



DEPARTMENT OF WATER AFFAIRS AND FORESTRY
LIMPOPO PROVINCE
WATER RESOURCE INFORMATION

STATUS ON MONITORING &
SURFACE WATER LEVEL TRENDS
MAY 2009 to OCTOBER 2009

D VILJOEN
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GH4319



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1. EXECUTIVE SUMMARY

The majority of dams used in this report have more water than during the corresponding period last year. In the Luvuvhu / Letaba Water Management Area **the Middle Letaba Dam is at a critical stage of 4% and the Nsami Dam is empty.** The Albasini Dam with a storage level of only 23.7% also gives reason for concern. In the Limpopo WMA the Nzhelele, Nwanedi and Luphephe Dams are currently at lower levels than the previous year for the same period. The dams are currently on storage levels of 44.4%, 22.5% and 53.3% respectively. The average storage volume for the Limpopo WMA is 225.9 million cubic meters (80.5%) and is 3.3 million cubic meters more than the corresponding period last year (79.3%). The average storage volume for the Luvuvhu / Letaba WMA is 379.8 million cubic meters (58.2%) and is 50.9 million cubic meters more than the corresponding period last year (50.4%). **Take note that these figures are derived from the attached WMA graphs, which also indicates which major dams were used for volume determination.**

The challenge in both of the WMAs is the fact that there are smaller dams, which supply water to communities that still need to be monitored. Owing to the lack of data these dams could not be included. Infrastructure at these dams are also a major concern and will have to be put in place before any form of water level monitoring can be considered.

Gauge plates have been installed at some of the smaller dams, but there are no observers to relay gauge plate readings to the Tzaneen Office. Hout River Dam has been equipped with near real-time data acquisition equipment.

The information presented in this report is based on the status of all the major dams in the province up to the end of October 2009.

2. MONITORING NETWORK

The hydrological monitoring network for the Limpopo Province consists of the following amount of gauging stations:

- 81 river flow gauging stations (excluding canals and pipelines)
- 21 dam gauging stations
- 16 evaporation stations

It is important to take cognizance of the fact that the hydrological gauging stations in the Crocodile-West and Olifants Water Management Areas (shared boundaries) are being managed by the hydrological offices of Gauteng and Mpumalanga respectively.

For the purpose of this report and owing to the strategic location and importance of certain dams in the Olifants and Nkomati Water Management Areas, information regarding their status is also attached.

3. OVERVIEW

No river flow gauging stations were used in this report as their importance will only play a roll when inflow stream requirements have to be met or during big flood events.

Take note that that the following dams have been included under the provincial boundary of the Limpopo Province: Nandoni, Flag Boshielo, Klaserie, Rust De Winter, Tonteldoos, Tours, Vlugkraal and Warmbad. This results in the full supply storage capacity increasing from 767.6 million cubic meters to 1166.6 million cubic meters.

To give an indication of what the percentage of normal rainfall was for the period July 2009 up to September 2009, see attached map (page 11). For information purposes a graph depicting provincial rainfall for the current hydrological year is attached (page 12). Rainfall forecasts up to the end of March 2010 are also attached see page 13. This information was obtained from the South African Weather Service.

The National dam storage graph (page 14) has been attached to the report for additional information. The Limpopo Province dam storage graph (page 15) as well as the graphs of the two WMAs (page 16-17), indicates the current situation clearly.

This information was obtained from Mr Elias Nel from Hydrological services, National Office.

For information purposes a graph indicating the comparison of water storage percentage for the different WMA's is attached on page 18. This information is also depicted in tabular format with the relevant storage volumes for each WMA, see page 19.

The purpose for attaching graphs of individual dams is to give a broader picture of water storage and status in the sub drainage catchments.

4. LIMPOPO WATER MANAGEMENT AREA

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

4.1 A4 Drainage Area (Matlabas, Mokolo Rivers)

The Mokolo Dam (A4R001) was used as no other dam exists in the A4 hydrological monitoring network. The dam storage is at a storage level of 100.4% ($145.95 \times 10^6 \text{m}^3$) and 7.3 % higher than the previous year, which means that the storage volume is 10.61 million cubic meters more than the corresponding period last year. See attached graph!

4.2 A5 Drainage Area (Lephalala River)

Two small dams exists in the A5 hydrological network namely the Susandale Dam (A5R001) and the Vischgat Dam (A5R002). Owing to their relatively small storage volumes of approximately 0.6 million cubic meters in total, these dams have not been included in this report!

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

The Doorndraai Dam (A6R001) and Glen Alpine Dam (A6R002) were used as no other dams exist in the A6 hydrological monitoring network. The Doorndraai Dam is at a storage level of 90.4% ($39.56 \times 10^6 \text{m}^3$) and 6% higher than the previous year, which means that the storage volume is 2.63 million cubic meters more than the corresponding period last year. See attached graph!

Glen Alpine Dam is at a storage level of 50.9% ($9.6 \times 10^6 \text{m}^3$) and 11.8% higher than the previous year, which means that the storage volume is 2.22 million cubic meters more than the corresponding period last year. See attached graph!

It must be noted that the full capacity storage of Glen Alpine Dam is only 18.889 million cubic and therefore the dam fills and empties much faster than Doorndraai Dam! The graph of Glen Alpine clearly indicates this!

Take note that the full supply capacity ($18.889 \times 10^6 \text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!

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

There are no existing dam monitoring stations in the hydrological network for this drainage area!

The Tzaneen Area Office in conjunction with the Hydrometry office is currently busy with the installation of gauge plates at dams in both of the Water Management Areas. Hout River Dam has been equipped with gauge plates, but a futile exercise at Mashashane Dam just iterated the point that gauge plates should be installed once water levels are below lowest outlet levels! Data capturing and real-time equipment has been installed at Hout River Dam.

Seshego and Rietfontein Dams will be investigated, but due to high water levels and the lack of infrastructure, the installation of gauge plates remains a huge challenge. According to preliminary investigations it seems obvious that the installation of gauge plates will only be feasible when water levels at these dams are on or below lowest outlet levels!

4.5 A8 Drainage Area (Nwanedzi and Nzhelele Rivers)

The Nzhelele Dam (A8R001), Luphephe (A8R002), Nwanedzi (A8R003) and Mutshedzi (A8R004) Dams were used as indicators!

The Nzhelele Dam is at a storage level of 44.4% ($22.75 \times 10^6 \text{m}^3$) and 12.5% lower than the previous year, which means that the storage volume is 6.4 million cubic meters less than the corresponding period last year. See attached graph!

Luphephe and Nwanedzi Dams are at storage levels of 22.5% and 53.3% respectively. Their combined storage is at $5.88 \times 10^6 \text{m}^3$. The combined storage for the corresponding period the previous year was $14.45 \times 10^6 \text{m}^3$. (76% of storage volume) See attached graphs!

Mutshedzi Dam, is at a storage level of 91.4% ($2.136 \times 10^6 \text{m}^3$) and 34.9% higher than the previous year, which means that the storage volume is 0.82 million cubic meters more than the corresponding period last year.

5. LUVUVHU / LETABA WATER MANAGEMENT AREA

The catchment consists of secondary drainage areas A9, B8 and B9.

5.1 A9 Drainage Area (Mutale, Luvuvhu Rivers)

The Albasini Dam (A9R001), Vondo Dam (A9R002) and Nandoni (A9R004) Dams were used as monitoring points in this report.

Albasini Dam is at a storage level of 23.7% ($6.69 \times 10^6 \text{m}^3$) and 5.8% lower than the previous year, which means that the storage volume is 1.63 million cubic meters less than the corresponding period last year. See attached graph!

Vondo Dam is at a storage level of 84.6% ($25.76 \times 10^6 \text{m}^3$) and 7.1% higher than the previous year, which means that the storage volume is 2.16 million cubic meters more than the corresponding period last year. See attached graph!

Nandoni Dam is at a storage level of 94.2% ($156.44 \times 10^6 \text{m}^3$) and 0.4% higher than the previous year, which means that the storage volume is 0.63 million cubic meters more than the corresponding period last year. See attached graph!

5.2 B8 Drainage Area (Groot, Middle and Klein Letaba Rivers)

The Ebenezer Dam (B8R001), Magoebaskloof Dam (B8R003), Tzaneen Dam (B8R005), Middle-Letaba Dam (B8R007) and Modjadji Dam (B8R011), were used as monitoring points in this report. The Dap Naudé Dam (B8R006), Hans Merensky Dam (B8R002) and Nsami Dam (B8R009) are also being monitored, but were not included in this report!

Thapane Dam has been investigated but due to high water levels and the lack of infrastructure, the installation of gauge plates remains a huge challenge. According to preliminary investigations it seems obvious that the installation of gauge plates will only be feasible when the water level at this dam is on or below lowest outlet level!

The Ebenezer Dam is at a storage level of 80.1% ($55.39 \times 10^6 \text{m}^3$) and 20.4% higher than the previous year, which means that the storage volume is 14.12 million cubic meters more than the corresponding period last year. See attached graph!

Magoebaskloof Dam is at a storage level of 100.2% ($4.85 \times 10^6 \text{m}^3$) and 0.1% higher than the previous year, which means that the storage volume is 0.01 million cubic meters more than the corresponding period last year. See attached graph! **Take note that the full supply capacity ($4.84 \times 10^6 \text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!**

Tzaneen Dam is at a storage level of 77.1% ($120.62 \times 10^6 \text{m}^3$) and 28.7% higher than the previous year, which means that the storage volume is 44.86 million cubic meters more than the corresponding period last year. See attached graph! **Take note that the full supply capacity ($156.53 \times 10^6 \text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!**

Middle-Letaba Dam is at a storage level of 4% ($6.87 \times 10^6 \text{m}^3$) and 2.3% lower than the previous year, which means that the storage volume is 3.97 million cubic meters less than the corresponding period last year. See attached graph!

The Modjadji Dam is at a storage level of 71.9% ($5.16 \times 10^6 \text{m}^3$) and 2.3% higher than the previous year, which means that the storage volume is 0.16 million cubic meters more than the corresponding period last year.

5.3 B9 Drainage Area (Shingwedzi, Phugwane and Mphongolo Rivers)

Only a limited part of this drainage area falls outside the Kruger National Park!
There are no existing dam monitoring stations in the hydrological network for this drainage area!

6. OLIFANTS WATER MANAGEMENT AREA

Monitoring points in the B3, B5, B6 and, B7 sub drainage areas were also included in this report owing to their strategic location and importance to operational matters in the Limpopo Province.

6.1 B3 Drainage Area (Olifants, Elands, Bloed and Selons Rivers)

For information as well as operational matters the status of Rust de Winter Dam (B3R001) and Loskop Dam (B3R002) has been included in this report.

Rust de Winter Dam is at a storage level of 100.5% ($28.3 \times 10^6\text{m}^3$) and 0.5% higher than the previous year, which means that the storage volume is 0.15 million cubic meters more than the corresponding period last year. See attached graph!

Loskop Dam is at a storage level of 95.1% ($343.76 \times 10^6\text{m}^3$) and 7.8% higher than the previous year, which means that the storage volume is 28.16 million cubic meters more than the corresponding period last year. See attached graph!

6.2 B5 Drainage Area (Olifants River)

For information as well as operational matters the status of Flag Boshielo Dam (B5R002) has been included in this report.

Flag Boshielo Dam is at a storage level of 94.1% ($174.16 \times 10^6\text{m}^3$) and 0.3% higher than the previous year, which means that the storage volume is 0.51 million cubic meters more than the corresponding period last year. See attached graph!

6.3 B6 Drainage Area (Blyde and Ohrigstad Rivers)

For information as well as operational matters the status of Ohrigstad Dam (B6R001) and Blyde Rivierspoort Dam (B6R003) has been included in this report.

Ohrigstad Dam is at a storage level of 59.5% ($7.99 \times 10^6\text{m}^3$) and 49.9% higher than the previous year, which means that the storage volume is 6.71 million cubic meters more than the corresponding period last year. See attached graph!

Take note that the full supply capacity ($13.448 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!

Blyde Dam is at a storage level of 80.6% ($43.82 \times 10^6\text{m}^3$) and 15.7% higher than the previous year, which means that the storage volume is 8.533 million cubic meters more than the corresponding period last year. See attached graph!

Take note that the full supply capacity ($54.369 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!

6.4 B7 Drainage Area (Klaserie and Olifants Rivers)

For information as well as operational matters the status of Klaserie Dam (B7R001) and Tours Dam (B7R003) has been included in this report.

Klaserie Dam is at a storage level of 89.6% ($5.02 \times 10^6 \text{m}^3$) and 36.5% higher than the previous year, which means that the storage volume is 2.04 million cubic meters more than the corresponding period last year. See attached graph!

Tours Dam is at a storage level of 86.0% ($5.23 \times 10^6 \text{m}^3$) and 9.2% higher than the previous year, which means that the storage volume is 0.56 million cubic meters more than the corresponding period last year. See attached graph!

Take note that the full supply capacities ($5.604 \times 10^6 \text{m}^3$ and $6.084 \times 10^6 \text{m}^3$) Klaserie and Tours Dams respectively, as supplied in the National Weekly Dam Status report, were used for calculation purposes!

7. NKOMATI WATER MANAGEMENT AREA

7.1 X2 Drainage Area (Crocodile River)

For information as well as operational matters the status of Kwena Dam (X2R005) has been included in this report.

Kwena Dam is at a storage level of 86.6% ($137.67 \times 10^6 \text{m}^3$) and 15.3% higher than the previous year, which means that the storage volume is 24.38 million cubic meters more than the corresponding period last year. See attached graph!

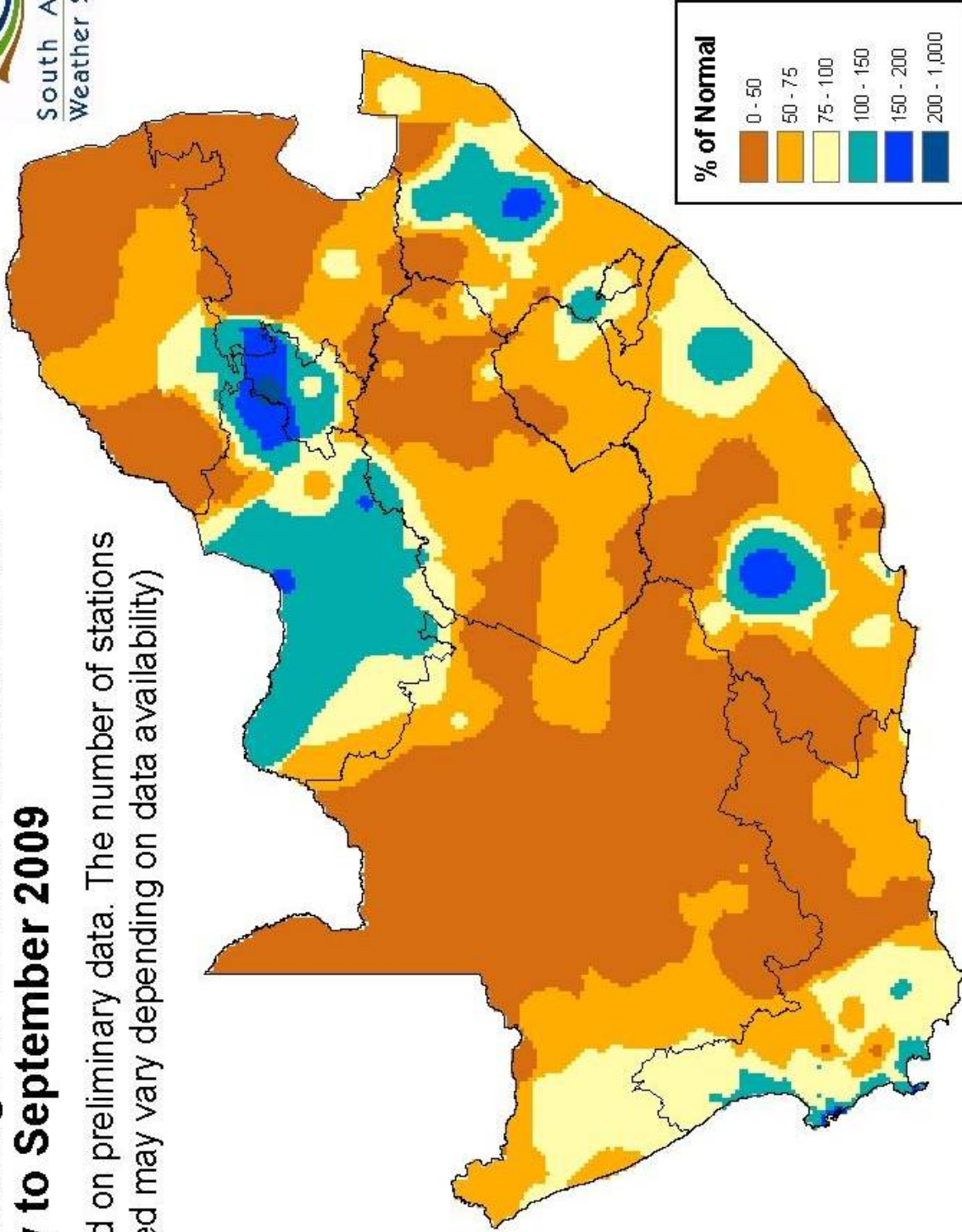
7.2 X3 Drainage Area (Mariti River)

For information as well as operational matters the status of Inyaka Dam (X3R002) has been included in this report.

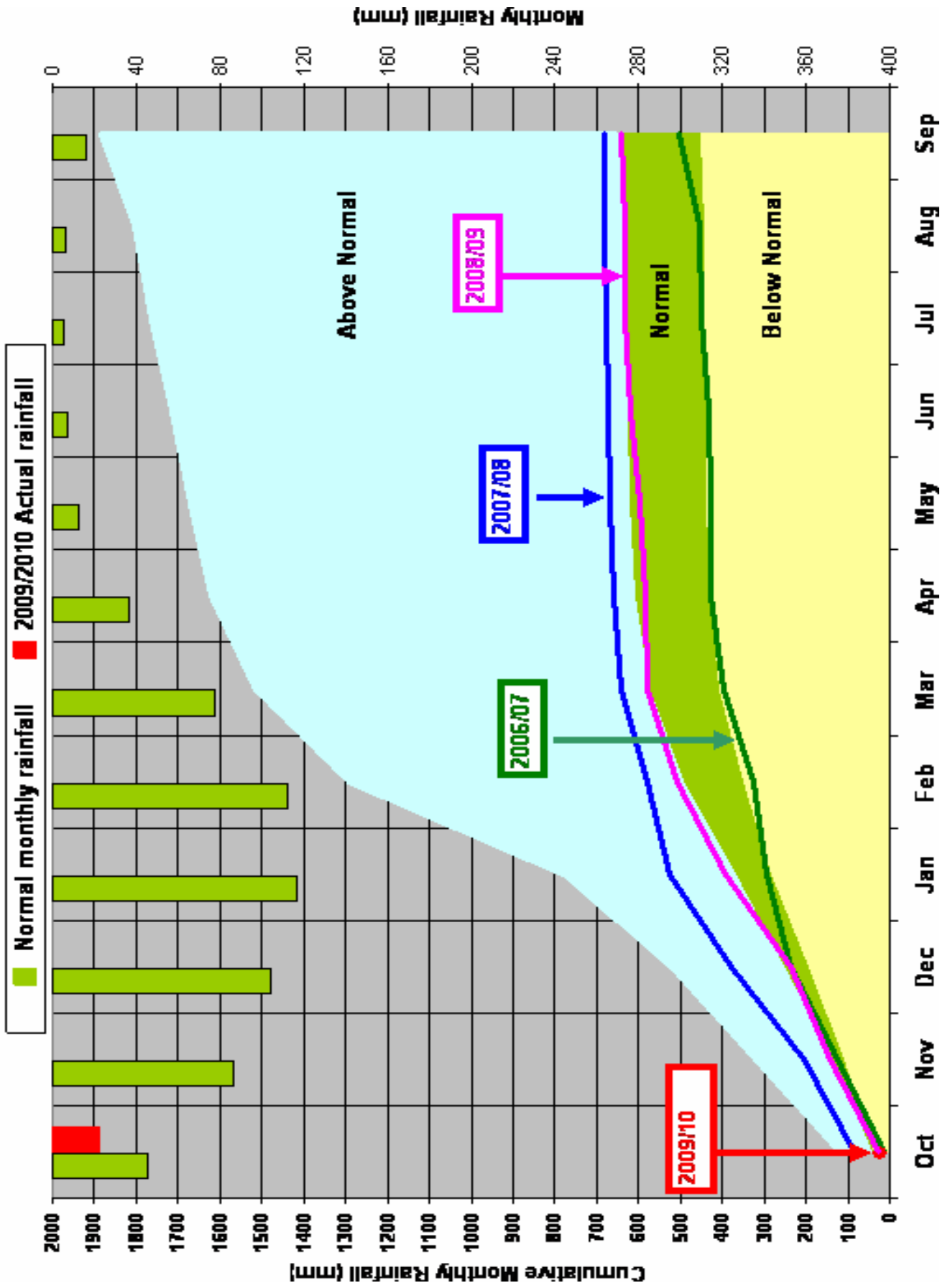
Inyaka Dam is at a storage level of 99.9% ($123.58 \times 10^6 \text{m}^3$) and 4% higher than the previous year, which means that the storage volume is 4.99 million cubic meters more than the corresponding period last year. See attached graph!

Percentage of Normal Rainfall for the Season July to September 2009

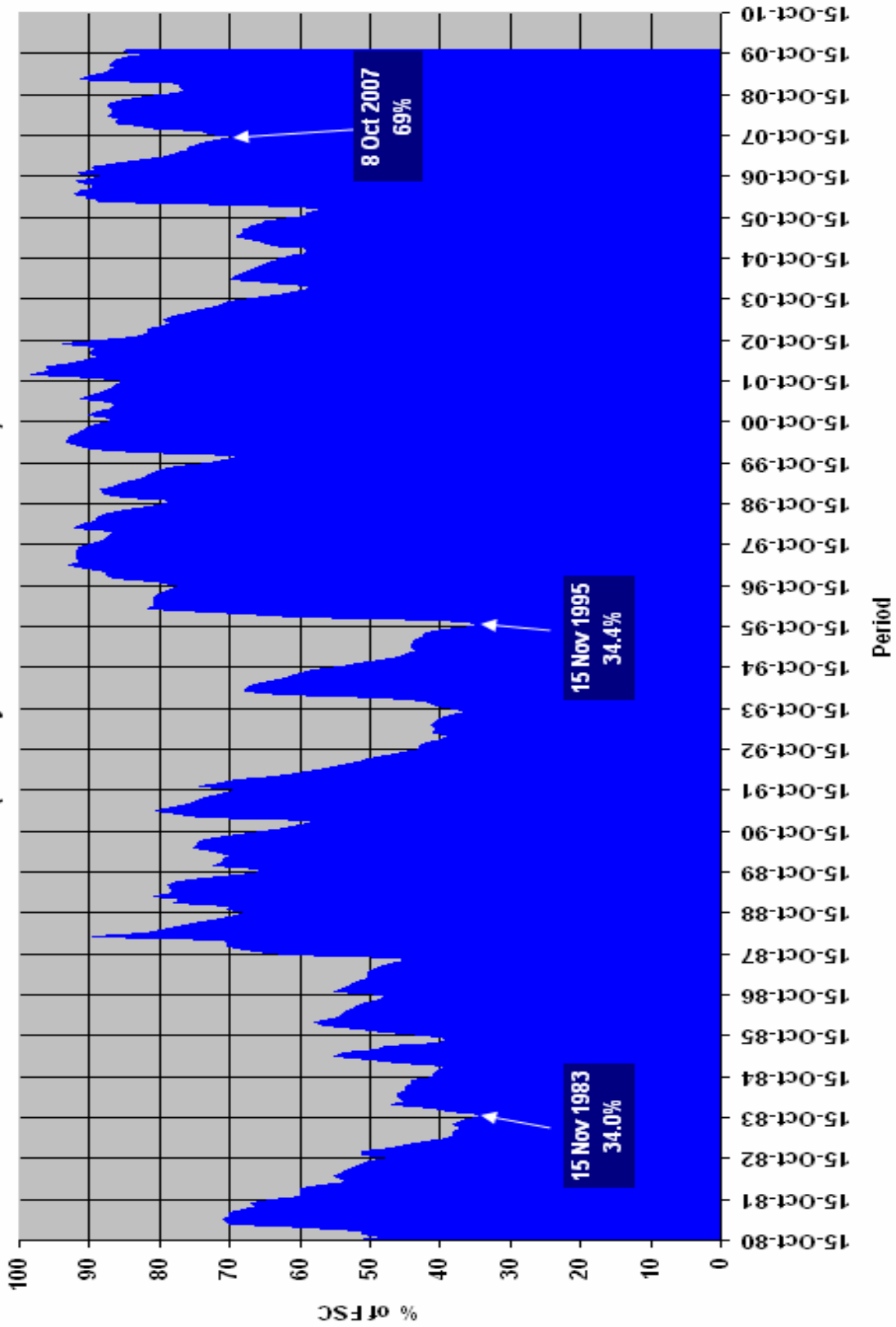
(based on preliminary data. The number of stations used may vary depending on data availability)



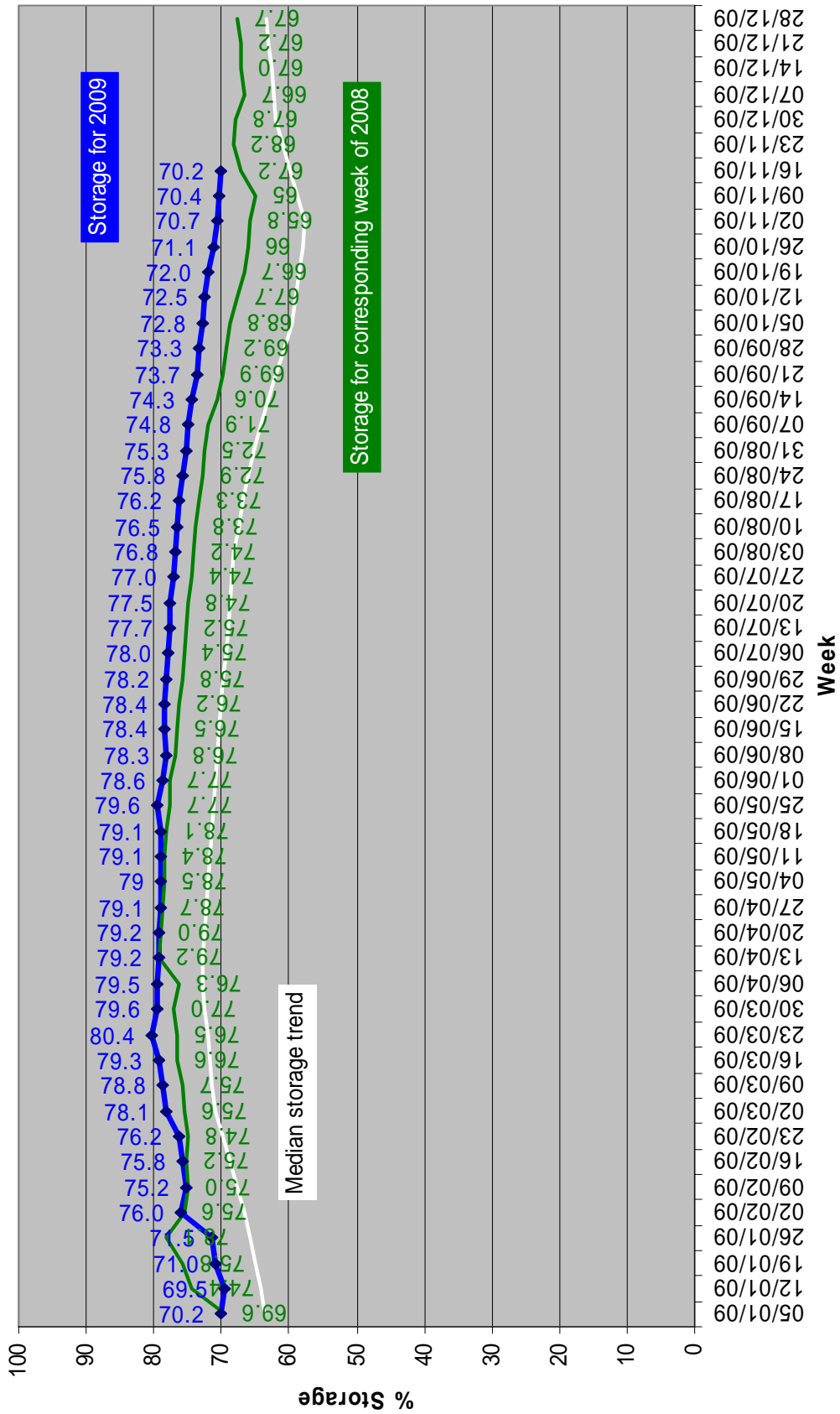
LIMPOPO



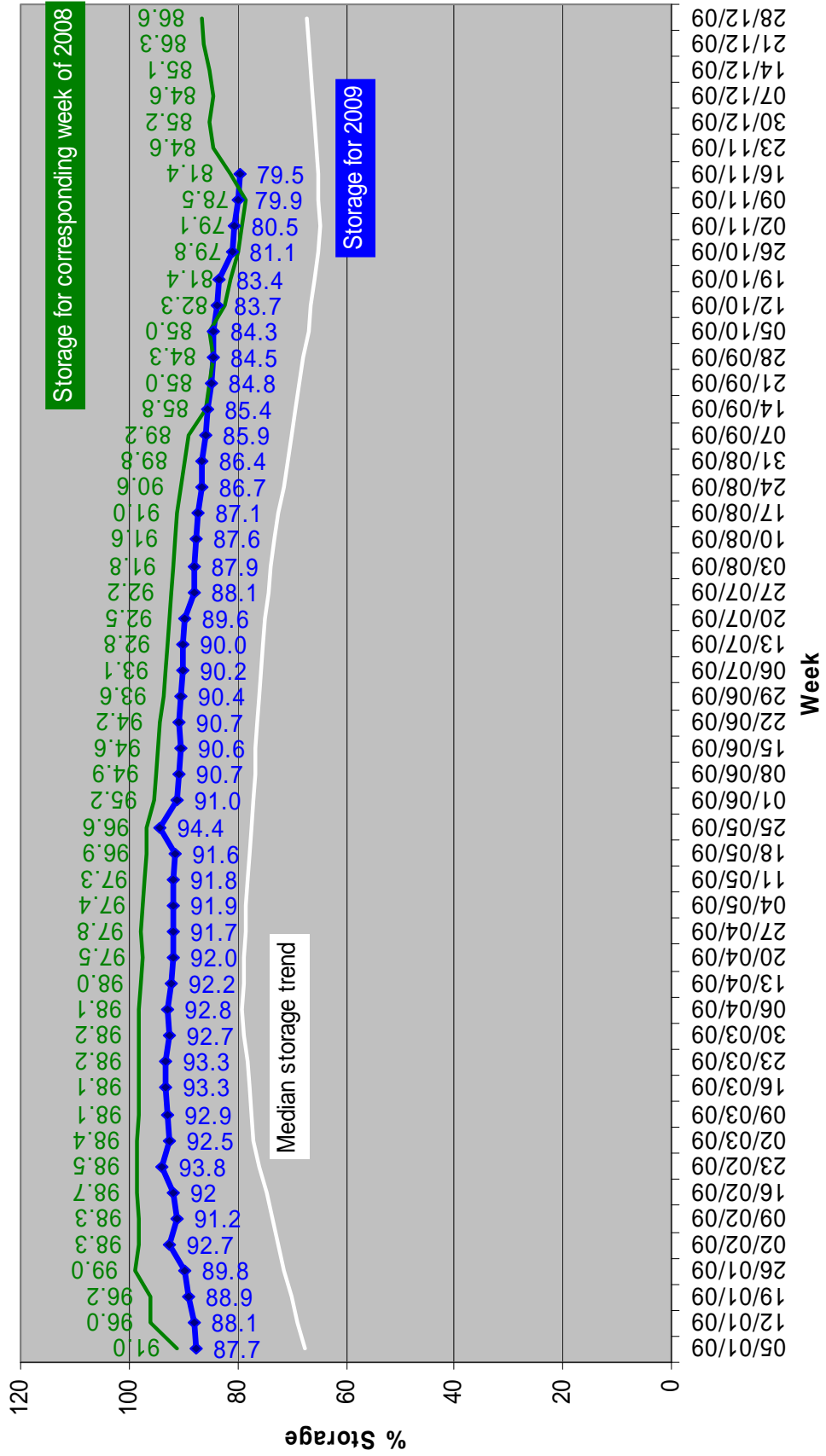
National Dams: Water Storage
Oct 1980 (Weekly values since 15/10/80)



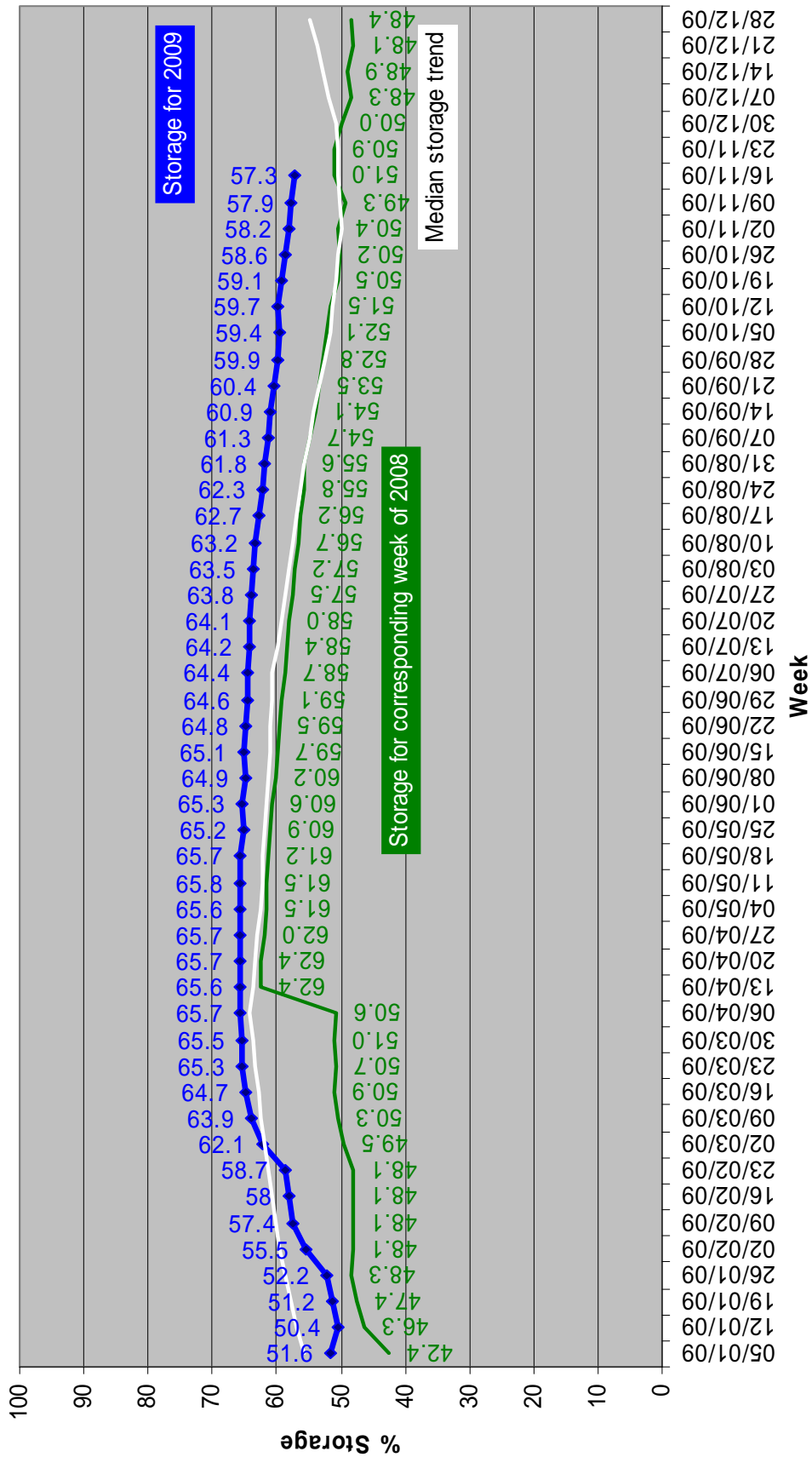
LIMPOPO



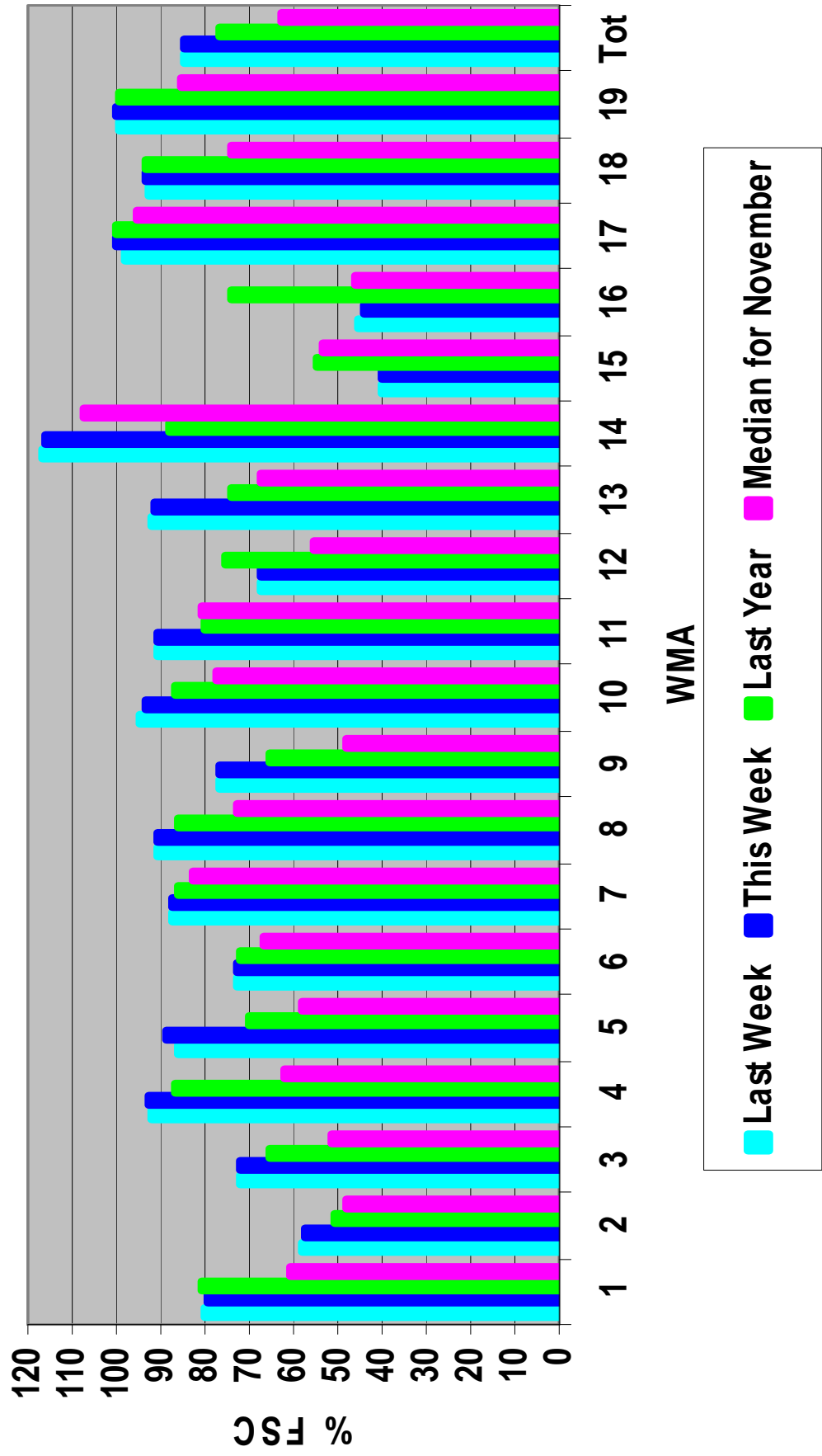
WMA 1: Limpopo



WMA 2: Luvubu & Letaba



Comparison of water storage as on 16 Nov 2009 per WMA

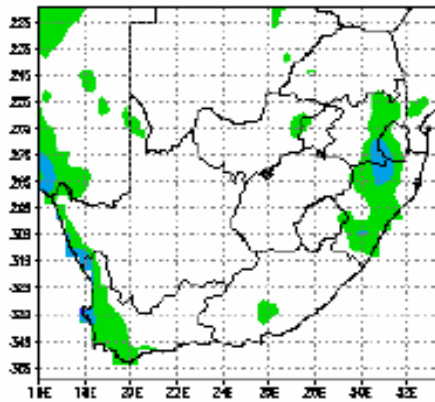


WMA Storage Summary

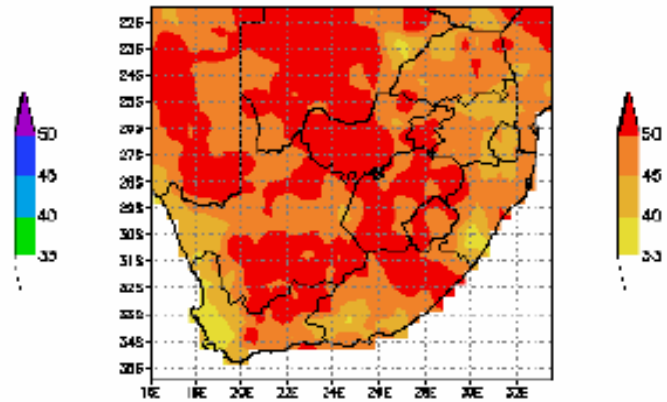
	WMA	Last Week		This Week		16-Nov-09		Last Year		Median	
		%Full	%Full	%Full	%Full	% Rise	%Full	%Full	November	November	
1	Limpopo	79.9	79.5	81	-0.4	81	60.65				
2	Luvuvhu/Letaba	57.9	57.3	50.8	-0.6	50.8	48.15				
3	Crocodile (West) Marico	72.1	72.3	65.2	0.2	65.2	51.5				
4	Olifants	91.7	92.7	86.8	1.0	86.8	62.25				
5	Inkomati	86	88.7	69.7	2.7	69.7	57.75				
6	Usutu/Mhlatuze	72.7	72.8	71.7	0.1	71.7	66.9				
7	Tshukela	87.4	87.3	86.2	-0.1	86.2	82.8				
8	Upper Vaal	91	90.9	86.1	-0.1	86.1	72.35				
9	Middle Vaal	76.4	76.6	65.5	0.2	65.5	47.85				
10	Lower Vaal	94.7	93.4	86.4	-1.3	86.4	77.5				
11	Mooif/Umzimkulu	90.5	90.6	80	0.1	80	80.65				
12	Mzimvubu/Kesikamma	67.1	67.2	75.3	0.1	75.3	55.45				
13	Upper Orange	91.8	91.1	74.3	-0.7	74.3	67.65				
14	Lower Orange	116.7	115.8	87.7	-0.9	87.7	107.6				
15	Fish/Tsitsikamma	39.9	39.9	54.4	0.0	54.4	53.25				
16	Goutz	45.4	44.2	74.1	-1.2	74.1	45.75				
17	Olifants/Ooib	97.7	99.9	100.3	2.2	100.3	95.5				
18	Breede	92.9	93.4	93.6	0.5	93.6	74.05				
19	Berg	99.2	99.7	99.6	0.5	99.6	85.35				
	GRAND TOTAL	84.9	84.8	76.5	-0.1	76.5	62.8				

RAINFALL FORECAST (NOVEMBER 2009 TO MARCH 2009)

NOVEMBER–DECEMBER–JANUARY 2009/10
Above-Normal Rainfall



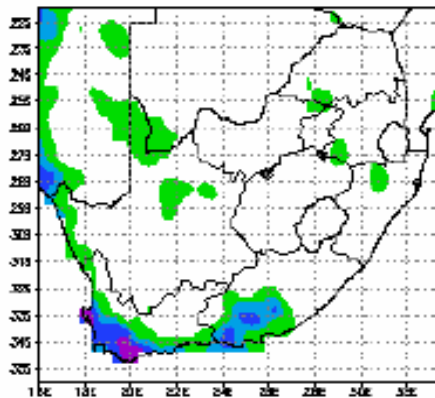
NOVEMBER–DECEMBER–JANUARY 2009/10
Below-Normal Rainfall



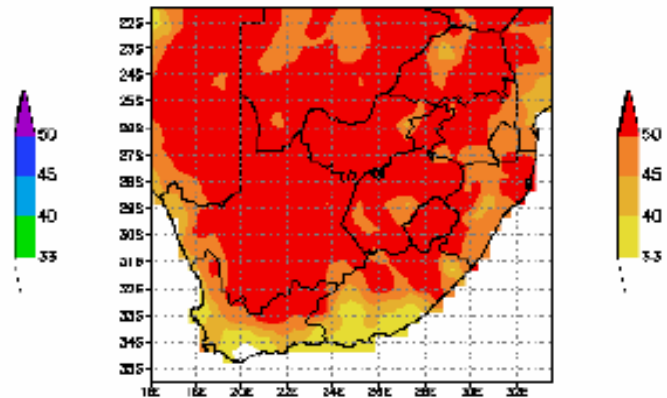
November-December-January

El Niño related drought conditions are expected to occur over the larger part of South Africa and its neighbouring countries.

DECEMBER–JANUARY–FEBRUARY 2009/10
Above-Normal Rainfall



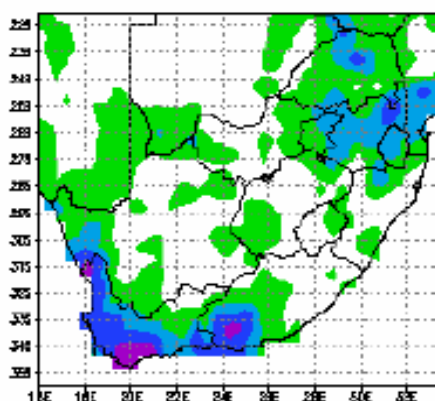
DECEMBER–JANUARY–FEBRUARY 2009/10
Below-Normal Rainfall



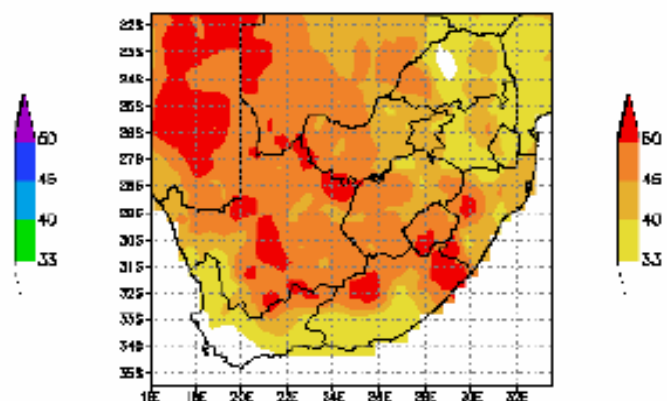
December-January-February

Enhanced probabilities for below-normal rainfall totals to occur are forecast over the summer rainfall regions, and enhanced probabilities for above-normal rainfall totals over parts of the south-western and Eastern Cape.

JANUARY–FEBRUARY–MARCH 2010
Above-Normal Rainfall

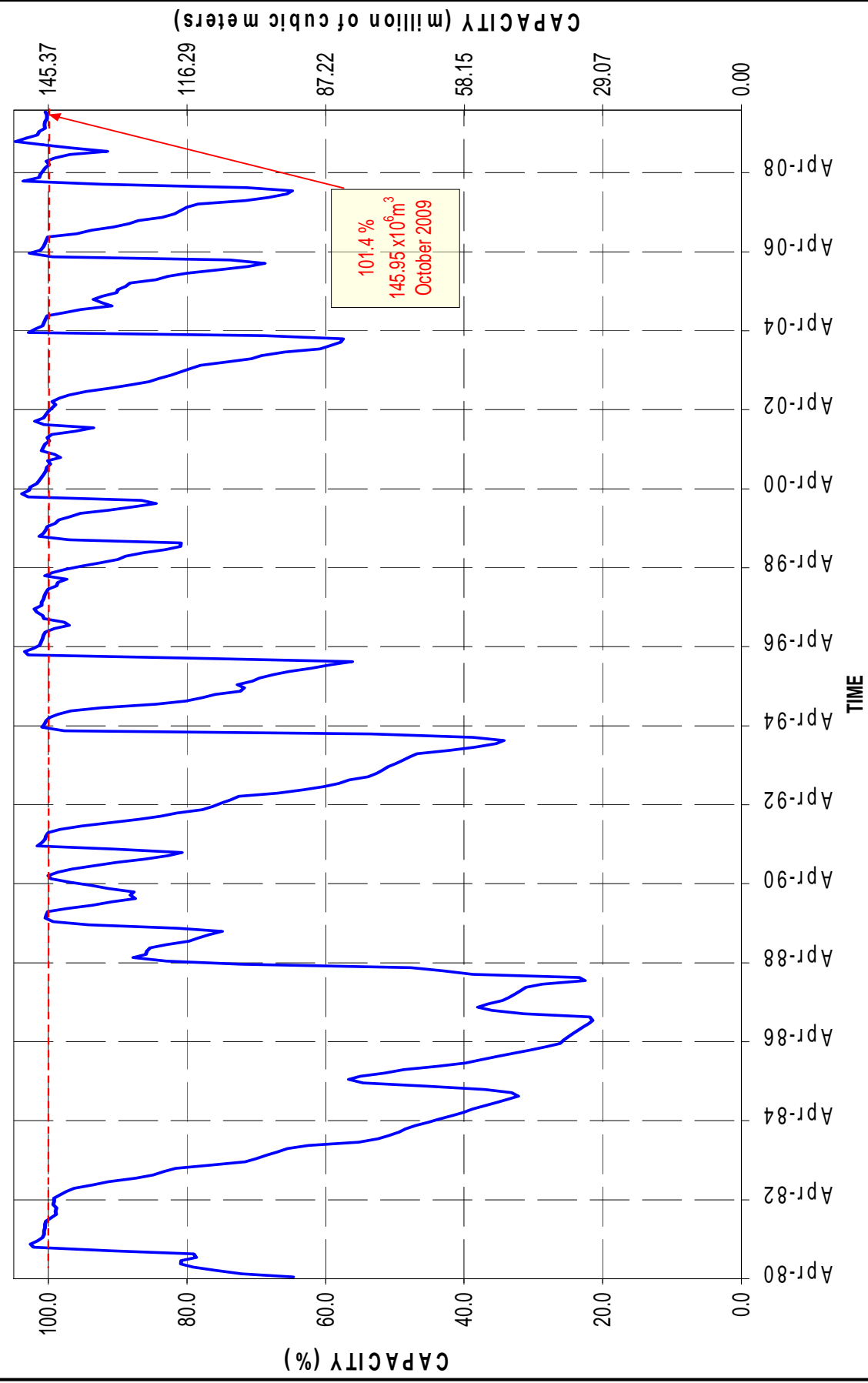


JANUARY–FEBRUARY–MARCH 2010
Below-Normal Rainfall



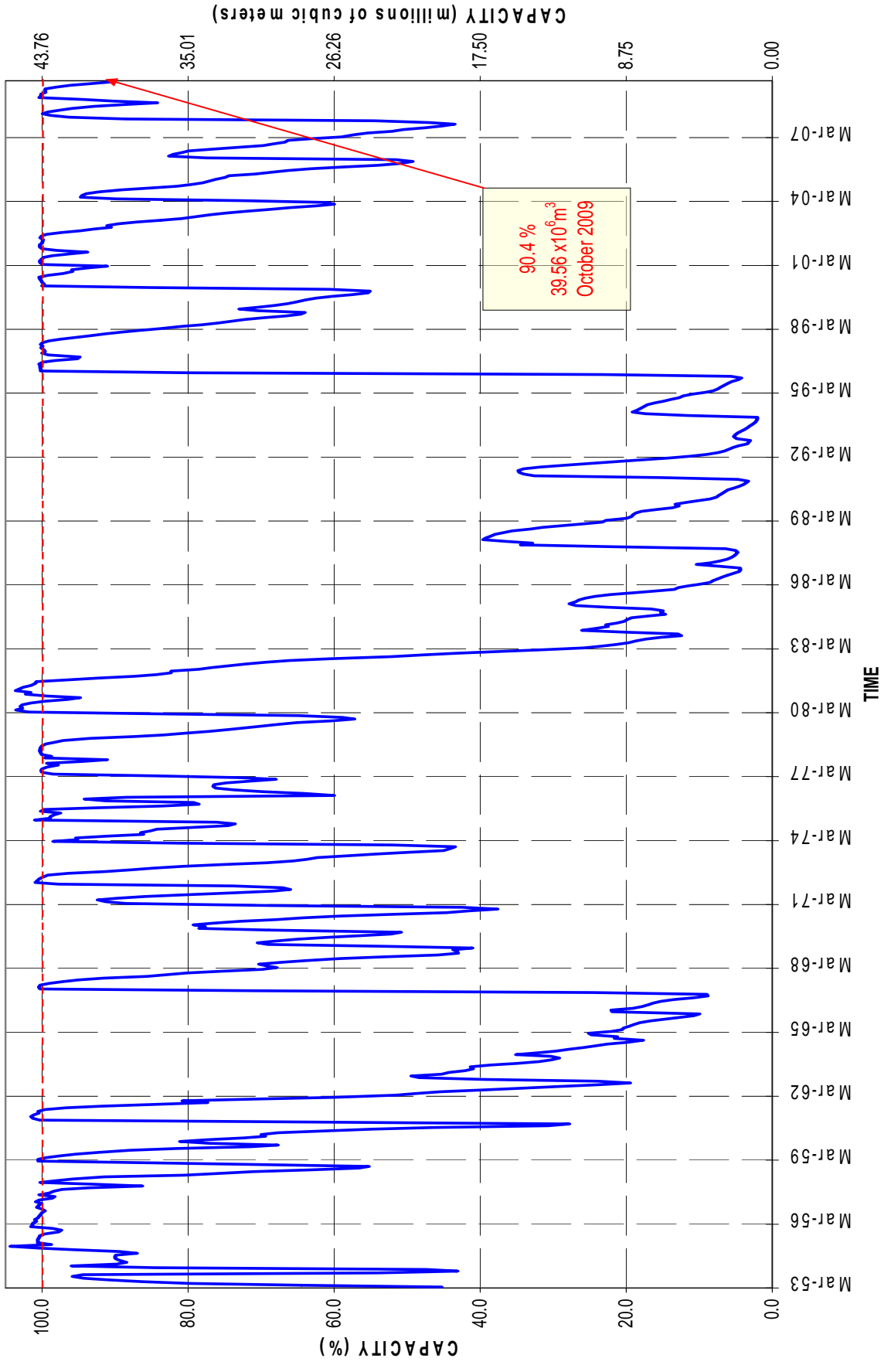
MOGOL RIVER AT MOKOLO DAM

FULL CAPACITY 145.37 *10⁶m³



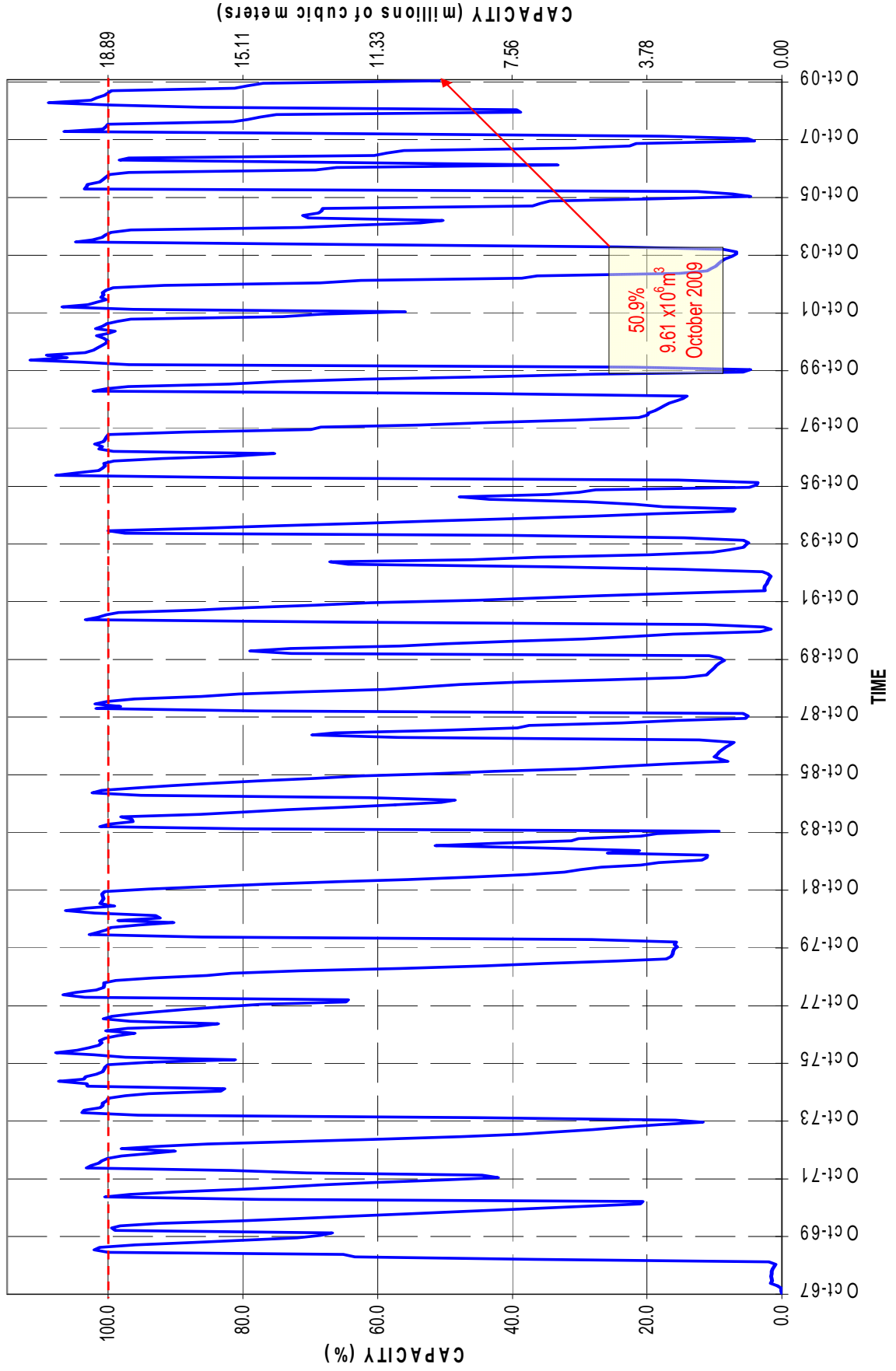
STERK RIVER AT DOORNDRAAI DAM

FULL CAPACITY 43.76 *10⁶m³



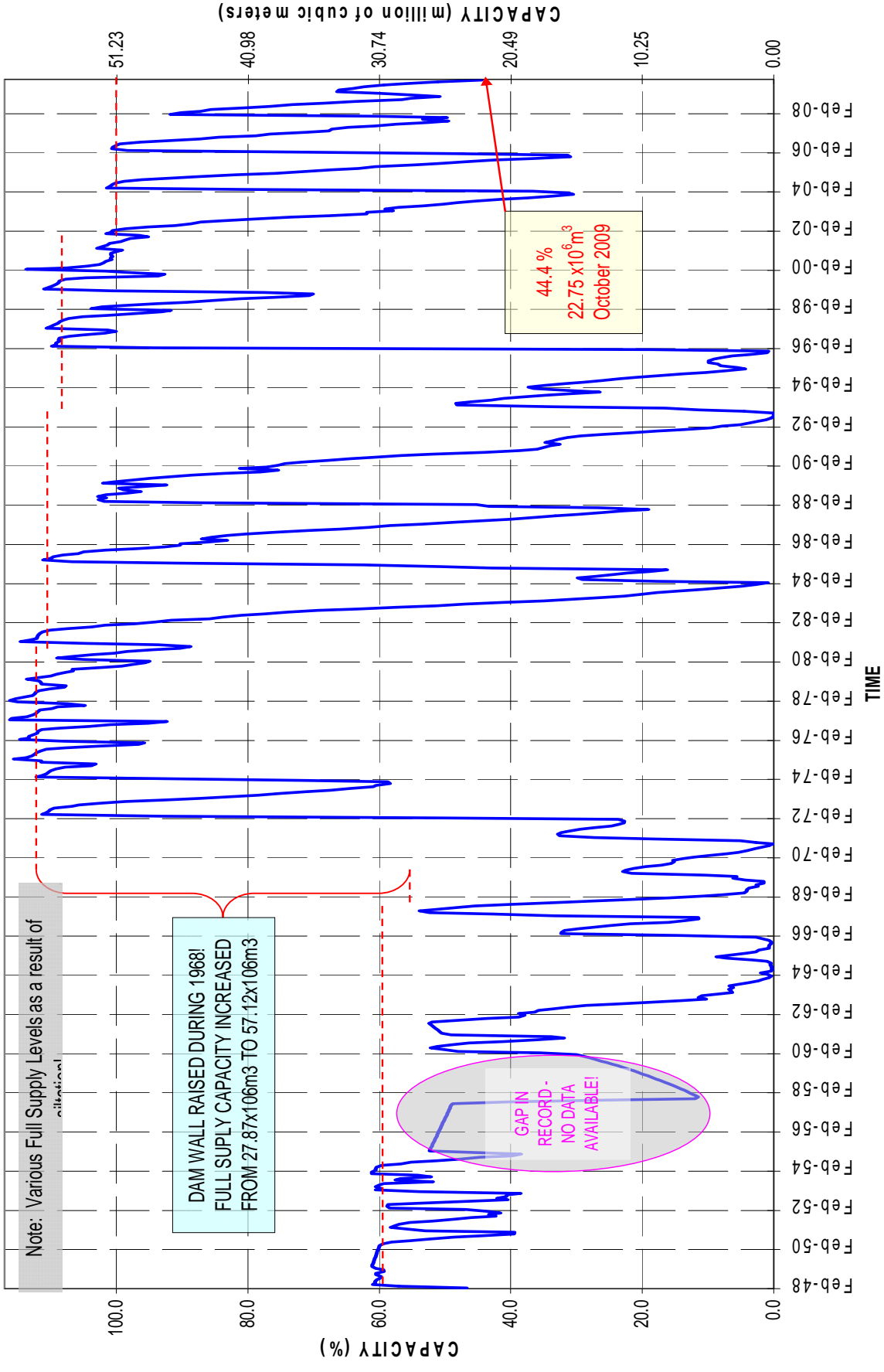
MOKGALAKWENA RIVER AT GLEN ALPINE DAM

FULL CAPACITY 18.89 *10⁶m³



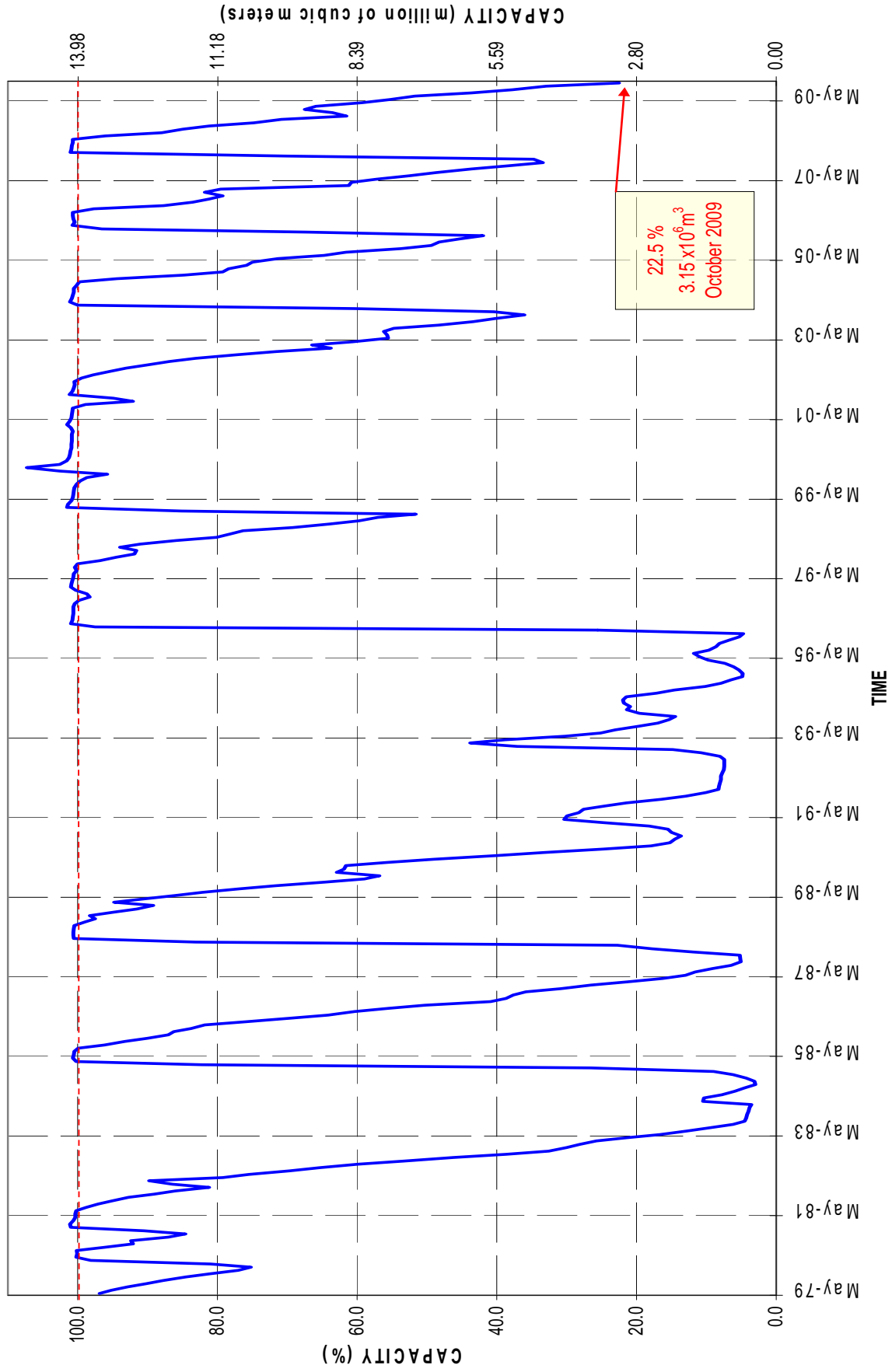
NZHELELE RIVER AT NZHELELE DAM

FULL CAPACITY 51.23 *10⁶m³



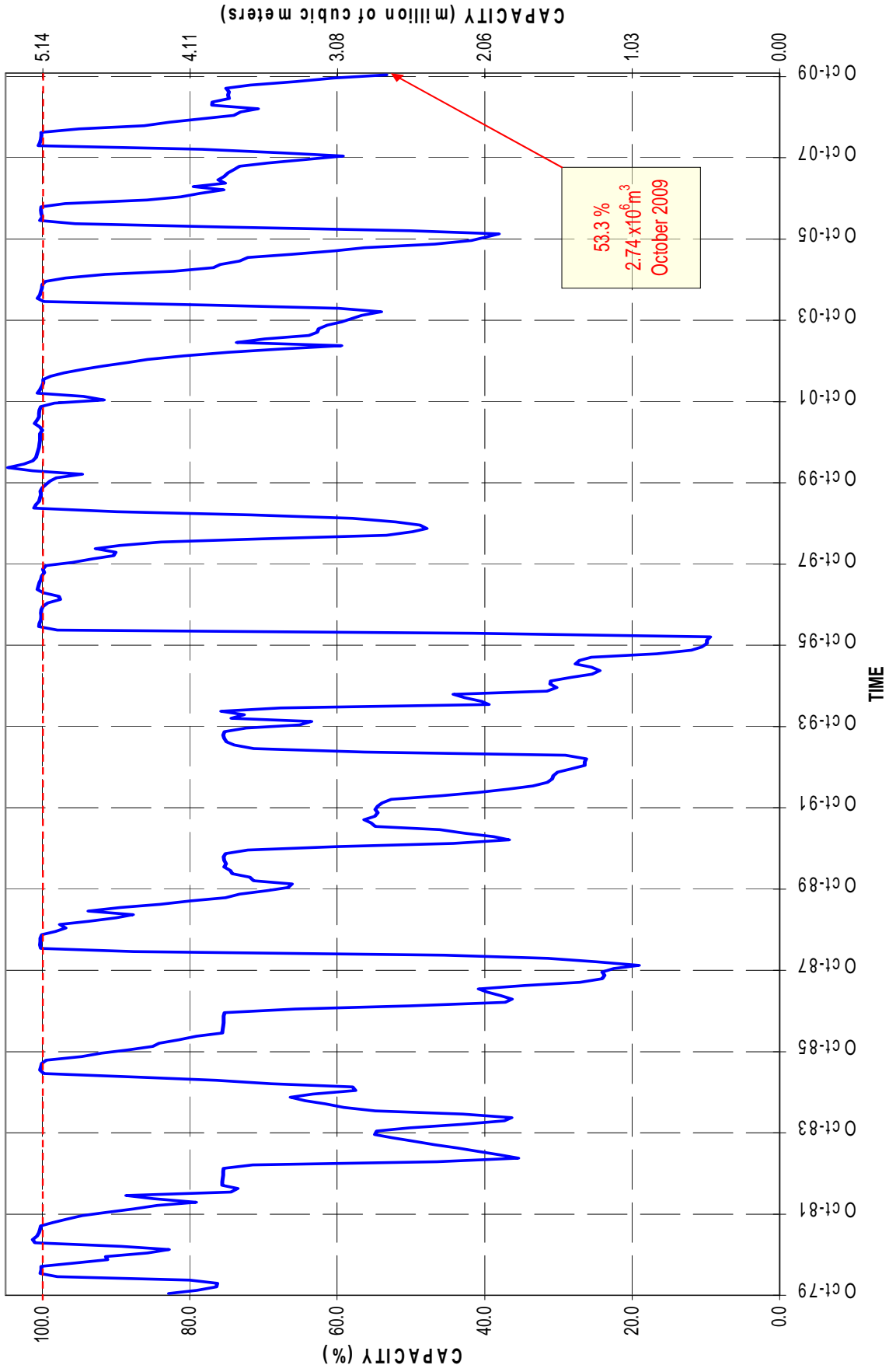
LUPEPHE RIVER AT LUPEPHE DAM

FULL CAPACITY 13.984 *10^6m^3



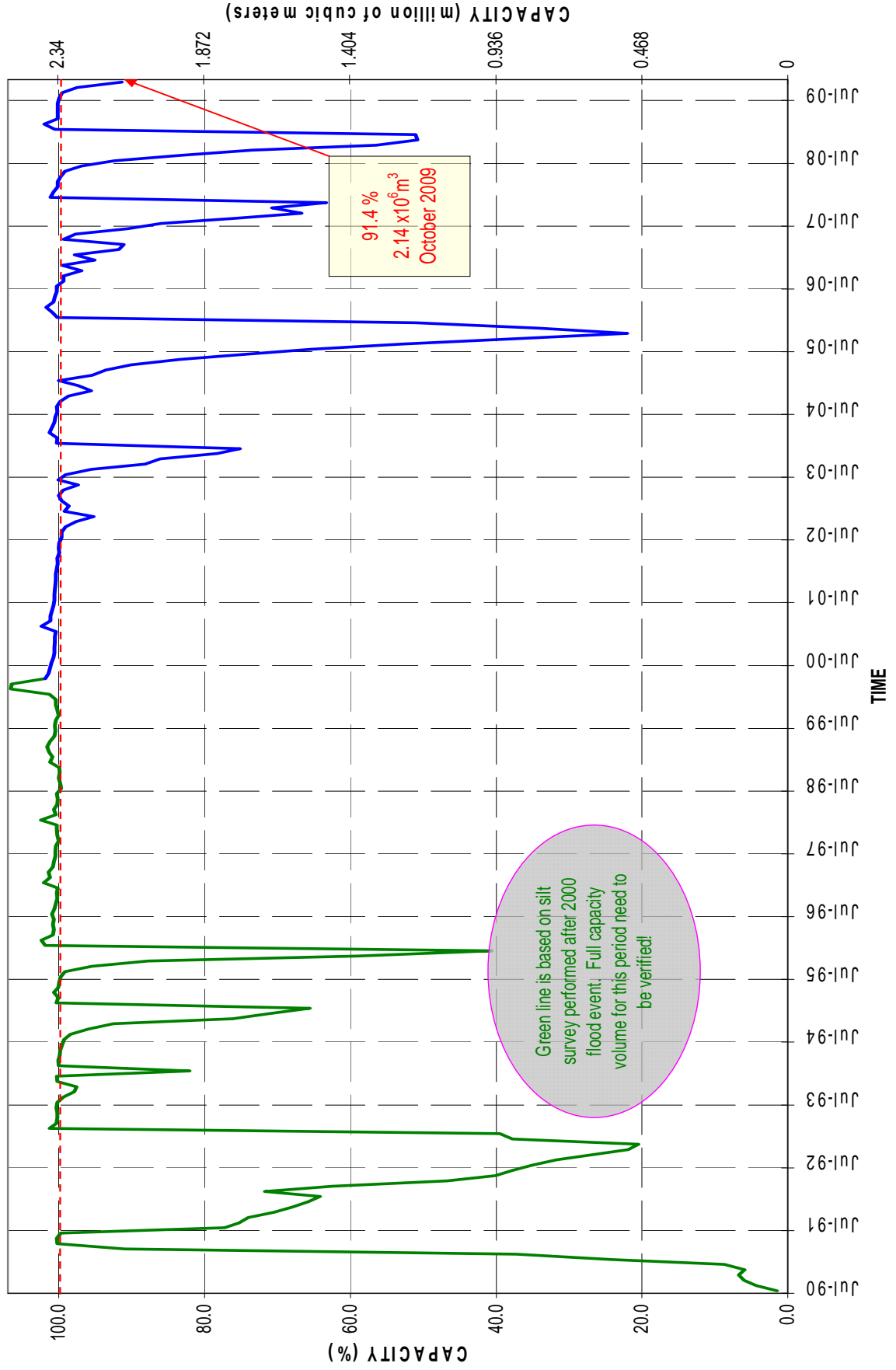
NWANEDZI RIVER AT NWANEDZI DAM

FULL CAPACITY 5.14 * 10⁶m³



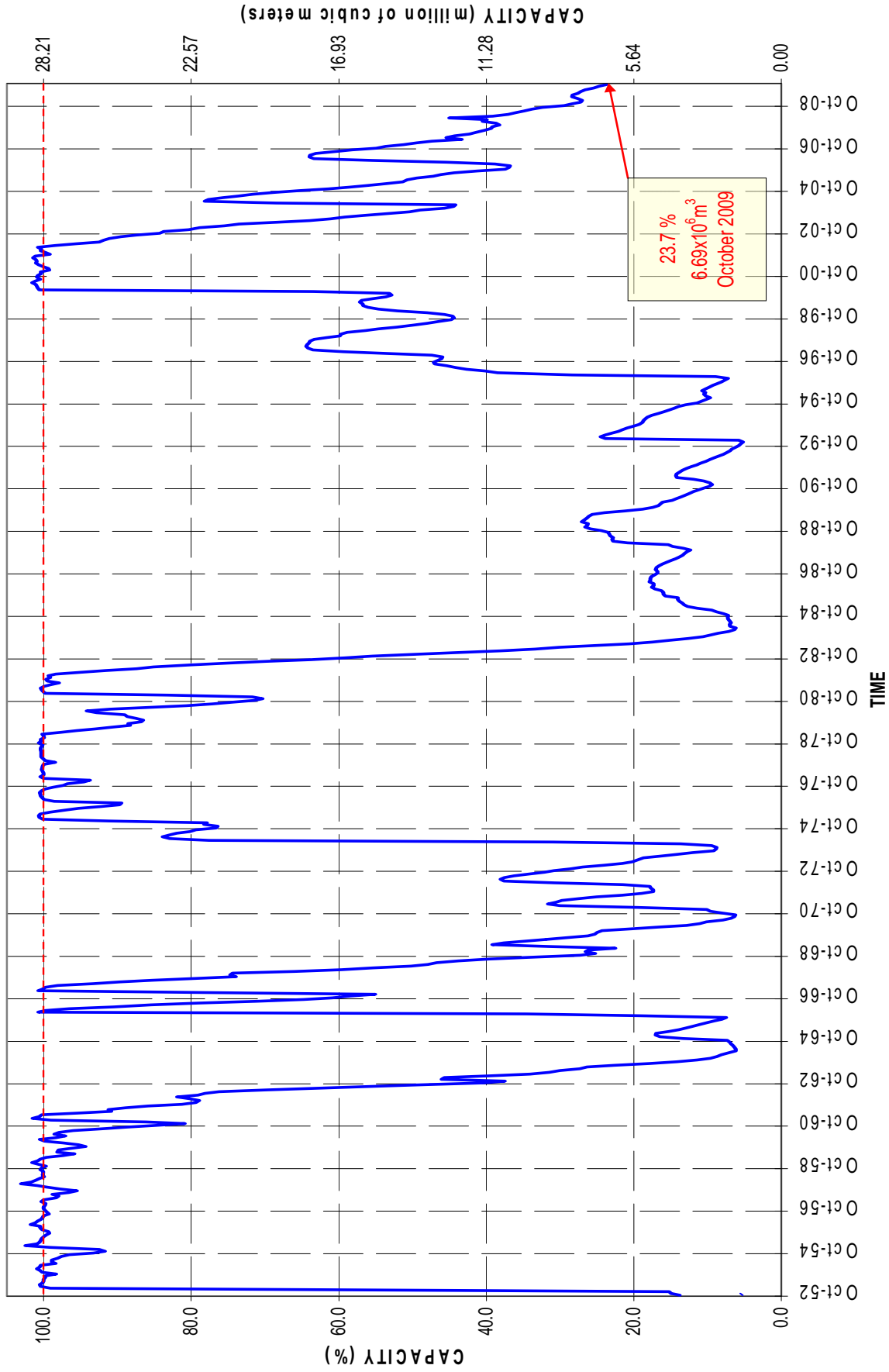
MUTSHEDZI RIVER AT MUTSHEDZI DAM

FULL CAPACITY 2.34 * 10⁶m³



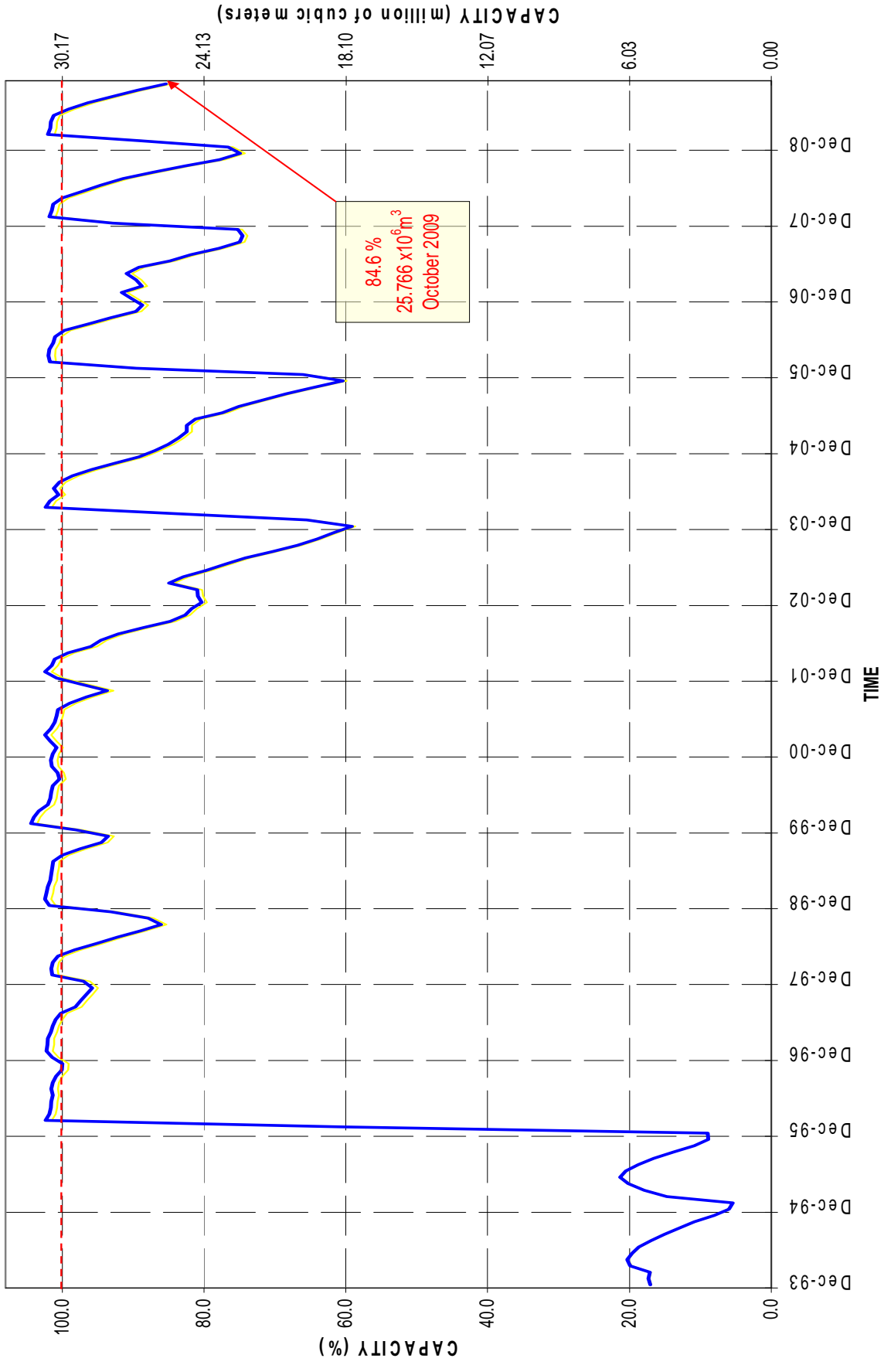
LUVUVHU RIVER AT ALBASINI DAM

FULL CAPACITY 28.21*10⁶m³



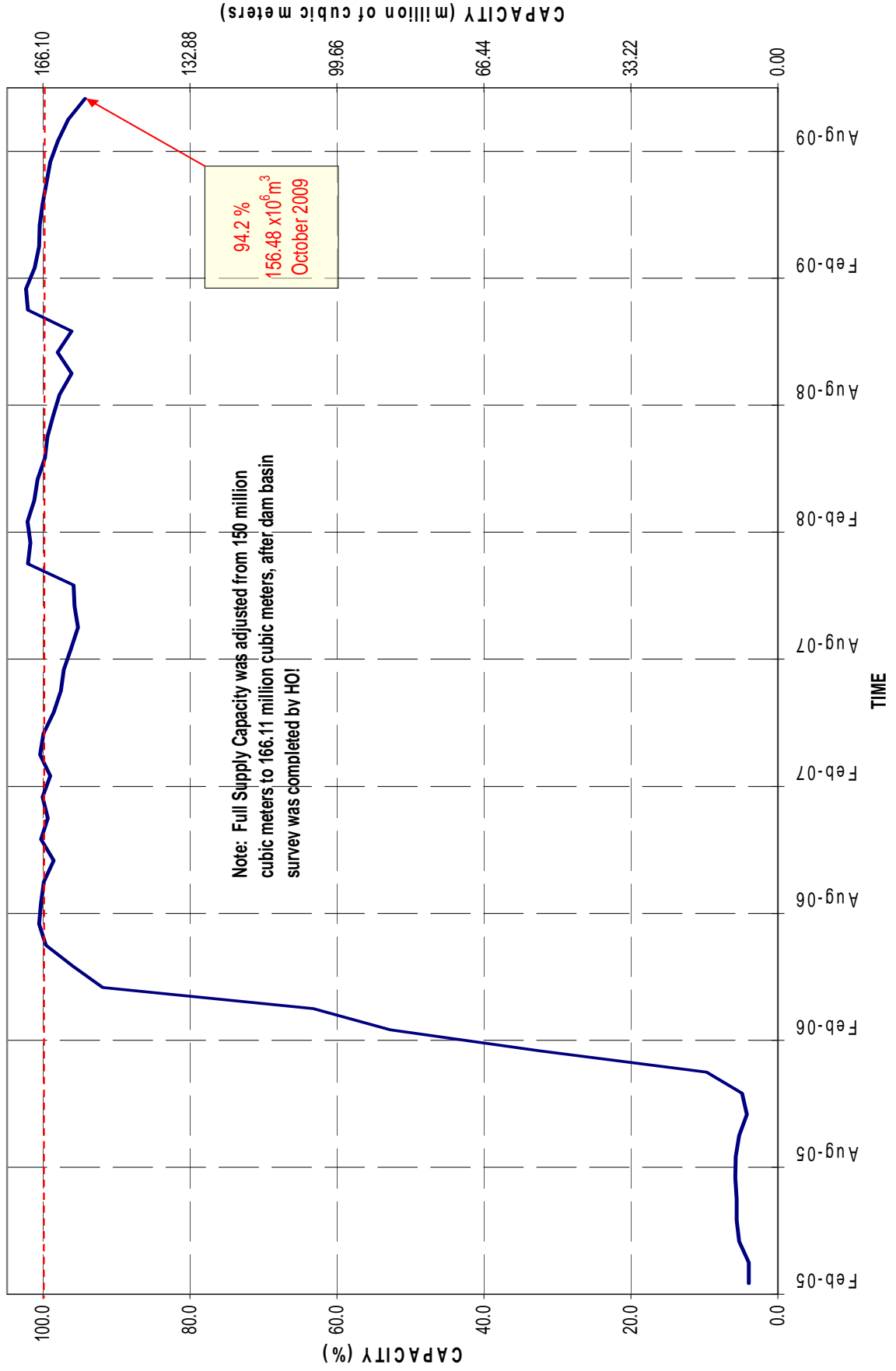
MUTSHINDUDI RIVER AT VONDO DAM

FULL CAPACITY 30.447*10⁶m³



LUVUVHU RIVER AT NANDONI DAM

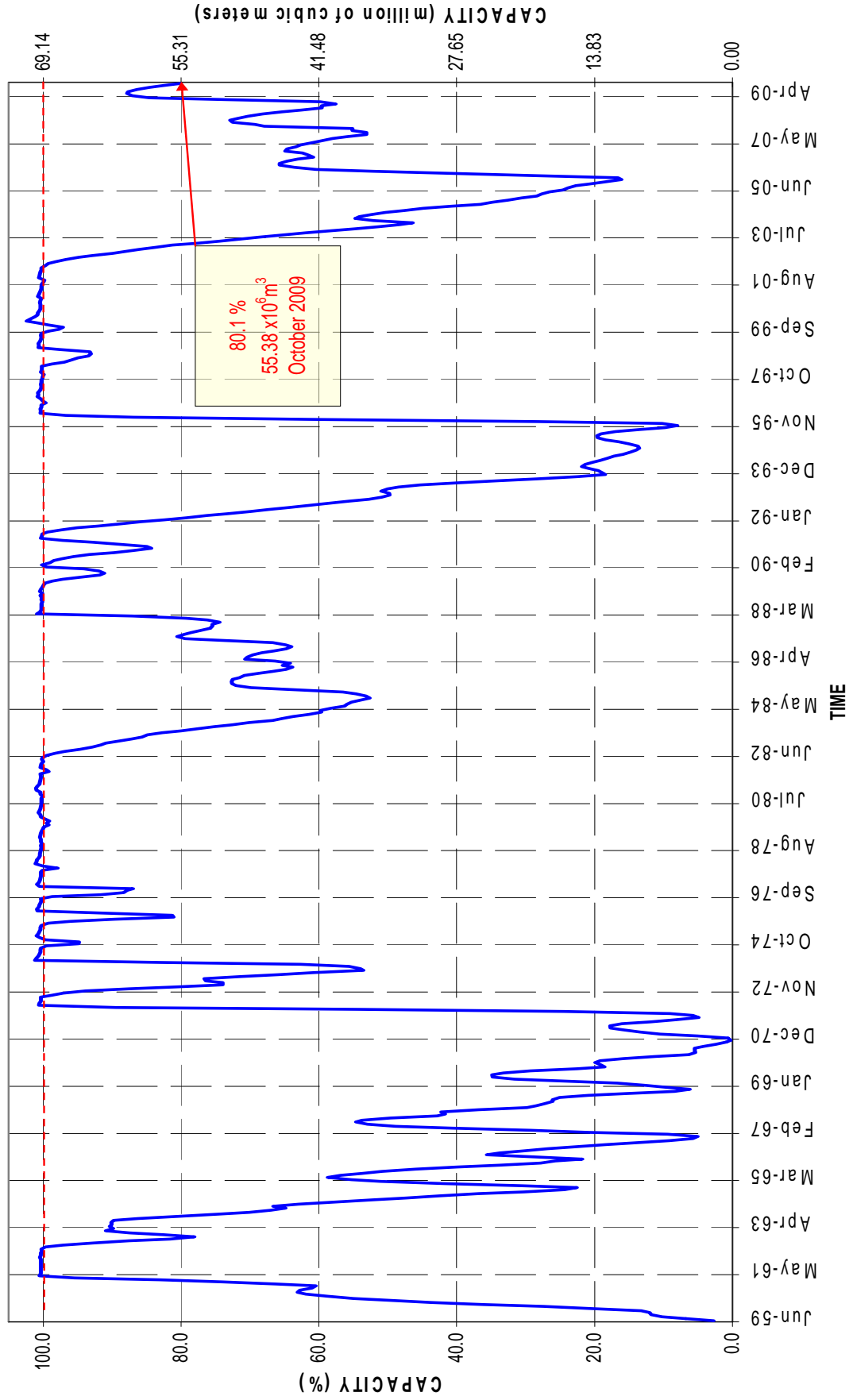
FULL CAPACITY 166.11*10⁶m³



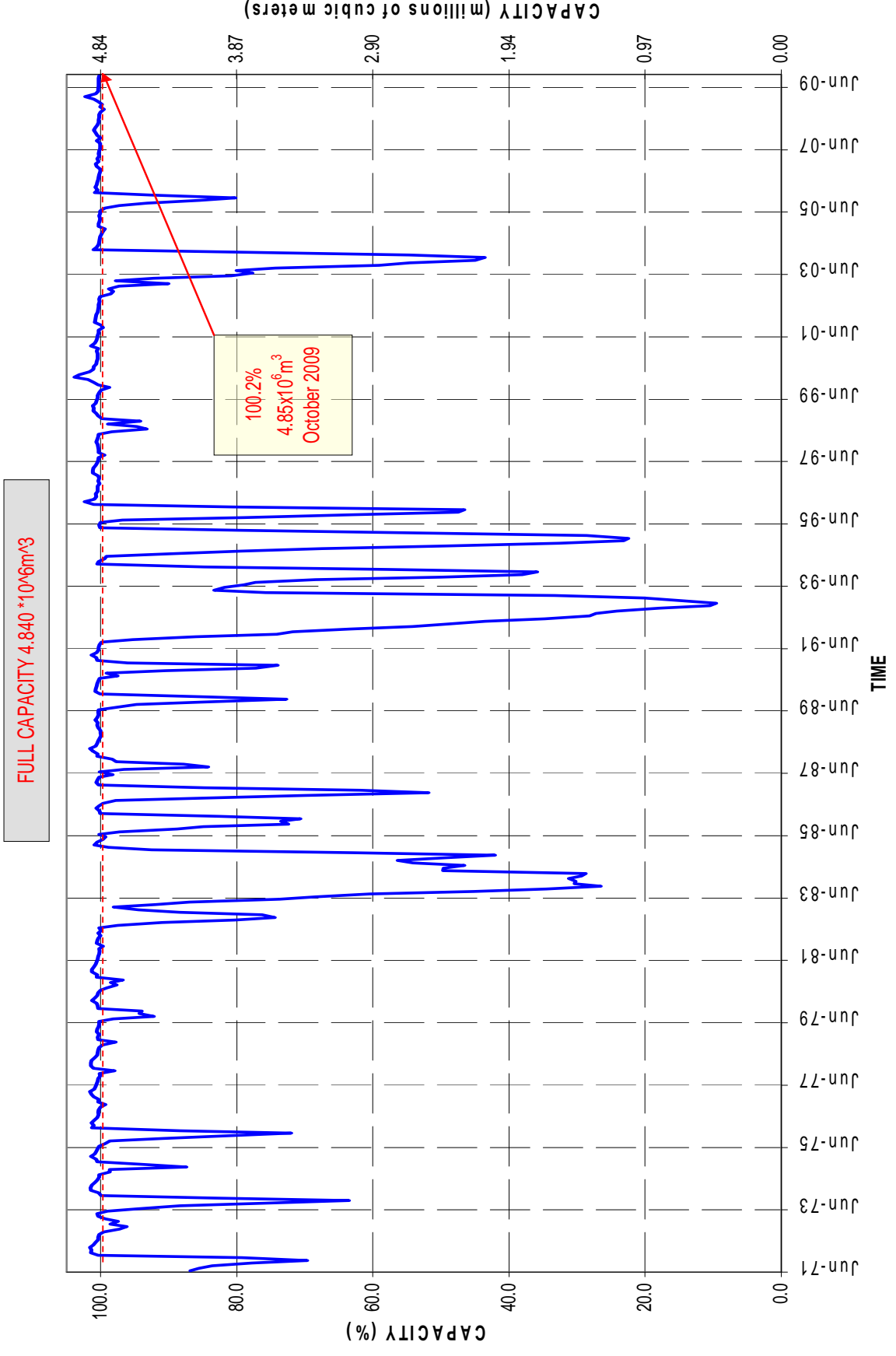
Note: Full Supply Capacity was adjusted from 150 million cubic meters to 166.11 million cubic meters, after dam basin survey was completed by HO!

GREAT LETABA RIVER AT EBENEZER DAM

FULL CAPACITY 69.139 *10⁶m³

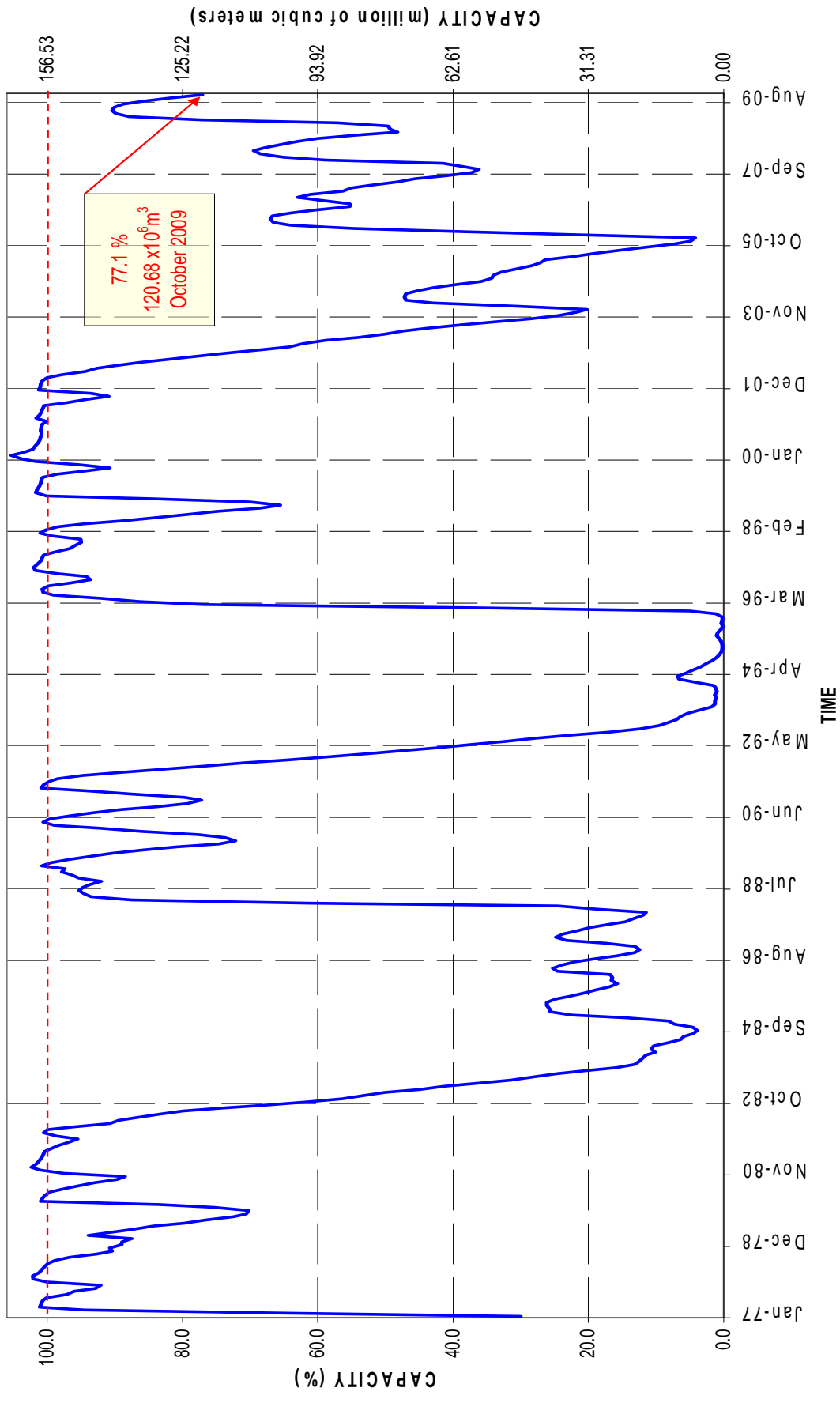


POLITSI RIVER AT MAGOEBASKLOOF DAM



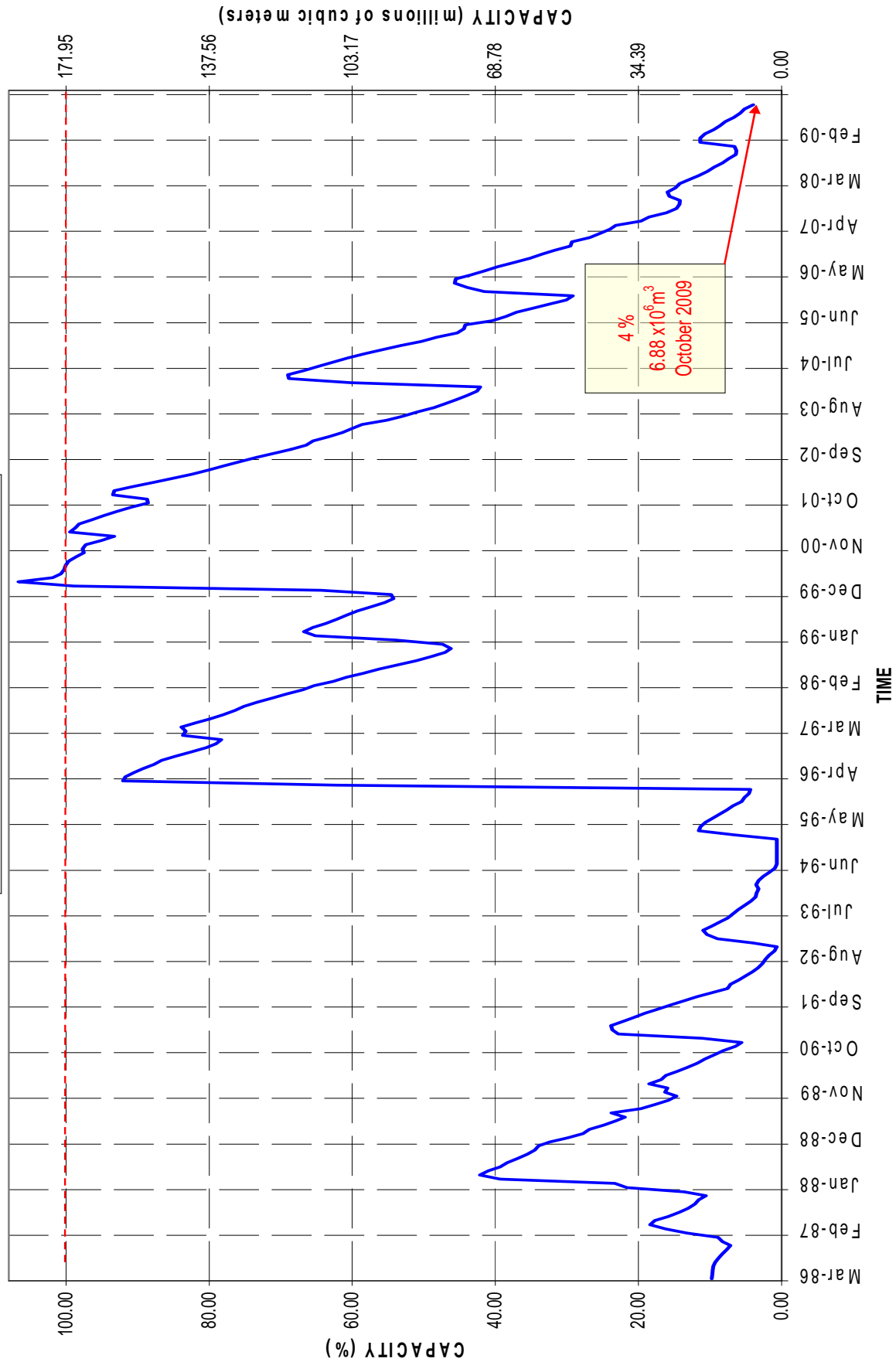
GREAT LETABA RIVER AT TZANEEN DAM

FULL CAPACITY 156.53 *10⁶m³



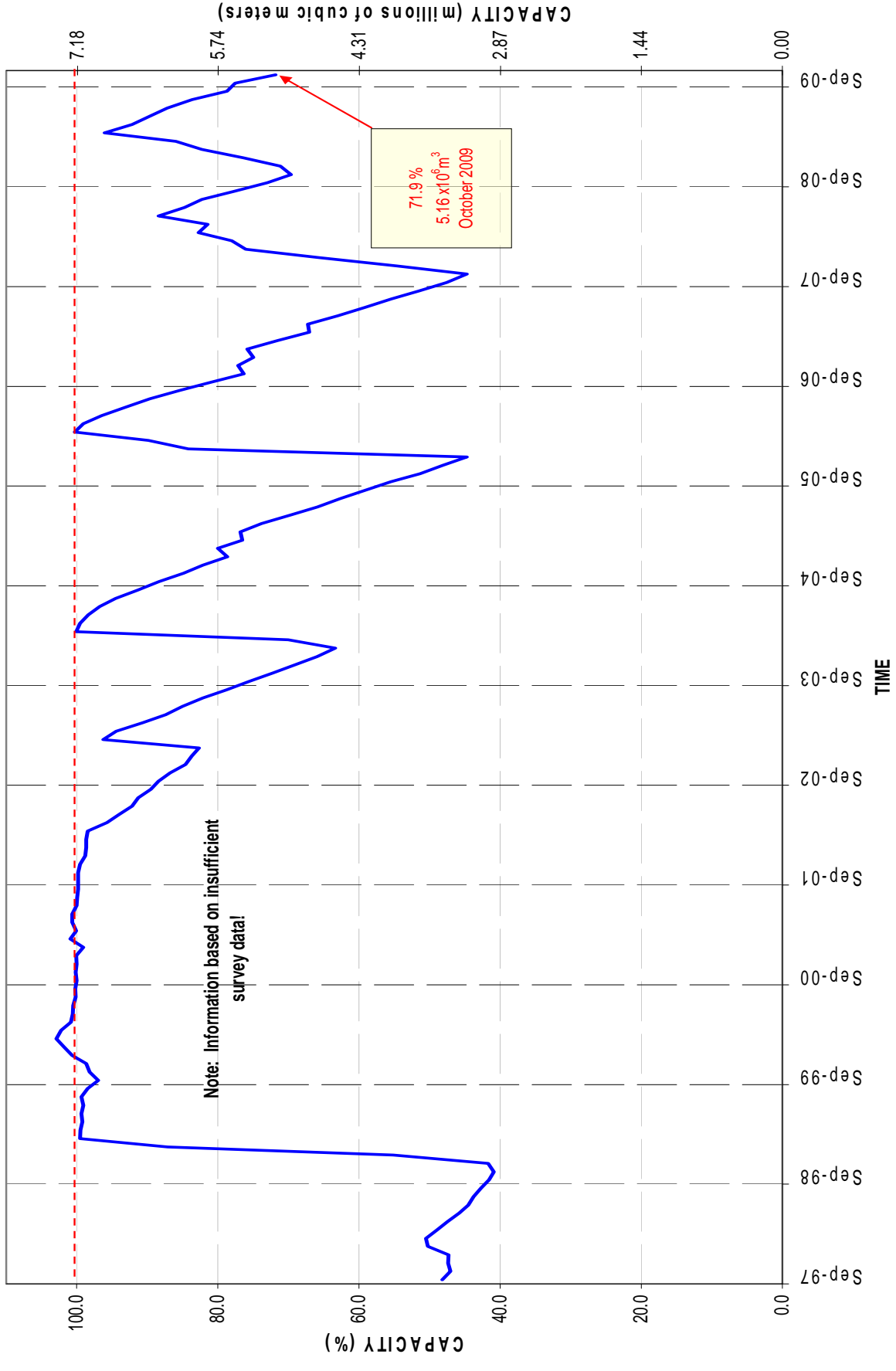
MIDDLE LETABA RIVER AT MIDDLE LETABA DAM

FULL CAPACITY 171.95 * 10⁶m³



MOLOTOTSI RIVER AT MODJADJI DAM

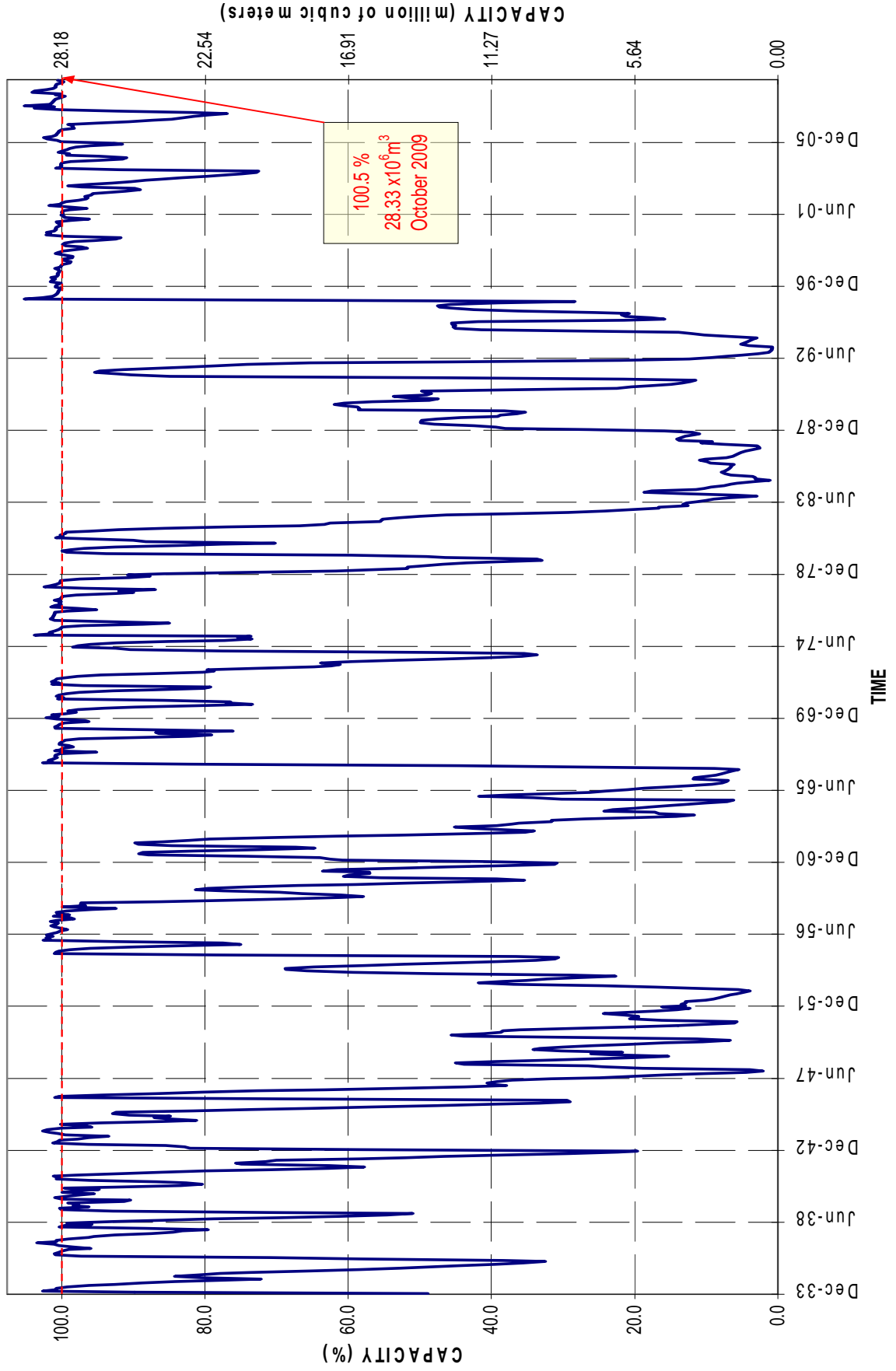
FULL CAPACITY 7.18 *10⁶m³



Note: Information based on insufficient survey data!

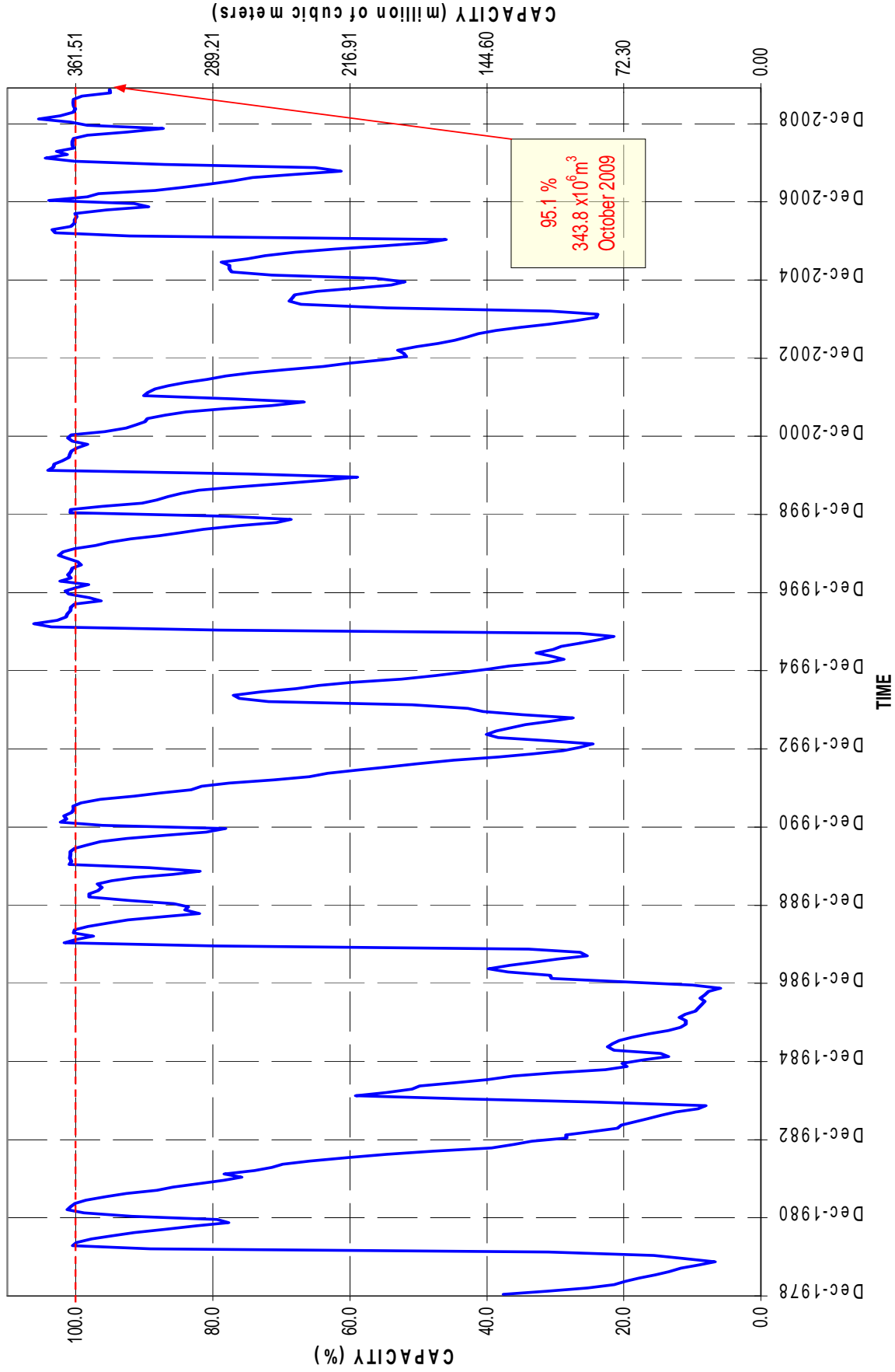
ELANDS RIVER AT RUST DE WINTER DAM

FULL CAPACITY 28.186*10⁶m³



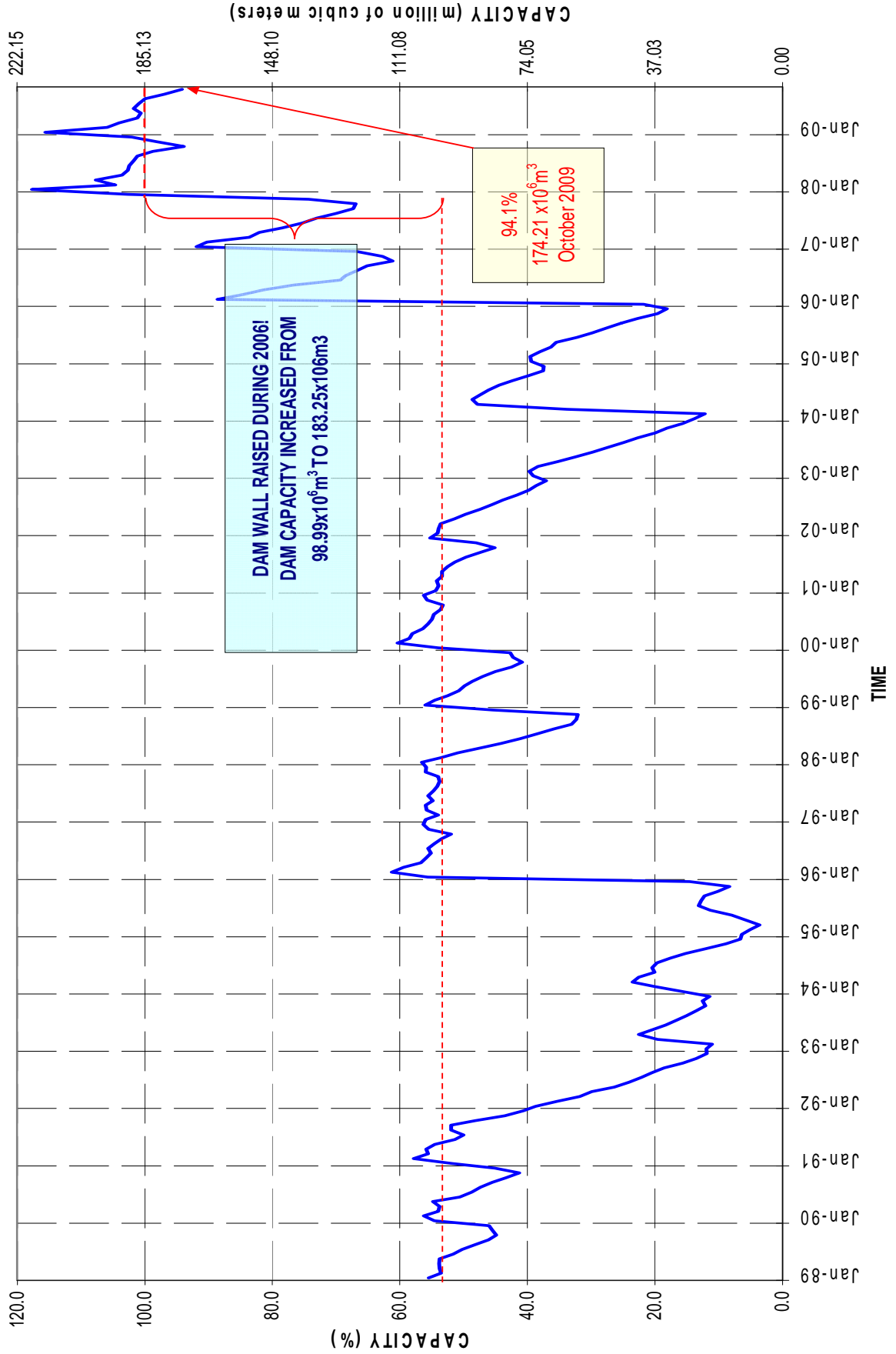
OLIFANTS RIVER AT LOSKOP DAM

FULL CAPACITY 361.51 *10⁶m³



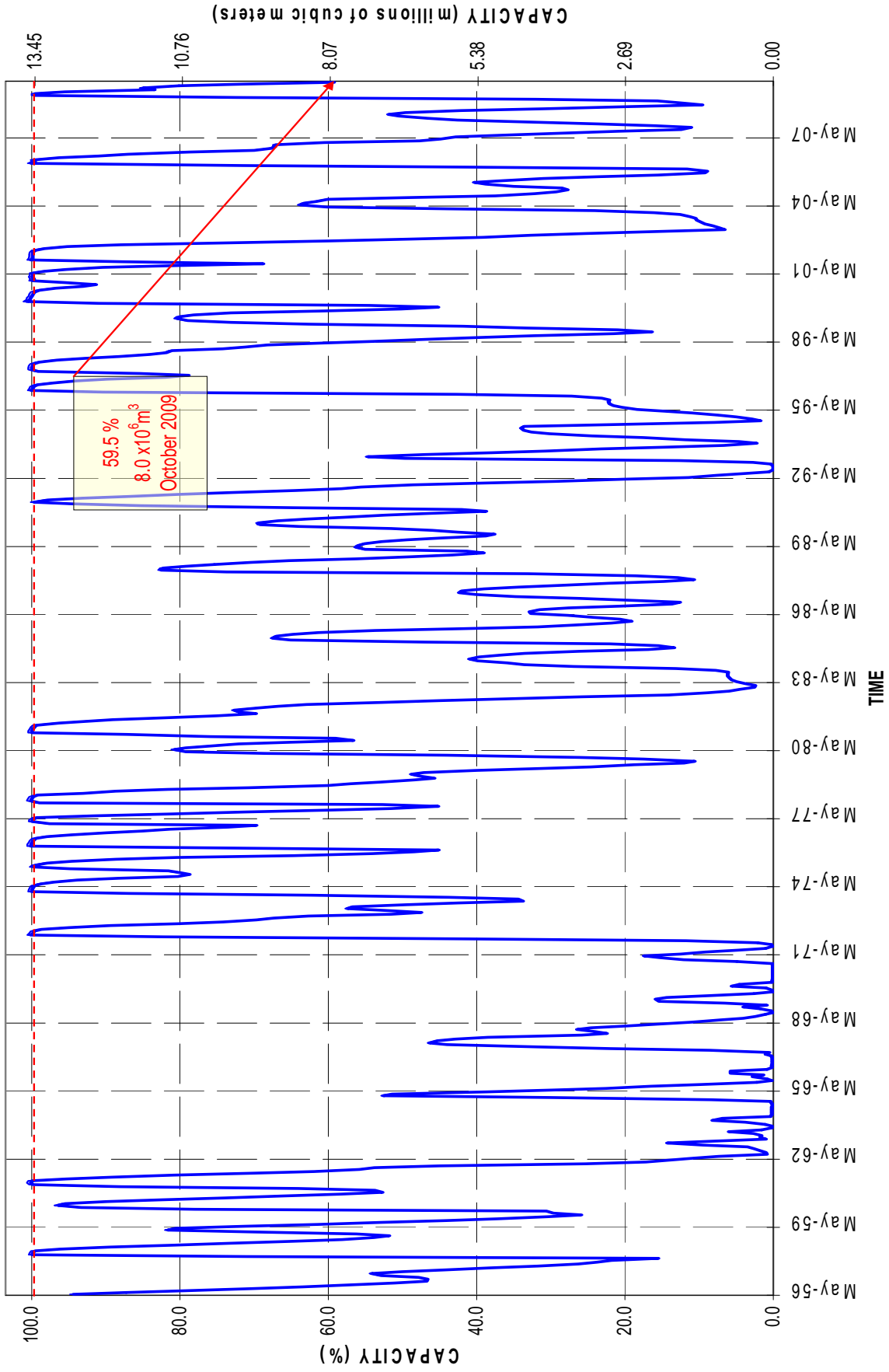
OLIFANTS RIVER AT FLAG BOSHELIO DAM

FULL CAPACITY 185.13*10⁶m³



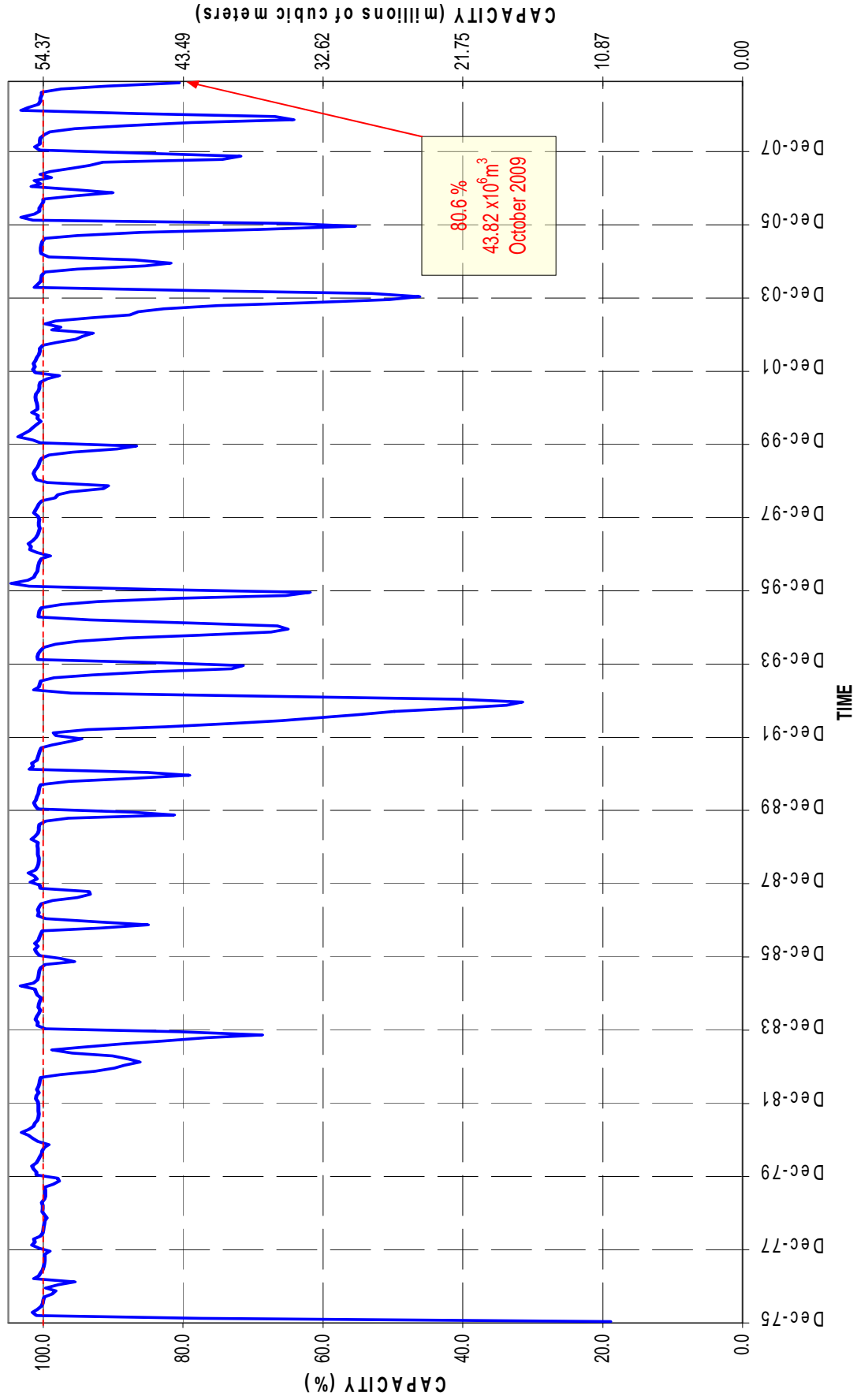
OHRIGSTAD RIVER AT OHRIGSTAD DAM

FULL CAPACITY 13.45*10⁶m³



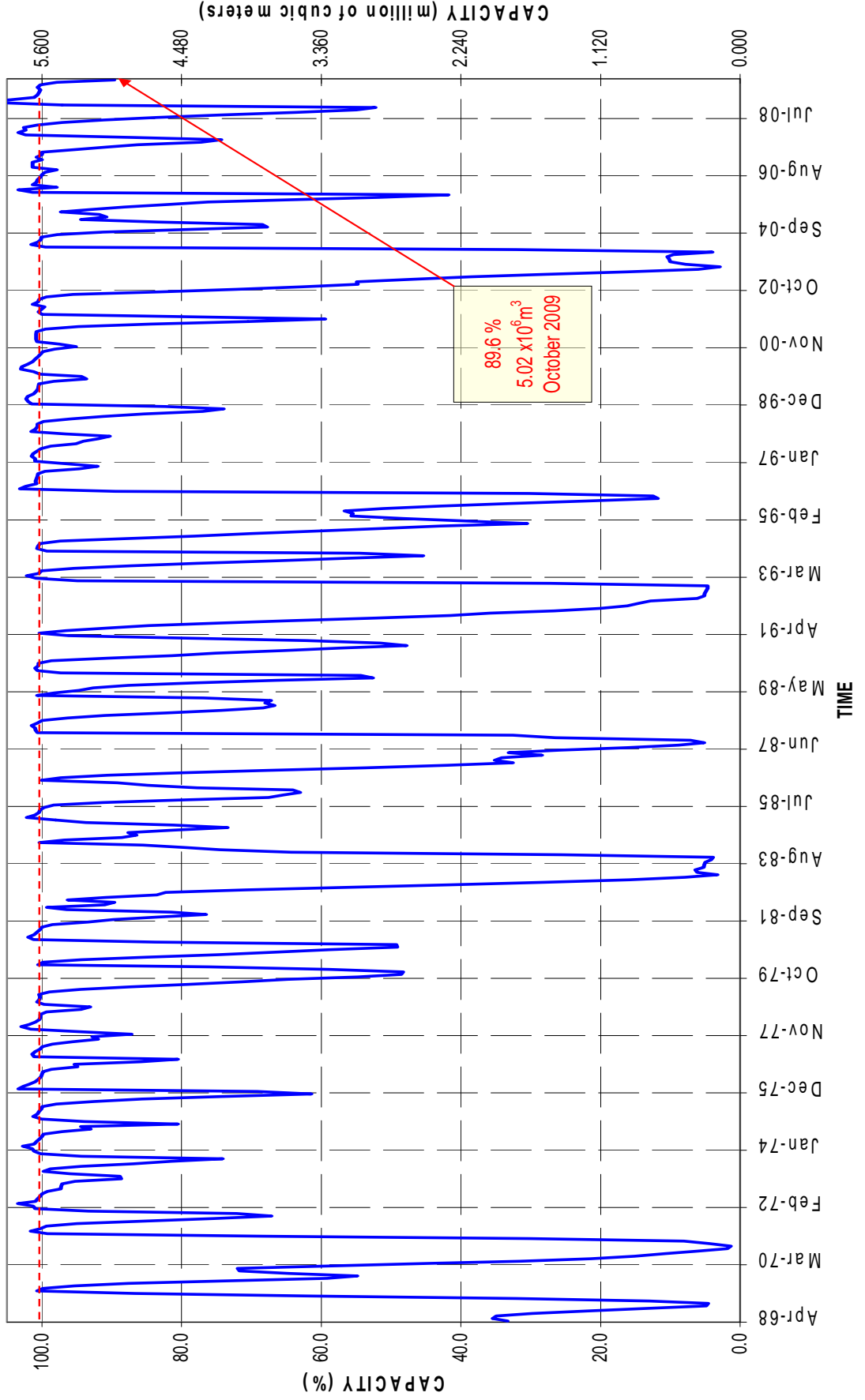
BLYDE RIVER AT BLYDE RIVERSPOORT DAM

FULL CAPACITY 54.369*10⁶m³



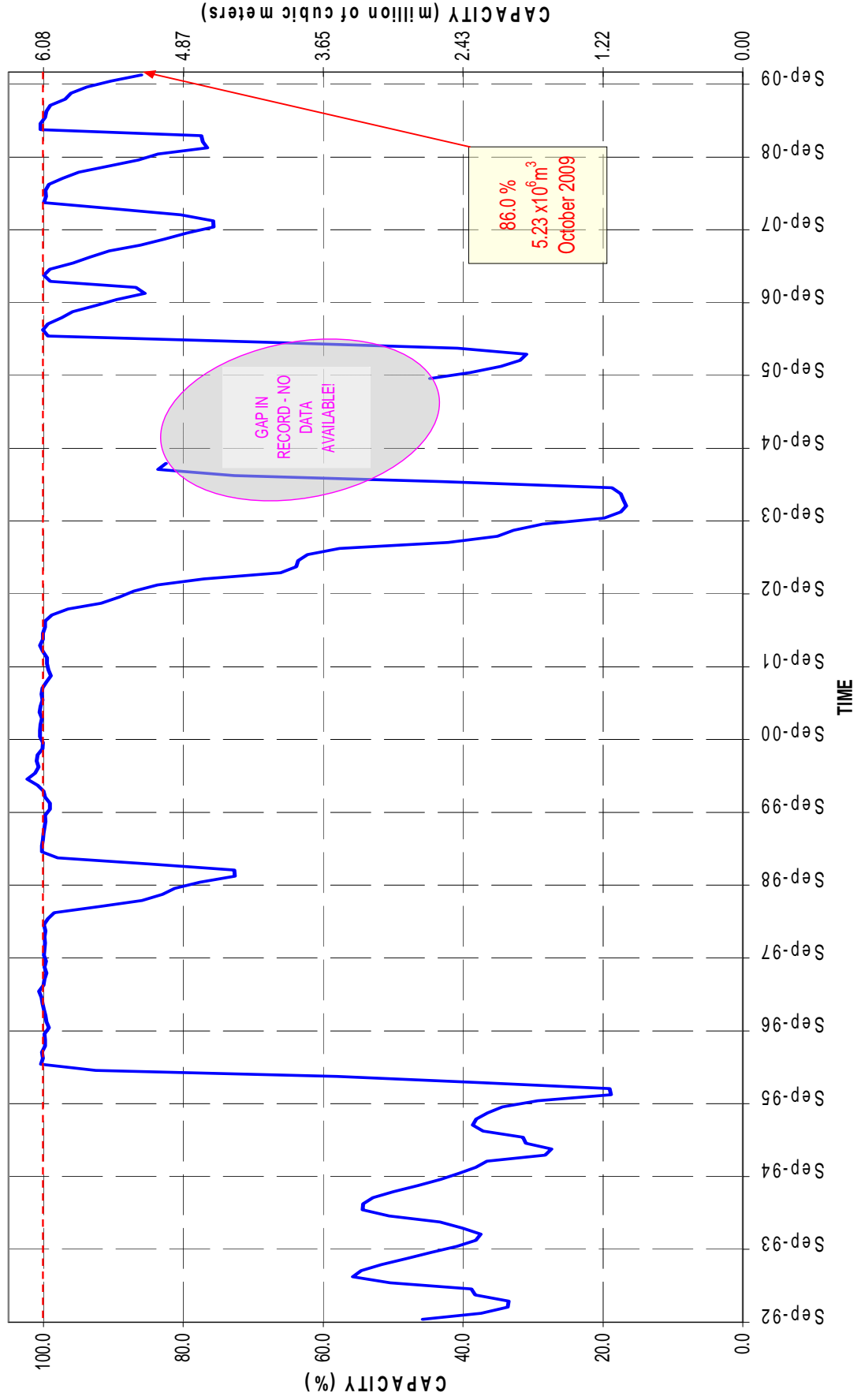
KLASERIE RIVER AT KLASERIE DAM

FULL CAPACITY 5.604*10⁶m³



NGWABITSI RIVER AT TOURS DAM

FULL CAPACITY $6.084 \times 10^6 \text{m}^3$



CROCODILE RIVER AT KWENA DAM

FULL CAPACITY $158.89 \times 10^6 \text{m}^3$

