

## **QUARTERLY REPORT OF THE REGIONAL SUBPROJECT**

**PERIOD: 6<sup>th</sup> November 2006 to 28<sup>th</sup> February 2007**

### **Botswana National Meteorological Services**

#### **1. HIGHLIGHTS OVER THE PERIOD (NDJF)**

- The first quarter was extremely drier than normal years
- November 2006 had highest incident of localised regions of strong winds not well predicted by models
- December, January, February period had few incidents of severe weather.

#### **2. OVERVIEW OF PRODUCTS**

##### **a. Usefulness of RSMC-Pretoria guidance**

RSMC – Pretoria guidance is very useful on large scale rainfall bearing systems. The guidance helps the forecasters in issue warning well in time. It also guide them to find areas of possible severe activities. However, the guidance has its shortcomings such as failing pick the areas of localized regions of strong winds. This is simply because the models themselves are not able to pick such areas.

##### **b. Usefulness of SWFDP NWP/EPS Products received from each global centre and RSMC UM-SA12**

Like the above the SWFDP NWP/EPS products received from the global centre are very useful because the products guides the forecasters to able to identify areas of severe storms well beyond the five days which has not been possible in the past. All near real time forecasts would not go beyond five days. With the new products it increases the confidence of the forecasters because the accuracy of the products has improved as well as the reliability of the products.

During this period NMC was not using RSMC UM-SA12 products that much. NMC is not in a position to comment whether the products are good or not. However, since March 2007 NMC started using products from Unified model from SAWS and the products have been good for the short period that have been in used.

### 3. PROJECT EVALUATION AGAINST SWFDP GOALS

SWFDP GOAL	PROGRESS AGAINST GOALS
To improve the ability of NMCs to forecast severe weather events	The Deterministic and EPS products have improve the visibility of the NMC. The Public have shown appreciation of the forecasts that are issued by the NMC.
To improve the lead time of alerting these events	It is now possible to issue a forecast beyond five days with confidence, before it was close to impossible.
To improve the interaction of NMCs with Disaster Management and Civil Protection authorities before, during and after severe weather events	This project has help NMC to realized how it interacts with the DMCPA. The interaction is not that good. We have realized that the difficulties emanate from the fact that National Disaster Management does have action plan or legislation which will streamline their structure. However, NMC is dealing directly with National Disaster Management before, during and after severe weather events. It has proven to be difficult to get a feedback after the events. The warnings that are sent to the National Disaster management take time to reach the intended district because their communication lines are not defined. Recently NMC and stakeholders met to work on the Disaster Action Plan in which the Disaster Management Plan is expected to streamline its operational

	structure.
To identify gaps and areas for improvements	The models in general tend to reduce the intensity of the precipitation. Secondly, the models do not well predict localized strong winds due to convection.
To improve the skill of products from Global Centres through feedback from NMCs	Skill of the models is good. In case of localized regions strong wind from convection the skill is poor. This is due to the fact that the models are not able to predict small localized regions of convection.

#### 4. EVALUATION OF WEATHER WARNINGS:

##### A) feedback from the public

The public appreciates our warnings and the visibility of the NMC has tremendously improved. NMC is now capable of issuing advisories beyond five days and the public really appreciate that. However, the media like criticizing the NMC for failure to issue warning especially for localized strong winds which normally cause destruction to the communities.

##### B) feedback from the DMCPA to include comments of the timeliness and usefulness of the warnings

The feedback from DMCPA is not all ways positive, the argument being that sometimes they area hit by storm without being warned prior to the storm. This is common during when a dry localized storm occurs. Warning is also provided in a lead time of two days. Since the implementation of the SWFDP it was realized that National Disaster Management does not have a clear structure such that if you send a communiqué (issue warning) to the National Disaster Office it take times for that communiqué to reach the a specific district. However, the Meteorological Service is working on that with them. Several meetings at national and districts levels have been held to develop response plan to any disaster.

##### C) feedback from the media

The media, like the general public appreciated warnings and the forecasts that are provided or issued. However, the media becomes skeptic when localized regions of strong winds hit towns and villages which normally blow roofs of buildings away leaving

households stranded without shelter. Despite the fact that Meteorological services meet with the media to explain how severe weather from the convection is difficult to forecast and that all models up to date are not well predicting the localized strong winds. The media criticize or the question the capability of the service in handling or dealing the issues of severe weather events (especially strong localized winds) in the country. However, when event is from large scale weather systems warnings are issued well in time and the media report positively about the NMC. Since the implementation SWFDP the accuracy of the forecasts have improved which resulted in an improvement of the perception of the media about meteorological services.

#### **D) warning verification by the NMCs**

The warning is verified once the event was either observed or forecasted. NMC looks at the impact of the warning from the District Disaster Management committees reports whether the warning was useful to them or not. In most cases warnings for heavy precipitation are issued. Most models are able to well predict a heavy precipitation contrary to localized strong winds which normally causes catastrophic effects. Warnings for strong winds are rarely issued because it is difficult to forecast because their size and conditions that lead to their occurrence of such event develop very rapidly. Then finally, an evaluation report (assessment report) is compiled on impact of the weather phenomenon/event that occurred. In a case where by a warning was issued and a severe weather event did not occur, an evaluation is also carried out to see why the severe weather event did not occur.

### **5. SUMMARY (general comments, challenges, etc, details in Annex 1)**

- It remains a challenge to issue warnings due to localized strong winds from convection, which causes natural calamity to the communities. A different approach is needed to try to reduce the impact of the problem unpredicted localized strong winds.
- More training is needed to forecasters in order to improve their skills and competences.
- NMC should assist the National Disaster Management to come with a disaster management plan not just a response plan.

### **6. CASE STUDY (PowerPoint Presentation to include guidance products (RSMC and NWP), satellite imagery, warnings issued, impact evidence etc)**

### **7. ANNEX 1 – Quarterly Evaluation Table (to be fulfilled according to the Severe Weather Evaluation Form)**

Starting date of the event	SWFDP Evaluation Form Event Number	Type of event Heavy Precipitation or Strong Wind	Region affected	Highest observed value	RSMC Guidance		Which NWP/EPS forecast product(s) used by NMC		Local warnings issued?	Impact of the event	Impact of the warning
					Amount predicted (same unit as in the preceding column)	Usefulness from 1 to 4 1- Misleading 2- Not useful 3 - Useful 4 - Very useful	(RSMC UM-SA12 ECMWF, Met-Office, NCEP)	Usefulness from 1 to 4 1- Misleading 2- Not useful 3 - Useful 4 - Very useful			
dd/mm/yy		Indicate if extreme phenomena are the consequence of severe convection		(mm/period or kts, according to the phenomenon)							
13-11-06	2	Strong winds/ heavy precipitation	Extreme east	Wind gusts from a convective activity not known  Heavy precipitation 55mm/24hrs	n/a  >20mm in 6hrs >100mm in 24hrs	4	RSMCUM-SA12  NCEP  ALAM	  3  3	Warning not issued. Models did not predicted the storm well because it was localised convective activity	100 households were rendered homeless by strong damaging winds from a severe storm in Mining town called Selibe Phikwe. No one was injured during the storms	
15-11-06	3	Strong wing /heavy precipitation	Extreme northeast	Strength of wind gusts not determined.  Heavy precipitation 87mm/24hrs	n/a	1	NCEP  ALAM  ECMWF	2  2  2	Warning not issued. Models did not predicted the storm well because it was localised convective activity	A primary school, primary hospital and two houses were blown away gusts and were flooded. The medicine in the hospital and the standard seven school leaving exams were soaked in water. Two families were given tents as temporary measure	
17-11-06	4	Heavy precipitation	Central and extreme east	67mm/24hrs	n/a	1	NCEP  ALAM  ECMWF	2  2  2	Difficult to issue a warning when models are not well predicting convective activity	No impacts because it was dry prior to the severe storm.  No impact	
18-11-06	5	Heavy precipitation	East	123mm/24hrs	n/a	4?	NCEP ALAM ECMWF	2 2 2	Warning was not issued	No impact	

22-11-06	6	1. Heavy precipitation 2. strong winds	Extreme east	94mm/24hrs  Strength of the gusts not determined (no instruments to measure the winds)	n/a	4	NCEP ALAM ECMWF	2 2 2	Warning issued	Prior to heavy precipitation the conditions were dry therefore no floods observed.	
29-12-06	7	Heavy precipitation	East and central	75mm/24hrs	50mm in 24hrs	4	NCEP ALAM ECMWF	3 3 4	Warning issued	Prior to heavy precipitation the conditions were dry therefore no floods observed.	
30-12-06	8	Heavy precipitation	East	77mm/24hrs	50mm in 24hrs		NCEP ALAM ECMWF	4 4 4	No threat for flooding	No impact at all	
17-01-2007	9	Heavy precipitation (localized )	southeast	53mm/24hrs	none	1	NCEP ALAM ECMWF	1 1 1	No warning issued	Horticultural fields were destroyed.	
27-01-2007	10	Strong winds (localized)	Southeast (central parts of the capital city)	40Knots were recorded in nearest station	none	1	NCEP ALAM ECMWF	2 2 2	No warning issued.	The university Botswana new build Faculty of Business roof was blown away by the storm. About 500metres from the University the soft ball had to be abandoned after the stands were blown away. One person broke his leg and few had minor injuries. The African champion's league game held in the near by National stadium had to be delayed for the freak storm to pass.	
06-02-2007	11	Heavy precipitation	East and central	54mm in 24hrs	none	1	NCEP ALAM ECMWF	2 2 2			

