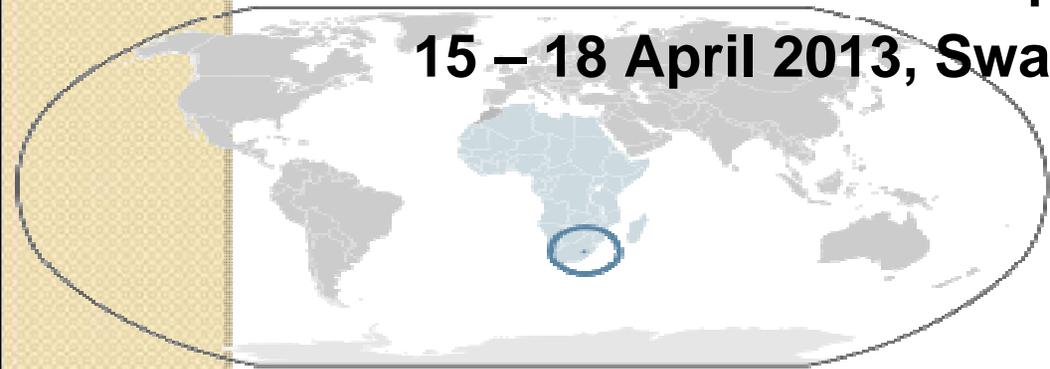




# The Status and needs of Monitoring and Predicting Climate Anomalies and Extremes Lesotho

WMO workshop on Climate Monitoring and Climate Watch Systems in  
RA1

15 – 18 April 2013, Swanlake Lodge, Pretoria, SA



*By: Mokoena France, Lesotho Meteorological Services*

*16 April 2013*

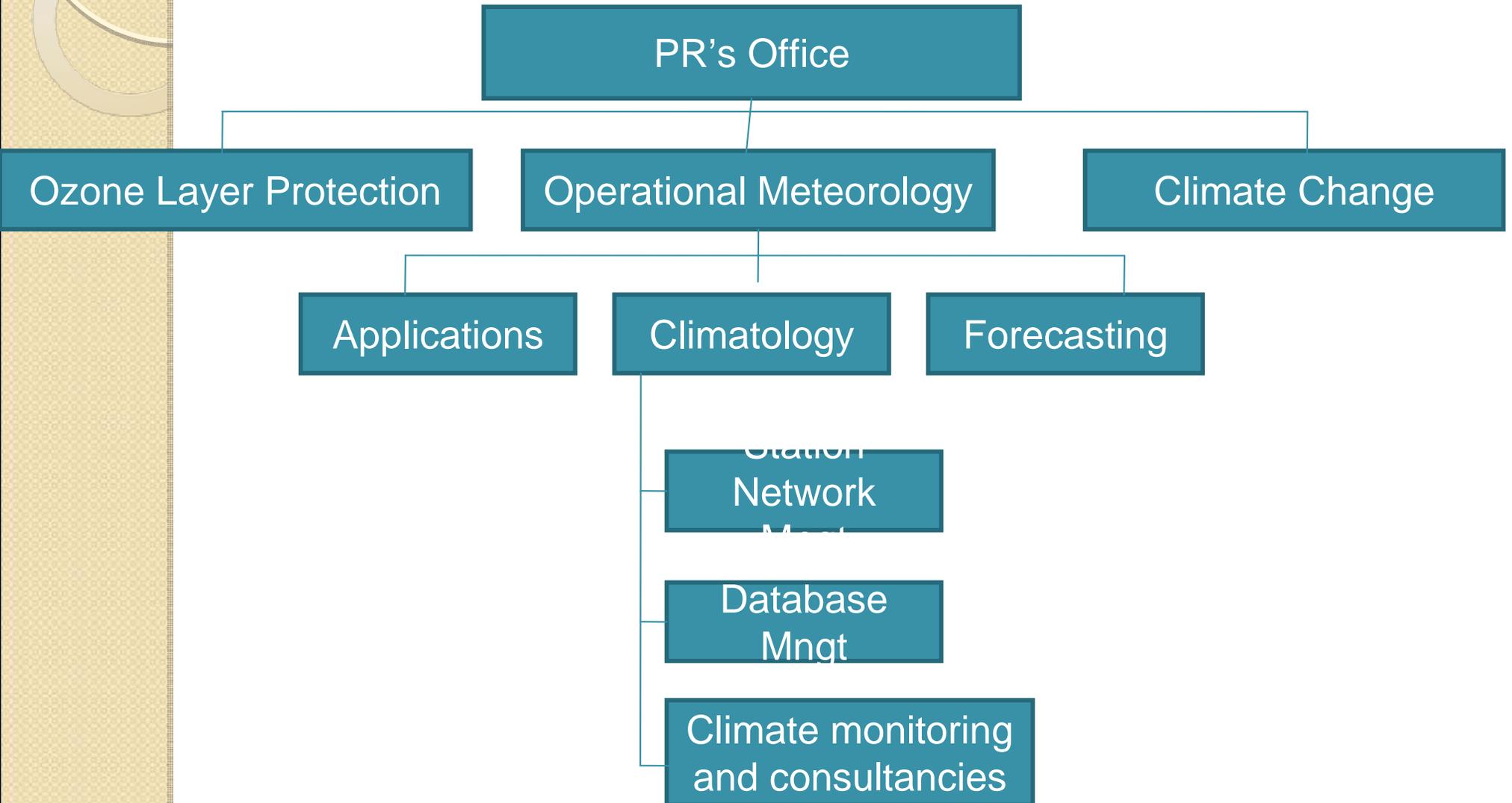


# OUTLINE

- Organisational structure
- Climate Observations
- Climate data management
- Climate monitoring
- Long range forecasting
- Needs



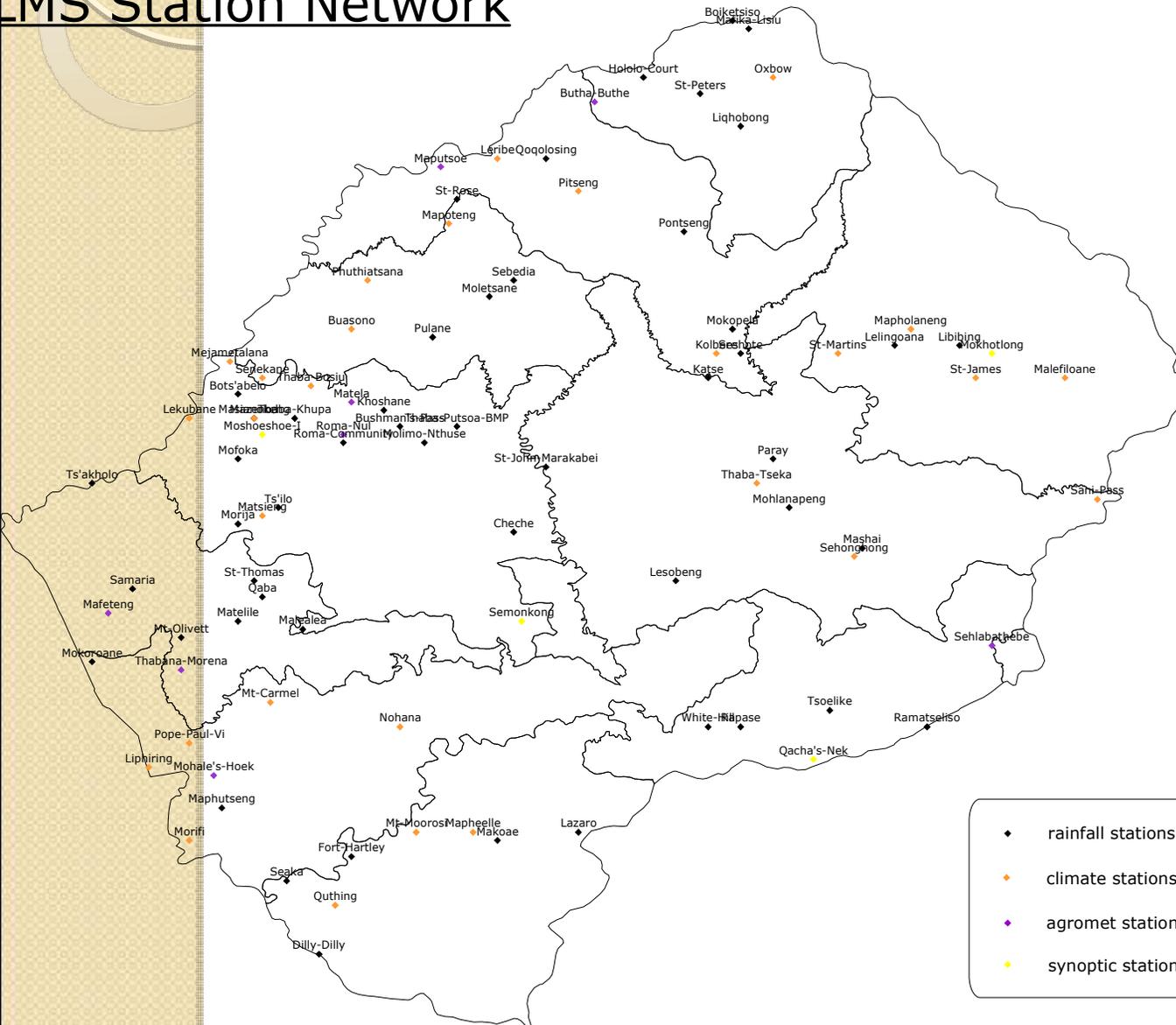
# Organisational Structure





# Climate Observations

## MS Station Network



92 operational stations

- 52 rainfall
- 27 climate
- 13 “Major” (1 is Synoptic and reporting)
- 1 none operational AWS

◆	rainfall stations
◆	climate stations
◆	agromet stations
◆	synoptic stations



# Climate Observations

- **Data Recording and Collection**

- Recorded on climate returns (31 days)
- Mainly Sent by post
- Occasional during field visits

- By telephone also for major stations

## **Data Reception and Archiving**

- Registered in the register book
- Initial QCb
- Archiving (returns)
- Digitised (Database management)

The image shows two pages of handwritten climate observation data. The top page is a 'Climate Return' form for station 'MASHMOOSHHEE' with station number '4229' and observer 'D.B.'. It contains columns for 'Date of return', 'Wind' (direction and speed), 'Pressure', and 'Weather conditions'. The bottom page is a 'Register Book' with columns for 'Station No.', 'Name of Station', 'Observer', and 'Remarks'. It lists various station numbers and names, such as '660989', '672285', '699118', etc.



# Climate Data Management

- Climate data was managed using CLICOM
- Since 2006 migrated to CLIMSOFT
- Some rainfall station have records from 1896
- Temperatures start in late 1960s



# Climate Monitoring

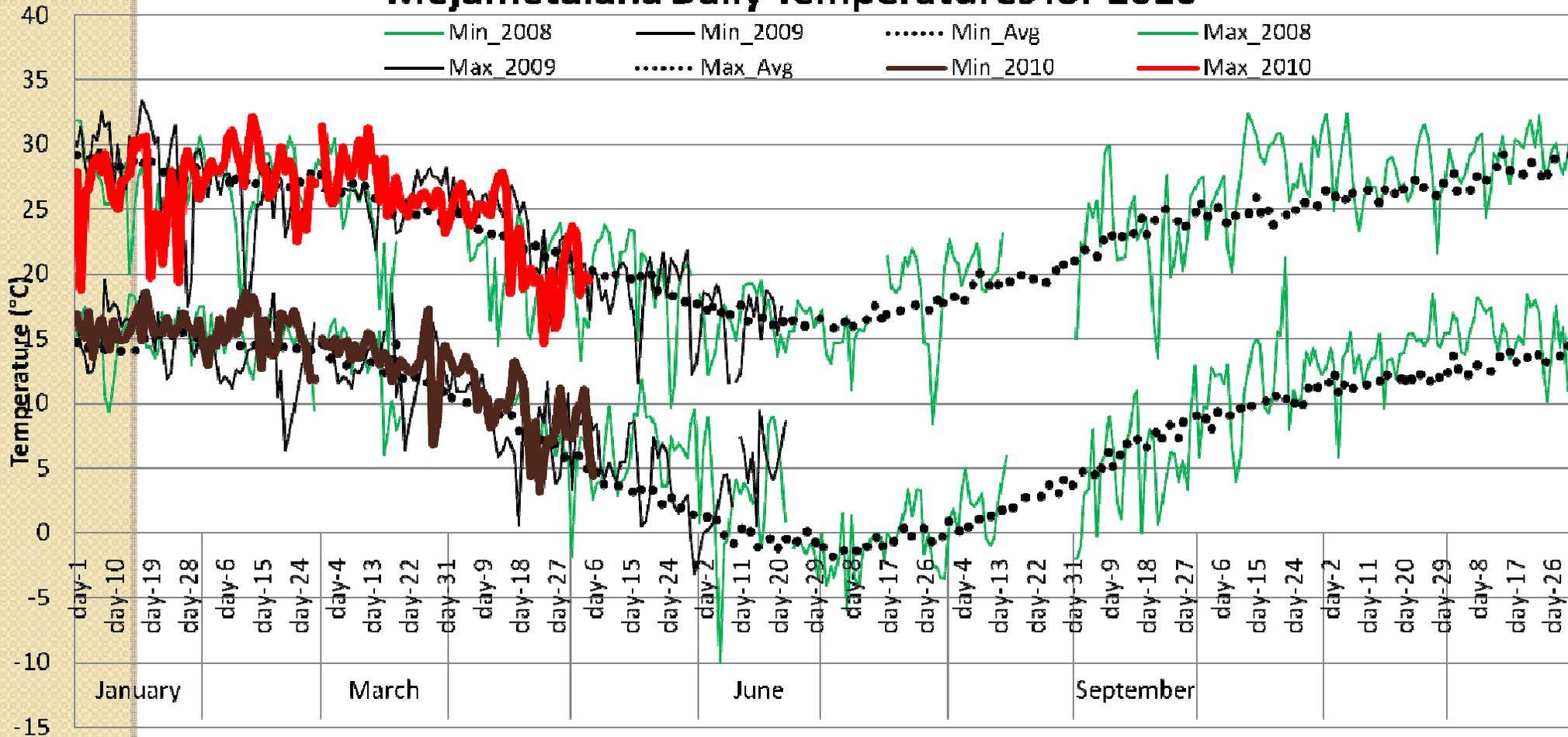
- Daily climate monitoring
- Weekly weather briefs
- Monthly bulletins



# Climate Monitoring

## Daily monitoring - Temperatures

### Mejametalana Daily Temperatures for 2010

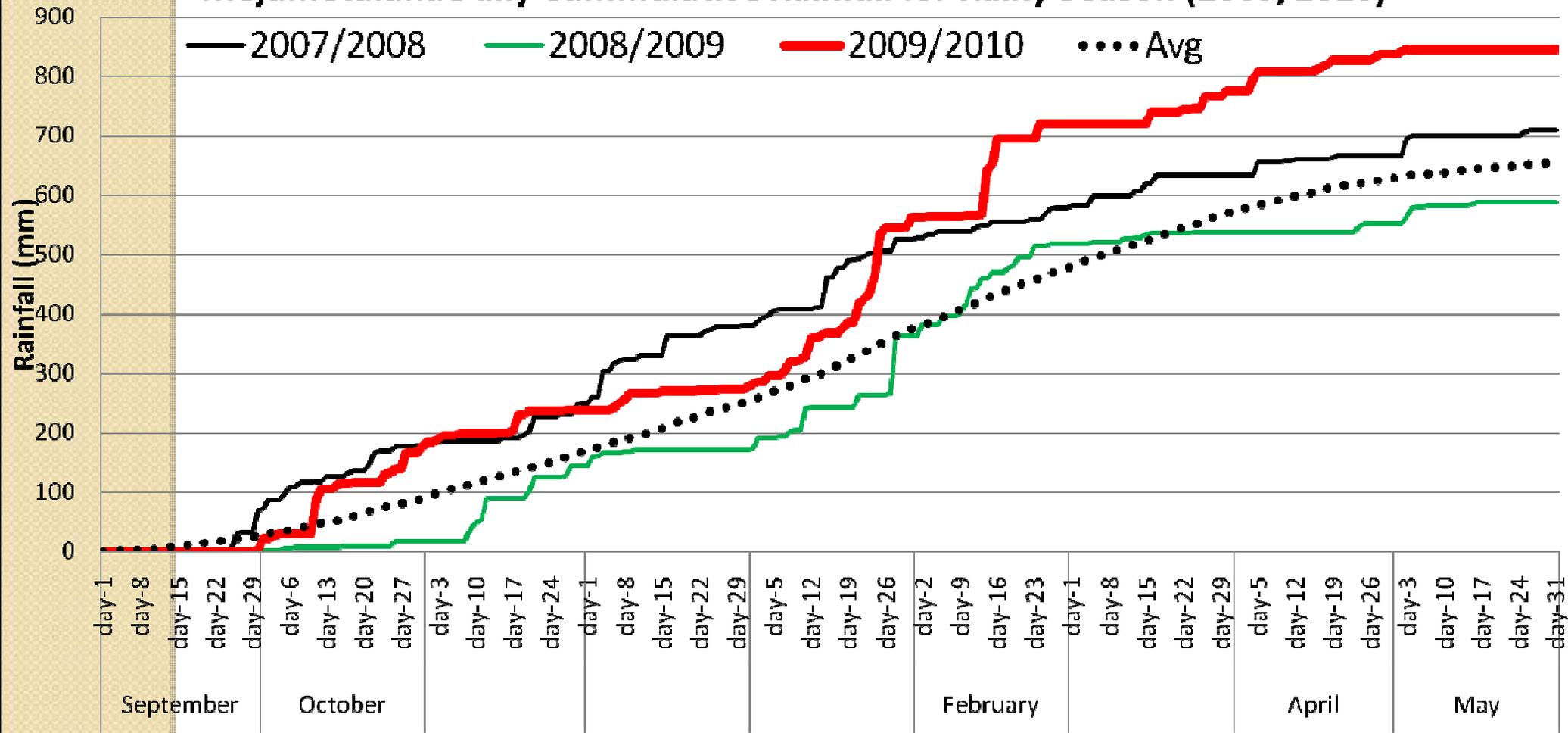




# Climate Monitoring

## Daily monitoring - Rainfall

Mejametalana Daily Cummulative Rainfall for Rainy Season (2009/2010)





# Climate Monitoring

## Weekly Weather Brief



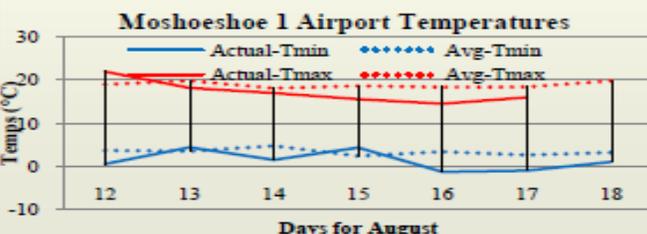
Friday (19<sup>th</sup> August 2011)

Lesotho Meteorological Services  
Weekly Weather Brief

### REVIEW OF WEATHER CONDITIONS 12<sup>TH</sup> – 18<sup>TH</sup> AUGUST, 2011

Generally mild to cool weather conditions prevailed during the period under review. Maximum temperatures were initially above average but constantly dropped to below average and reached the lowest point on the 16<sup>th</sup> while Minimum temperatures were initially slightly below averages but improved to average. Likewise, the 16<sup>th</sup> recorded the lowest minimum temperatures for the period. Maximum temperatures ranged from 11.8 C to 23.2 C in the Lowlands and from 4.5 C to 18.7 C in the Highlands. Minimum temperatures ranged from -3.2 C to 7.1 C in the Lowlands and from -9.0 C to 4.6 C in the Highlands.

Isolated rain showers were recorded at few stations on the 14<sup>th</sup> becoming heavy at Thaba-Tseka. The highest weekly rainfall of 15.9mm and 10.0mm were recorded at Thaba-Tseka and Mokhotlong while the rest of the stations recorded rainfall below 4.0mm.



### SEASONAL OUTLOOK (AUG – OCT 2011)

The period is expected to be dry and cold. Rainfall is anticipated to be below normal and both temperatures to be below average during the forecast period.

### WEEKLY WEATHER 19<sup>TH</sup> – 26<sup>TH</sup> AUG 2011

The period is expected to be dominated by partly cloudy and cold conditions with rainfall and snowfall over the southern and eastern highlands on the 19<sup>th</sup>. However, snowfall with very cold weather conditions is expected on the 23<sup>rd</sup> at night to the 24<sup>th</sup> morning. Maximum temperatures are expected to range between 10°C and 18°C in the Lowlands and between 6°C and 14°C in the Highlands. Minimum temperatures are expected to range between 0°C and 5°C in the Lowlands and between -7°C and 4°C in the Highlands.

### DETAILED FORECAST

#### Friday 19<sup>th</sup>

Mainly fine and mild becoming partly cloudy and cold with a slight chance of isolated rain and snowfall over the southern and eastern highlands at night.

Wind: Light to moderate north-westerly.

#### Saturday 20<sup>th</sup>

A few patches of clouds expected in the morning clearing up to become relatively mild as the day progresses.

Wind: Moderate westerly.

#### Sunday 21<sup>st</sup>

Mainly fine and cool but cold over the highlands.

Wind: Moderate north-westerly.

#### Monday 22<sup>nd</sup>

A few patches of clouds anticipated otherwise mild but cool in the highlands.

Wind: Moderate northerly.

#### Tuesday 23<sup>rd</sup>

Initially partly cloudy and cool becoming mostly cloudy and very cold at night with a possibility of isolated rain and snowfall over the highlands.

Wind: Moderate north-westerly.

#### Wednesday 24<sup>th</sup>

Partly cloudy with snowfall over the highlands in the morning.

Wind: Light westerly.

#### Thursday 25<sup>th</sup>

Mostly fine but very cold.

Wind: Light to moderate north-westerly.

#### Friday 26<sup>th</sup>

Fine and cold in the morning with temperatures slightly warming as the day progresses.

Wind: Moderate north-westerly.

*(For updates, please stay tuned to local radio stations and Lesotho TV)*



# Climate Monitoring

## 1. WEATHER SITUATION, DECEMBER 2006

### (a) Summary of the weather

Below normal monthly rainfall was registered at most stations during this month, except the northern and central parts of the country which registered above normal monthly rainfall. Severely dry areas were the western parts of Mafeteng and southern parts of Quthing districts. The poor rainfall performance for this month is contrary to good rains that occurred during the first two months of the season. It is these rains of October and November that left the season October-November-December with above normal rainfall besides the deficit in December. Over the generally dry weather conditions, the month was hot with above average monthly mean temperatures.

### (b) Weather Synopsis

A shallow surface interior trough with little moisture influx was a dominant feature over the country during this month. Occasional weak cold fronts invaded the southern subcontinent from the west, resulting in cool weather on some days.

## 2. DECEMBER 2006 RAINFALL

Table 1: Rainfall Figures, December 2006

STATION NAME	Monthly Total (mm)			Number of Rain Days		Highest 24-Hrs Precipitation (mm)		
	2006	Highest on Record	Normal	2006	Average	2006	Date of Record	Highest on Record
Phuthiatsana	95.9	272.5	88.2	9	10	30.1	21 <sup>st</sup>	46.8
Butha-Buthe	187.3	383.4	118.3	13	12	46.5	21 <sup>st</sup>	142.2

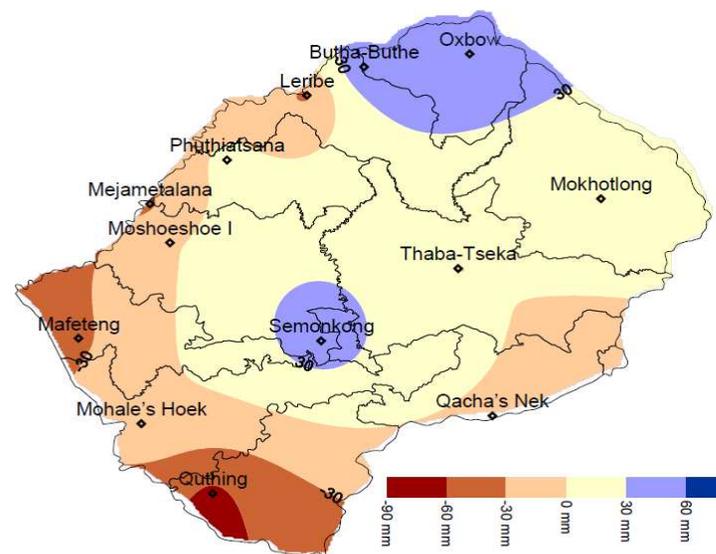
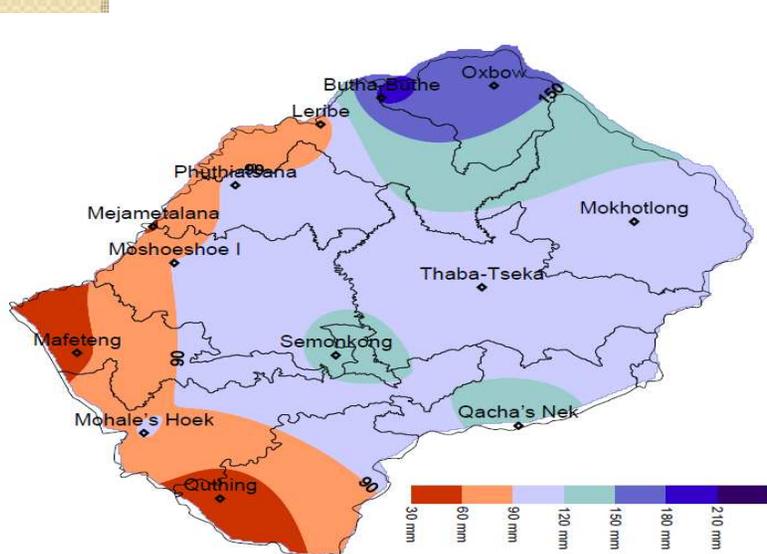


Figure 1: Actual rainfall distribution for December 2006

Figure 2: Percentage rainfall departure from normal for December 2006



# Climate Monitoring

## 3. DECEMBER 2006 TEMPERATURES

Table 2: Maximum Temperatures, December 2006

STATION NAME	Monthly Mean Maximum Temperature (°C)			Highest 24-Hrs Maximum Temperature (°C)		
	2006	Highest on Record	Long-Term Mean	2006	Date of Record	Highest
Phuthiatsana	27.9	28.2	26.3	32.2		
Butha-Buthe	26.7	28.9	25.1			

Table 3: Minimum Temperatures, December 2006

STATION NAME	Monthly Mean Minimum Temperature (°C)			Lowest 24-Hrs Minimum Temperature (°C)		
	2006	Lowest on Record	Long-Term Mean	2006	Date of Record	Lowest on Record
Phuthiatsana	14.9	13.4	14.0	8.2	11 <sup>th</sup>	6.0
Butha-Buthe	13.9	10.1	12.8	7.0	11 <sup>th</sup>	0.6

## 4. CLIMATE FOR THE MONTH OF JANUARY

### (a) Summary

The month of January experiences both the high-

## 5. WEATHER OUTLOOK, JANUARY 2007

### (a) General

Although the Inter Tropical Convergence Zone is generally expected to drift southwards and bring with it tropical moist airmass over the sub-continent, the current atmospheric

## 6. EL-NINO OUTLOOK

El Niño event is now established across the tropical Pacific basin. Sea surface temperatures in the central and eastern equatorial Pacific were about 1 to 1.0 degrees



# Long Range Forecasting

- Seasonal Forecast (SARCOF)
  - Use Climate Prediction Tool (CPT)
  - Systat

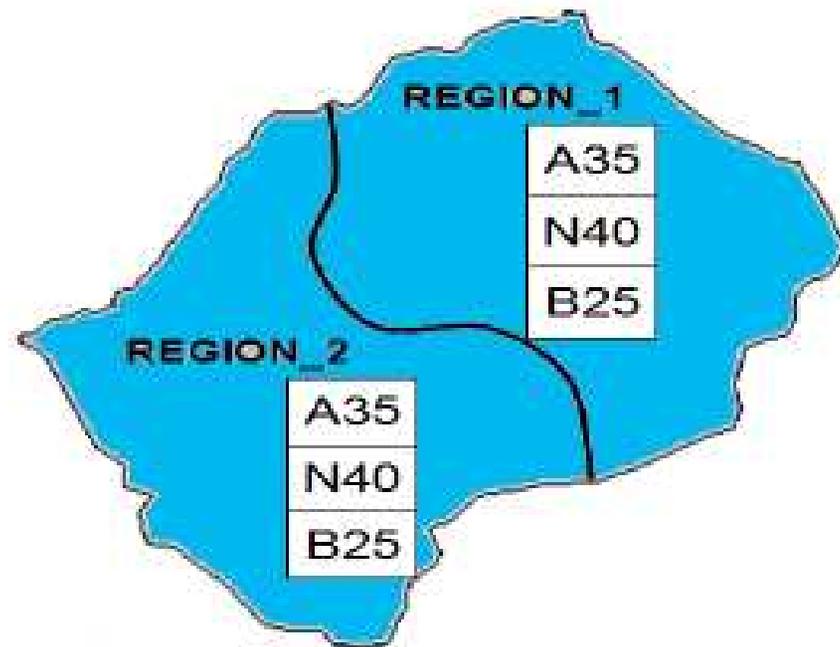
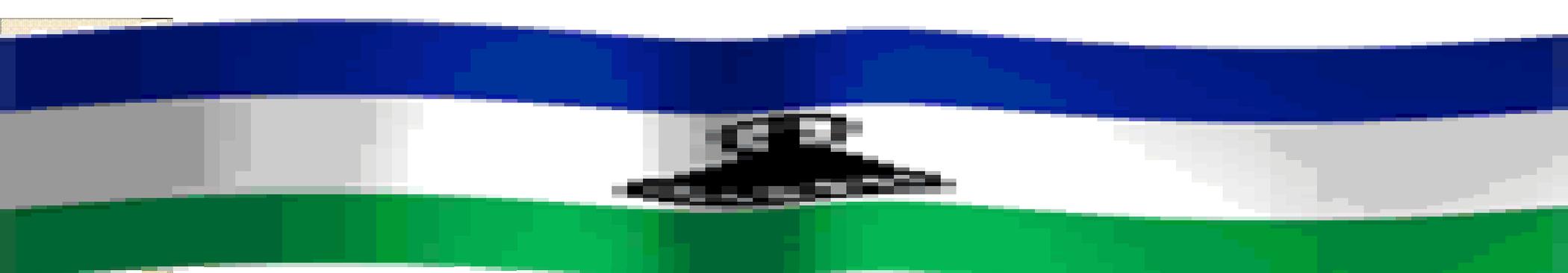


Fig.1 JFM 2013 Seasonal Forecast for Lesotho (updated)



# Needs

- Human capacity
- infrastructure upgrading (AWS)
- Infrastructure – increase observation distribution
- Data rescue



# THANK YOU

*ANY QUESTIONS?*

