2009,
1 November 2009 and 1 February 2010
Monitoring Stations
A5Kitty
A5Ongerep 2
A5Tom Burke
A5Visgat
A5UpperLephalale
A5SouthEast Lephalale
A5Western Lephalale
m Below collar
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
11.12
11.60
11.54
24.68
25.02
25.13
12.11
12.33
12.46
5.3
6.27
6.45
1.34
3.98
1.00
63.61
63.91
64.01
9.20
9.27
Lower water levels at 5 (83.3%) of the 6 stations with data for the year.
Average -0.56m
Feb-09
Nov-09
Feb-10

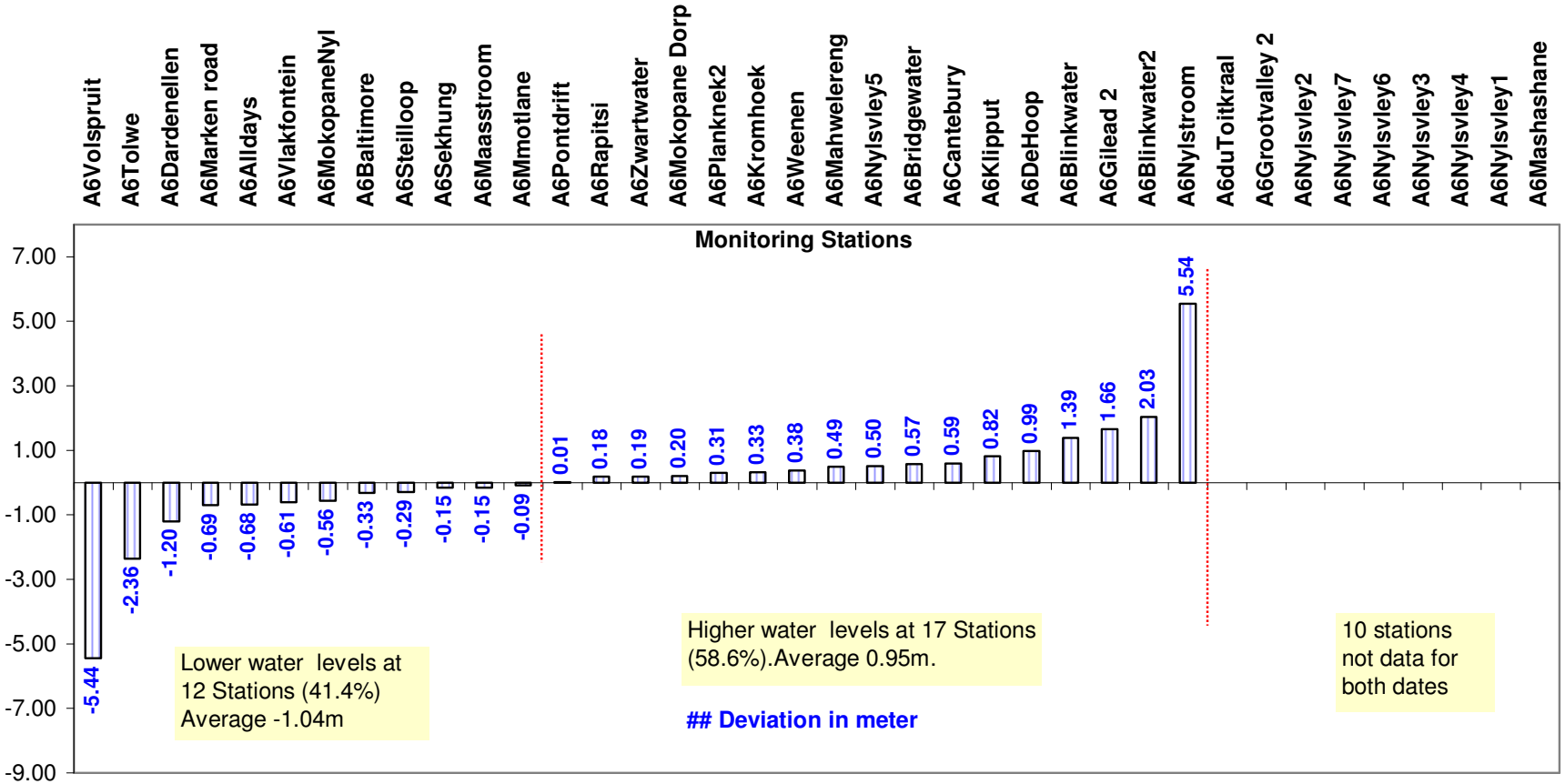
GRAPH 8


Comparison of water level trends at some stations in A6 drainage: 1 February 2009 to 1 February 2010
2.00
4.00
6.00
8.00
10.00
12.00
14.00
m Below collar
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
m Below collar
Feb-09
May-09
Aug-09
Nov-09
Feb-10
Date
A6Mokopane Dorp
A6Mahwelereng
A6Rapitsi
A6Pontdrift
A6Klipput
A6DeHoop

GRAPH 9

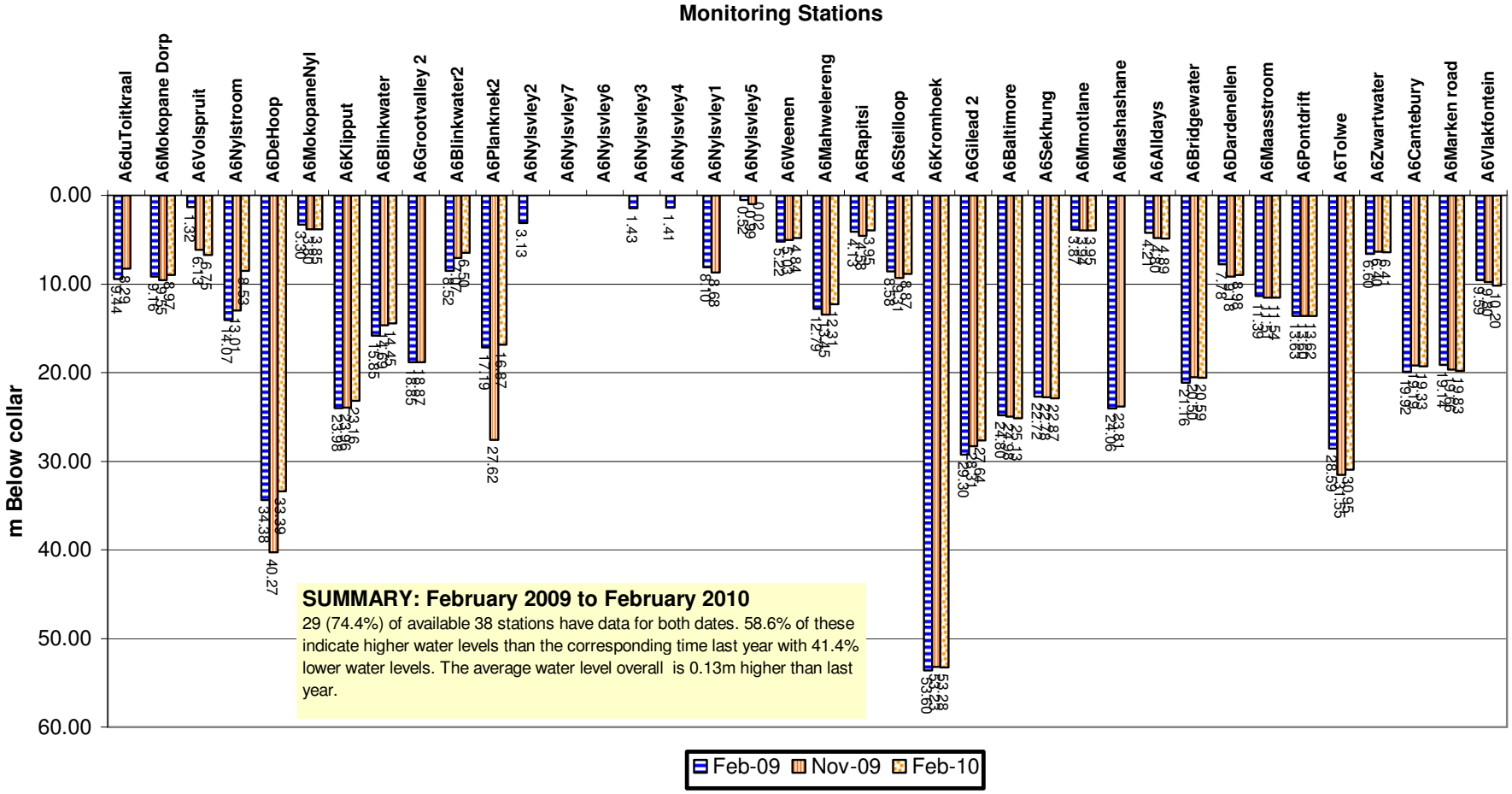

A6 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
A6Volspruit
A6Vlakfontein
A6Marken road
A6Baltimore
A6Cantebury
A6Alldays
A6Bridgewater
A6Sekhung
A6MokopaneNyl
A6Kromhoek
A6Maasstroom
A6Pontdrift
A6Mmotlane
A6Zwartwater
A6Weenen
A6Dardenellen
A6Blinkwater
A6Steilloop
A6Blinkwater2
A6Mokopane Dorp
A6Tolwe
A6Rapitsi
A6Gilead 2
A6Klipput
A6Nylsvley5
A6Mahwelereng
A6Upper Sterk2
A6Nylstroom
A6DeHoop
A6Planknek2
A6duToitkraal
A6Grootvalley 2
A6Nylsvley2
A6Nylsvley7
A6Nylsvley6
A6Nylsvley3
A6Nylsvley4
A6Nylsvley1
A6Mashashane
12.00
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
Monitoring Stations
Lower water levels at 14 Stations. (46.7 % of stations). Average -0.14m
Higher water level at 16 Stations.(53.3% of stations). Average 1.32m. (Planknek not considered due to pump effects)
Not data for both dates 9 stations.
-0.63
-0.40
-0.17
-0.15
-0.14
-0.09
-0.09
-0.09
-0.05
-0.05
-0.03
-0.02
-0.01
-0.01
0.19
0.19
0.24
0.44
0.58
0.58
0.60
0.63
0.66
0.80
0.97
1.14
1.38
4.48
6.88
10.75
Deviation in meter

GRAPH 10


A6 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010
A6Volspruit
A6Tolwe
A6Dardenellen
A6Marken road
A6Alldays
A6Vlakfontein
A6MokopaneNyl
A6Baltimore
A6Steilloop
A6Sekhung
A6Maasstroom
A6Mmotlane
A6Pontdrift
A6Rapitsi
A6Zwartwater
A6Mokopane Dorp
A6Planknek2
A6Kromhoek
A6Weenen
A6Mahwelereng
A6Nylsvley5
A6Bridgewater
A6Cantebury
A6Klipput
A6DeHoop
A6Blinkwater
A6Gilead 2
A6Blinkwater2
A6Nylstroom
A6duToitkraal
A6Grootvalley 2
A6Nylsvley2
A6Nylsvley7
A6Nylsvley6
A6Nylsvley3
A6Nylsvley4
A6Nylsvley1
A6Mashashane
Monitoring Stations
7.00
5.00
3.00
1.00
-1.00
-3.00
-5.00
-7.00
-9.00
-5.44
-2.36
-1.20
-0.69
-0.68
-0.61
-0.56
-0.33
-0.29
-0.15
-0.15
-0.09
0.01
0.18
0.19
0.20
0.31
0.33
0.38
0.49
0.50
0.57
0.59
0.82
0.99
1.39
1.66
2.03
5.54
Lower water levels at 12 Stations (41.4%) Average -1.04m
Higher water levels at 17 Stations (58.6%).Average 0.95m.
Deviation in meter
10 stations not data for both dates

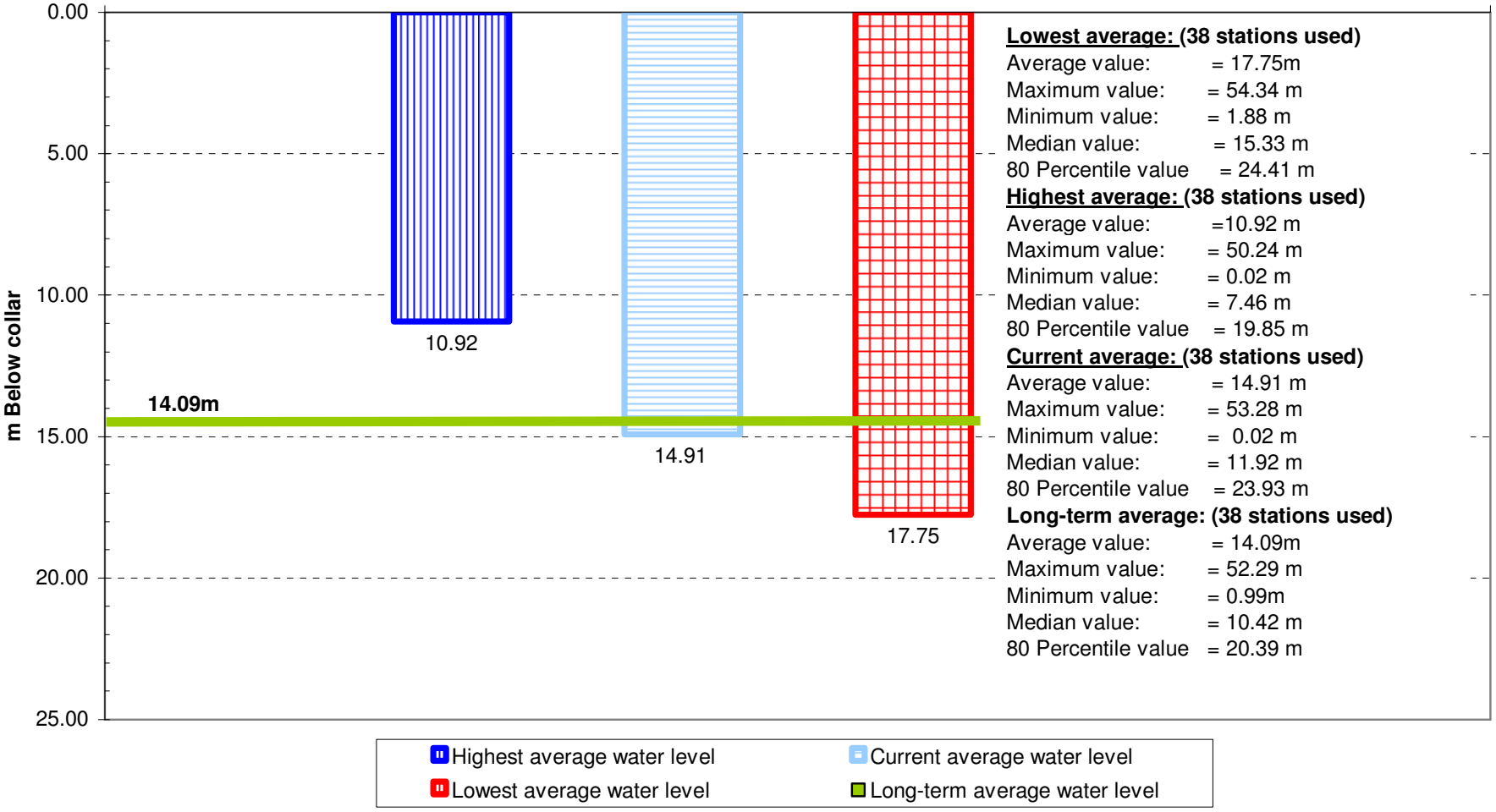
GRAPH 11

A6 DRAINAGE AREA
Comparison between water level depths: 1 February 2009, 1 November 2009, and 1 February 2010

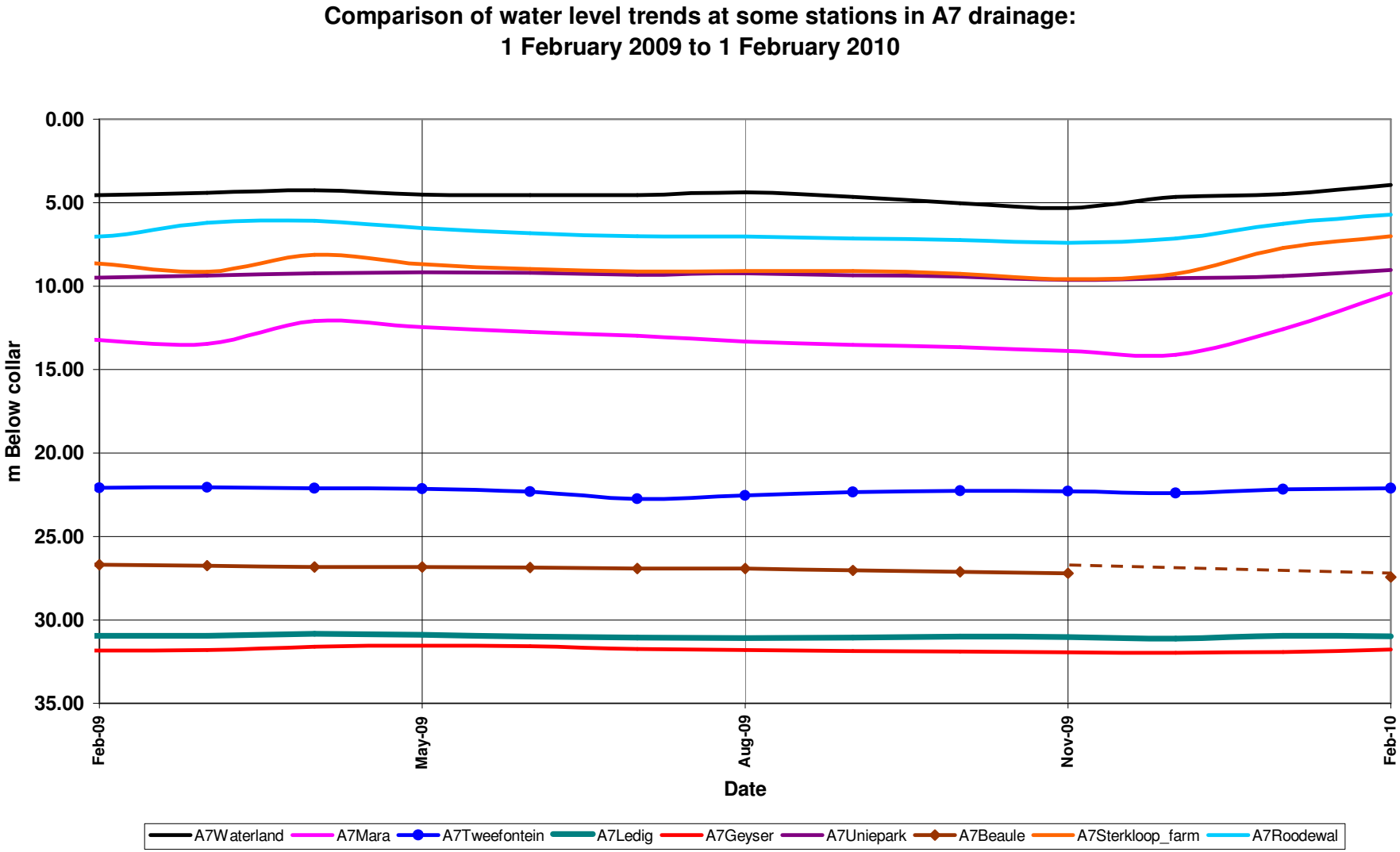


GRAPH 12

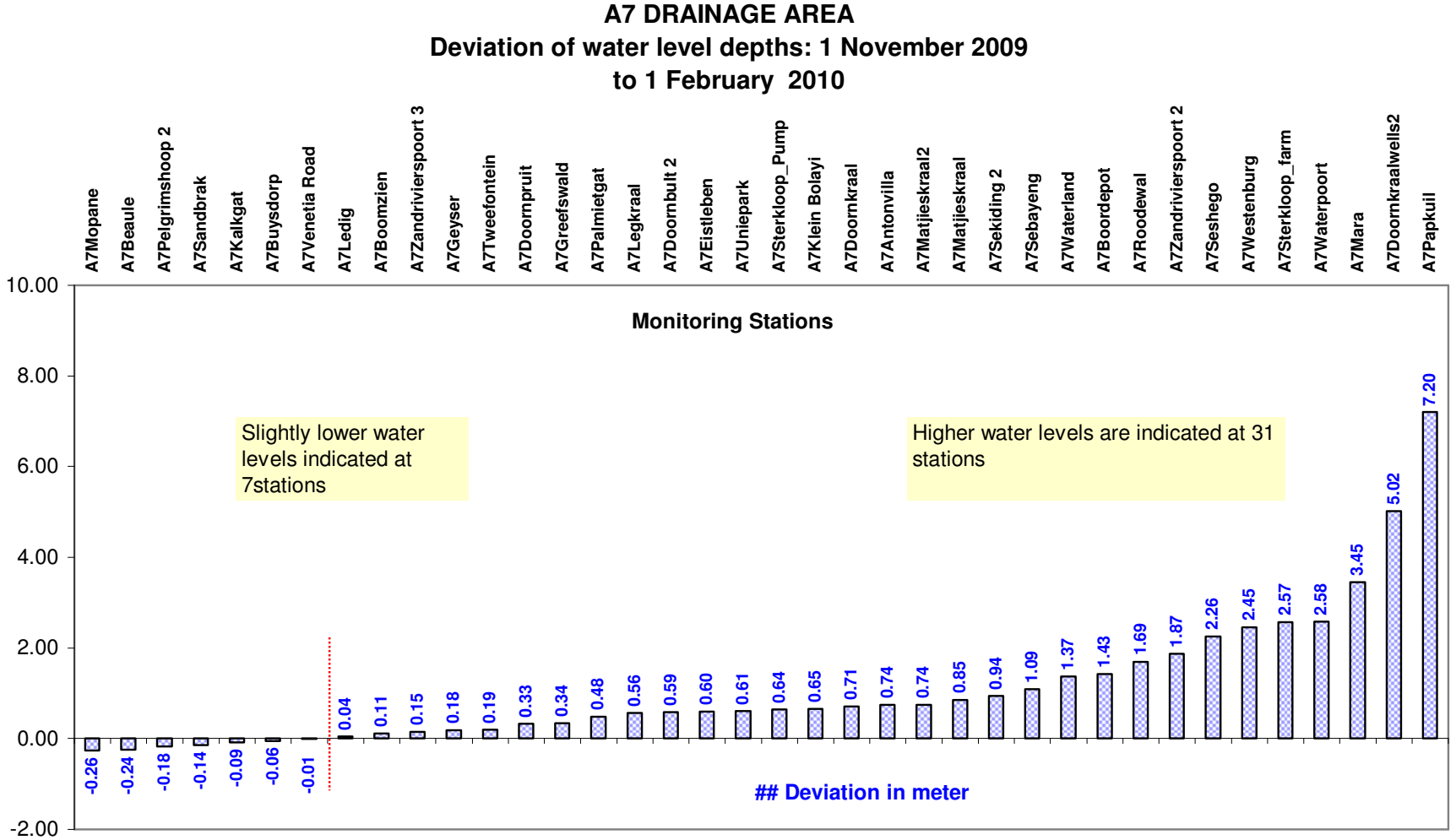
A6 DRAINAGE AREA
Comparison of average current water level depths with highest, lowest & long-term average water level depths recorded



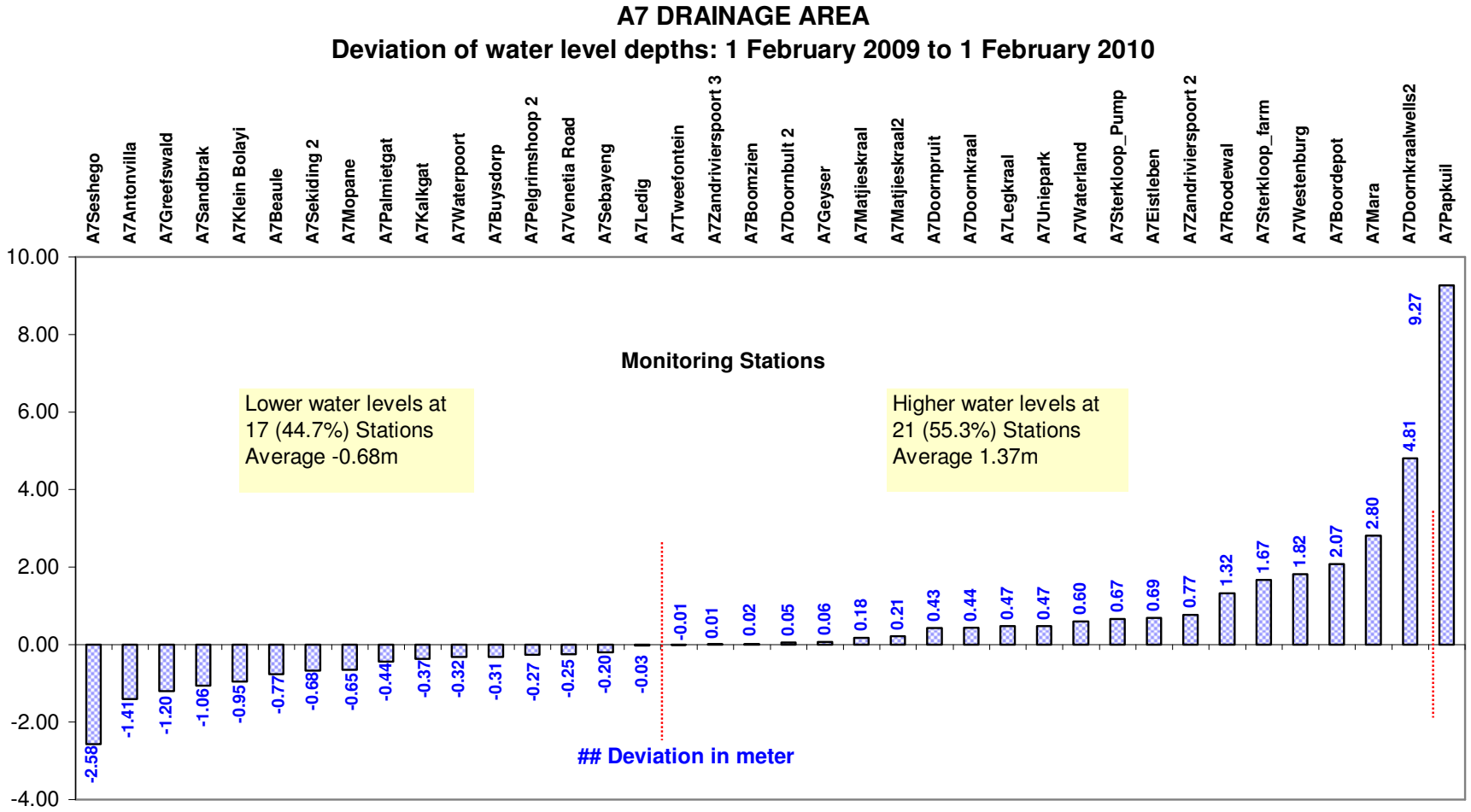
GRAPH 13


Comparison of water level trends at some stations in A7 drainage:
1 February 2009 to 1 February 2010
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
m Below collar
Feb-09
May-09
Aug-09
Nov-09
Feb-10
Date
A7Waterland
A7Mara
A7Tweefontein
A7Ledig
A7Geyser
A7Uniepark
A7Beaule
A7Sterkloop_farm
A7Roodewal

GRAPH 14

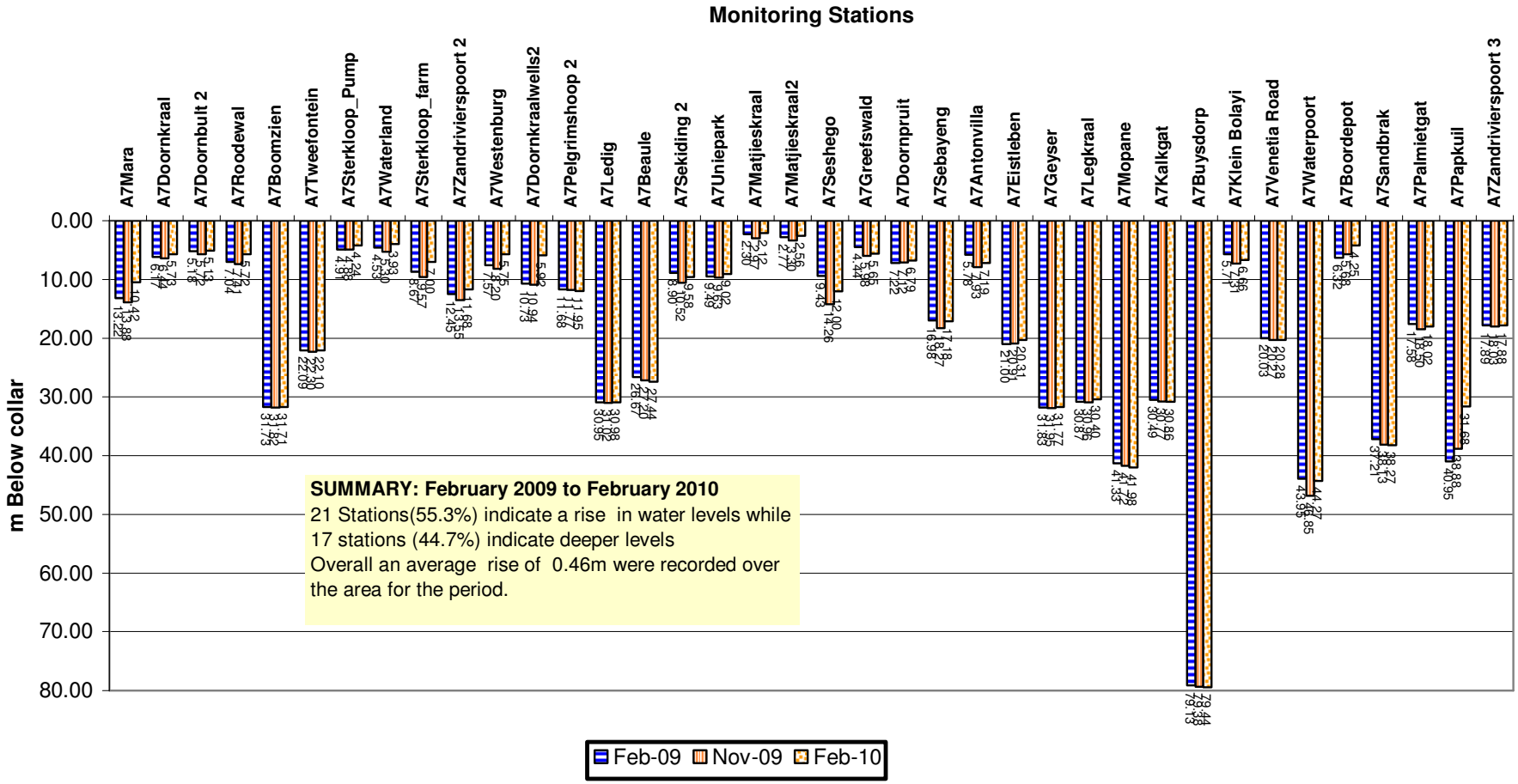

A7 DRAINAGE AREA
Deviation of water level depths: 1 November 2009
to 1 February 2010
A7Mopane
A7Beaule
A7Pelgrimshoop 2
A7Sandbrak
A7Kalkgat
A7Buysdorp
A7Venetia Road
A7Ledig
A7Boomzien
A7Zandrivierspoort 3
A7Geyser
A7Tweefontein
A7Doornpruit
A7Greefswald
A7Palmietgat
A7Legkraal
A7Doornbult 2
A7Eistleben
A7Uniepark
A7Sterkloop_Pump
A7Klein Bolayi
A7Doornkraal
A7Antonvilla
A7Matjieskraal2
A7Matjieskraal
A7Sekiding 2
A7Sebayeng
A7Waterland
A7Boordepot
A7Roodewal
A7Zandrivierspoort 2
A7Seshego
A7Westenburg
A7Sterkloop_farm
A7Waterpoort
A7Mara
A7Doornkraalwells2
A7Papkuil
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
Monitoring Stations
Slightly lower water levels indicated at 7stations
Higher water levels are indicated at 31 stations
-0.26
-0.24
-0.18
-0.14
-0.09
-0.06
-0.01
0.04
0.11
0.15
0.18
0.19
0.33
0.34
0.48
0.56
0.59
0.60
0.61
0.64
0.65
0.71
0.74
0.74
0.85
0.94
1.09
1.37
1.43
1.69
1.87
2.26
2.45
2.57
2.58
3.45
5.02
7.20
Deviation in meter

GRAPH 15

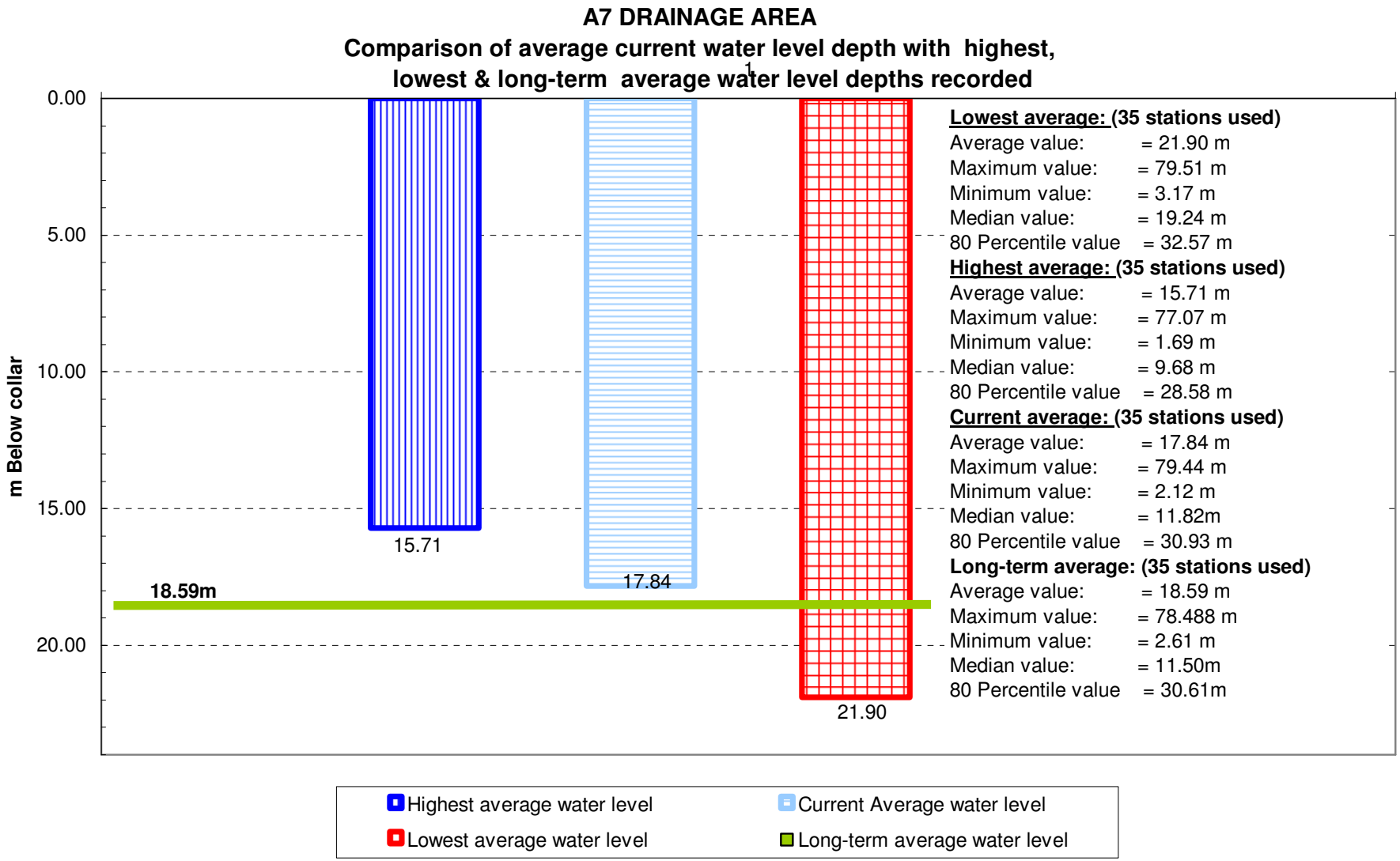

A7 DRAINAGE AREA
Deviation of water level depths: 1 February 2009 to 1 February 2010
A7Seshego
A7Antonvilla
A7Greefswald
A7Sandbrak
A7Klein Bolayi
A7Beaule
A7Sekiding 2
A7Mopane
A7Palmietgat
A7Kalkgat
A7Waterpoort
A7Buysdorp
A7Pelgrimshoop 2
A7Venetia Road
A7Sebayeng
A7Ledig
A7Tweefontein
A7Zandrivierspoort 3
A7Boomzien
A7Doornbult 2
A7Geyser
A7Matjieskraal
A7Matjieskraal2
A7Doornpruit
A7Doornkraal
A7Legkraal
A7Uniepark
A7Waterland
A7Sterkloop_Pump
A7Eistleben
A7Zandrivierspoort 2
A7Roodewal
A7Sterkloop_farm
A7Westenburg
A7Boordepot
A7Mara
A7Doornkraalwells2
A7Papkuil
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
Monitoring Stations
Lower water levels at
17 (44.7%) Stations
Average -0.68m
Higher water levels at
21 (55.3%) Stations
Average 1.37m
-2.58
-1.41
-1.20
-1.06
-0.95
-0.77
-0.68
-0.65
-0.44
-0.37
-0.32
-0.31
-0.27
-0.25
-0.20
-0.03
-0.01
0.01
0.02
0.05
0.06
0.18
0.21
0.43
0.44
0.47
0.47
0.60
0.67
0.69
0.77
1.32
1.67
1.82
2.07
2.80
4.81
9.27
Deviation in meter

GRAPH 16

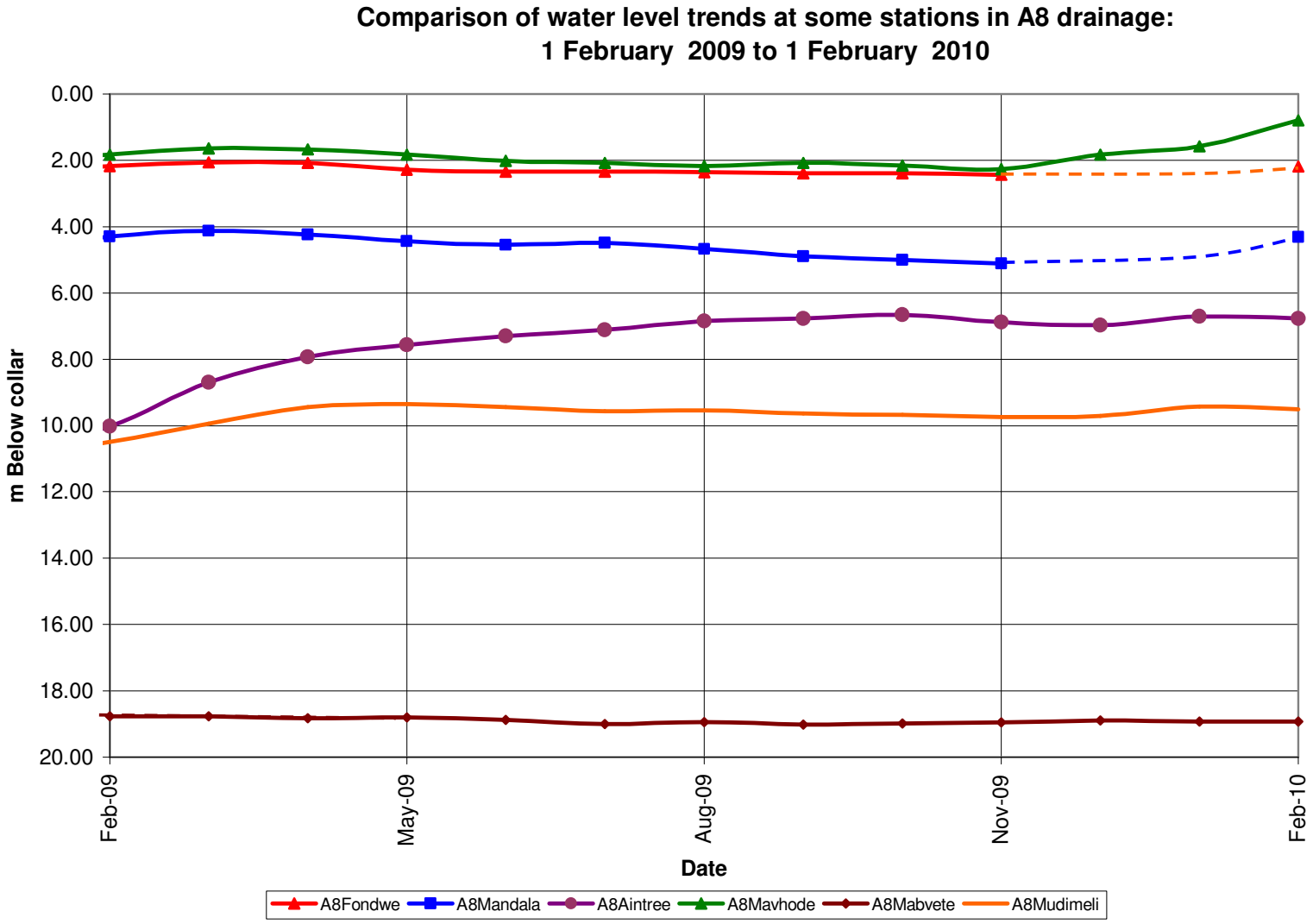
A7 DRAINAGE AREA
Comparison between water level depths: 1 February 2009, 1 November 2009 and 1 February 2010



GRAPH 17

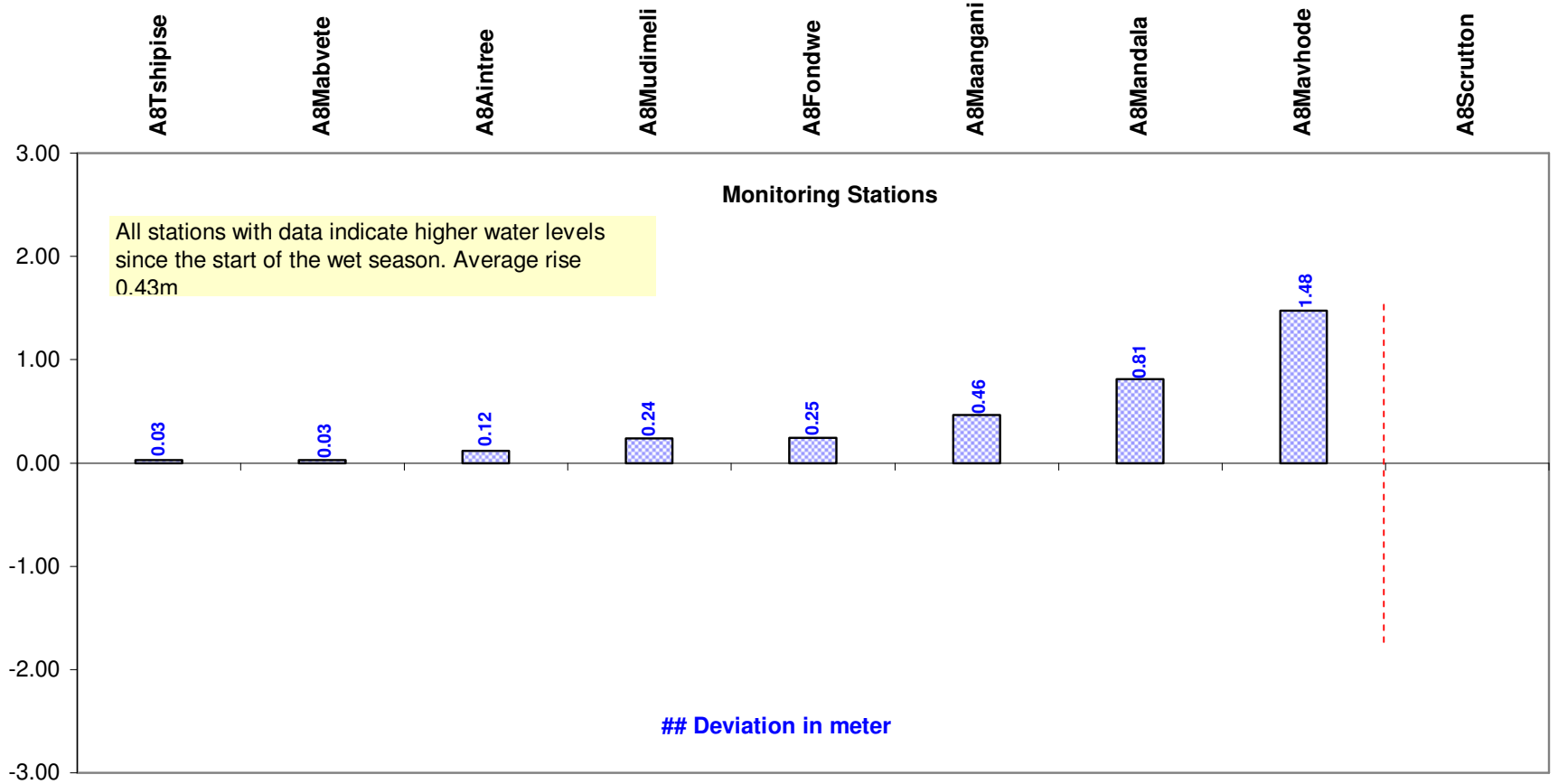

A7 DRAINAGE AREA
Comparison of average current water level depth with highest,
lowest & long-term average water level depths recorded
m Below collar
0.00
5.00
10.00
15.00
20.00
15.71
17.84
21.90
18.59m
Lowest average: (35 stations used)
Average value: = 21.90 m
Maximum value: = 79.51 m
Minimum value: = 3.17 m
Median value: = 19.24 m
80 Percentile value = 32.57 m
Highest average: (35 stations used)
Average value: = 15.71 m
Maximum value: = 77.07 m
Minimum value: = 1.69 m
Median value: = 9.68 m
80 Percentile value = 28.58 m
Current average: (35 stations used)
Average value: = 17.84 m
Maximum value: = 79.44 m
Minimum value: = 2.12 m
Median value: = 11.82m
80 Percentile value = 30.93 m
Long-term average: (35 stations used)
Average value: = 18.59 m
Maximum value: = 78.488 m
Minimum value: = 2.61 m
Median value: = 11.50m
80 Percentile value = 30.61m
Highest average water level
Current Average water level
Lowest average water level
Long-term average water level

GRAPH 18


Comparison of water level trends at some stations in A8 drainage:
1 February 2009 to 1 February 2010
m Below collar
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
Feb-09
May-09
Aug-09
Nov-09
Feb-10
Date
A8Fondwe
A8Mandala
A8Aintree
A8Mavhode
A8Mabvete
A8Mudimeli

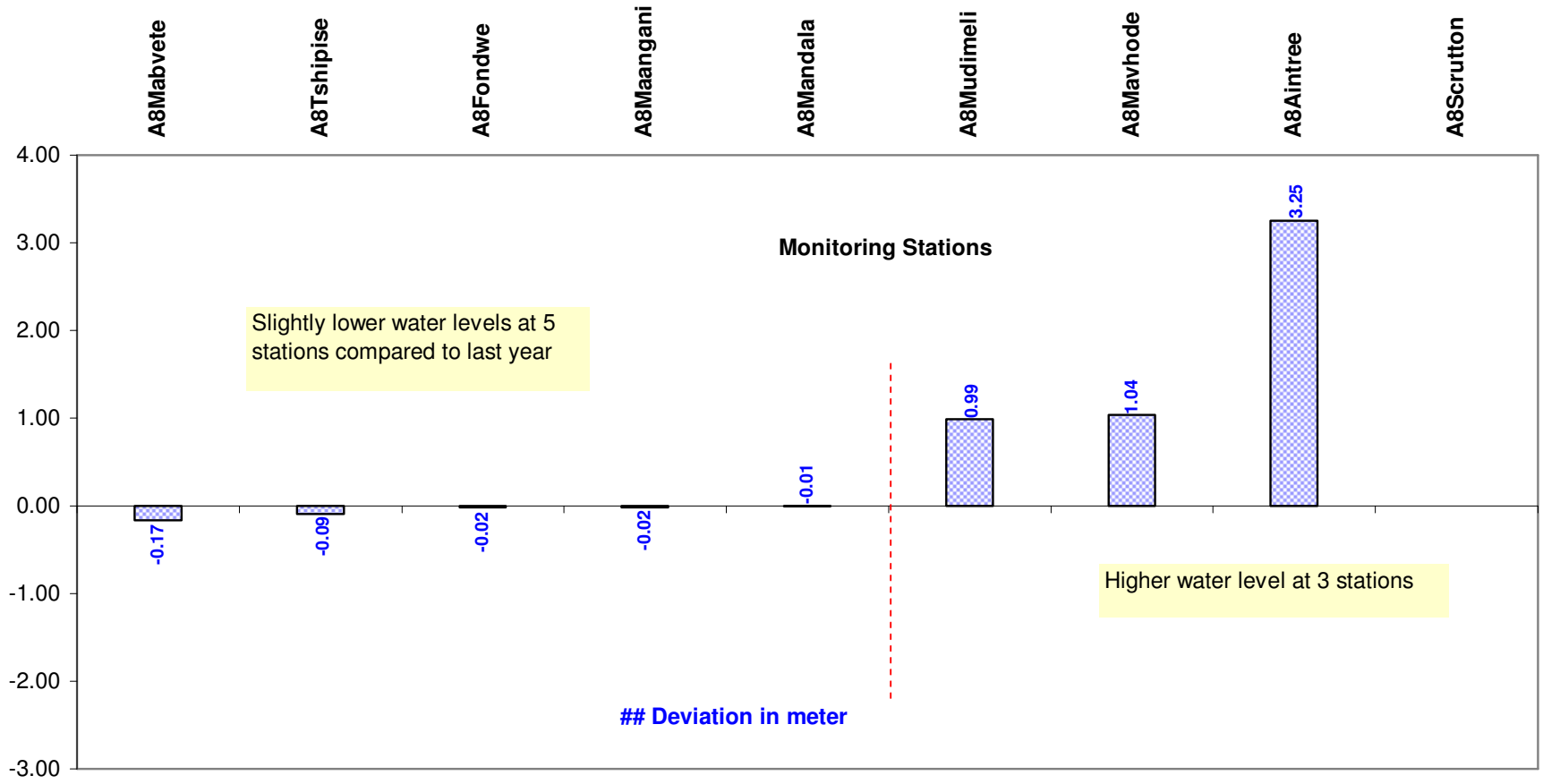
GRAPH 19

A8 DRAINAGE AREA
Deviation of water level depths: 1 November 2009 to 1 February 2010

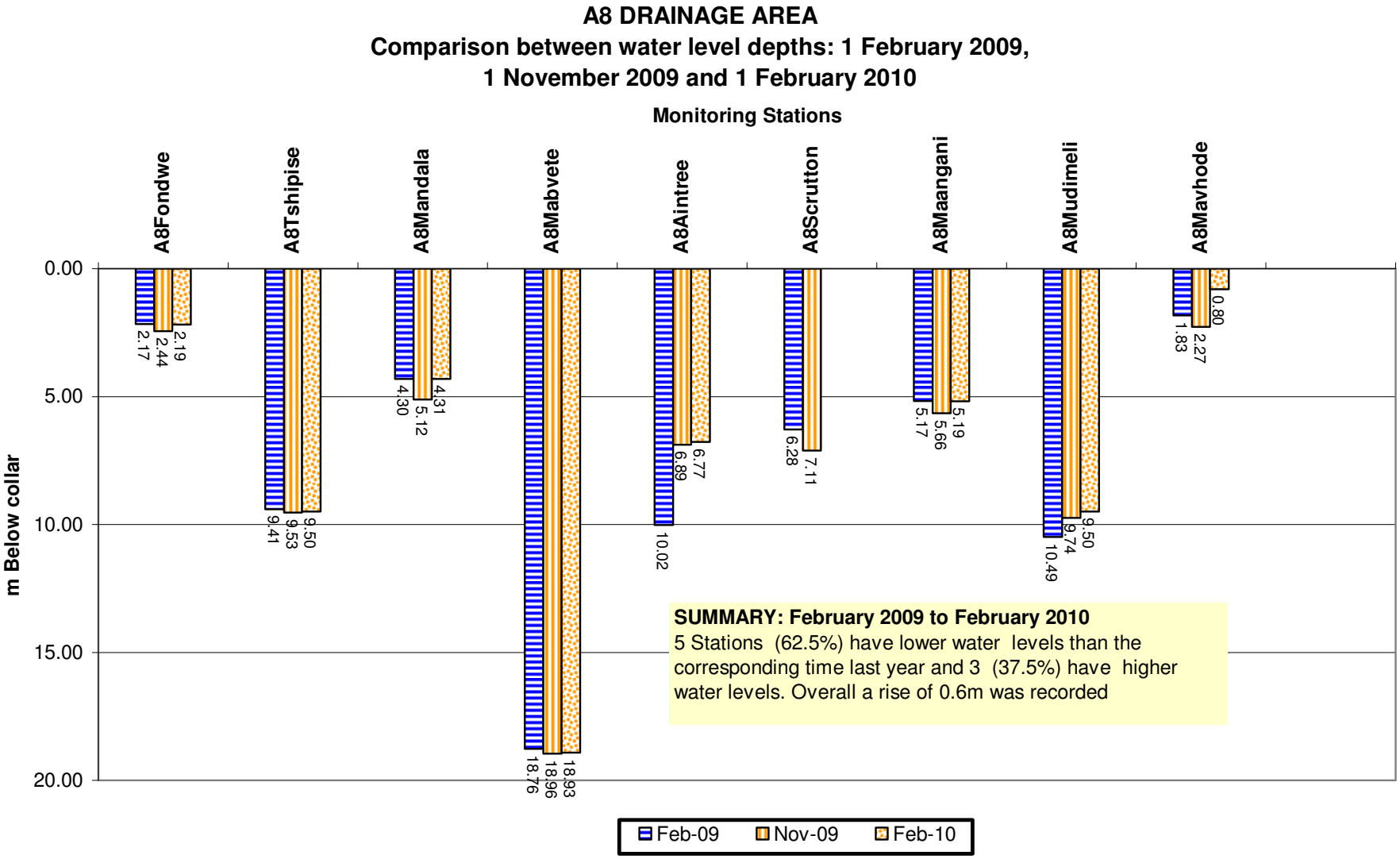


GRAPH 20

A8 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010

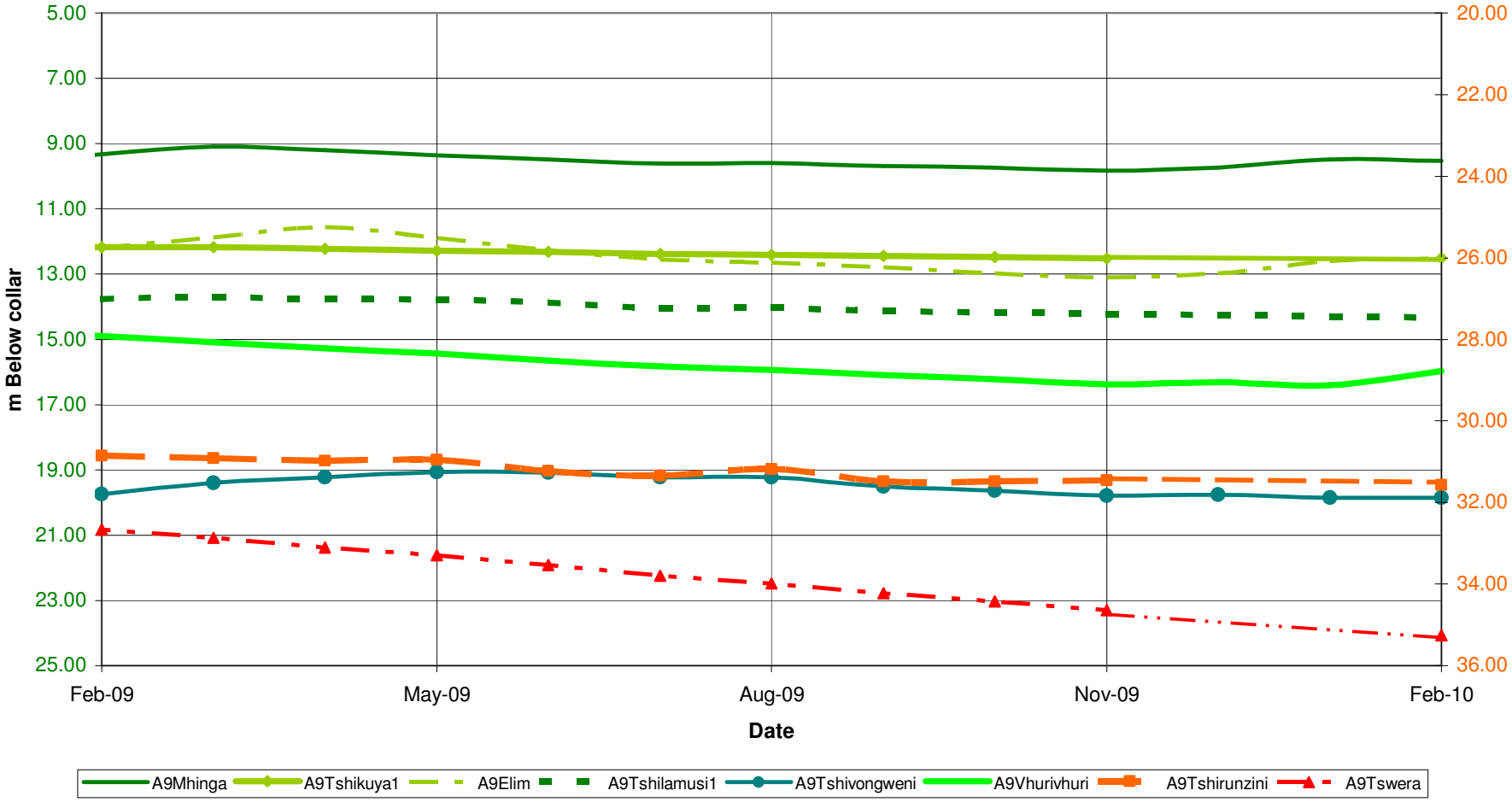


GRAPH 21


A8 DRAINAGE AREA
Comparison between water level depths: 1 February 2009,
1 November 2009 and 1 February 2010
Monitoring Stations
A8Fondwe
A8Tshipise
A8Mandala
A8Mabvete
A8Aintree
A8Scrutton
A8Maangani
A8Mudimeli
A8Mavhode
m Below collar
0.00
5.00
10.00
15.00
20.00
2.17
2.44
2.19
9.41
9.53
9.50
4.30
5.12
4.31
18.76
18.96
18.93
10.02
6.89
6.77
6.28
7.11
5.17
5.66
5.19
10.49
9.74
9.50
1.83
2.27
0.80
SUMMARY: February 2009 to February 2010
5 Stations (62.5%) have lower water levels than the corresponding time last year and 3 (37.5%) have higher water levels. Overall a rise of 0.6m was recorded
Feb-09
Nov-09
Feb-10

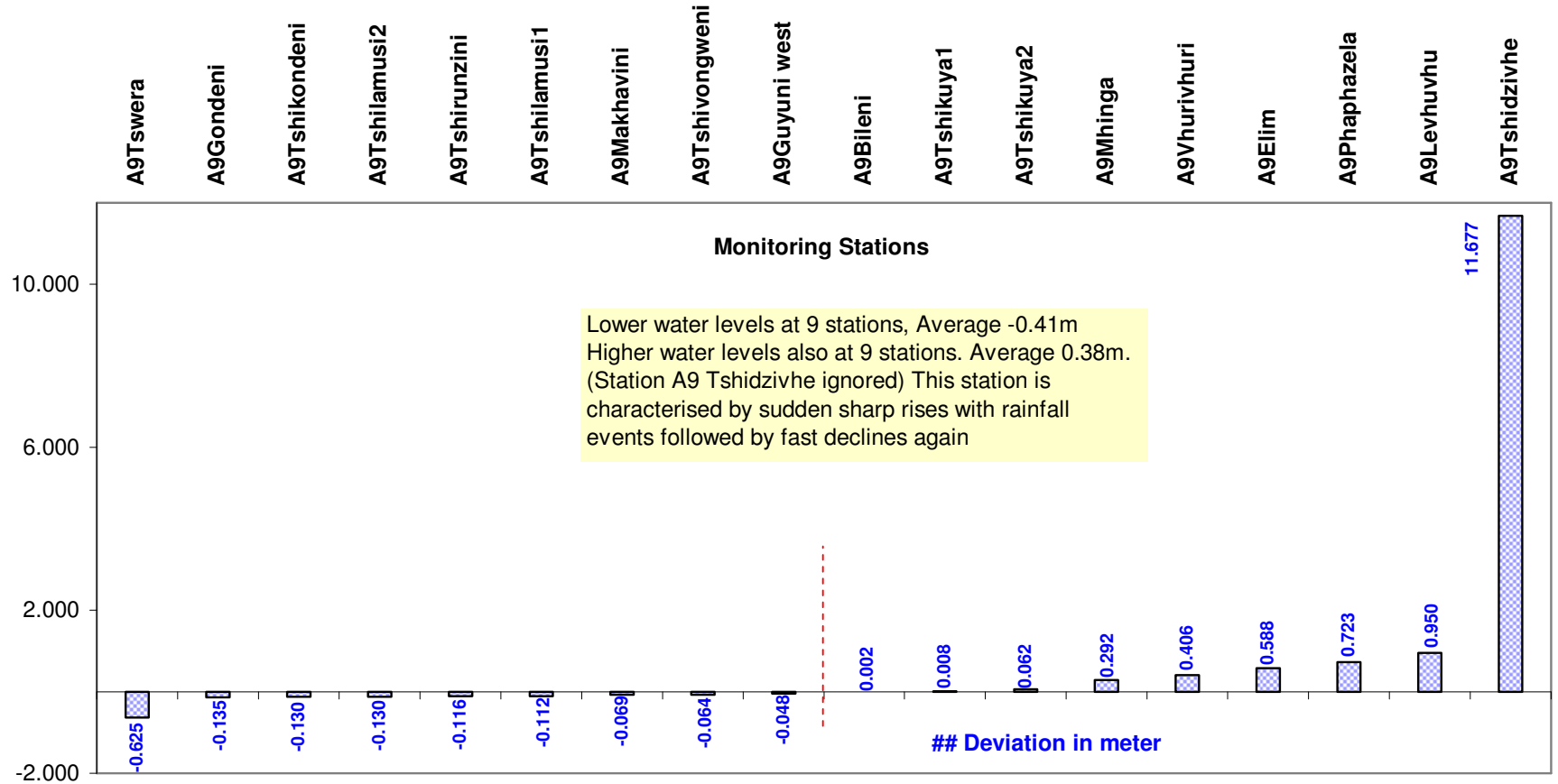
GRAPH 22

Comparison of water level trends at some stations in A9 drainage :
1 February 2009 to 1 February 2010

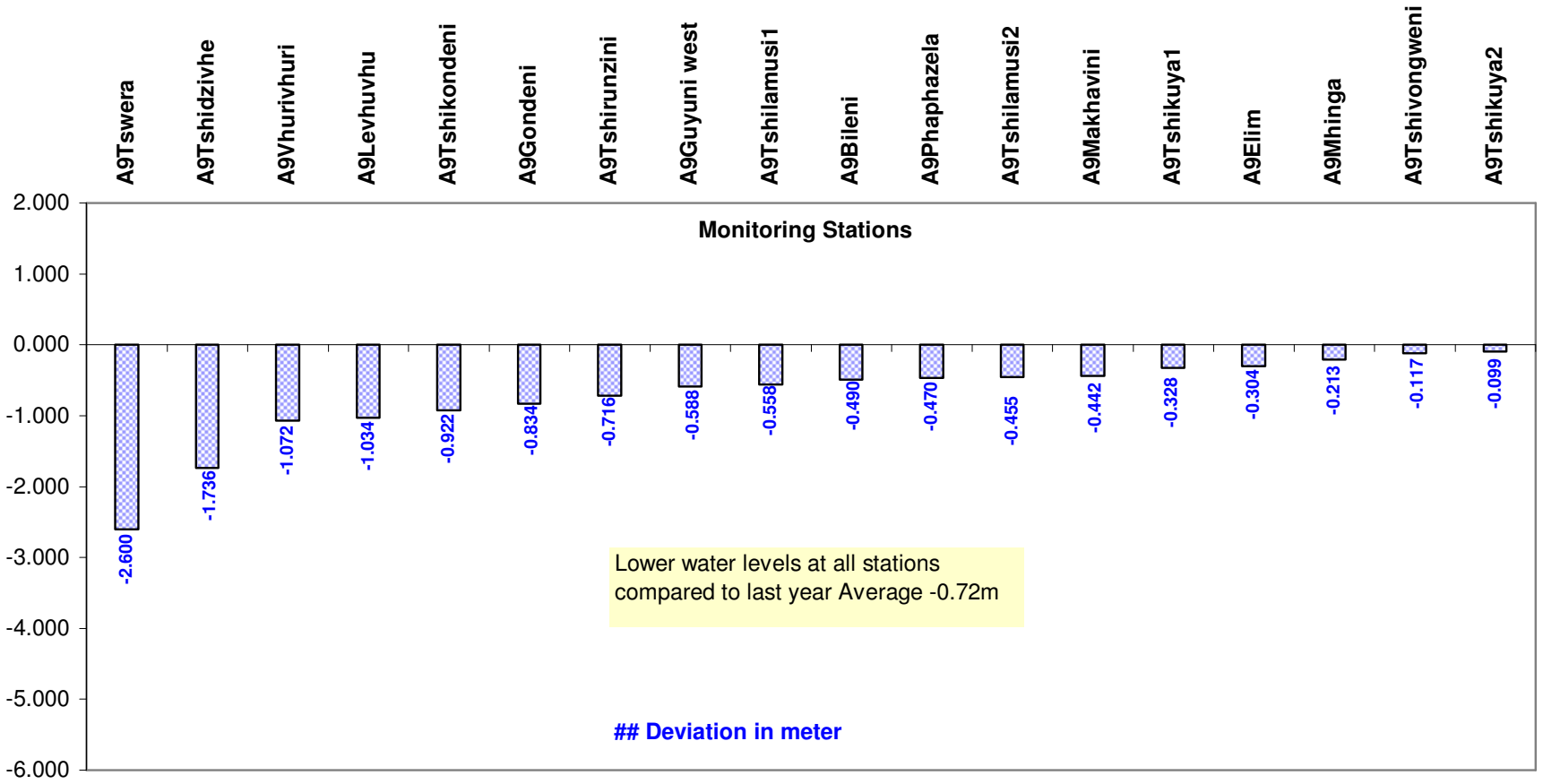


GRAPH 23

A9 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010

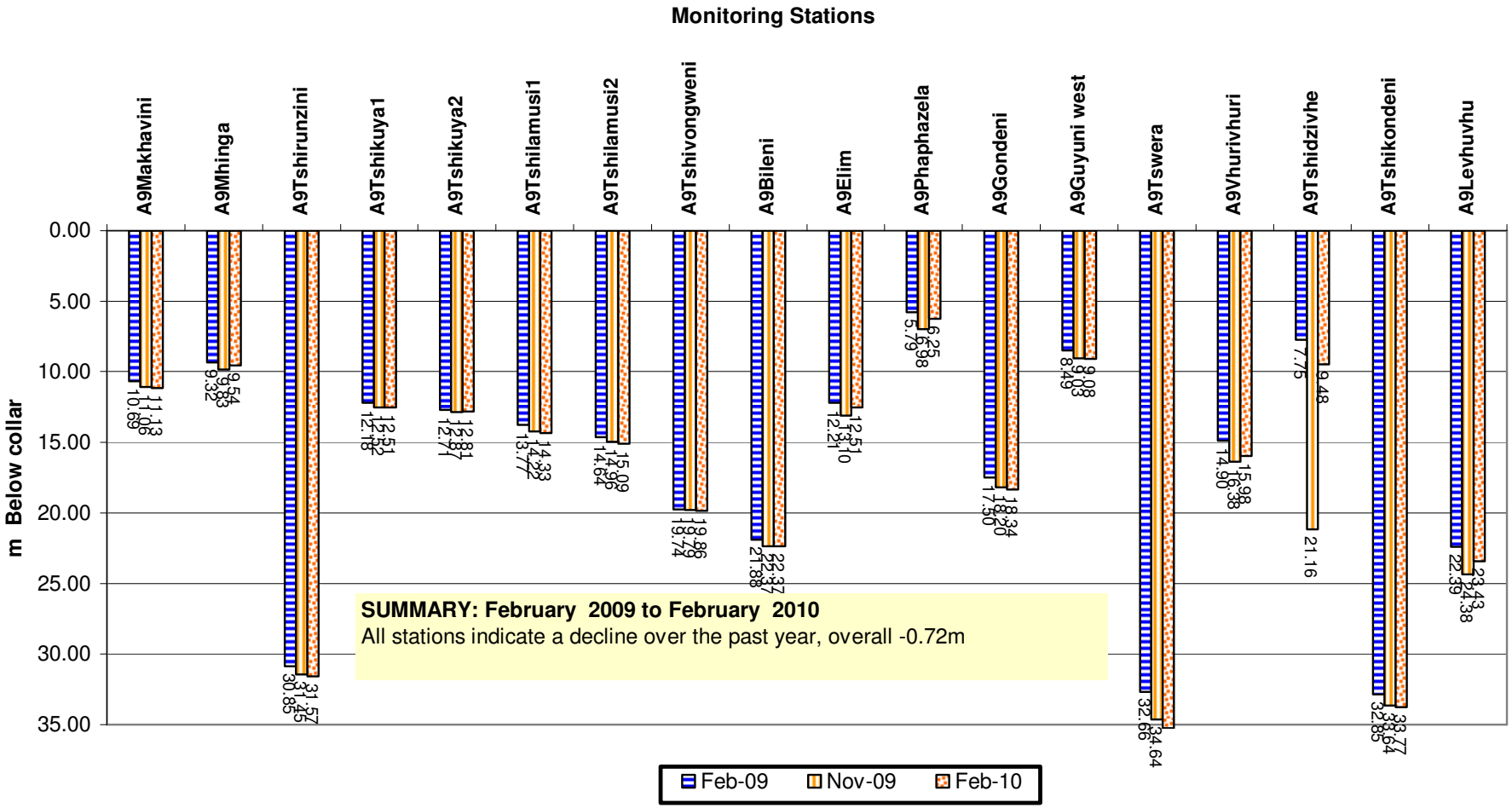


GRAPH 24


A9 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010
A9Tswera
A9Tshidzivhe
A9Vhurivhuri
A9Levhuvhu
A9Tshikondeni
A9Gondeni
A9Tshirunzini
A9Guyuni west
A9Tshilamusi1
A9Bileni
A9Phaphazela
A9Tshilamusi2
A9Makhavini
A9Tshikuya1
A9Elim
A9Mhinga
A9Tshivongweni
A9Tshikuya2
2.000
1.000
0.000
-1.000
-2.000
-3.000
-4.000
-5.000
-6.000
Monitoring Stations
-2.600
-1.736
-1.072
-1.034
-0.922
-0.834
-0.716
-0.588
-0.558
-0.490
-0.470
-0.455
-0.442
-0.328
-0.304
-0.213
-0.117
-0.099
Lower water levels at all stations compared to last year Average -0.72m
Deviation in meter

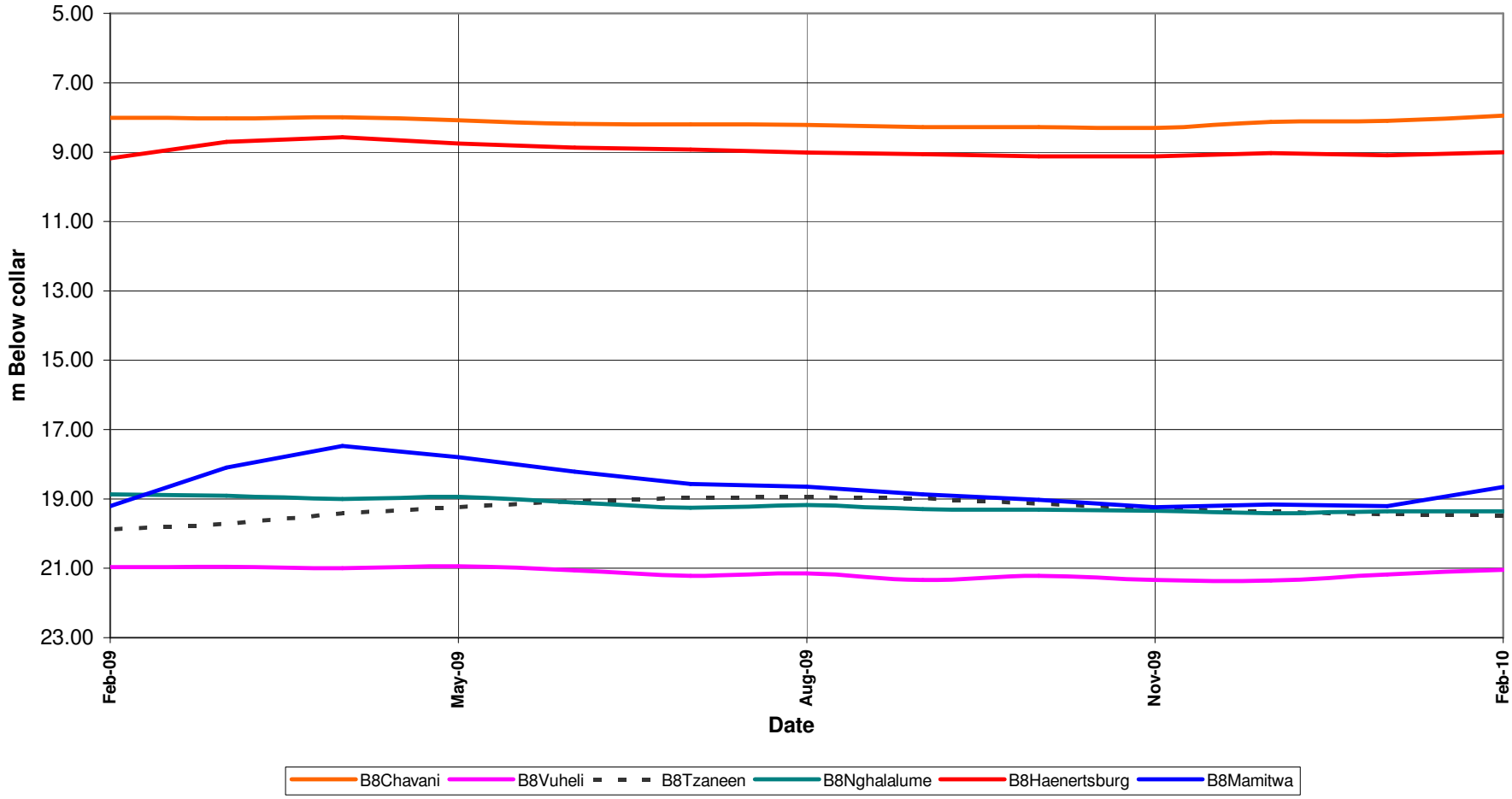
GRAPH 25

A9 DRAINAGE AREA
Comparison between water level depths: 1 February 2009,
1 November 2009 and 1 February 2010

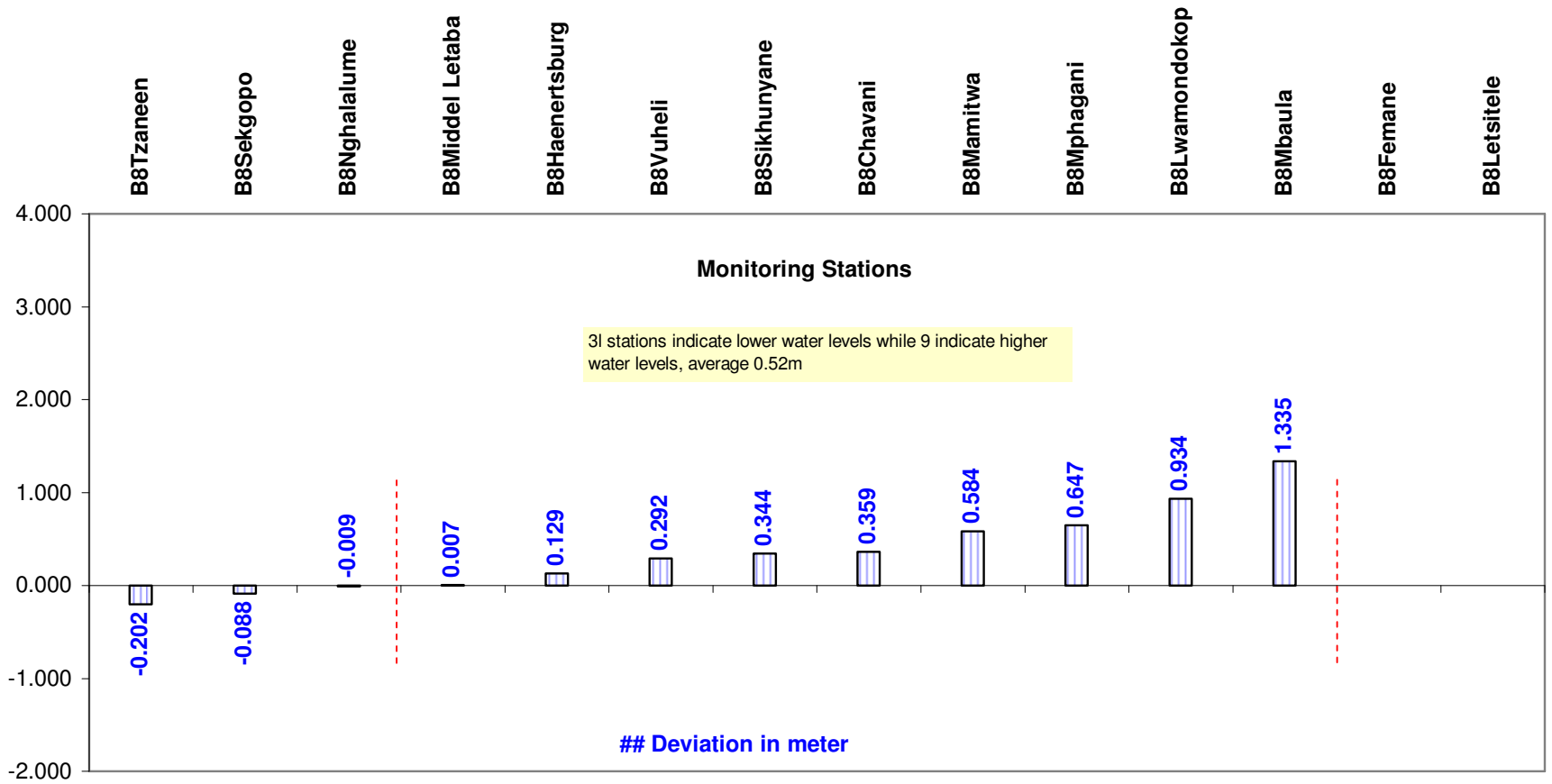


GRAPH 26

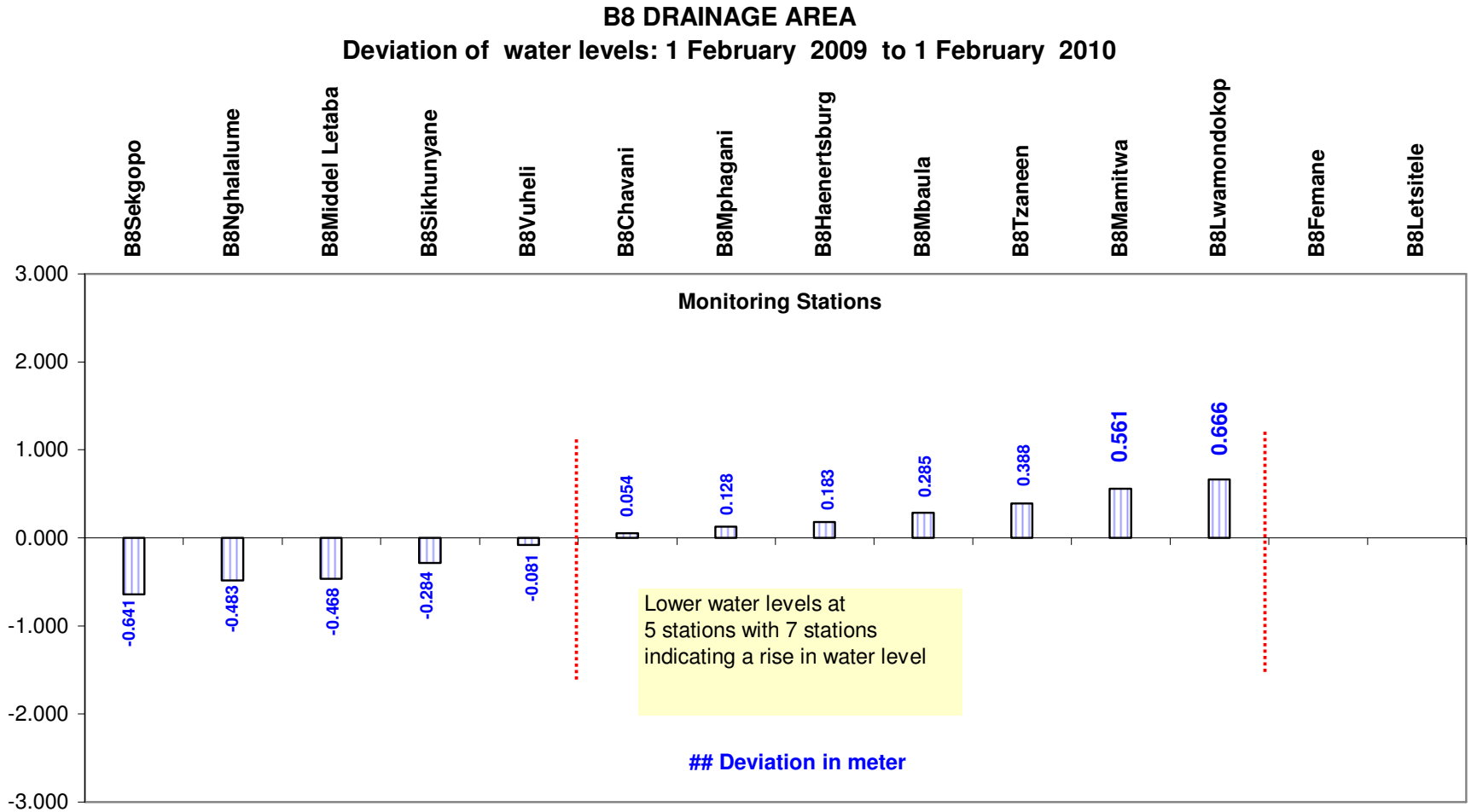
Comparison of water level trends at some stations in B8 drainage:
1 February 2009 to 1 February 2010



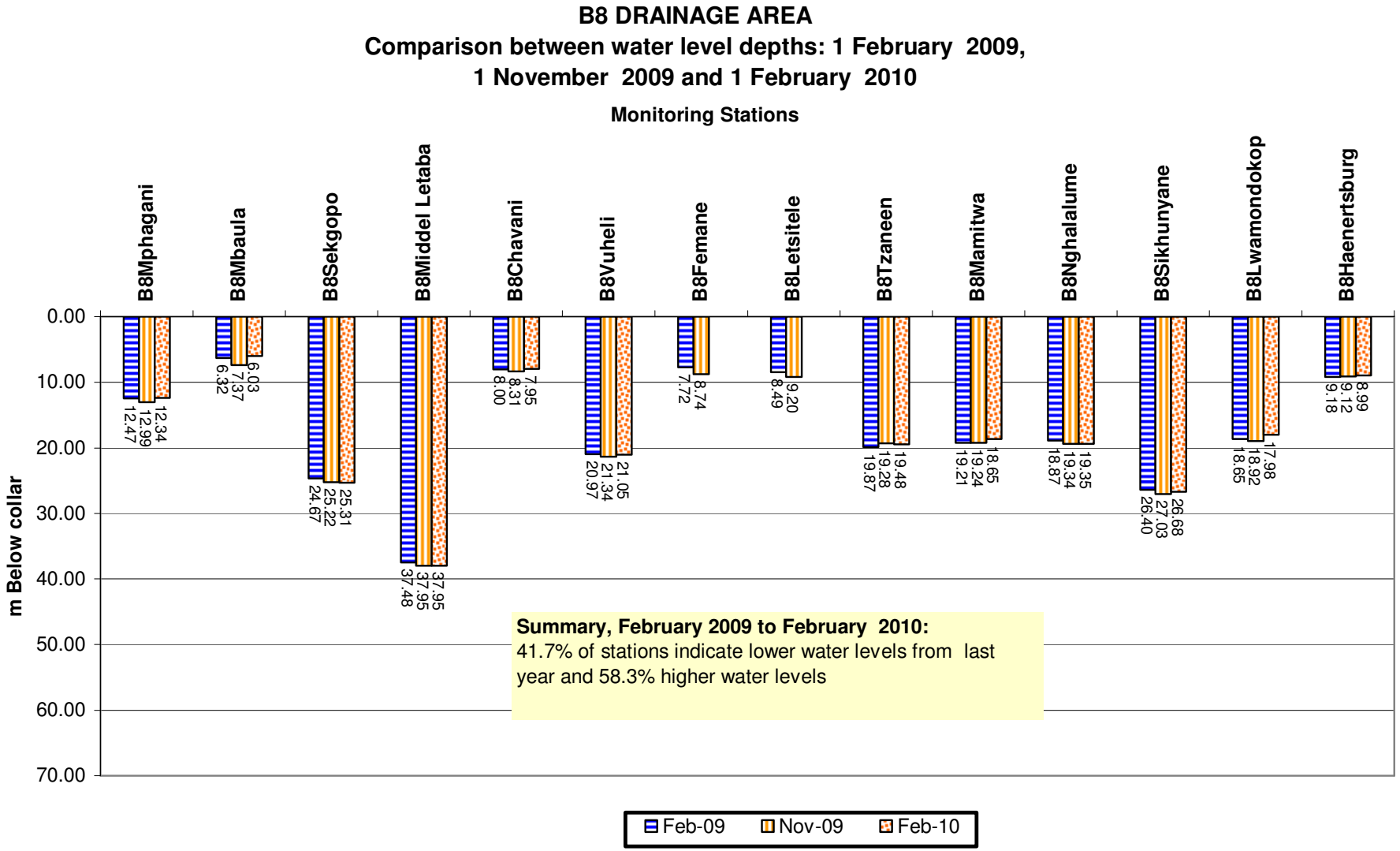
GRAPH 27


B8 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
B8Tzaneen
B8Sekgopo
B8Nghalalume
B8Middel Letaba
B8Haenertsburg
B8Vuheli
B8Sikhunyane
B8Chavani
B8Mamitwa
B8Mphagani
B8Lwamondokop
B8Mbaula
B8Femane
B8Letsitele
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
Monitoring Stations
3l stations indicate lower water levels while 9 indicate higher water levels, average 0.52m
-0.202
-0.088
-0.009
0.007
0.129
0.292
0.344
0.359
0.584
0.647
0.934
1.335
Deviation in meter

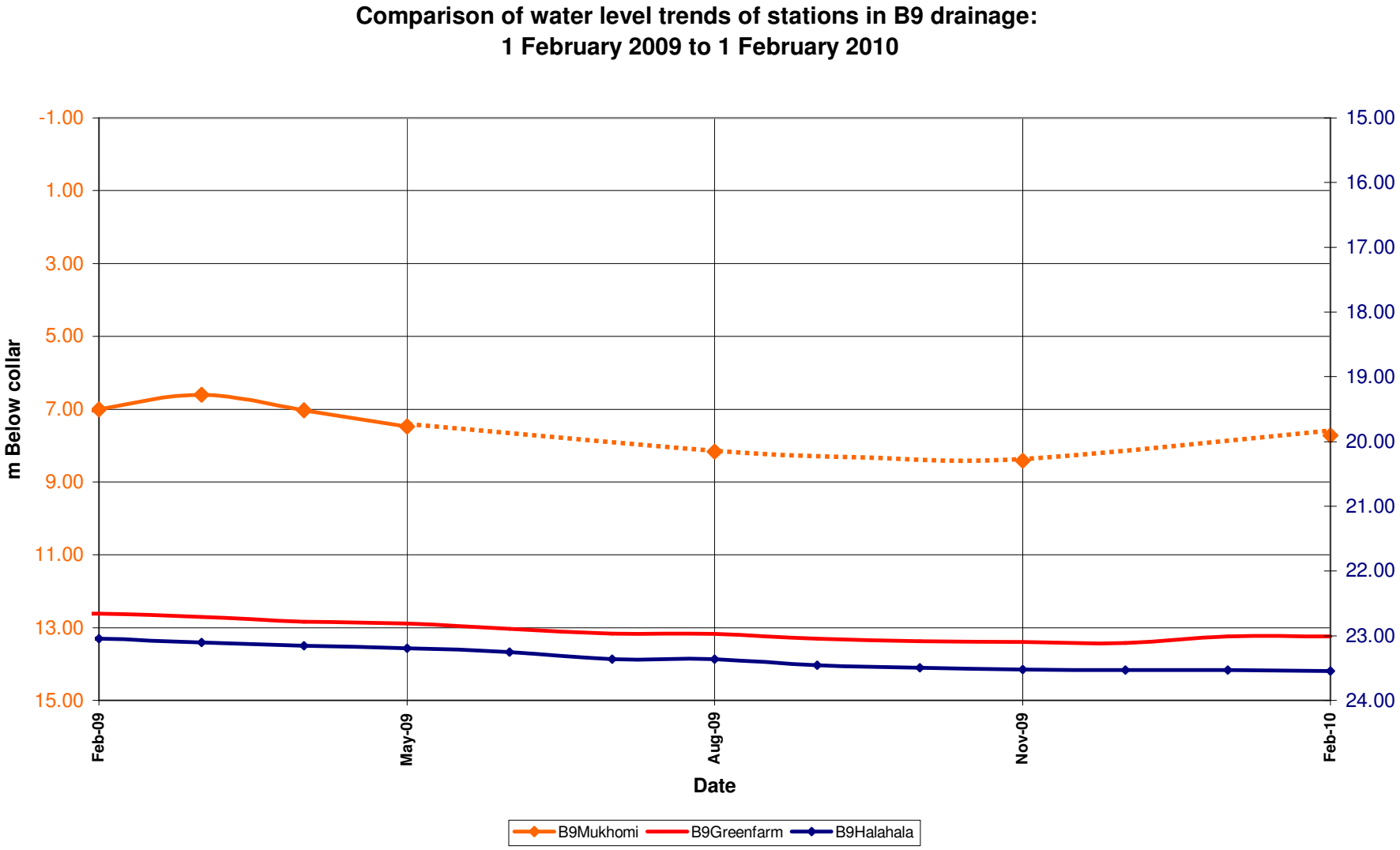
GRAPH 28


B8 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010
B8Sekgopo
B8Nghalalume
B8Middel Letaba
B8Sikhunyane
B8Vuheli
B8Chavani
B8Mphagani
B8Haenertsburg
B8Mbaula
B8Tzaneen
B8Mamitwa
B8Lwamondokop
B8Femane
B8Letsitele
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
Monitoring Stations
-0.641
-0.483
-0.468
-0.284
-0.081
0.054
0.128
0.183
0.285
0.388
0.561
0.666
Lower water levels at
5 stations with 7 stations
indicating a rise in water level
Deviation in meter

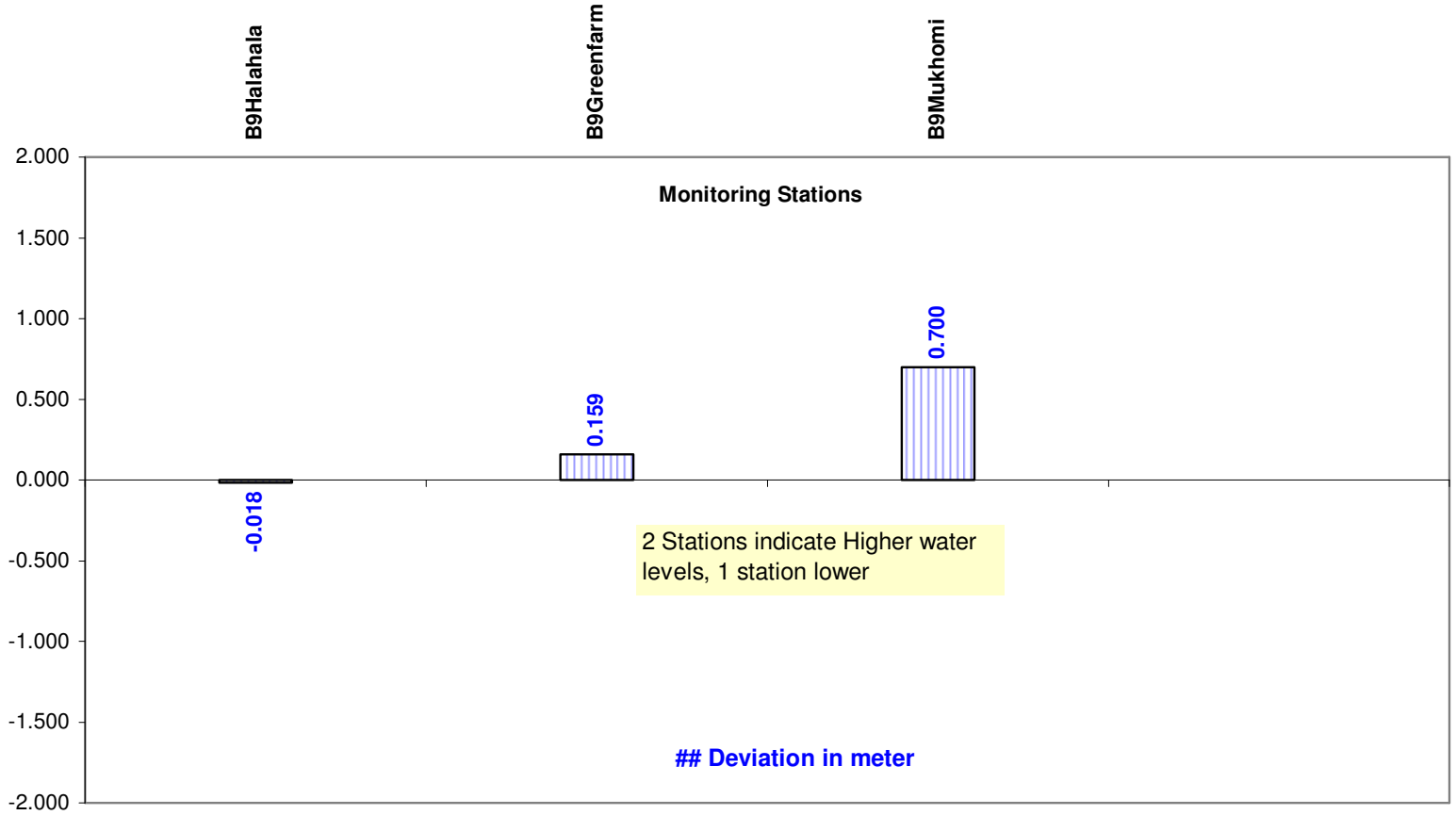
GRAPH 29


B8 DRAINAGE AREA
Comparison between water level depths: 1 February 2009,
1 November 2009 and 1 February 2010
Monitoring Stations
m Below collar
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
B8Mphagani
12.47
12.99
12.34
B8Mbaula
6.32
7.37
6.03
B8Sekgopo
24.67
25.22
25.31
B8Middel Letaba
37.48
37.95
37.95
B8Chavani
8.00
8.31
7.95
B8Vuheli
20.97
21.34
21.05
B8Femane
7.72
8.74
B8Letsitele
8.49
9.20
B8Tzaneen
19.87
19.28
19.48
B8Mamitwa
19.21
19.24
18.65
B8Nghalalume
18.87
19.34
19.35
B8Sikhunyane
26.40
27.03
26.68
B8Lwamondokop
18.65
18.92
17.98
B8Haenertsburg
9.18
9.12
8.99
Summary, February 2009 to February 2010:
41.7% of stations indicate lower water levels from last year and 58.3% higher water levels
Feb-09
Nov-09
Feb-10

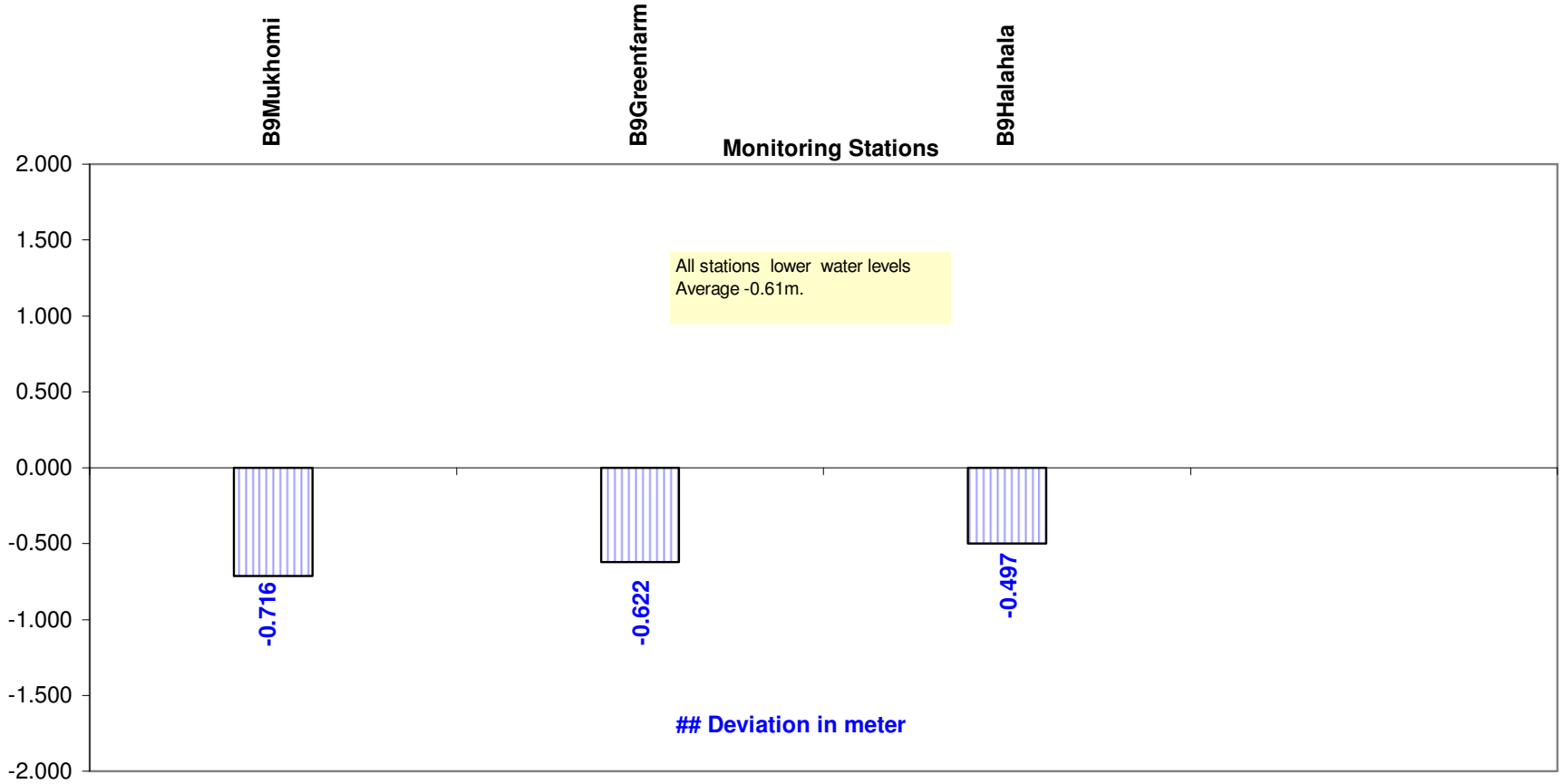
GRAPH 30


Comparison of water level trends of stations in B9 drainage:
1 February 2009 to 1 February 2010
m Below collar
-1.00
1.00
3.00
5.00
7.00
9.00
11.00
13.00
15.00
15.00
16.00
17.00
18.00
19.00
20.00
21.00
22.00
23.00
24.00
Feb-09
May-09
Aug-09
Nov-09
Feb-10
Date
B9Mukhomi
B9Greenfarm
B9Halahala

GRAPH 31

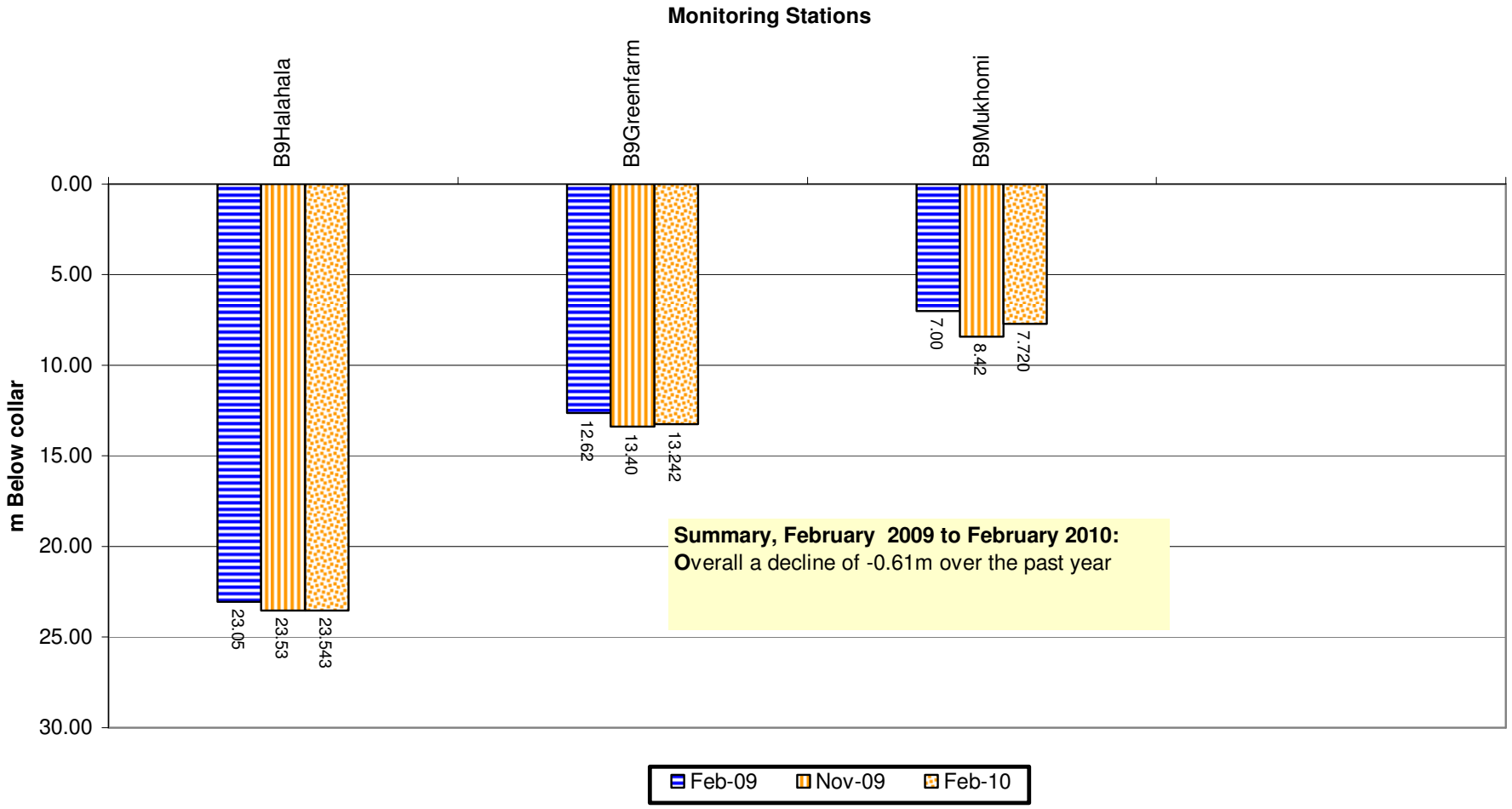

B9 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
B9Halahala
B9Greenfarm
B9Mukhomi
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-2.000
Monitoring Stations
0.700
0.159
-0.018
2 Stations indicate Higher water levels, 1 station lower
Deviation in meter

GRAPH 32

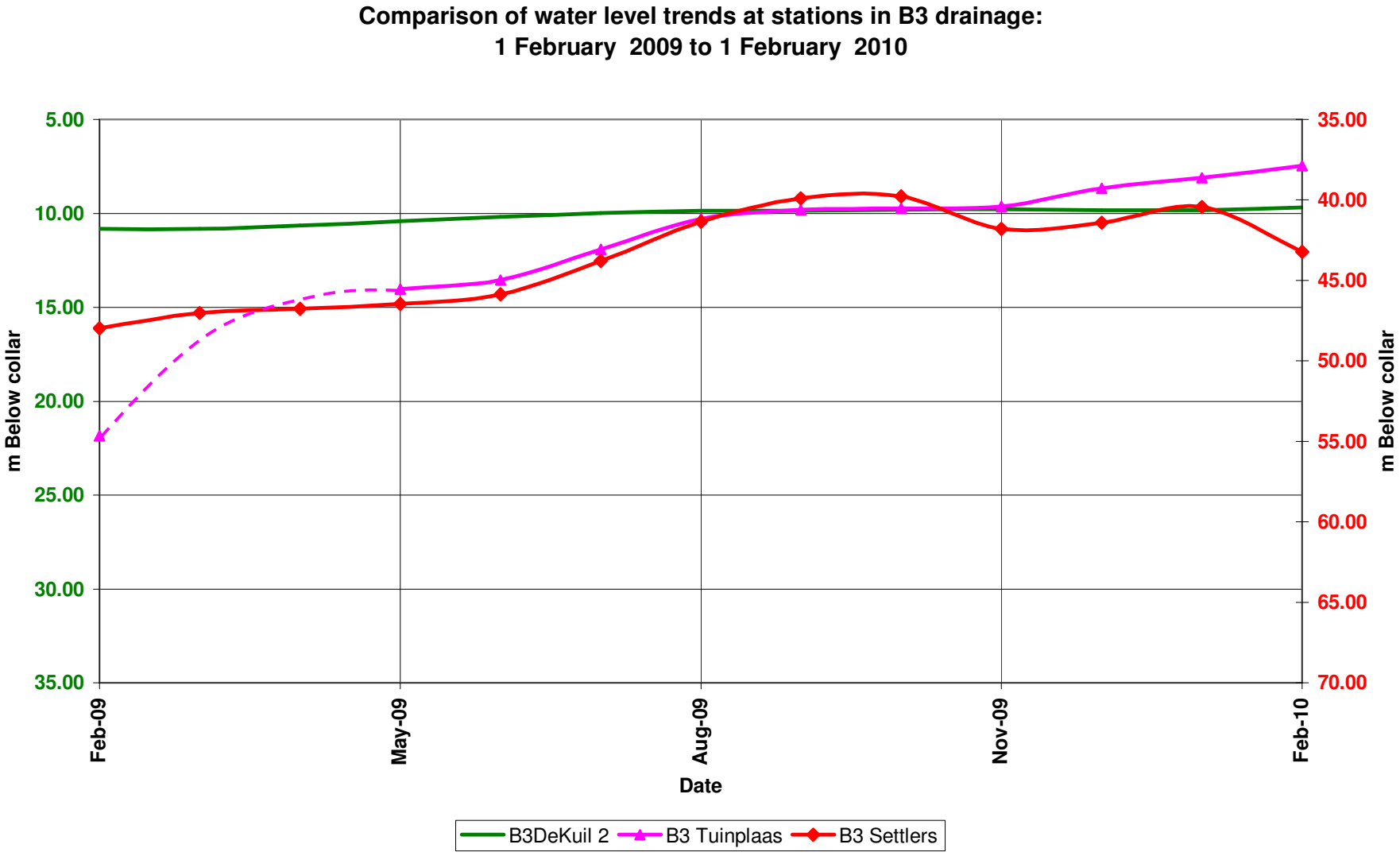

B9 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010
B9Mukhomi
B9Greenfarm
B9Halahala
Monitoring Stations
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-2.000
All stations lower water levels
Average -0.61m.
-0.716
-0.622
-0.497
Deviation in meter

GRAPH 33

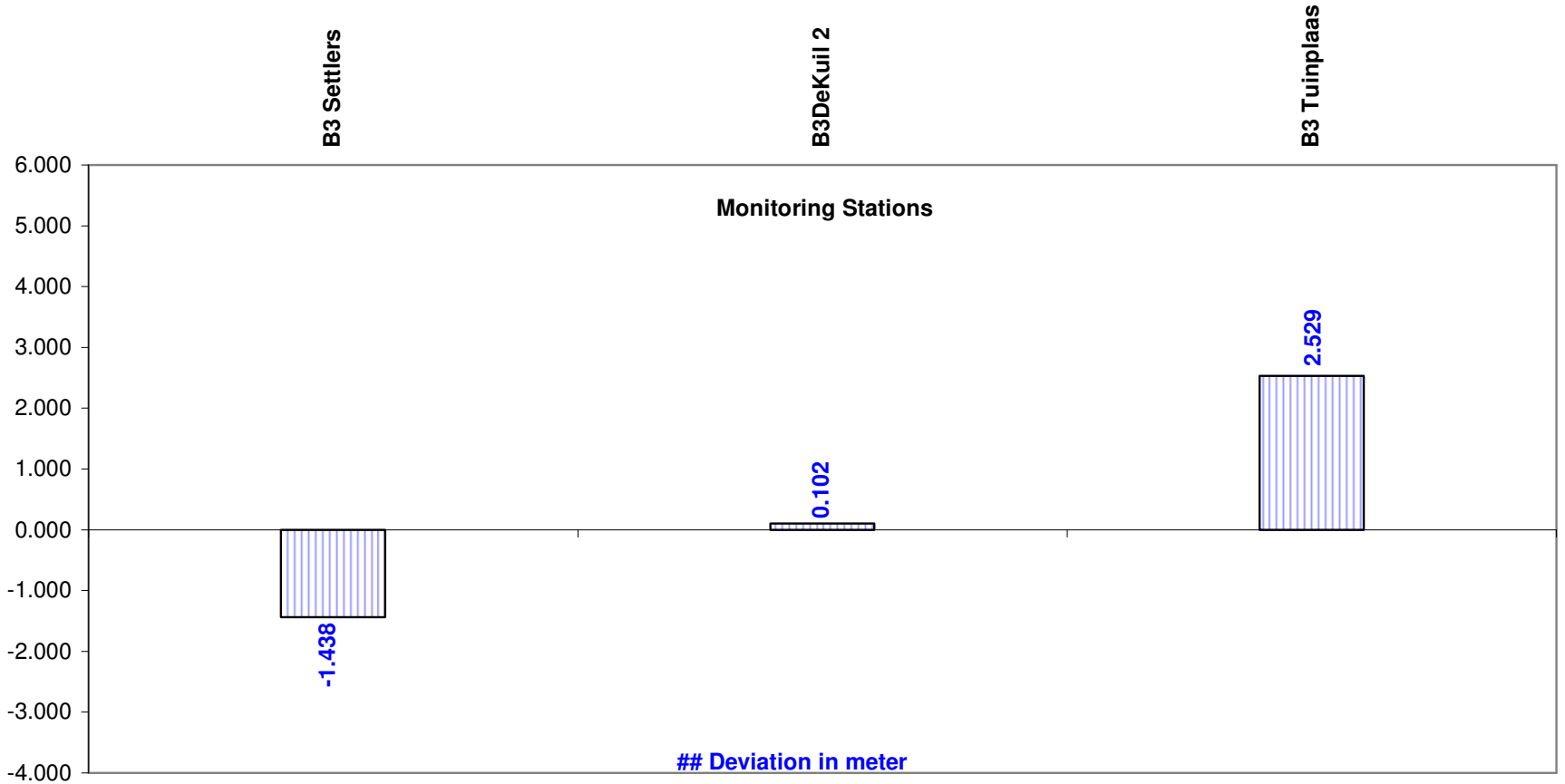
B9 DRAINAGE AREA
Comparison between water level depths: 1 February 2009, 1 November 2009 and 1 February 2010



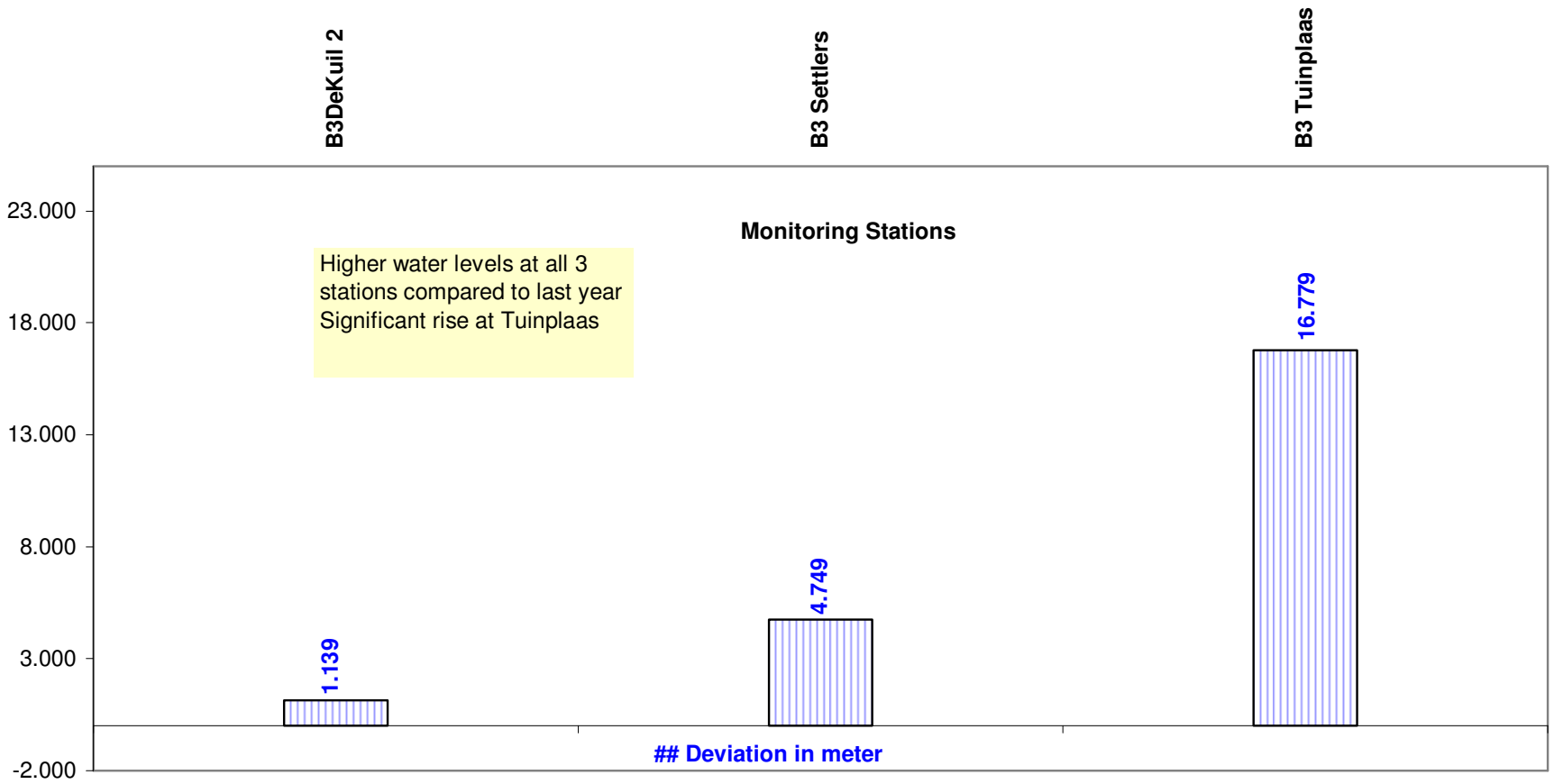
GRAPH 34


Comparison of water level trends at stations in B3 drainage:
1 February 2009 to 1 February 2010
5.00
10.00
15.00
20.00
25.00
30.00
35.00
m Below collar
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
m Below collar
Feb-09
May-09
Aug-09
Nov-09
Feb-10
Date
B3DeKuil 2
B3 Tuinplaas
B3 Settlers

GRAPH 35

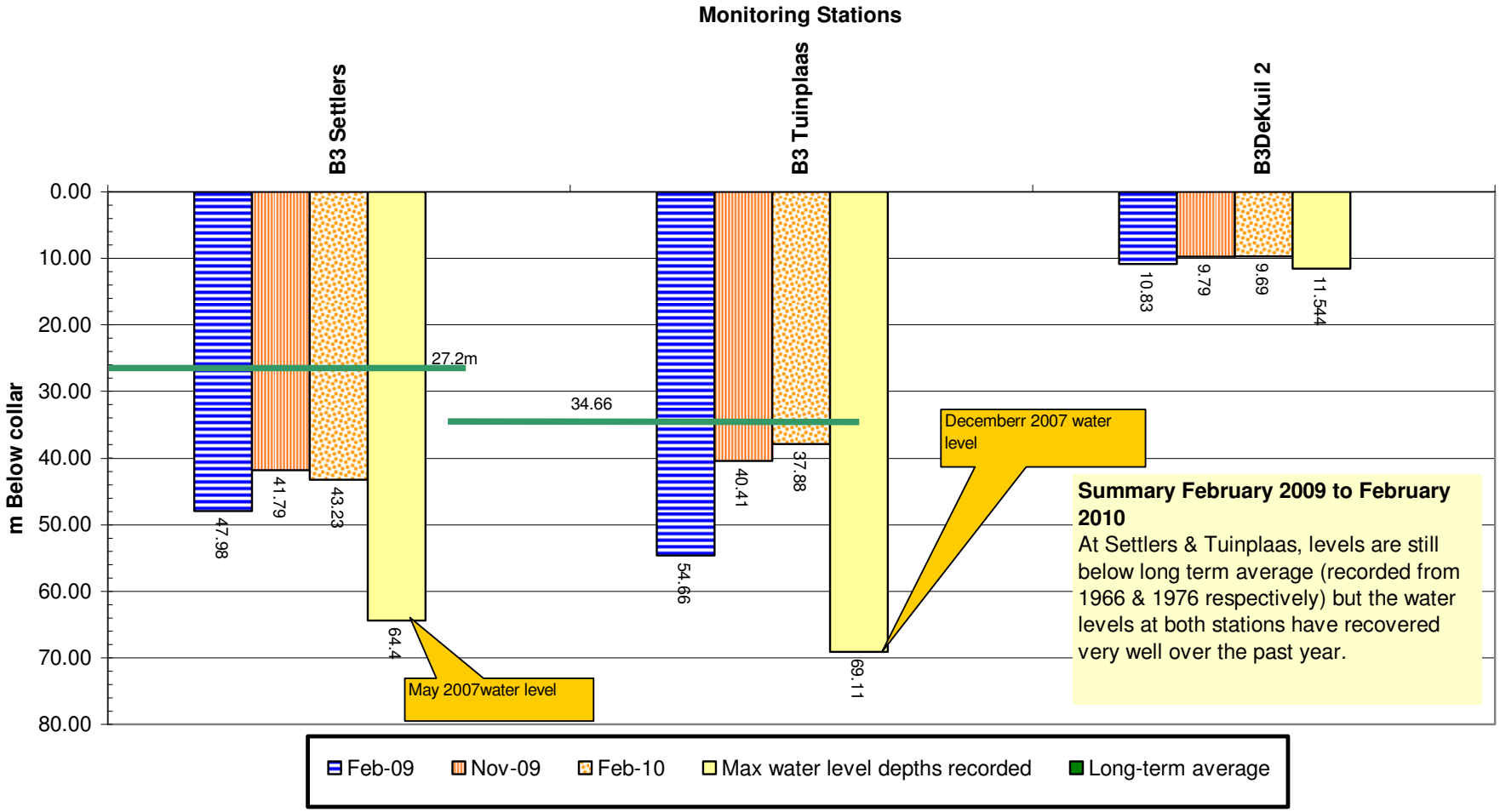

B3 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
B3 Settlers
B3DeKuil 2
B3 Tuinplaas
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
-4.000
Monitoring Stations
2.529
0.102
-1.438
Deviation in meter

GRAPH 36

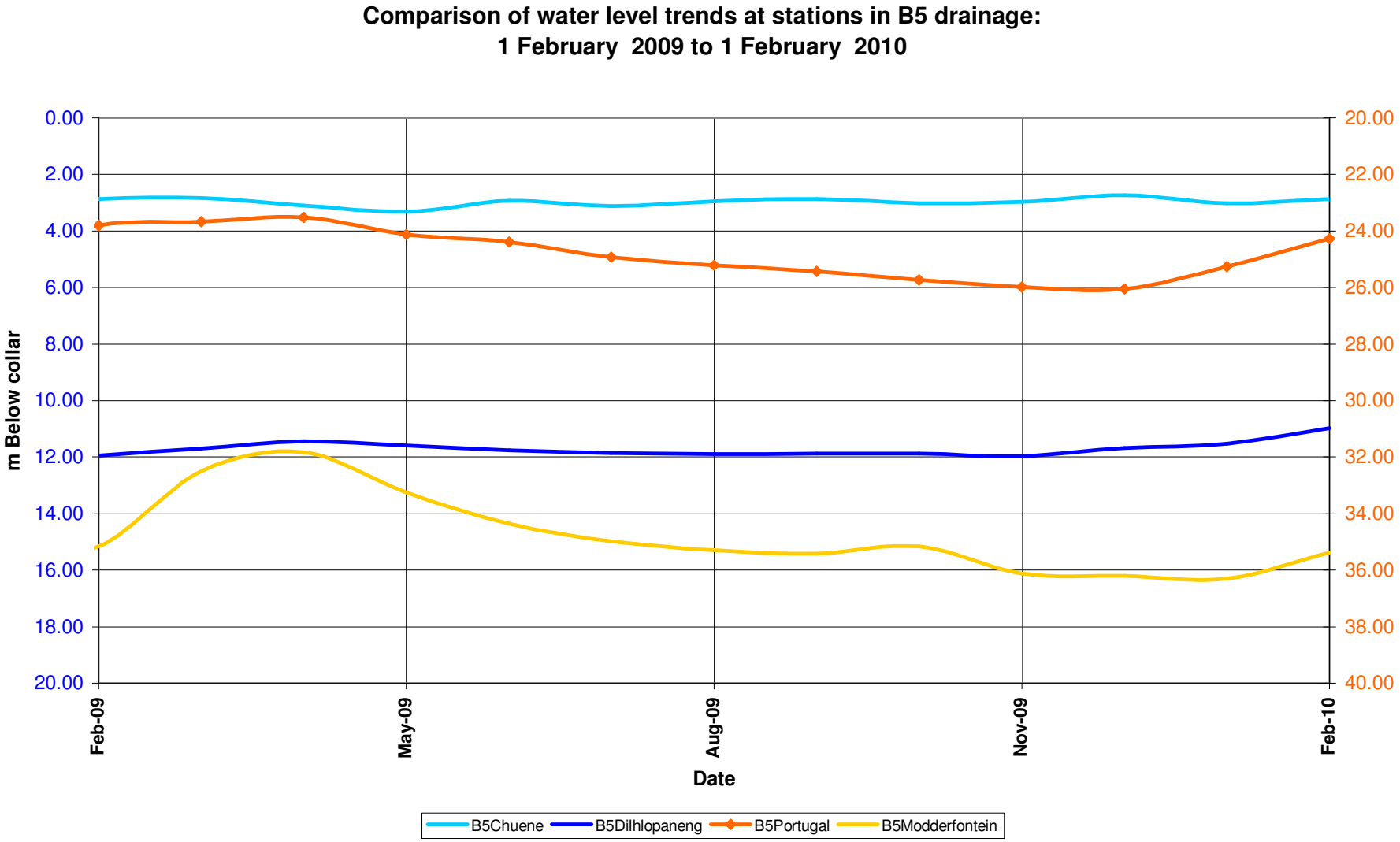

B3 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010
B3DeKuil 2
B3 Settlers
B3 Tuinplaas
23.000
18.000
13.000
8.000
3.000
-2.000
Monitoring Stations
Higher water levels at all 3 stations compared to last year
Significant rise at Tuinplaas
1.139
4.749
16.779
Deviation in meter

GRAPH 37

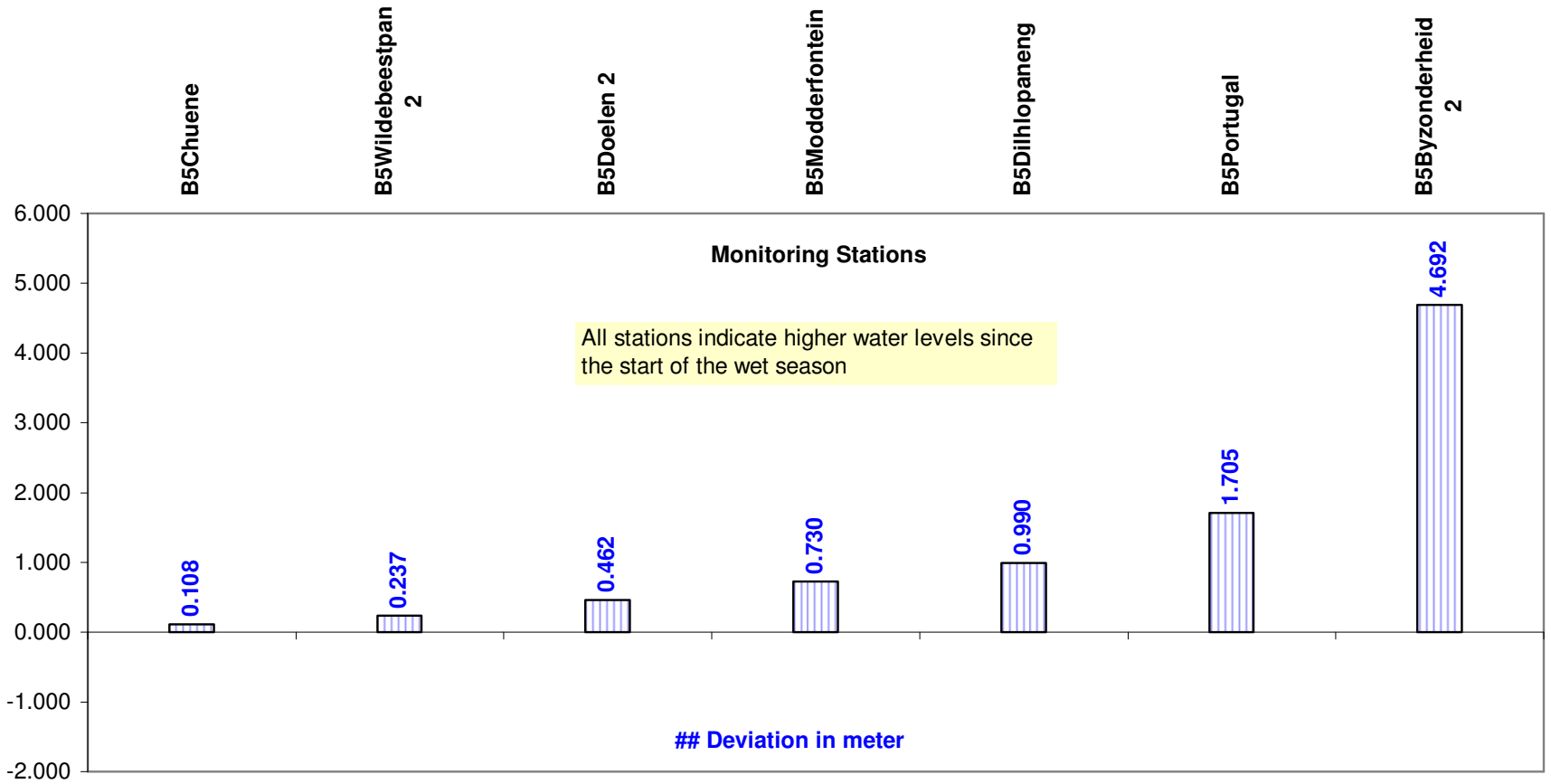
B3 DRAINAGE AREA
Comparison between water level depths: 1 February 2009
1 November 2009, 1 February 2010 and maximum depths recorded



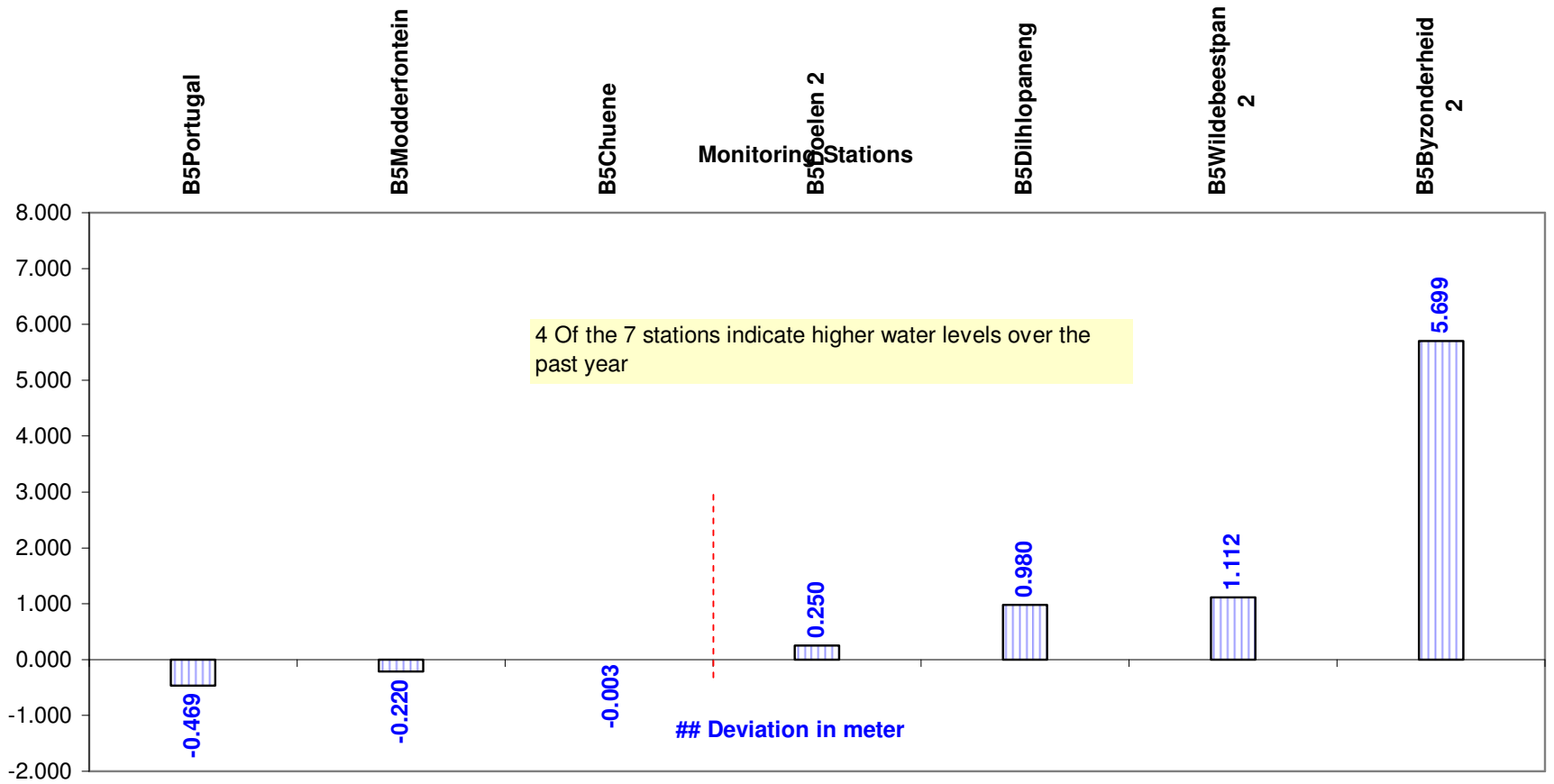
GRAPH 38


Comparison of water level trends at stations in B5 drainage:
1 February 2009 to 1 February 2010
m Below collar
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
20.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
Feb-09
May-09
Aug-09
Nov-09
Feb-10
Date
B5Chuene
B5Dilhlopaneng
B5Portugal
B5Modderfontein

GRAPH 39

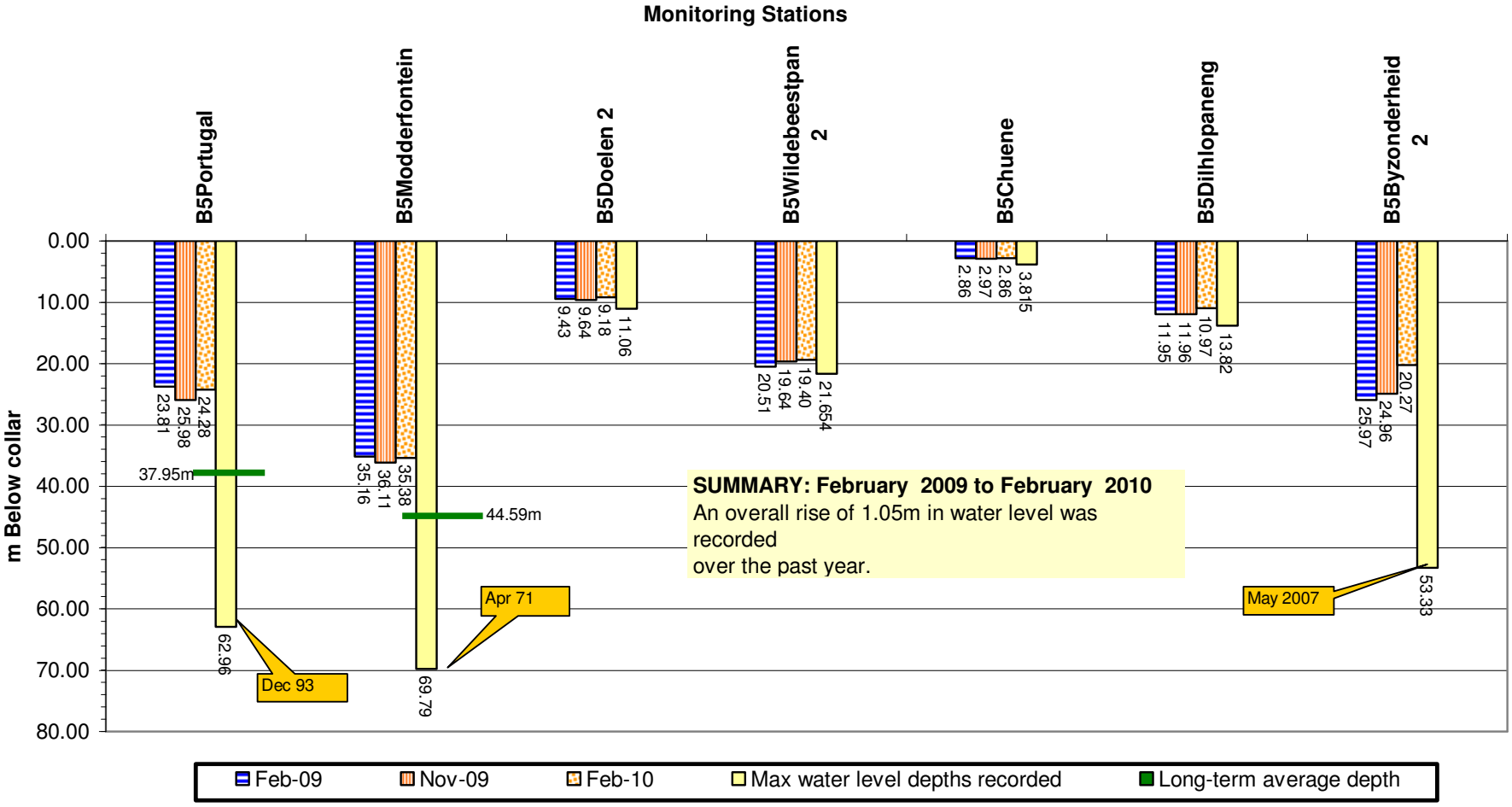

B5 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
B5Chuene
B5Wildebeestpan 2
B5Doelen 2
B5Modderfontein
B5Dilhlopaneng
B5Portugal
B5Byzonderheid 2
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
Monitoring Stations
All stations indicate higher water levels since the start of the wet season
0.108
0.237
0.462
0.730
0.990
1.705
4.692
Deviation in meter

GRAPH 40

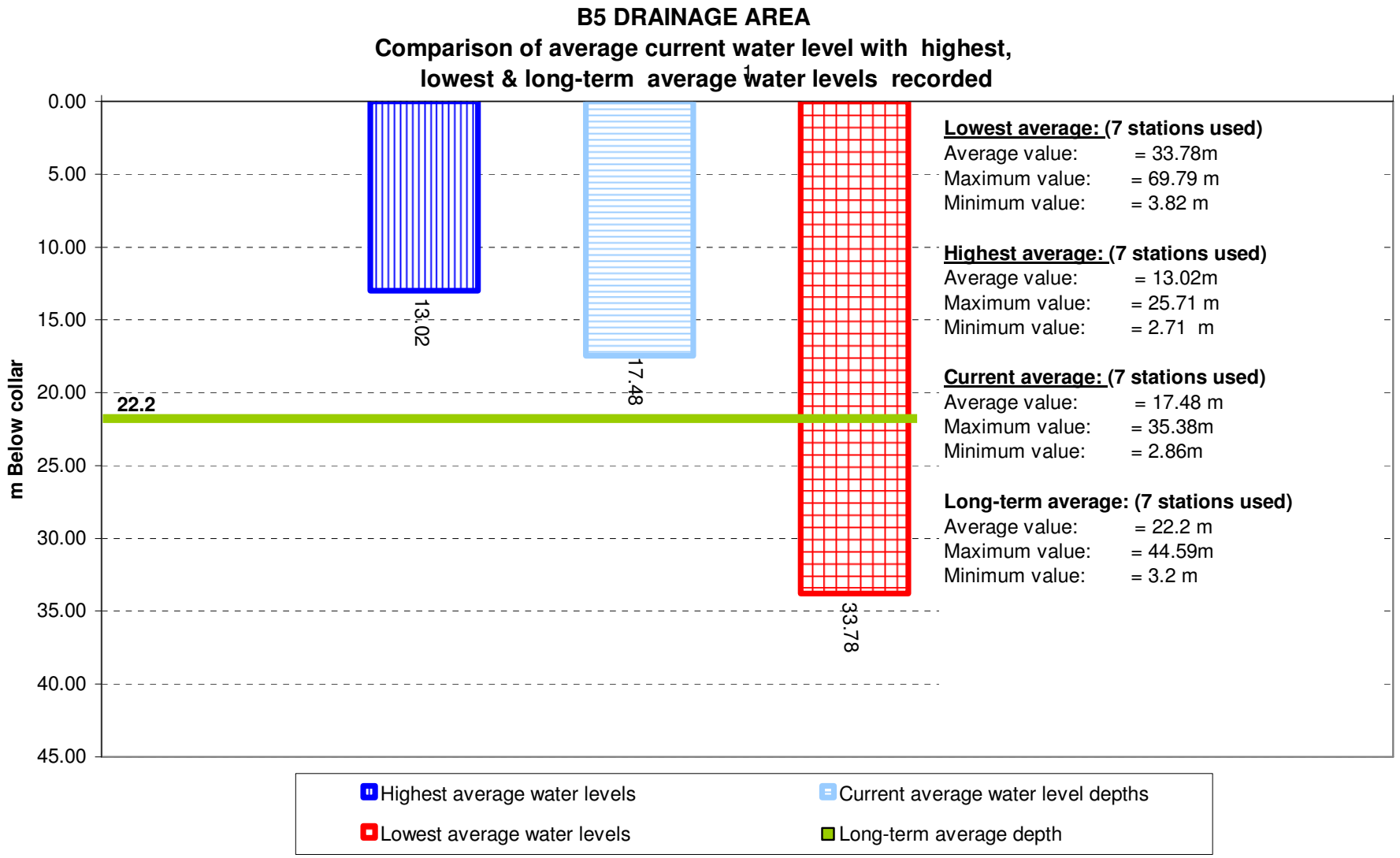

B5 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010
B5Portugal
B5Modderfontein
B5Chuene
B5Doelen 2
B5Dilhlopaneng
B5Wildebeestpan 2
B5Byzonderheid 2
Monitoring Stations
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
4 Of the 7 stations indicate higher water levels over the past year
-0.469
-0.220
-0.003
0.250
0.980
1.112
5.699
Deviation in meter

GRAPH 41

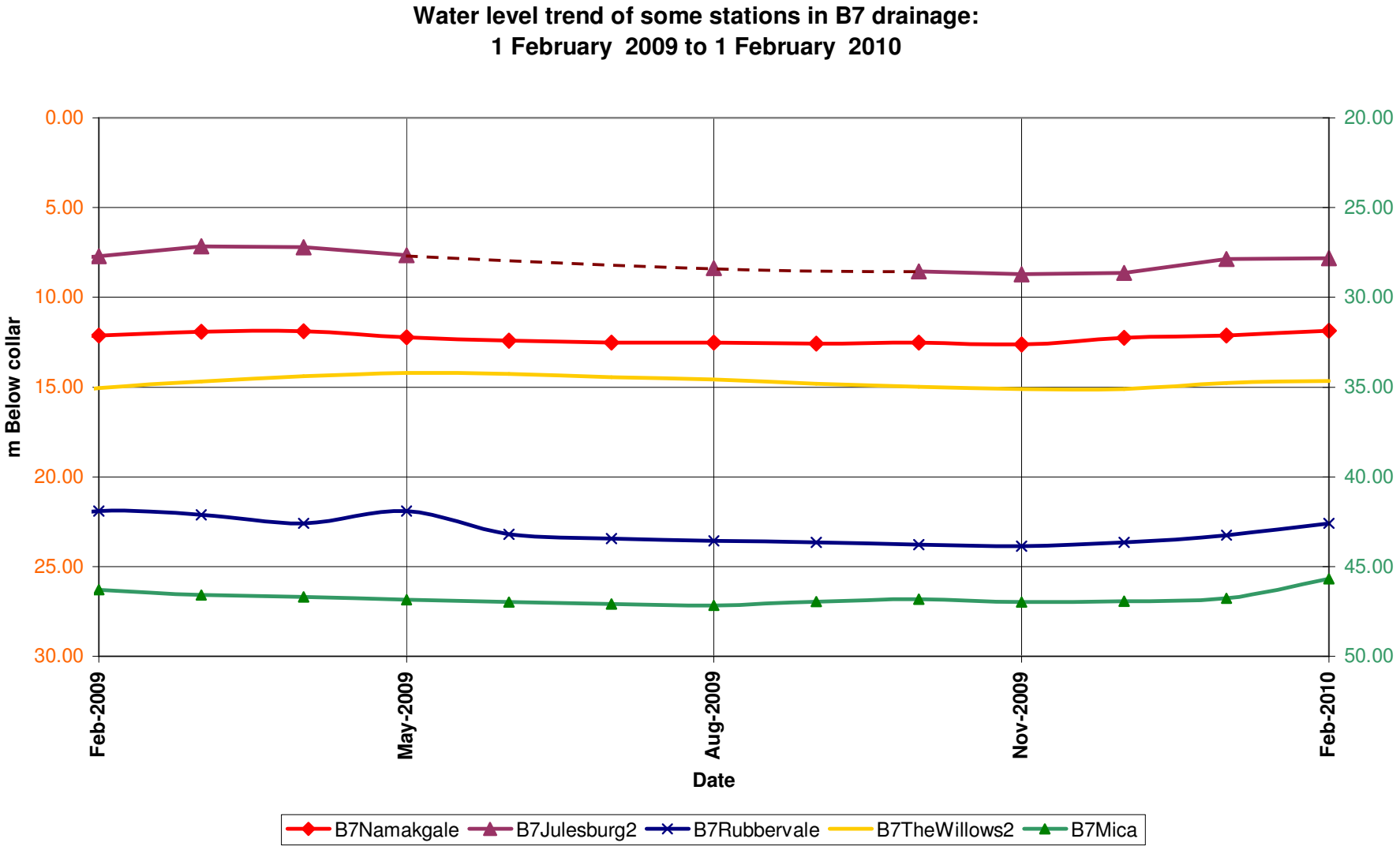
B5 DRAINAGE AREA
Comparison between water level depths: 1 February 2009,
1 November 2009 , 1 February 2010 and maximum depths recorded



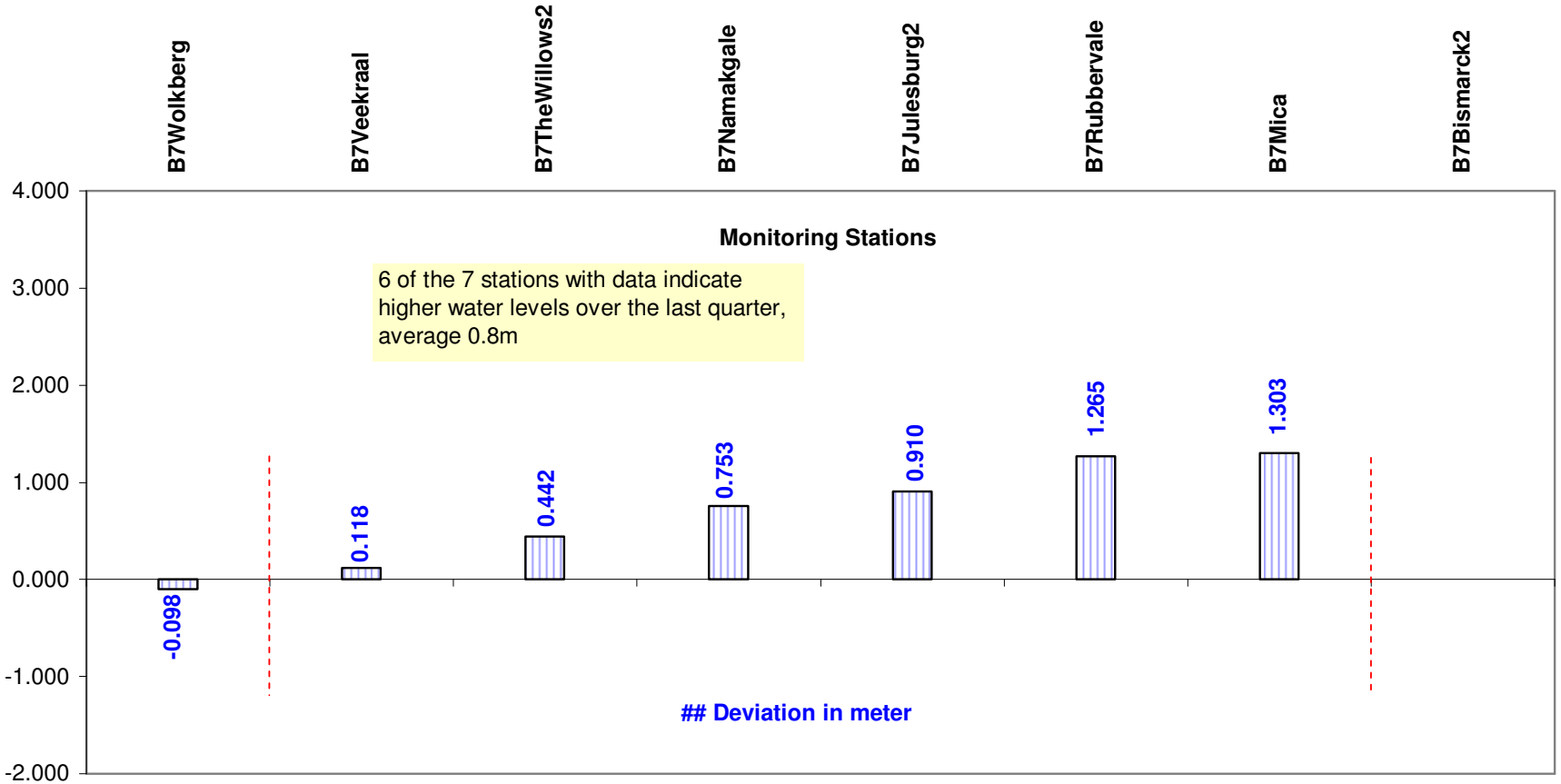
GRAPH 42


B5 DRAINAGE AREA
Comparison of average current water level with highest,
lowest & long-term average water levels recorded
m Below collar
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
22.2
13.02
17.48
33.78
Lowest average: (7 stations used)
Average value: = 33.78m
Maximum value: = 69.79 m
Minimum value: = 3.82 m
Highest average: (7 stations used)
Average value: = 13.02m
Maximum value: = 25.71 m
Minimum value: = 2.71 m
Current average: (7 stations used)
Average value: = 17.48 m
Maximum value: = 35.38m
Minimum value: = 2.86m
Long-term average: (7 stations used)
Average value: = 22.2 m
Maximum value: = 44.59m
Minimum value: = 3.2 m
Highest average water levels
Current average water level depths
Lowest average water levels
Long-term average depth

GRAPH 43

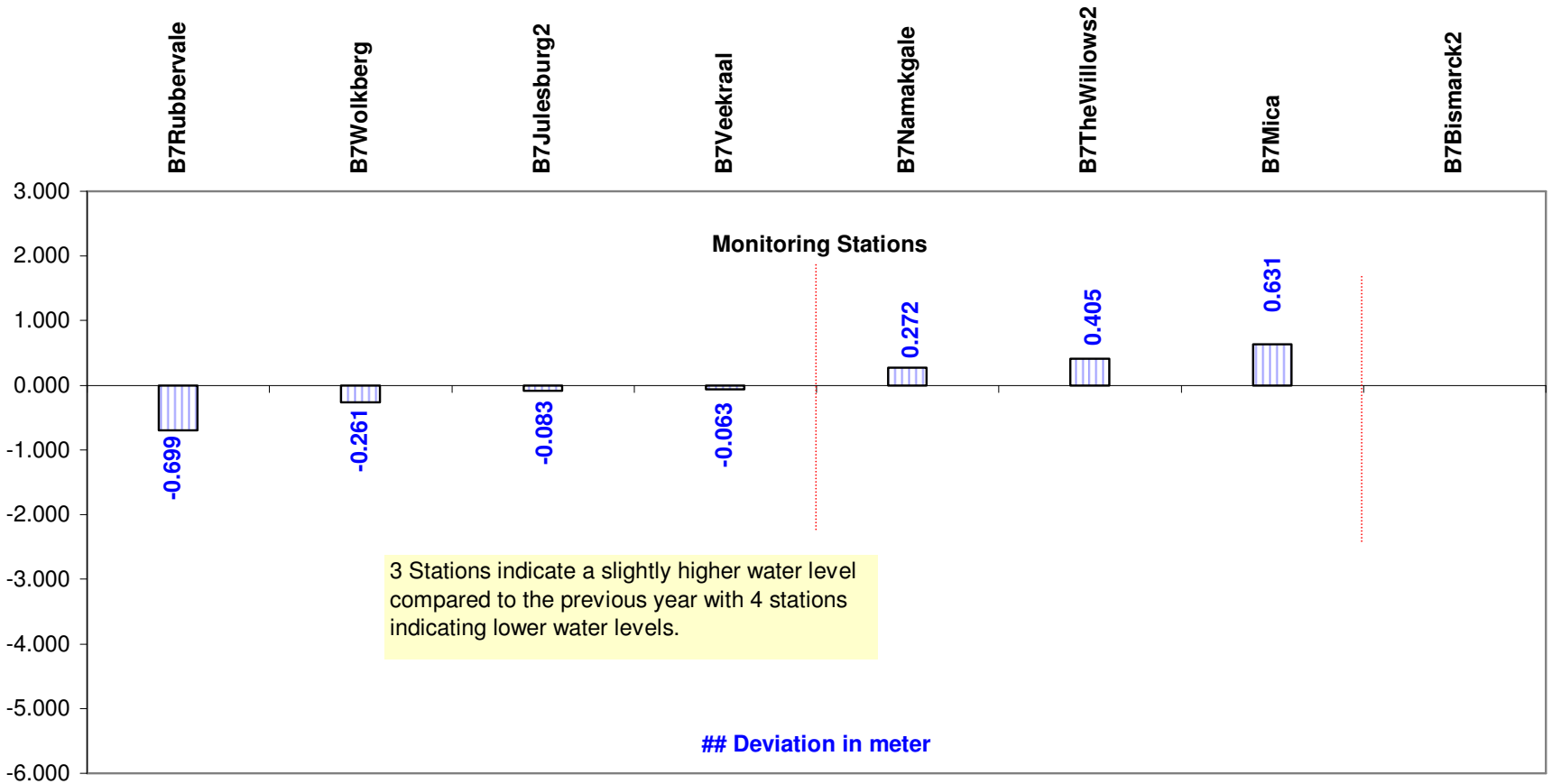

Water level trend of some stations in B7 drainage:
1 February 2009 to 1 February 2010
m Below collar
0.00
5.00
10.00
15.00
20.00
25.00
30.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
Feb-2009
May-2009
Aug-2009
Nov-2009
Feb-2010
Date
B7Namakgale
B7Julesburg2
B7Rubbervale
B7TheWillows2
B7Mica

GRAPH 44

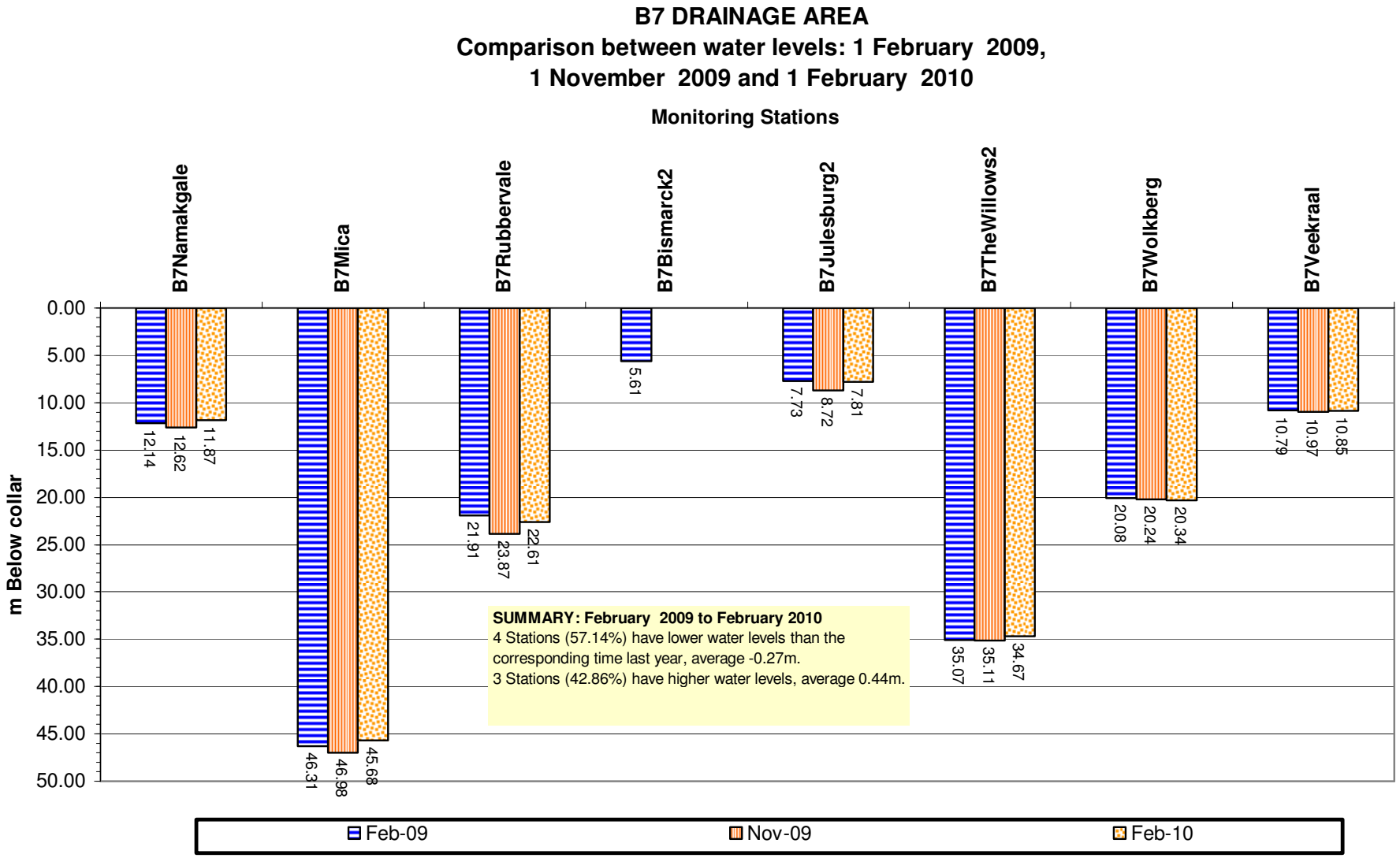

B7 DRAINAGE AREA
Deviation of water levels: 1 November 2009 to 1 February 2010
B7Wolkberg
B7Veekraal
B7TheWillows2
B7Namakgale
B7Julesburg2
B7Rubbervale
B7Mica
B7Bismarck2
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
Monitoring Stations
6 of the 7 stations with data indicate higher water levels over the last quarter, average 0.8m
-0.098
0.118
0.442
0.753
0.910
1.265
1.303
Deviation in meter

GRAPH 45

B7 DRAINAGE AREA
Deviation of water levels: 1 February 2009 to 1 February 2010



GRAPH 46


B7 DRAINAGE AREA
Comparison between water levels: 1 February 2009,
1 November 2009 and 1 February 2010
Monitoring Stations
B7Namakgale
B7Mica
B7Rubbervale
B7Bismarck2
B7Julesburg2
B7TheWillows2
B7Wolkberg
B7Veekraal
m Below collar
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
12.14
12.62
11.87
46.31
46.98
45.68
21.91
23.87
22.61
5.61
7.73
8.72
7.81
35.07
35.11
34.67
20.08
20.24
20.34
10.79
10.97
10.85
SUMMARY: February 2009 to February 2010
4 Stations (57.14%) have lower water levels than the corresponding time last year, average -0.27m.
3 Stations (42.86%) have higher water levels, average 0.44m.
Feb-09
Nov-09
Feb-10

GRAPH 47