

STATUS OF THE REGIONAL SUBPROJECT

QUATERLY REPORT OF THE REGIONAL SUBPROJECT

PERIOD: 6 November 2006 – 28 February 2007
NMS: NATIONAL INSTITUTE OF METEOROLOGY (INAM – MOZAMBIQUE)

1. HIGHLIGHTS OVER THE PERIOD

- The period was notably marked by heavy rain episodes, mainly along the Zambezi Valley in a situation that led to floods in the Central region of the country;
- The most remarkable episode of heavy rain was the one observed in Quelimane on the night of 20th and early hours of 21st January 2007 with an observed precipitation amount of 339,2 mm in 24 hours, leaving the city completely flooded. This heavy rain was due to a combination of factors: the ITCZ and a low pressure system (1008 hpa) located just over the central coast of Mozambique. Very unfortunately all the models used did not estimate such amount of rainfall and also the guidance received from RSMC-Pretoria was not able to pick this amount of rain. In fact, the guidance issued on the 19th did not consider any significant rainfall event for the above location; and the guidance issued on the 20th was only showing 50mm/24hrs in contrast to the 143,9mm observed in 24hrs with 115mm falling in just two hours (More details see the case study);
- Although not within the scope of the SWFDP it is worth to mention the occurrence of heavy rains and strong winds associated with tropical disturbances and cyclones.

2. OVERVIEW OF PRODUCTS

a. Usefulness of RSMC-Pretoria guidance

RSMC-Pretoria guidance has already proven to be very useful with special reference to weather features that lead to heavy rain in the southern part of the country. But, the same confidence is not attained in relation to the northern part of the country. As pointed out above the guidance was unable to pick the 20th and 21st January episode in the Zambezia province. The case study demonstrates that the guidance issued on the 19th January and valid up to 23rd failed to pick this heavy rain event, meaning less lead-time for issuing a warning.

Overall, the guidance is well acceptable and performs quite well.

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

The SWFDP NWP/EPS products received from the global centres have been shown to be a very useful tool in forecasting severe weather events. The stability indices for forecasting convection perform quite well. The use of

these new products have made possible to produce forecasts beyond the four to five days ahead usually done by the NMC. The UM-SA12 works very well despite its time output limitation (48 hours).

3. PROJECT EVALUATION AGAINST SWFDP GOALS

SWFDP GOAL	IMPACT
To improve the ability of NMCs to forecast severe weather events	The new products introduced by the SWFDP have boosted the forecasters' confidence in predicting severe weather events.
To improve the lead time of alerting these events	In the past INAM very rarely could issue alerts on severe weather events with a long advanced lead-time, with exception in cases of Tropical Cyclones. But now alerts are issued even with four days lead-time and that gives more time for carrying out a series of mitigation activities.
To improve the interaction of NMCs with Disaster Management and Civil Protection authorities before, during and after severe weather events	Interaction between INAM and the DMCPA has been existing for years and the Project had made it more effective and efficient. Before any predicted severe weather event the DMCPA are among the first authorities to receive the warnings and whenever necessary daily briefings are performed. This interaction continues during and even after the event. A good example was the attachment of two senior meteorologists to the DMCPA during the last rain season. The meteorologists attached to the DMCPA were able to take advantage of the various products available through the Project.
To identify gaps and areas for improvements	The models tend to underestimate the convective and localized precipitation, as well as strong winds. Nevertheless, the Severe Weather Indices have been tremendously useful.
To improve the skill of products from Global Centres through feedback from NMCs	Overall the models have a good skill but improvements are needed in forecasting localized severe events mainly those related to strong winds.

4. EVALUATION OF WEATHER WARNINGS

- **Feedback from the Public**

It has not been easy to get a feedback from the public. This is mainly due to the absence of a regular mechanism through which the users could provide any official information on the accuracy and reliability as well as the lead-time of the warnings issued by the NMC.

- **Feedback from the DMCPA**

No formal feedback has been received from the DMCPA. This is an exercise to be put in place for the next rainy season.

- **Feedback from the Media**

One could say that there is no real feedback from the media. Nevertheless, there were few times when the Meteorological Service was praised by the media for having issued a well advanced lead-time warning to the public. Even though we had not issued a warning for the 20th and 21st January episodes the media did not criticize, since a very good explanation for that had been given.

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

It is worth to acknowledge that improvements in forecasting and issuing warnings for severe weather events have been achieved through the implementation of the SWFDP. Nevertheless, we still have to tackle some few handicaps, such as making every forecaster able to use the various products now available, since some do not accept easily to work with them.

In most of the cases is not easy to determine the wind speed since the strong winds events have happening in places where INAM does not have an observation station.

Since the SWFDP deals with heavy precipitation and strong winds not associated with tropical cyclones we left out all information related to the Tropical Cyclone Favio that devastated the town of Vilankulo and some other places in February 2007.

Finally, more training is needed, mainly in the field of EPS products.

6. CASE STUDY (Heavy Rainfall over Central Coast of Mozambique – January 20th and 21st).

ANNEX VI.1

Evaluation Table

DATE	SWFDP Evaluation Form Event Nr (If Applicable)	Weather Type	Location	Observed amount (rainfall or wind speed)	RSMC Guidance		Which NWP/EPS forecast product(s) used by NMC	Local Warnings issued	Impact
					Amount predicted	Usefulness (1-4) 4 is best			
Dd/mm/yy		Mesoscale rainfall or synoptic scale rainfall or strong winds (convective or synoptic)		(mm/period or KTS)	Amount predicted	Usefulness (1-4) 4 is best	List by centre		
12/11/2007	1	Convective strong winds	Nampula & Zambezia provinces (North & Centre)	N/A		1	ECMWF, ALAM, NCEP, UM SA12	No	722 mud hats had their thatched-roofs destroyed; and 4 classrooms were left roofless; 1 person reported dead in Milange district (Zambezia).
13/11/2007	2	Synoptic scale rainfall	Maputo (South)	83,5mm/24hrs	>20mm/6hrs >100mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	Road transit temporarily affected; 4 houses partially destroyed.

14/11/2007	3	Strong winds	Sofala (Buzi)(Centre)	N/A		1	ECMWF, ALAM, NCEP, UM SA12	No	21 classrooms were left roofless; 285 with their roofs affected and 90 houses completely destroyed.
29/11/2007	4	Synoptic scale rainfall & Strong winds	Pemba (North)	72,3mm/24hrs 30kts	>100mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	N/A
12/12/2007	5	Mesoscale rainfall & Convective strong winds	Nampula (North) Beira (Centre) Panda (South)	86mm/24hrs 147,0 mm/24hrs 81,2 mm/24hrs	50mm/24hrs	3	ECMWF, ALAM, NCEP, UM SA12	Yes	120 families homeless; 692 people in Beira received support in terms of food supply.
18/12/2007	6	Mesoscale rainfall	Maputo	63,2 mm/24hrs	Not predicted	1	ECMWF, ALAM, NCEP, UM SA12	No	No major impacts
21/12/2007	7	Mesoscale rainfall	Changalane (South)	72,0mm/24hrs	Not predicted	1	ECMWF, ALAM, NCEP, UM SA12	No	No major impacts
01/01/2007	8	Synoptic rainfall & strong winds	Panda (South)	56,7mm/24hrs 25kts	80-100mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	3 people were reported dead after being struck by a lightning; 143 families affected.
02/01/2007	9	Synoptic rainfall	Quelimane Beira	51,1mm/24hrs 103,5mm/24hrs	>50mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	1 person dead; 20 houses destroyed; Places slightly inundated.
03/01/2007	10	Synoptic rainfall	Beira	99,8mm/24hrs	>50mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	Places reported to be slightly inundated;
04/01/2007	11	Synoptic rainfall	Quelimane	102,9mm/24hrs	>100mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	Places reported to be slightly

									inundated;
08/01/2007	12	Mesoscale rainfall & strong winds	Angoche (NE coast)	155,3mm/24hrs	>50mm/24hrs	2	ECMWF, ALAM, NCEP, UM SA12	Yes	N/A
10/01/2007 & 11/01/2007	13	Mesoscale rainfall	Nampula (North)	88,0mm/24hrs 62,9mm/24hrs	50mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	N/A
12/01/2007	14	Mesoscale rainfall & convective strong winds	Quelimane	55,0mm/24hrs Wind speed n/a	50mm/24hrs	3	ECMWF, ALAM, NCEP, UM SA12	Yes	2 people reported dead.
20/01/2007	15	Mesoscale rainfall	Quelimane	117mm/2hrs	Not predicted	1	ECMWF, ALAM, NCEP, UM SA12	No	The city was left flooded; 3500 people left homeless.
21/01/2007	16	Mesoscale rainfall	Quelimane	345mm/24hrs	100mm/24hrs	1	ECMWF, ALAM, NCEP, UM SA12	No. It was already late for issuing a warning.	
03/02/2007	17	Mesoscale rainfall	Pemba Nampula	107,3mm/24hrs 61,1mm/24hrs	Low risk for heavy precipitation	1	ECMWF, ALAM, NCEP, UM SA12	No	No major impacts
14/02/2007	18	Synoptic scale rainfall	Pebane (Central coast)	54,5mm/24hrs	50mm/24hrs	4	ECMWF, ALAM, NCEP, UM SA12	Yes	No major impacts