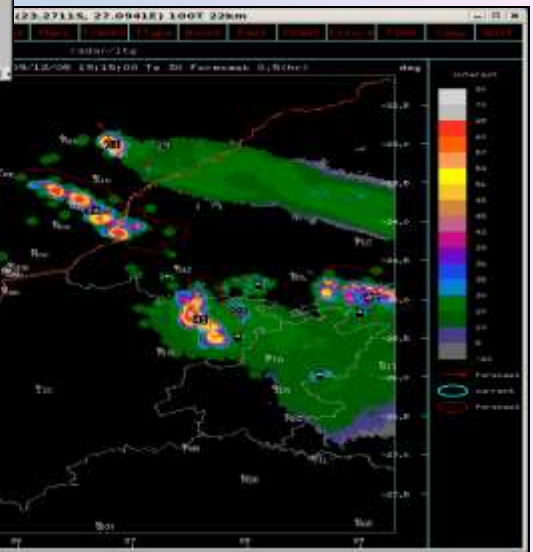
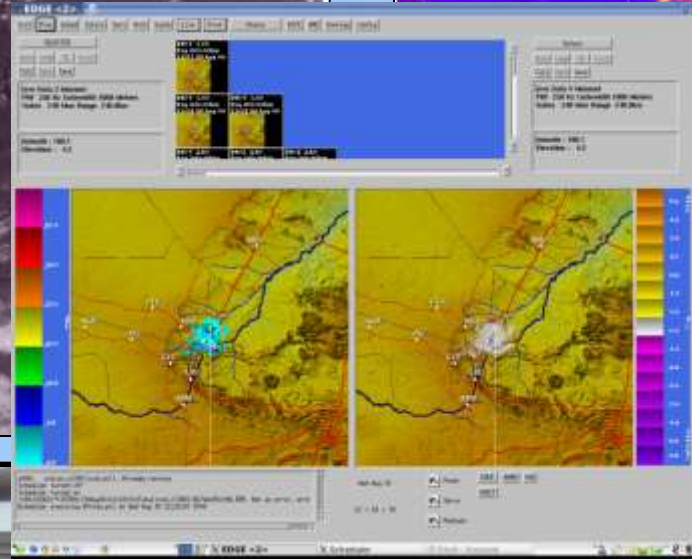
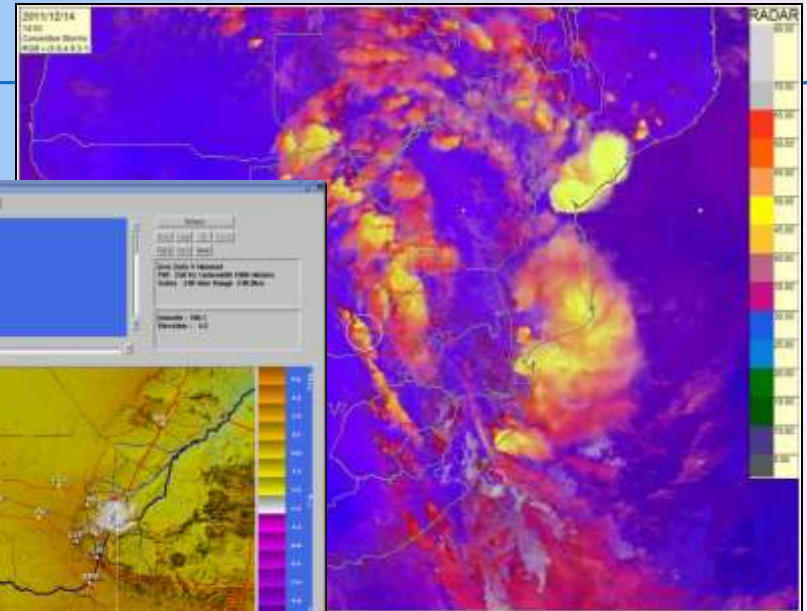
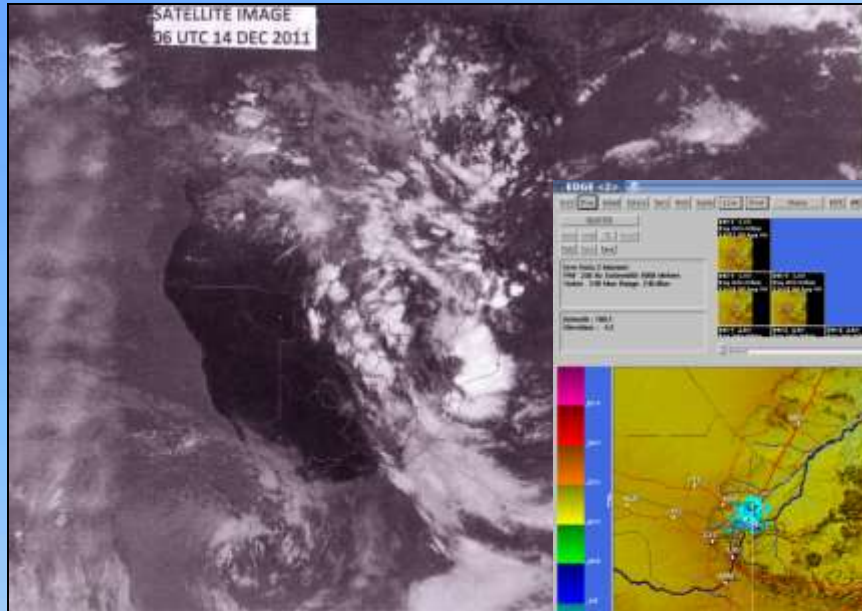


**DEPARTMENT OF  
METEOROLOGICAL SERVICES**

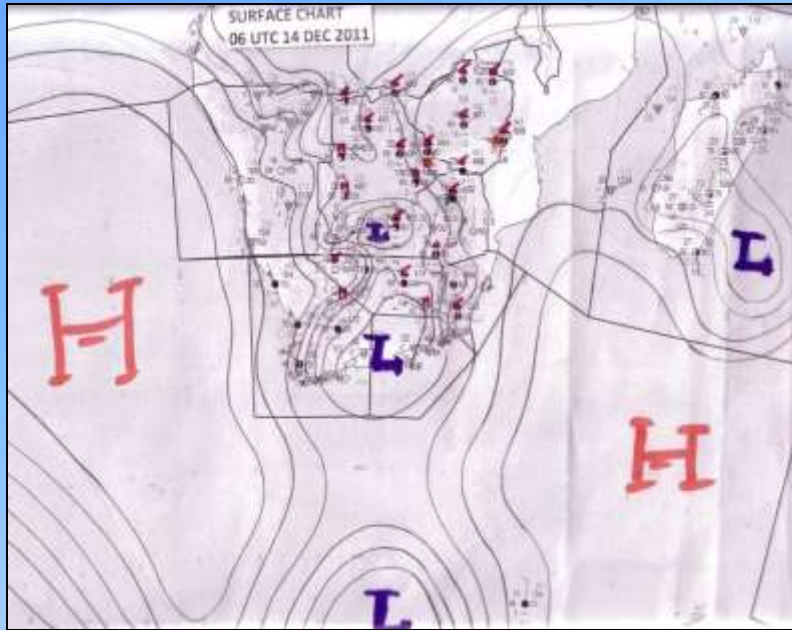


# 1. MONITORING WEATHER - OBSERVATIONS



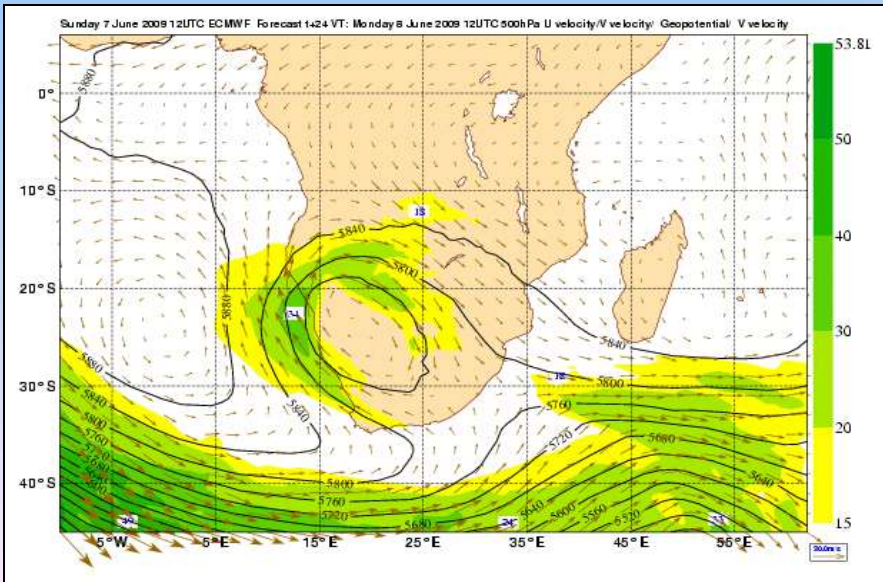
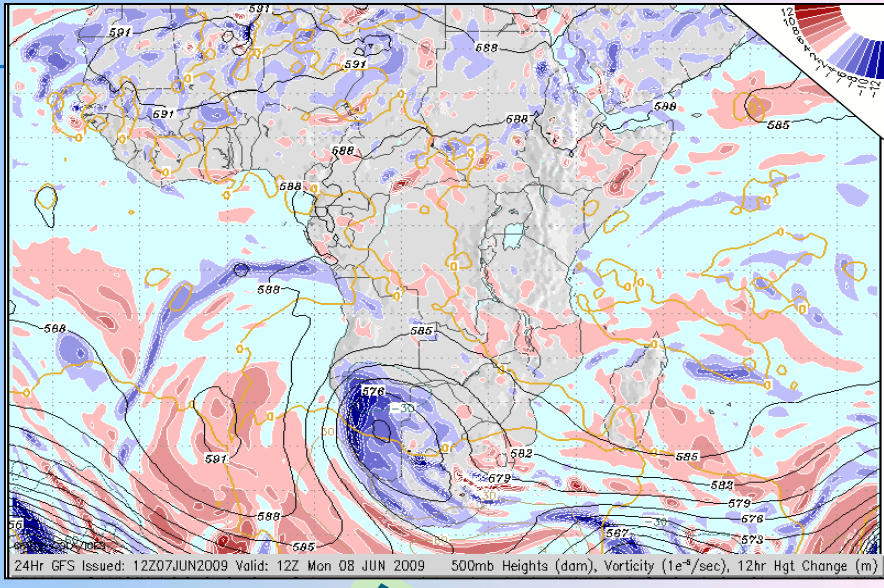
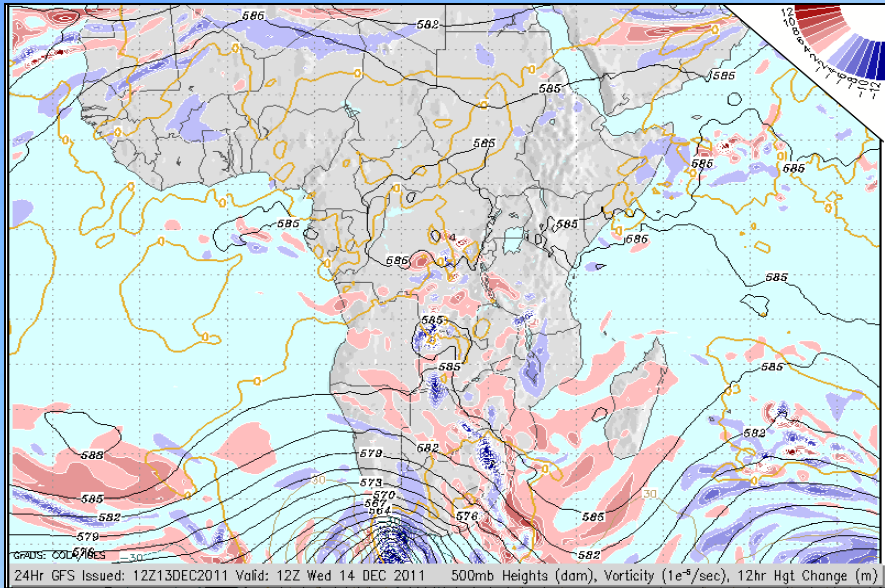


## 2. DIAGNOSE WEATHER THROUGH ANALYSING CHARTS



Analysed CHARTS

# FORECASTING TOOLS- MODELS



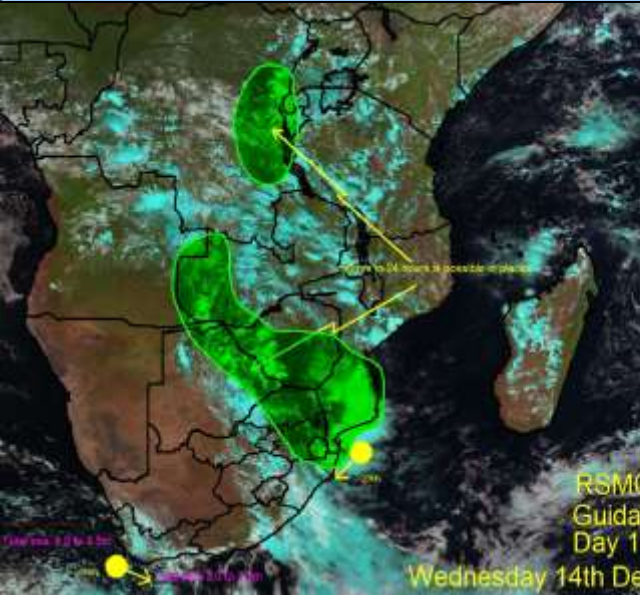
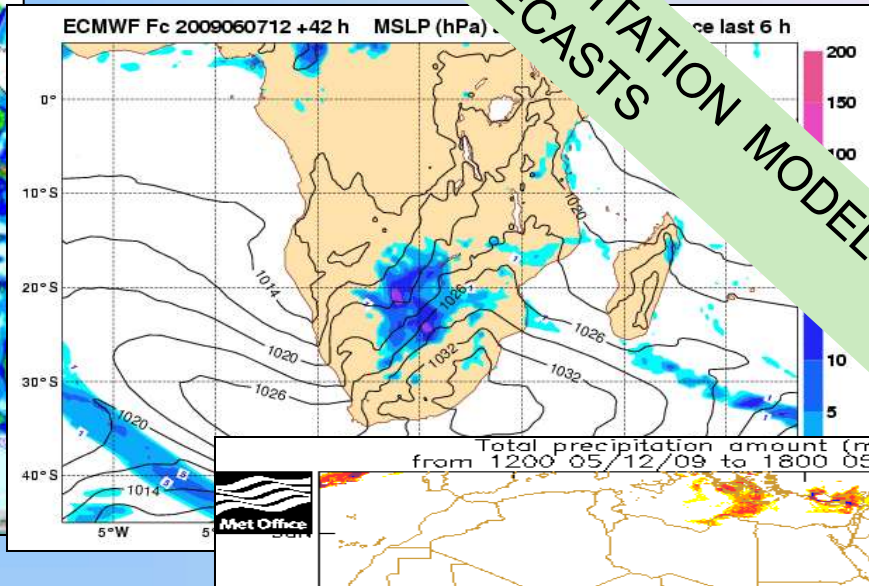
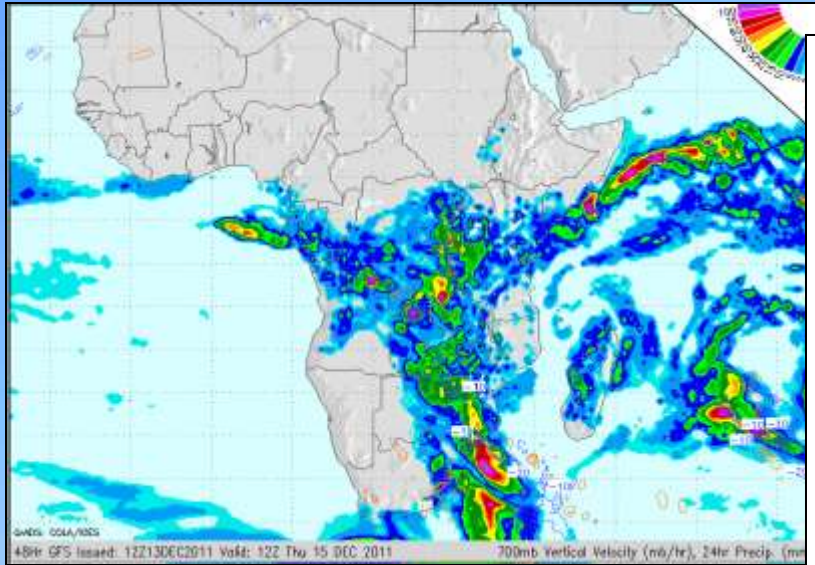
**500MB MODEL CHARTS)**



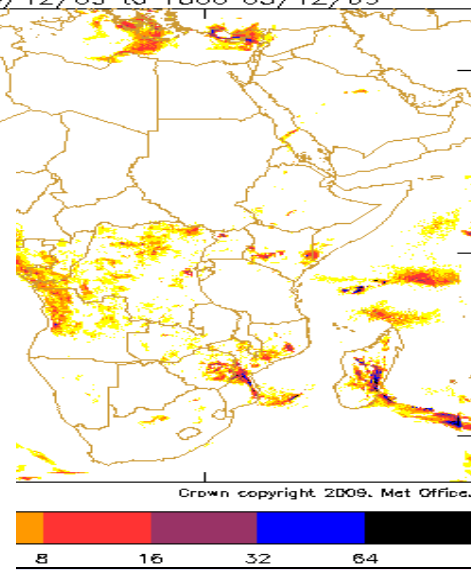
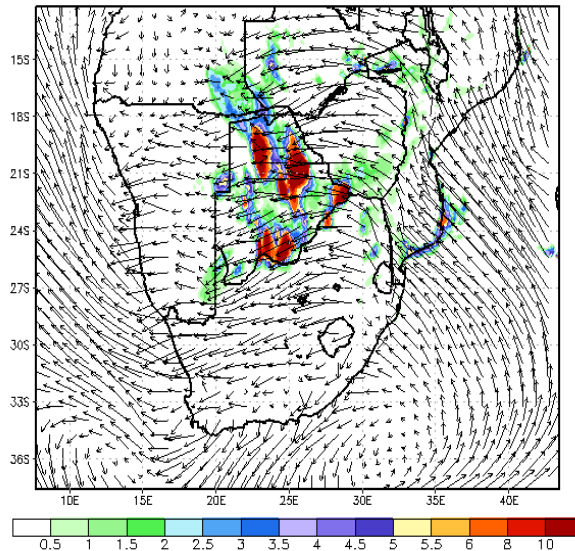


# FORECASTING TOOLS--

PRECIPITATION MODEL FORECASTS



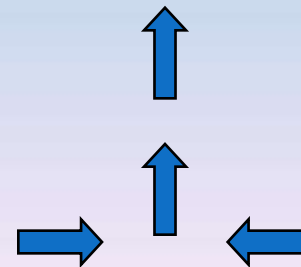
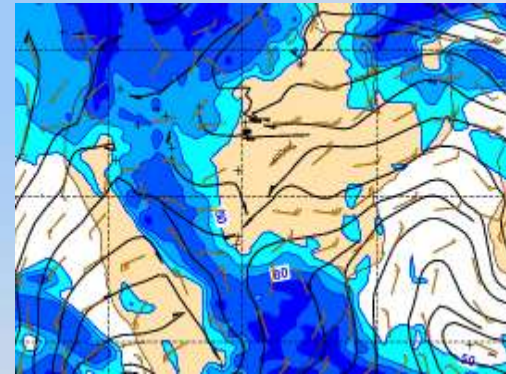
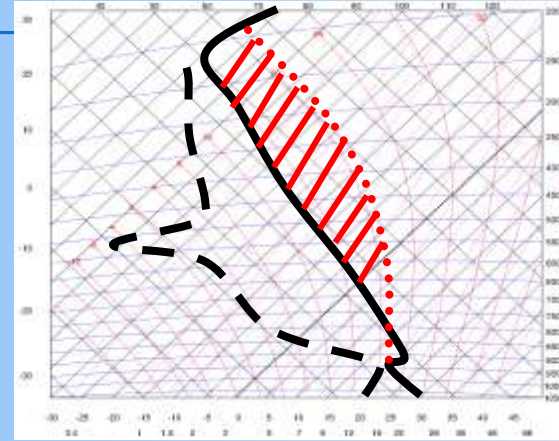
WRF-EMS BOT15 3hr to 6hr Precipitation, & 10m Winds  
00Z Cycle 6h Forecast Valid 06Z09JUN2009





# CASE FOR SEVERE STORMS

- Unstable atmosphere
- Enough moisture
- Rising motion trigger in the atmosphere



# 4. IMPACTS OF SEVERE WEATHER



...s of the recent hailstorm in Mahalapye. He handed over food hampers to ... n Friday. Photo: Phenyio Mosloli



**DURING THE WATERS**— National Disaster Management Office has warned the public against crossing submerged bridges following President's widespread heavy downpours. With more rains forecast, the weather department has also warned of flash floods in many parts of the country. Photo: Mankwato Mankwato

## Heavy rains cause damage

**By Mankwato Mankwato**

**RAINS** that have caused damage in various parts of the country.

In Mankwato, the heavy rain has caused damage to the roads and the houses. The roads are very muddy and the houses are very damaged.

The heavy rain has also caused damage to the crops. The crops are very damaged and the farmers are very sad.

The heavy rain has also caused damage to the people. The people are very sad and the children are very sick.

The heavy rain has also caused damage to the animals. The animals are very sad and the farmers are very sad.

The heavy rain has also caused damage to the environment. The environment is very damaged and the people are very sad.

The heavy rain has also caused damage to the economy. The economy is very damaged and the people are very sad.

The heavy rain has also caused damage to the society. The society is very damaged and the people are very sad.

The heavy rain has also caused damage to the culture. The culture is very damaged and the people are very sad.

The heavy rain has also caused damage to the religion. The religion is very damaged and the people are very sad.

The heavy rain has also caused damage to the politics. The politics is very damaged and the people are very sad.

The heavy rain has also caused damage to the education. The education is very damaged and the people are very sad.

The heavy rain has also caused damage to the health. The health is very damaged and the people are very sad.

The heavy rain has also caused damage to the environment. The environment is very damaged and the people are very sad.

The heavy rain has also caused damage to the economy. The economy is very damaged and the people are very sad.

The heavy rain has also caused damage to the society. The society is very damaged and the people are very sad.

The heavy rain has also caused damage to the culture. The culture is very damaged and the people are very sad.

The heavy rain has also caused damage to the religion. The religion is very damaged and the people are very sad.

The heavy rain has also caused damage to the politics. The politics is very damaged and the people are very sad.

The heavy rain has also caused damage to the education. The education is very damaged and the people are very sad.

The heavy rain has also caused damage to the health. The health is very damaged and the people are very sad.

## Rains cause havoc

**By Mankwato Mankwato**

**RECENT** heavy rains have caused havoc in various parts of the country.

The heavy rain has caused damage to the roads and the houses. The roads are very muddy and the houses are very damaged.

The heavy rain has also caused damage to the crops. The crops are very damaged and the farmers are very sad.

The heavy rain has also caused damage to the people. The people are very sad and the children are very sick.

The heavy rain has also caused damage to the animals. The animals are very sad and the farmers are very sad.

The heavy rain has also caused damage to the environment. The environment is very damaged and the people are very sad.

The heavy rain has also caused damage to the economy. The economy is very damaged and the people are very sad.

The heavy rain has also caused damage to the society. The society is very damaged and the people are very sad.

The heavy rain has also caused damage to the culture. The culture is very damaged and the people are very sad.

The heavy rain has also caused damage to the religion. The religion is very damaged and the people are very sad.

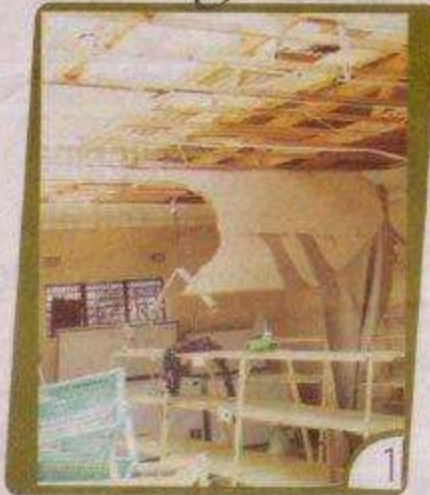
The heavy rain has also caused damage to the politics. The politics is very damaged and the people are very sad.

The heavy rain has also caused damage to the education. The education is very damaged and the people are very sad.

The heavy rain has also caused damage to the health. The health is very damaged and the people are very sad.



# Maitengwe hailstorm through the lens of Phaeatawe Mornahgomo



1. Nkoma general dealer and fresh produce ceiling destroyed after the roof was blown off by storm. The tenant at the shop, Mr Nkobi Masole said goods amounting to over P25 000 were destroyed.

2. Trees were also uprooted by storm, which on the other hand became source of energy as firewood to some in the community.

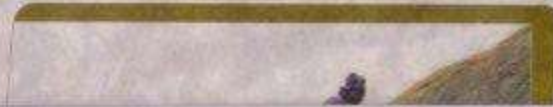
3. One of the 45 houses belonging to a needy was also affected.

4. Ms Tandi Pholele repairing her hurt after a hailstorm swept through their village. Only one mud-house was damaged by the storm in the area.

5. Some clothes and blankets being put out to dry in the sun after the storm.

6. Village Development Committee houses were also affected by the storm. Five out of six VDC houses roofs were blown off.

7. Roofing from a damaged house was put on the power line by strong wind.



## **THUNDERSTORM DEVELOPMENT**

### **What SHOULD we BE looking for?**

1 – Environments that are already conducive to (will support) thunderstorm growth

Or

2 - Synoptic flow patterns that will produce this kind of environment in the near future

- a) Abundant low level moisture
- b) A capping inversion (to prevent convection from forming too early)
  - c) Dry air at middle levels
  - d) Diurnal heating
  - e) Development of Low-level lift
  - f) Development of Upper-level divergence
- g) For heavy precipitation - add a continuous supply of additional low-level moisture
  - h) For strong winds – a continuous supply of mid-level dryness



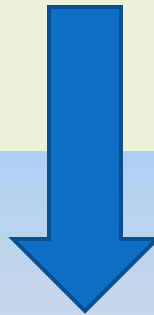
# 5.CRITERIA FOR ISSUING SEVERE WEATHER WARNINGS

# USING CLASSIFICATION AND COLOURS SCHEME FOR IDENTIFYING HAZARDS

- × Colours and classes indicate the severity of the danger posed by a hazard and its possible impact
- × COLOURS ARE: GREEN, YELLOW, ORANGE AND RED
- × CLASSES ARE: I, II AND III



# WARNING MAPS WITH LEGENDS AND KEYS OR PICTOGRAMS



# HOW TO INTERPRET THE COLOURS

- **GREEN**=no warnings or nothing to worry about
- **Yellow** =means potential danger. The weather is unlikely to be extreme but care should be exercised in activities that are weather dependent. Keep an eye on the information
- **ORANGE**=danger. There is severe weather that may cause damage or accidents. Keep in mind that the weather brings risk. Be careful and keep abreast for the latest development in the weather. Take heed of all advice given.
- **RED**=extreme danger from extreme severe weather. Major damage or accidents are likely, in many cases, with threat to life and livelihood, over a wide area. Be extreme careful. Pay constant attention to news bulletin and obey instruction and advice given by authorities under all circumstances. Bear in mind that exceptional measures may be taken



# LEVEL OF IMPORTANCE ATTACHED TO WARNINGS

- Low, medium and high or top priority levels depends on the seriousness attached to the warning issued for any hazard.
- **Class 1** warnings will be allocated lowest level as they attract lower or no risk.
- **Class 2** and **3** will attract medium to high levels as they attract higher risks. They ,therefore, call for higher awareness and may even warrant immediate dissemination or broadcast of the warnings. For these classes pictograms may also be included in the maps.

# DEFINING HAZARDOUS WEATHER RISKS USING STATEMENTS

- Various weather conditions have different levels of risk.
- DMS uses a multi-tier system of weather statements to notify the public of threatening weather conditions.
- These statements are used in conjunction with specific weather phenomena to convey different levels of risk.

## THESE STATEMENTS ARE:

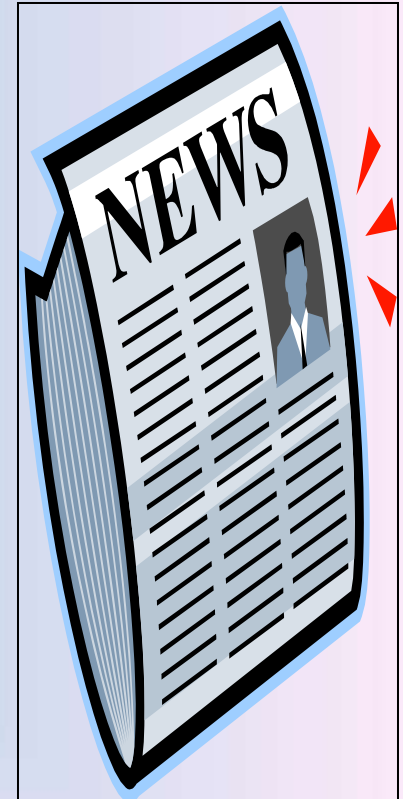
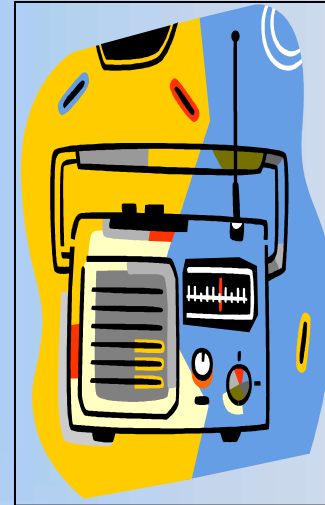
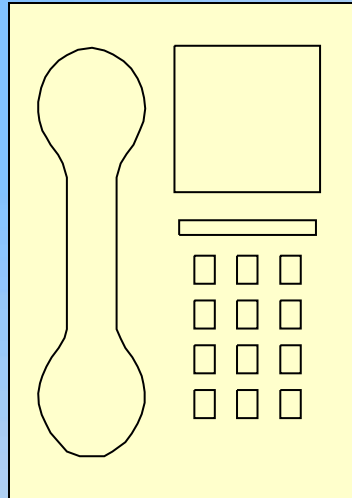
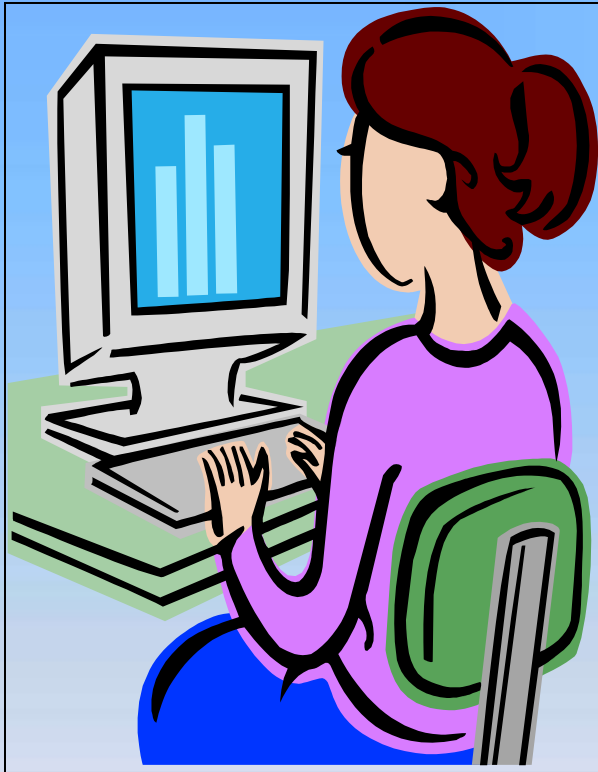
➤ **OUTLOOK /EARLY WARNING-** A weather outlook is issued daily to indicate that a hazardous weather or event may occur in the next several days. The outlook will include information about potential severe thunderstorms , heavy rain or flooding, winter weather, extremes of heat or cold, etc., that may develop over the next 7 days with an emphasis on the first 24 hours of the forecast. It is intended to provide information to those who need considerable lead time to prepare for the event.(**issued beyond 5 days in advance**).The outlook will ,in most cases ,be issued in a form of a **PRESS RELEASE**.

➤ **ADVISORY** - An advisory is issued when a hazardous weather or event is occurring, imminent or likely.(  **issued at least 72 -120 hrs in advance.**)

➤ **WARNING** - A warning is issued when a hazardous weather or hydrologic event is occurring, imminent or likely. A warning means weather conditions pose a threat to life or property.e.g People in the path of the storm need to take protective action. (  **issued at least 0-48 hrs in advance**)



# DISSEMINATION OF WARNINGS AND FORECASTS



# Cold Weather Forecast

By Monkagedi Gauthobogwe  
Staff Writer

Weather forecasters have warned that the country will be hit by severe winter and heavy down pours starting this week. The severe winter and heavy rains will be felt throughout the country, according to the Department of Meteorological Services' Weather Forecasting Division.

The Botswana weather bureau official's warning coincides with a stern warning to South Africa about severe weather conditions coming in the next few days.

For Botswana, rains were expected to start on Saturday evening and into Sunday morning when isolated rains were expected to occur over the Kgalegadi and Southern Districts," Radithupa Radithupa, an official at Weather Bureau said on Friday.

The Weather Bureau had warned that on Sunday the rains would intensify and spread to the Gantsi and Ngamaland districts

where cloudy and cold conditions are also anticipated. The rains will intensify further and spread



other parts of the country with occasional heavy downpours in some places, the report warned.

Today is also supposed to be windy over the eastern parts of the country, with cloudy and cold conditions expected to accompany these rains throughout the period.

The anticipated rains will be triggered by a westerly trough, which started yesterday. Radithupa warned the rains might cause damage to crops and endanger livestock, and of course create inconvenience to the public in their daily lives.

The South African authorities predicted very cold conditions that were to start on Saturday, over the high ground of the Western Cape and the southwestern part of Northern Cape. The severe conditions were expected to have spread to the high ground regions of Eastern Cape later on Saturday.

The South African Weather Bureau also predicted very rough sea conditions with wave heights in excess of five metres between Plettenberg Bay and East London on Saturday night and yesterday.

They also predicted that conditions favourable for the development of runaway fires were expected in places such as Mpumalanga and Limpopo, low-yeild regions.

"The forecast shows that rains will occur during the period between June 7-10, 2009, in the southern part of the country before spreading to the rest of the country," the South African authorities said.





## 2. BENEFITS GAINED THROUGH THE

### SWFDP

- Enhanced credibility and visibility for the DMS.
- More positive perception by the users generated
- Improved Forecasting capacity and capability
- More useful tools for forecasters
-

- **Better timing for issuing severe weather warnings**
- **Press releases have become the norm**
- **Improved relations with the media in general**
- **Improved collaboration with the Disaster Management office**

- **Verification of forecasts now done routinely and results shared among colleagues.**
- **A severe weather warning criteria developed and implementation**



### 3. CHALLENGES ENCOUNTERED DURING THE PROJECT

- **Unreliable links with media leading to broadcasts of decayed forecasts**
- **Not getting regular feedback from disaster managers**
- **Inadequate feedback from the public and other users -too many surveys to deal with**



-----end----- thanks