STATUS OF THE REGIONAL SUBPROJECT

QUARTERLY REPORT OF THE REGIONAL SUBPROJECT

PERIOD: 1st September – 30th November 2007
NMS: **NATIONAL INSTITUTE OF METEOROLOGY (INAM – MOZAMBIQUE)**

1. HIGHLIGHTS OVER THE PERIOD

- During the period of analysis seasonable dry weather prevailed over much of Mozambique, except for the middle October to the end of November, where scattered moderate to heavy rains (46 – 86mm in 24 hours) fell over Maputo, Gaza and Inhambane provinces (Southern Mozambique) and also over Quelimane and Nampula, due to the beginning of the rain season.

- A severe thunderstorm (with strong winds and hail) was observed in Lichinga (north western Mozambique), Manjacaze (Gaza province) and Inhambane.

I- False alarm leaded September 2007

Dry weather prevailed across Mozambique. No heavy rain or strong wind event was observed during September, except isolated scattered rain (less than 20mm in 24 hours) over southern portions of the country on the 30th September. Thus, false alarm was provided by the RSMC-Pretoria guidance.

II- Isolated Early Heavy Rainfall and Severe Thunderstorms characterized October 2007

October, the end of the winter season (dry season) it is when the strongest easterlies develop, and the southeasterly flow is occasionally broken by migrating high and low pressure centers. The coastal low centers occasionally affect the extreme southern coast of Mozambique, enhancing the convective activity.

During this period, the cold fronts penetrate over the southern and central Mozambique mainly in coastal areas and strong winds develop when there is a coastal low pressure systems ahead of the advancing cold front.

These small coastal disturbances are often associated with strong surface winds (20 – 30 kt), severe thunderstorms and unseasonal heavy rainfall.

On 1st October 2007, Maputo reported 48,9mm and 30kt winds. Severe thunderstorm, with hail, was observed over northwestern Mozambique, according to the media, but due to the lack of observation station over the affected region, it was not possible to quantify the amount of precipitation and the wind intensity.

Unseasonal moderate to heavy precipitation (85,9mm) fell over portions of Nampula Province causing isolated flash flooding over the urban area on 25th October.

III- Heavy Rain continued to fall in November

From November to March the ridging over the northern Mozambique Channel is associated with northeasterly flow of unstable tropical air. Orographic lifting and convective cloud development occur often in this case.

Additionally the northeasterly flow converges with the southeasterlies over northern and central Mozambique, increasing the convection and rain/shower activity.

The semi-permanent low pressure system over interior of South Africa occasionally extends as a trough eastward to the Mozambique coast, associated with a weak low which often develops over the Mozambican coast between 17^0 S and 21^0 S. This coastal low varies in intensity and occasionally enhances onshore flow over the central coast.

Synoptic scale rainfall (event 3 and 4 in the annex) and severe thunderstorm with hail was observed over the southern portion of the country. The most expressive event was observed on 9th November, during the passage of a cold front associated with a coastal low, thus severe thunderstorm, moderate rainfall and strong wind with hail was reported.

2. OVERVIEW OF PRODUCTS

a. Usefulness of RSMC-Pretoria guidance

The RSMC-Pretoria guidance is strongly enhancing the weather discussions, although no warning is issued just by viewing the guidance.

In the case of the strong wind reported above, the guidance was very helpful on issuing the respective warning.

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

The NWP products received from the global centers performed well, except during the mesoscale convective systems where the severe weather indexes (GFS and ECMWF) depicted very well the severe thunderstorm (with hail) over Inhambane and Lichinga.

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	INAM issued heavy rain with hail early warning with 5 hours lead time.
To improve the interaction of NMCs with Disaster Management and Civil Protection authorities before, during and after severe weather events	During this quarter INAM prepared and disseminated the seasonal forecast for 2007/2008 to different governmental and non-governmental organizations. After that INAM and DMCPA prepared a contingency plan for disaster preparedness and response and it contributed for the management of the actual floods in central Mozambique.
To identify gaps and areas for improvements	The GFS model tends to underestimate the localized strong winds and precipitation.
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 spatial resolution mainly in the strong wind events and also for nowcasting.

4. EVALUATION OF WEATHER WARNINGS

- **Feedback from the Public**

  INAM is developing mechanism for assessment or evaluation of the weather forecasts in general in order to get a feedback from the public. However it seems to be satisfactory the warnings related to the extreme weather events in the last two years compared to years before the establishment of the SWFDP.

- **Feedback from the DMCPA**
  As described in the Highlights of the quarter only one case of strong winds was reported and there was no formal feedback from the DMCPA. It is our hope to have this channel of collaboration working perfectly during the forthcoming rain season.

- **Feedback from the Media**
  During the dissemination of seasonal forecast all media were invited to participate and to collaborate on the dissemination process. Normally INAM issues warnings and these are disseminated by the media. Informally the feeling is that nowadays the Weather Service is playing important role to the public and to decision makers. INAM has programmed to host a seminary with media in order to get feedback.

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

The SWFDP strengthened the capability of INAM on forecasting and issuing of early warnings for heavy rains and strong winds, but the system needs to be improved in terms of temporal resolution and it requires to take in account the different meteorological situations that occur in Mozambique and in the region. We greatly appreciate the continuation of the dissemination of the different products beyond the Demonstration Phase.
The absence of meteorological stations contributes negatively the process of assessment and evaluation of the products.

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
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		
01/10/2007	1	Strong winds and mesoscale rainfall	Maputo (FQMA)	48.9mm/24hrs Wind gusts of 30 kt	>50mm/24hrs	4	ECMWF, ALAM, GFS, UM SA12	Yes	Trees uprooted.
25/10/2007	2	Synoptic scale rainfall	Nampula (FQNP)	85.9mm/24hrs	>50mm/24hrs	3 (weak on the lead time and location)	ECMWF(efi, precip. Prob.) GFS (EPS) UM SA12 (accuml precip)	Yes	Flash flooding
07/11/2007	3	Synoptic scale rainfall	Xai-xai (southeastern coast)	56.6mm/24hrs Wind gust of 35kt (with hail)	>50mm/24hrs	4	ECMWF, ALAM, GFS (K-Index picked the potentiality for hail formation), UM SA12	Yes	Trees uprooted. Damage on crops Unroofed houses

09/11/2007	3	Synoptic scale rainfall	Vilanculos (FQVL)	48.3mm/24hrs Strong Winds with hail	>50mm/24hrs	3	ECMWF, ALAM, GFS (K-Index picked the potentiality for hail formation), UM SA12	Yes	Trees uprooted. Damage on crops
11/11/2007	3	Synoptic scale rainfall	Chimoio (FQCH)	68.3mm/24hrs	>50mm/24hrs	4	ECMWF, ALAM, GFS, UM SA12	Yes	No major impacts
24/11/2007	4	Synoptic scale rainfall	Xai-xai	65.2mm/24hrs	>50mm/24hrs	4	ECMWF, ALAM, GFS, UM SA12	Yes	No major impacts
28, 29/11/2007	4	Synoptic scale rainfall	Quelimane (FQQL)	66.3mm/24hrs and 53.4mm/24hrs for days 1 and 2	30 -50mm/24hrs	4	ECMWF, ALAM, GFS, UM SA12	Yes	No major impacts