QUATERLY REPORT OF THE REGIONAL SUBPROJECT
PERIOD: (March 2007 to May 2007)
RSMC-PRETORIA

1. HIGHLIGHTS OVER THE PERIOD

a. March 2007:

Heavy falls of rain were mainly caused by low pressure system over the interior (heavy falls over Namibia, Botswana and southern Zimbabwe during the 4th to 7th of and Tanzania and Zambia during the 9th to 12th. Tropical cyclone Indlala caused heavy falls and strong to gale force winds over Madagascar during the 15th to the 18th. Heavy falls were again forecast for Botswana due to a 500hPa low during the 28th for the following three days and on day 4 over southern Zimbabwe. A forecast for heavy rain was issued again over Madagascar due to a tropical low on the 28th and for the following four days.

b. April 2007:

Tropical cyclone Jaya was picked up through ECMWF on the 3rd of April and was expected to move over Madagascar on day 4 and into the Mozambique Channel on day 5. A warm core equatorial low caused heavy rain and strong winds at times along the coast of Tanzania between the 16th and 19th. After the 19th followed a period of settled weather over the SWFDP region. On the 24th mention was made of a cold front over South-Africa that resulted in a forecast for snow over Lesotho for day 4 and 5. On the 28th and 29th a forecast was issued for heavy rain and strong winds along the south coast of Mozambique for day 1, 2, 3, 4 & 5 due to a strong onshore flow caused by a surface high off the east coast of South-Africa.

c. May 2007:

On the 5th and 6th heavy rain was foreseen over southern Mozambique for day 1 to 5 due to a cut-off low over southern Mozambique. Between the 11th and the end of May a forecast for sporadic heavy falls of rain on the Tanzania coast was issued on several days.

2. OVERVIEW OF PRODUCTS

a. Limited Area Modelling (LAM)

The 12 km resolution Unified Model run by SAWS (UM SA12) has replaced the Eta 32 km model since December 2006. The UM SA12 performed quite well during the period and is a definite improvement on the older Eta model. Output of the model is made available through the RSMC-Pretoria website. It is also available in grib format, but the current communication lines cannot accommodate the transfer in an acceptable time.

b. RSMC Website

The RSMC-Pretoria website has been the main means of communication for the project between RSMC-Pretoria and the five NMHSs involved in the project. All guidance products are distributed on this website. There are also

links to the UM SA12 as well as other models and ensemble products used by the forecasters in the project. During this period (March to May) the website scored 1430 hits from 843 different login sessions.

All guidance products are archived under a related webpage that will be linked to the main RSMC website.

c. Preparation of RSMC-Pretoria guidance

RSMC Guidance products for the next five days are prepared daily by the forecasters of the National Forecast Centre and disseminated according to the set deadlines. Products from the global centres (deterministic models and ensemble products) play a critical role in the analysis process.

During the tropical cyclone season RSMC-Pretoria relied heavily on the guidance of the tropical cyclone bulletins and information from RSMC-Reunion.

Areas of improvement or concern:

- There is still room for improvement on the narrative story prepared by the senior forecasters. This refers particularly to consistency between different forecasters to ensure all achieve the same high quality needed.
- Quite a lot of interpretation and experience is needed for the prediction of areas severe storms on days 3 to 5 over the equatorial regions, since on these timescales models many times struggle to provide good guidance in those regions.
- Prediction of strong wind overland is a challenge, since it is mainly associated with gusts and squall lines that are not resolved on the resolution of the models available.
- There is a need for constant communication between NMC's and RSMC-Pretoria about the Severe Weather Warnings issued by RSMC-Pretoria. If a rainfall or wind event was overlooked input is needed from experienced forecasters of that particular country who have more insight about the Climatology of that area since models tend to underestimate localised (Mesoscale) rainfall and winds events.

d. **Usefulness of SWFDP NWP/EPS Products received from each global centre**

The range of products is extremely valuable to aid the forecasters during their analysis of the current and expected weather situation. The variety of model products from different centres aid the forecasters in decision making particularly in situations where they differ from each other on the weather expected. Some products are also useful to quickly alerting forecasters on potential hazardous weather.

1. ECMWF

   Products are very useful, especially the Tropical cyclone tracks. Wind forecasts are quite good as well as the placement of heavy rain areas also highly accurate.

2. NOAA-NCEP

Their products are very useful on the synoptic scale systems but they tend to struggle overland with regards to the strong winds. The spaghetti diagrams of winds greater than 20kts, for instance, are very useful over the sea but are missing most of the strong winds events overland.

3. Met Office

Their products are also doing well with rainfall or precipitation forecasts of a synoptic scale but missing the mesoscale or localised events, particularly regarding strong winds.

3. PROJECT EVALUATION AGAINST SWFDP GOALS

SWFDP GOAL	**PROGRESS AGAINST GOALS**
To improve the ability of NMCs to forecast severe weather events	NMCs are receiving guidance products daily broadening their decision making tools.
To improve the lead time of alerting these events	Guidance products for five days in advance are disseminated daily, alerting NMCs to potential severe weather as predicted by the models and ensembles.
To improve the interaction of NMCs with Disaster Management and Civil Protection authorities before, during and after severe weather events	
To identify gaps and areas for improvements	Some gaps that have already been identified are: • There is a need for improving nowcasting tools in a similar way as been done for forecasting tools in this project. • There is still room for improving collaboration with emergency management authorities • Verification of products through the forecast chain (i.e. guidance forecasts, warnings issued and response by emergency authorities) is still a challenge.
To improve the skill of products from Global Centres through feedback from NMCs	Little feedback is received from NMCs..

4. LESSONS LEARNED

a. Communication between the regional centre and the national forecast centres of participating countries on guidance products

This remains a challenge. Interaction between operational forecasters of RSMC Pretoria and each participating countries, and also interaction between participating countries themselves, prior and after the severe weather event is limited and needs to be addressed. Since weather knows no boundaries, it is important that forecasters of countries interact with each other regularly. In this period no telephone call or email communication was made to RSMC-Pretoria forecasters from any NMHS, or made to a NMHS to discuss potential threatening weather. Mechanisms to foster regular discussion between NMCs and the RSMC should be investigated. At the very least NMCs should forward their own forecast/warnings to RSMC for their information (and possible feedback).

b. Feedback on guidance product quality, and on NWP and ensemble products to RSMC and Global Centres.

RSMC-Pretoria did not receive any ad hoc feedback about the guidance forecasts (either going right or wrong). Neither was any feedback received regarding the quality of the NWP or ensemble products, or any biases as picked up by NMC forecasters. For the RSMC to strive to give more detail in the guidance forecasts they need to learn more about the local weather over the region. This will only be possible if the RSMC get regular feedback on their forecasts. This is also a challenge that needs to be addressed one way or another.

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

The SWFDP project provided a positive platform for RSMC-Pretoria to share its information with participating NMCs and to deliver a useful service to them. Even though there was scaling down of severe weather during the period due to the approaching winter, the weather situation over Southern Africa was continuously monitored for potential severe weather, thereby keeping forecasters alert to potential hazardous winter weather that affects the southern parts of the sub-continent.

ADDENDUM. RSMC-PRETORIA PRODUCTS

Figure 1. RSMC-Pretoria web site main page

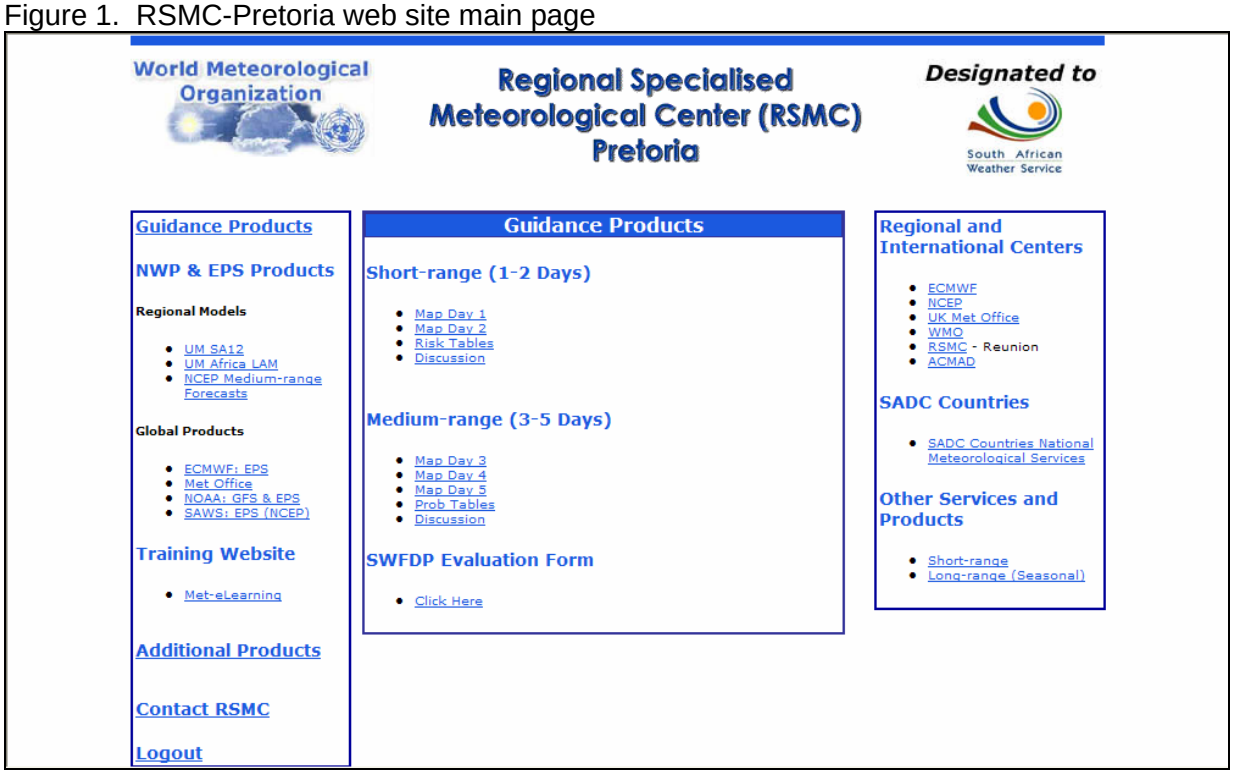

Figure 2. Guidance map for day 1

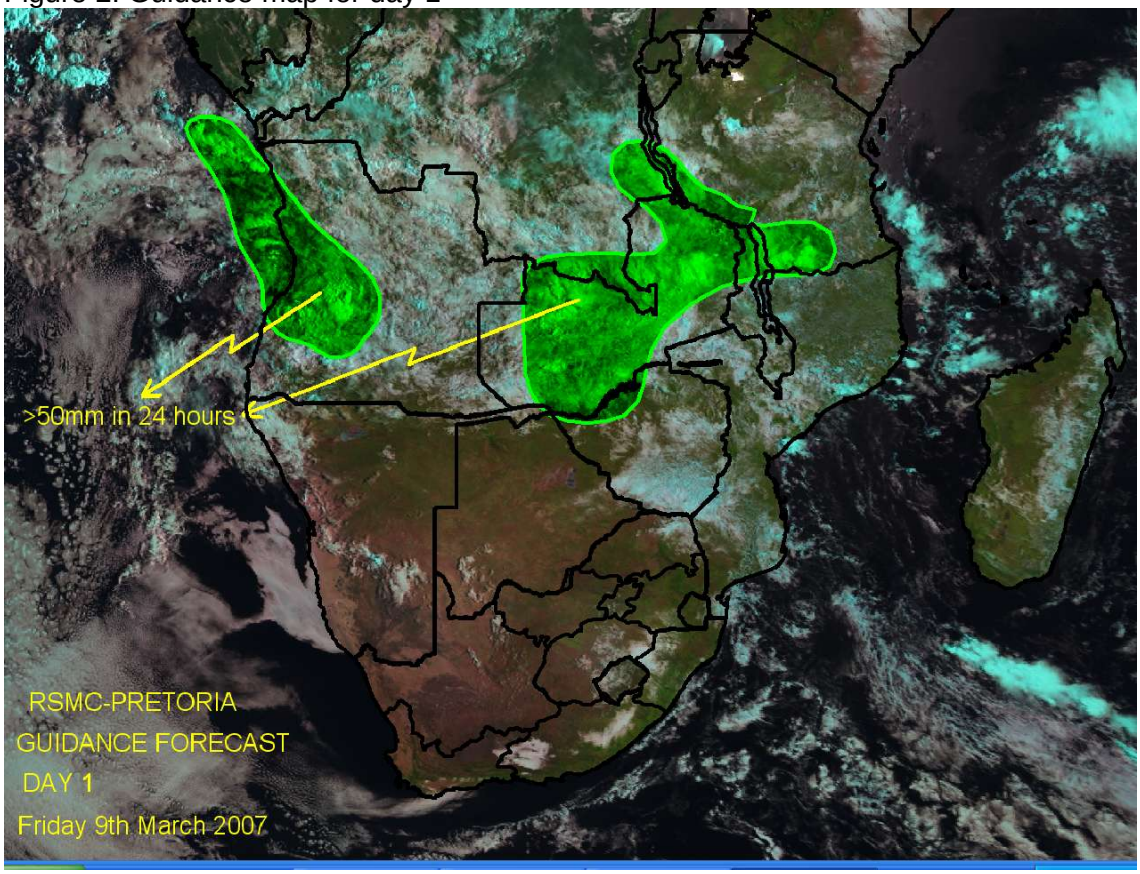

Figure 3. Guidance map for day 5

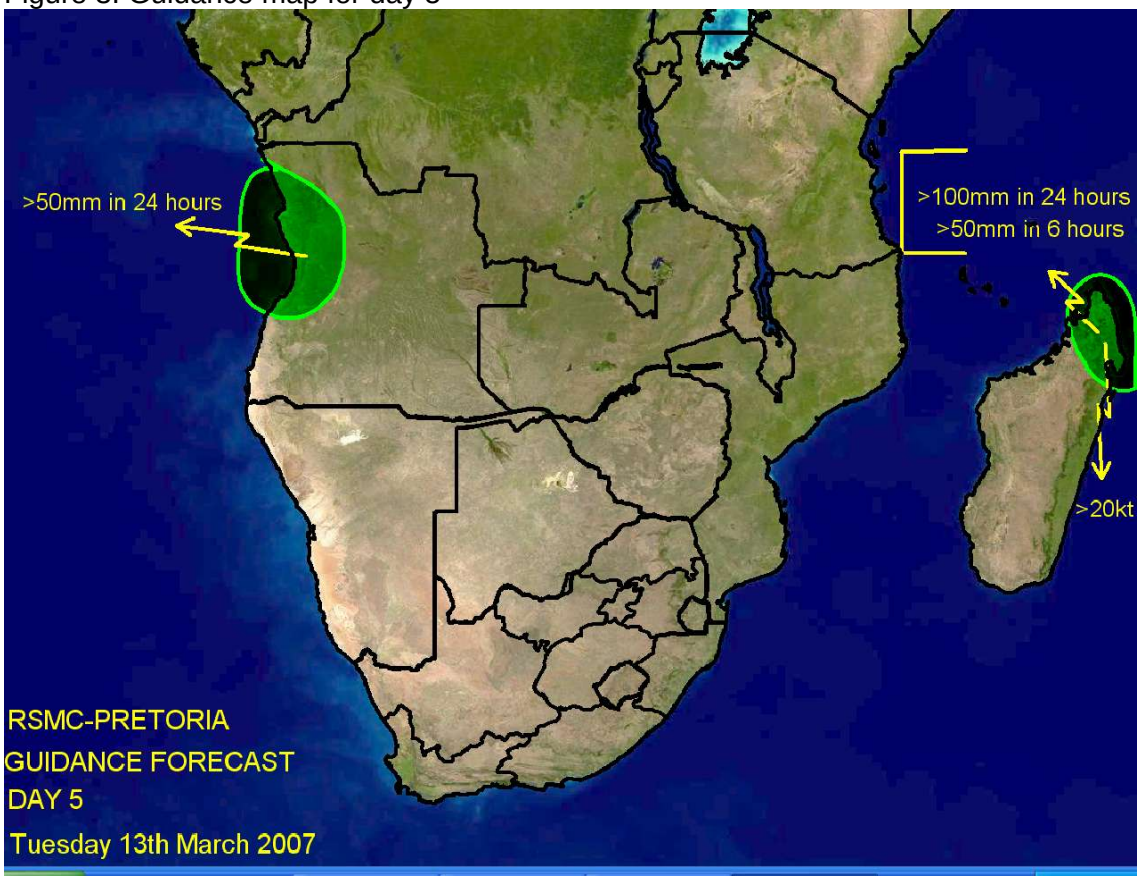

Figure 4. Example of a discussion of short-range (days 1 and 2)

RSMC-PRETORIA
SWFDP GUIDANCE PRODUCTS

SHORT-RANGE (DAY 1 AND DAY 2)

Issue Date: Friday 9th March 2007
Valid for: 9th and 10th March 2007

1. SYNOPSIS OF EXPECTED WEATHER PATTERNS

1.1 Day 1 : 9th March 2007.

Ridge of high pressure over South-Africa with a low-level onshore flow along the Mozambique coast, causing low-level convergence over northern Mozambique. A low over southern Angola coast causing low-level convergence over southern Angola. 200hPa divergence over Tanzania, northern Zambia and Angola.

Heavy rain over southern Tanzania, Zambia and the coast of Angola.

Confidence: Moderate. to good.

1.2 Day 2: 10th March 2007

The Angola low shifts to west of the Angola coast with low-level convergence over south-western Angola and on the Mozambique coast south of Beira. 200hPa divergence over northern Mozambique channel, Zaire and south-western Angola. Areas of heavy rain over Angola coast and over the Mozambique channel off Beira.

Confidence: Moderate to good

Forecaster: Evert Scholtz.

Figure 5. Example of risk tables for short-range (days 1 and 2).

RSMC-PRETORIA
SWFDP GUIDANCE PRODUCTS
RISK TABLES

SHORT-RANGE (DAY 1 AND DAY 2)

Issue Date: 9th March 2007

In order to provide more information about the geographical location of the severe event the following convention is adopted when filling in the cells: X for the whole country, N for the northern part, S for the southern part, W for the western part and E for the eastern part.

DAY 1: Friday 9th March 2007

	HEAVY PRECIPITATION				STRONG WINDS			
RISK	**No risk**	**Low risk**	**Medium risk**	**High risk**	**No risk**	**Low risk**	**Medium risk**	**High risk**
Botswana	X				X			
Madagascar	X				X			
Mozambique	X				X			
Tanzania			S		X			
Zimbabwe	X				X			

DAY 2: Saturday 10th March 2007

	HEAVY PRECIPITATION				STRONG WINDS			
RISK	**No risk**	**Low risk**	**Medium risk**	**High risk**	**No risk**	**Low risk**	**Medium risk**	**High risk**
Botswana	X				X			
Madagascar	X				X			
Mozambique	X				X			
Tanzania	X				X			
Zimbabwe	X				X			

Figure 6. Example of a discussion for the medium range (days 3 to 5)

RSMC-PRETORIA
SWFDP GUIDANCE PRODUCTS

MEDIUM-RANGE (DAY 3, DAY 4 AND DAY 5)

Issue Date: 9th March 2007
Valid for: 11th , 12th ,13th March 2007.

2. SYNOPSIS OF EXPECTED WEATHER PATTERNS

DAY 3 : 11th March 2007

Tropical low north-east of Madagascar causing a strong onshore flow on the north-east coast of Madagascar, where heavy rain and strong surface winds could be expected. Strong 200hPa divergence over Tanzania, northern Zambia and Angola.

Degree of confidence: moderate to good

DAY 4 : 12th March 2007

Tropical low north-east of Madagascar, causing strong winds and heavy rain over the north-east of Madagascar. Surface and upper low over northern Angola, where heavy rain is expected.

Degree of confidence: moderate.

DAY 5 : 13th March 2007

Synopsys still much like day three and four but tropical low now closer to Mdagascar.

Degree of confidence: moderate.

3. DISCUSSION OF GUIDANCE PRODUCTS FROM GLOBAL AND REGIONAL CENTRES.

ECMWF not updated since 1200Z run on the 6th so only have from regional models NCEP Medium rang and from Global Products NOAA: GFS & EPS.

Forecaster: Evert Scholtz.

Fig 1. Mean sea level pressure at 1200Z on 13th and precipitation over past 12 hours

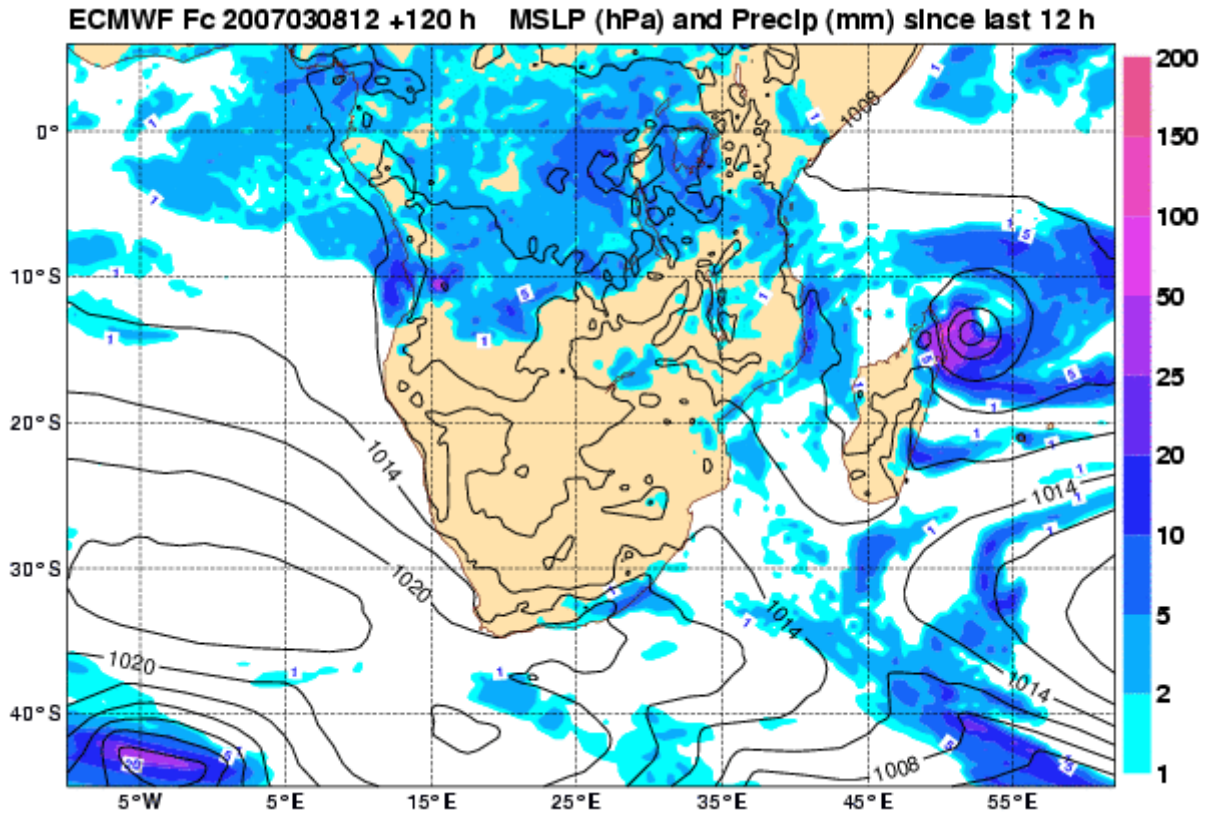

Figure 7. Example of probability tables for the medium range (days 3 to 5)

RSMC-PRETORIA
SWFDP GUIDANCE PRODUCTS
PROBABILITY TABLES

MEDIUM-RANGE (DAY 3, DAY 4 AND DAY 5)

Issue Date: 9th March 2007

In order to provide more information about the geographical location of the severe event the following convention is adopted when filling in the cells: X for the whole country, N for the northern part, S for the southern part, W for the western part and E for the eastern part.

DAY 3: 11th March 2007

	HEAVY PRECIPITATION (exceeding threshold 50 mm/6 hrs)	**STRONG WINDS** (exceeding threshold 20 kts)

Botswana	**X**				**X**			
Madagascar			**NE**				**NE**	
Mozambique	**X**				**X**			
Tanzania		**S**			**X**			
Zimbabwe	**X**				**X**			

DAY 4: 12th March 2007

	HEAVY PRECIPITATION (exceeding threshold 50 mm/6 hrs)				**STRONG WINDS** (exceeding threshold 20 kts)			
Probability	**<10%**	**30%**	**60%**	**>80%**	**<10%**	**30%**	**60%**	**>80%**
Botswana	**X**				**X**			
Madagascar			**NE**				**NE**	
Mozambique	**X**				**X**			
Tanzania	**X**				**X**			
Zimbabwe	**X**				**X**			

DAY 5: 13th March 2007

	HEAVY PRECIPITATION (exceeding threshold 50 mm/6 hrs)				**STRONG WINDS** (exceeding threshold 20 kts)			
Probability	**<10%**	**30%**	**60%**	**>80%**	**<10%**	**30%**	**60%**	**>80%**
Botswana	**X**				**X**			
Madagascar			**NE**				**NE**	
Mozambique	**X**				**X**			
Tanzania	**X**				**X**			
Zimbabwe	**X**				**X**			