WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

MEETING OF SEVERE WEATHER FORECASTING DEMONSTRATION PROJECT – REGIONAL SUBPROJECT RA I (AFRICA) (SWFDP-RA I)

PRETORIA, SOUTH AFRICA, 31 JULY – 3 AUGUST 2006

FINAL REPORT

Executive Summary

Numerical Weather Prediction systems have become increasingly relevant and indeed essential to the severe weather forecasting process, with a growing number and variety of sophisticated outputs, currently available from NWP producing centres, which could be beneficial to severe weather forecasting to many National Meteorological and Hydrological Services (NMHS). The SWFDP is organized as a series of regional subprojects whose scope is to explore and test the usefulness of the products currently available from NWP centres, or products that could be readily made available from current NWP systems, with the goal to improving severe weather forecasting services in countries where sophisticated model outputs are not currently used. The principal focus of the project is on the phenomena of heavy precipitation that could cause serious flooding, and strong destructive winds.

This report presents the discussions and results of the “kick-off” planning meeting of the Severe Weather Forecasting Demonstration Project (SWFDP), Regional Subproject in RA I, that was held 31 July to 3 August, 2006 at the Regional Specialized Meteorological Centre Pretoria at the kind invitation of the Government of South Africa. The major outcome of this meeting was the development of the Regional Subproject Implementation Plan for this first subproject of the SWFDP in the southeastern region of Africa, a plan that clearly specifies how the subproject will work to ensure its success in this region. The formation of a Regional Subproject Management Team was achieved, a necessary part of the Implementation Plan. The timeline for implementation is very short, i.e., to commence 6 November 2006.

The participating centres include global centres at ECMWF, Met Office UK (Exeter), and NCEP-CPC (Africa Desk, USA); regional centres RSMC Pretoria, RSMC La Réunion (Tropical Cyclones RA I), and ACMAD; and national centres of Botswana, Madagascar, Mozambique, Tanzania, and Zimbabwe. The RSMC Pretoria will act the single Regional Centre for collecting and synthesizing weather and forecast data and products from all participating global and regional centres, and produce a daily severe weather forecast guidance product to be made available to all NMHSs of the region.

Preparatory training for operational forecasters from the participating NMCs is proposed to take place at RSMC Pretoria, prior to the commencement of the actual experimental phase of the project.

1. Opening of the meeting

1.1 The Meeting of the Severe Weather Forecasting Demonstration Project for the planning of its Regional Subproject in RA I opened at 9:00 a.m. on Monday 31 July 2006 at the Regional Specialized Meteorological Centre Pretoria, South Africa. The opening session included remarks made by Mr Bruce Tashe, the Chief Executive Officer of the South African Weather Service (SAWS), the representative of the Secretary General of WMO, Mr Peter Chen, and Mr Mnikeli Ndabambi, Head of the National Forecasting Division of SAWS.

1.2 Mr Tashe emphasized the high relevance and importance of this Severe Weather Forecasting Demonstration Project to the saving of lives in this region of Africa, and informed the meeting of the full support of SAWS to achieve the goals of this Project. He noted the social and economic setting of South Africa including a number of realities of the region: high poverty levels, large rural and poor areas, large diversity of technical capabilities especially for example in telecommunications to reach rural and poor populations, high population growth rates, and where significant portions of the populations have a different traditional understanding of nature and their exposure to natural hazards. A successful strategy and plan to improve warning services must recognize these realities. He warmly welcomed this important meeting on behalf of SAWS and the Government of South Africa

1.3 On behalf of the Secretary General of WMO, Mr Michel Jarraud, Mr Chen recalled the motivation behind the CBS Severe Weather Forecasting Demonstration Project (SWFDP). Numerical Weather Prediction (NWP) systems have become increasingly relevant and indeed essential to the severe weather forecasting process, with a growing number and variety of sophisticated outputs, currently available from NWP producing centres, which could be beneficial to severe weather forecasting to many National Meteorological and Hydrological Services (NMHS). The SWFDP is being organized as a series of regional subprojects whose scope is to explore and test the usefulness of the products currently available from NWP centres, or products that could be readily made available from current NWP systems, with the goal to improving severe weather forecasting services in countries where sophisticated model outputs are not currently used. The principal focus of the project is on the phenomena of heavy precipitation that could cause serious flooding, and strong destructive winds.

1.4 CBS-XIII (2005) agreed with the goals of the Project as follows:

- To improve the ability of NMCs to forecast severe weather events;
- To improve the lead time of alerting of these events;
- To improve interaction of NMCs with the Disaster Management Civil Protection Authorities (DMCPA) before and during events;
- To identify gaps and areas for improvements; and
- To improve the skill of products from GDPFS centres through feedback from NMCs.

1.5 EC-LVIII (2006) agreed that the first of such regional subproject be initiated in southeastern Africa, of one-year duration as soon as possible.

1.6 The single major task of this meeting was to develop and agree to a Regional Subproject Implementation Plan for this first subproject in the southeastern region of Africa, a plan that clearly specifies how the subproject will work to ensure its success in this region of Africa. The formation of a Regional Subproject Management Team was also a necessary part of the Implementation Plan. The timeline for implementation is very short, i.e., to commence by the beginning of November 2006. This regional subproject is viewed as a flagship of the CBS SWFDP.

1.7 The meeting was chaired by Mr William Nyakwada, the Chairman of the Working Group on Planning and Implementation of the World Weather Watch in RA I. In his remarks he noted that the project provided a rare opportunity for global centres, regional centres and NMHSs to obtain

feedback on their products that would assist in the improvement of the products. He noted that severe weather events contribute significantly to high poverty levels in the majority countries in the region. He expressed high expectations from the results of the project being the first one in a series of similar regional projects to be implemented elsewhere.

2. Organization of the meeting

2.1 Approval of agenda. The Meeting adopted the agenda that is found in Annex 1 to the report.

2.2 Agreement of working arrangements. The Meeting agreed on the details concerning the organization of its work including the working hours.

2.3 The list of participants is given in Annex 2 of the report.

3. Introduction – Severe Weather Forecasting Demonstration Project (SWFDP)

3.1 The meeting was briefed on the SWFDP, its history and motivation, relevant documents, and its status, in particular the following key documents that were developed by the CBS SWFDP Steering Group:

- The SWFDP Overall Project Plan (Dec. 2005),
- The SWFDP Guidebook on Planning Regional Subprojects (Jan. 2006).

General discussion of the Project

3.2 The SWFDP recognizes existing structures and operational arrangements among the centres, and that the Project proposes to further enhance these aspects with focus on severe weather forecasting, and provide an opportunity for NMHSs to enhance their weather warning services provided to national disaster management and civil protection authorities;

3.3 In the context of the Project, it is necessary to clearly define the roles of centres, especially the role of one regional centre that acts as a single regional source of guidance to the participating NMCs for severe weather forecasting. National centres must not face multiple, and potentially conflicting guidance from different sources. In this context, RSMC Pretoria is the single Regional Centre that will provide this guidance. RSMC La Réunion will continue to act as the specializing regional centre for Tropical Cyclones, coordinate and liaise closely with RSMC Pretoria, and continue to provide specialized Tropical Cyclone forecasting products to all centres within its area of responsibility. As well, ACMAD will continue to provide its products to be included as input to RSMC Pretoria as part of the regional subproject. Conceptually, in the context of this project, products from the RSMC La Réunion and ACMAD are effectively treated as if they were products from the “global” centres, all provided to RSMC Pretoria for synthesizing into a single regional guidance product, issued daily to the NMHSs.

3.4 The meeting recognized the ongoing role and strength of ACMAD in matters related to meteorological training in Africa. It was felt that a potential role for ACMAD could be in the archiving of NWP products and other event information during the time of a severe weather event, in close cooperation with RSMC Pretoria. Such archived data could then be used by ACMAD to develop case studies for use in future training and for identifying future training needs. The NMHSs should also conduct archiving of the relevant products and information.

3.5 While this regional subproject was adopted by CBS as the first of the SWFDP regarding heavy precipitation and strong winds in the category of “not associated with Tropical Cyclones”, in its implementation it will include all heavy precipitation and strong winds severe weather events irrespective of whether they are associated with Tropical Cyclones. Another regional subproject

was adopted in principle by CBS to focus on forecasting of severe weather associated with Tropical Cyclone.

3.6 While the Project has a goal to improve the relationship between NMHSs and the National Disaster Management and Civil Protection Authorities (DMCPA), they have not been directly involved with the Project to this point. It was felt that with the limited resources that were available to the Project, the priority at this time was to well organize the project among the participating centres. NMHSs are encouraged to continue to engage or maintain contacts with their respective DMCPA using this Project as a leverage.

3.7 The meeting was informed that the Tropical Cyclone Committee in RA I has requested RSMC La Réunion to focus efforts on improving the forecasting of heavy precipitation of tropical cyclones over coastal lands following landfall. This Project is an opportunity to achieve this objective.

3.8 All participating NHMSs confirmed that the Internet access at each of their centres meet the minimum criteria of 64 kbps, except NMHS Madagascar which is presently at 33 kbps.

3.9 The meeting agreed that some kind of emergency communications procedure should be implemented among the participating regional and national centres, to be activated in anticipation of severe weather events. Such a system should be routinely activated (e.g. once a week) to ensure its operational readiness. This could be facilitated by an Internet/Web based software for network meetings.

3.10 For the purpose of carrying out effective operational information exchange and urgent communications during the project, the meeting agreed that as much as possible operational 24/7 supported e-mail addresses would be used. All participating centres will provide such operational e-mail addresses, to the RSMC Pretoria, copied to WMO Secretariat. The complete list of such e-mail addresses will be distributed to all participating centres as soon as possible before November 2006 and maintained operationally by RSMC Pretoria.

3.11 It was noted that during some severe weather events normal communications may become disrupted or broken. Contingencies should be developed and put into place, including the possibility of backup arrangements between NMCs.

3.12 The meeting agreed that the Project represents the implementation of the Cascading Concept of making NWP products of global centres useful at the NMHSs. It is therefore important that NMCs fully participates in the use of the regional centre's guidance and provide feedback to the regional centre to improve on the effectiveness of the information cascade. When the daily guidance from RSMC Pretoria is not followed, the reasons should be documented in the form of feedback.

3.13 Products from the global centres will be available to all participating centres as a minimum in the form of graphical products. It is the intention of these centres to provide their products via either a dedicated web page or an FTP site.

3.14 RSMC Pretoria noted that it will extend the northern boundary of its existing southern Africa window to include Tanzania for those products that are relevant to this Project. While this extension is technically feasible, the skill of products in that region may be less than in the southern sections.

Preparatory Training

3.15 Preparatory training relative to the regional subproject must focus on aspects that are absolutely essential to the project implementation, which should be limited to the relevant less familiar NWP products (especially EPS-based products), guidance products from RSMC Pretoria,

forecasting severe convective weather, and how to execute the evaluation procedures for the Project. The meeting concluded that this training should take place before the start of the actual experiment and would be most cost effective to be of 4-day duration.

3.16 The Met Office UK has been in the preparation of NWP training in conjunction with ACMAD, to deliver it at ACMAD, and as well is in discussion to deliver the same training at NMHS Tanzania in the October 2006 time frame, quite separately from this Project. These initiatives are well timed largely suitable for the preparatory training for this Project. The Met Office has agreed to adjust the training programme as necessary to meet the needs of the preparatory training, including inviting the participation of ECMWF, NCEP and RSMC Pretoria in the delivery of training.

3.17 It was proposed that a 4-day preparatory training session be conducted in the week of 30 October 2006 at RSMC Pretoria and that two participants from each of the participating NMCs of the project be invited to attend.

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3.18 NCEP (CPC, U.S.A.) is considering to expand its activities at its Africa Desk, on severe weather forecasting. One aspect is to host and support up to 8 forecasters from the Africa region at its Africa Desk. The meeting felt that this initiative would be highly welcomed and is complementary to the goals of the Project.

3.19 NCEP has also contacted the Storm Prediction Centre that has the responsibility for forecasting severe convective weather, to enquire whether they could assist in the Project as the heavy rainfall in southeastern region of Africa is often associated with severe convection, possibly similar in nature to Mesoscale Convective Complex (MCC) development in the Great Plains of North America.

3.20 Distant learning modules are freely accessible from NCEP and COMET (UCAR, USA), for example on forecasting severe convective weather and on Ensemble Prediction Systems.

3.21 ACMAD is exploring ways of getting forecasters from eastern and southern Africa on project-related work at the Centre, subject to the NMHSs making their personnel available.

4. Development of the RA I Regional Subproject Implementation Plan

4.1 The Meeting was briefed by each of the participating global, regional and national centres. Each centre provided documented information for the meeting. The global centres at Met Office UK and NCEP-CPC (Africa Desk, USA) provided briefings while the Secretariat provided the information on ECMWF, in the absence of its representative. Participating regional centres included RSMC Pretoria, RSMC La Réunion (Tropical Cyclones RA I), and ACMAD, and national centres included those of Botswana, Madagascar, Mozambique, Tanzania, and Zimbabwe. The meeting discussed numerous implementation issues, including the establishment of a Regional Subproject Management Team, development of an implementation plan for the regional subproject as well as identifying specific recommendations and actions.

4.2 The meeting agreed to tentatively set the commencement of the actual experimentation part of the demonstration on Monday 6 November 2006.

4.3 The meeting developed the draft Regional Subproject Implementation Plan given in the annex to this paragraph, which forms the basis for the implementation of this project. Additional details of the implementation actions for the global, regional and national centres will be developed by 30 September 2006 and annexed to the appropriate paragraphs of the Implementation Plan.

Regional Subproject Management Team - RA I (RSMT)

4.4 Members of the RSMT need to be confirmed by their respective Permanent Representatives with WMO. The Secretariat will undertake this task through appropriate correspondence. Participants of the meeting who represented participating centres agreed to include their names as recommended members to the RSMT, with the exception of the participant from NCEP who will raise this matter with his office as soon as possible.

4.5 The meeting agreed the Chairman of the Regional Subproject Management Team should be most appropriately assigned to Mr Mnikeli Ndabambi of SAWS, who was subsequently confirmed by the South Africa Permanent Representative with WMO.

NWP Products

4.6 For the purpose of the Project, the relevant geographical window for the relevant global NWP products is defined as follows: 10° W, 5° N, 65° E, 40° S.

4.7 Many global NWP products are presently accessible via the web sites of the global centres, as well as transmitted on the GTS. In particular, NCEP (CPC) has a dedicated site associated with the Africa Desk. The Met Office UK is experimentally running an Africa Local Area Model)"A-LAM", whose products are available through a password protected web site.

4.8 ECMWF is willing to provide any existing and relevant product to the Project via a dedicated password protected web portal, including those products which are not presently available to WMO Members.

4.9 The EPS-based meteograms, or "EPSgrams" will be made available from both ECMWF as well as Met Office UK. ECMWF is prepared to provide EPSgrams for 5 to 10 locations in each of the countries whose centres are participating in the project. The Met Office UK is prepared to provide EPSgrams for two locations in each of the participating NMHSs. The meeting suggested that a good strategy would be for NMHSs to request from the Met Office the two locations that are among those requested from ECMWF for the purpose of intercomparison The participants agreed to provide their respective lists (location names with latitude/longitude coordinates) by e-mail to:

- the Secretariat (pchen@wmo.int),
- the Met Office UK (ian.lisk@metoffice.gov.uk),
- and RSMC Pretoria (mnikeli.ndabambi@weathersa.co.za),

as soon as possible, however before 30 August 2006. Mr Ian Lisk agreed to convey the complete list of stations to ECMWF (david.Richardson@ecmwf.int and horst.boettger@ecmwf.int).

4.10 The South African Weather Service will soon implement a limited area model (LAM) over southern Africa. This is the implementation of the Met Office Unified Model in the configuration of 12-km horizontal resolution, with 3-DVar data assimilation, and forecasting out to 48 hours. Outputs from this LAM will be very suitable for the project, and its coverage will cover the regions of the participating NMHSs. In addition, the meeting would like SAWS to produce and make accessible forecast soundings based on outputs of this LAM. RSMC Pretoria will expand its current web-based products of the NCEP-EPS to cover all countries in the region.

4.11 The RSMC La Réunion will soon implement an Aladin LAM, in particular for its Tropical Cyclone forecasting responsibilities. Its domain window will be centered on La Réunion and include Madagascar to the west, however will not significantly extend inland of the Africa Continent. The outputs could be of interest to the Project, particularly if its boundaries could be extended further westward.

4.12 It was noted that the North American Ensemble Forecasting System (NAEFS) will soon commence producing multi-model EPS products with global coverage. NCEP will enquire whether products windowed on the project's domain could be made available.

RSMC Pretoria daily guidance product

4.13 The meeting developed a draft form of the RSMC Pretoria daily guidance product that includes one section on short-range guidance (up to and including day-2) and one section on medium-range (up to and including day-5). The guidance product includes probabilistic forecast information preferably in chart form when appropriate. There should be one text summary for the short-range and one text summary for the medium-range. A table of guidance is to be included for each day of the guidance. The draft form is given in the Regional Subproject Implementation Plan, annexed to paragraph 4.3 of this report.

A complete list of required products is given in the Implementation Plan.

Evaluation and feedback on severe weather events and forecasts

4.14 The meeting developed a draft evaluation form for NMHSs to evaluate the guidance from RSMC Pretoria relative to severe weather events (heavy rainfall and strong winds), whether forecasted or actual occurrence. This form is intended for use in the evaluation of the Project. The draft form is given in the Regional Subproject Implementation Plan, annexed to paragraph 4.3 of this report.

4.15 For the purpose of effectively monitoring severe weather in the region, the participating NMHS will provide RSMC Pretoria their respective warning criteria for heavy rainfall and strong winds. RSMC Pretoria will create a graphic to depict these thresholds on a single chart and distribute to all participating centres.

4.16 The meeting agreed that in the recording of severe weather events of heavy rainfall or strong winds by the NMCs, the form should also require the forecaster to note whether the event(s) is associated with severe convective activity.

4.17 For the purpose of project evaluation at the completion of the primary severe weather season, i.e., November to the following May, the meeting stressed the importance of creating and maintaining an archive of NWP products and related information about the severe weather during the severe weather episodes. The archived information could also be the basis for developing case studies for training purposes and exercising emergency procedures involving DMCPA.

4.18 The evaluation forms are to be completed by the NMCs and sent to RSMC Pretoria, ACMAD, NCEP-Africa Desk, Mr William Nyakwada (the subproject's contact with the SWFDP Steering Group), and the WMO Secretariat (Mr P. Chen).

4.19 The global centres invited the other participating centres to provide feedback on the performance of their respective NWP products. Such feedback is not required on a daily basis, however would be most useful in summary form, for example at the beginning of the experiment (November 2006), at the end of the rainy season (May 2007) and at the end of the regional subproject (October 2007). These summaries would be collected by RSMC Pretoria and then forwarded to the global centres for their consideration and action.

4.20 The meeting encouraged NMHSs to develop a suitable form that obtains feedback from their respective disaster management and civil protection authorities for the purpose of evaluating the warning services that are provided, through the advisories and warnings bulletins or any other means of alerting.

4.21 The meeting agreed that on a case-by-case basis (when a severe weather event is either observed or forecasted) all products relevant to the project should be archived by ACMAD and RSMC Pretoria. The daily guidance projects from RSMC Pretoria should also be archived. The participating NMCs are encouraged to archive relevant products and information as per local/national needs.

4.22 The success of the SWFDP – RA I subproject can ultimately be determined by assessing the ability of each participating NMHS to develop “best practice” processes for:

- effective forecasting of severe weather events using modern forecasting products and technologies,
- timely and efficient communication of alerts and warnings of severe weather to the public and disaster management authorities.

5. Any other business

There was no other business arising.

6. Closing

The meeting closed at 14:00, 3 August 2006.

ANNEX to Paragraph 4.3

Regional Subproject Implementation Plan (RSIP)

1. Introduction

1.1. Principles of the SWFDP

Numerical Weather Prediction (NWP) systems have become increasingly relevant and indeed essential to the severe weather forecasting process, with a growing number and variety of sophisticated outputs, currently available from NWP producing centres, which could be beneficial to severe weather forecasting to many National Meteorological and Hydrological Services (NMHS). The Severe Weather Forecasting Demonstration Project (SWFDP) was being organized as potentially a series of regional subprojects whose scope is to explore and test the usefulness of the products currently available from NWP centres, or products which could be readily made available from current NWP systems of global and regional meteorological centres, with the goal to improving severe weather forecasting services in countries where sophisticated model outputs are not currently used. The principal focus of the project is on the phenomena of heavy precipitation that could cause serious flooding, and strong destructive winds. Such a demonstration project would use a cascading (forecasting) approach to provide greater lead-time for severe weather and would at the same time contribute to capacity building and improving links with Disaster Management and Civil Protection Authorities (DMCPA).

According to the recommendations of the CBS-XIII (2005), the goals of the SWFDP are the following:

- to improve the ability of NMCs to forecast severe weather events;
- to improve the lead time of alerting of theses events;
- to improve interaction of NMCs with DMCPA before and during events;
- to identify gaps and areas for improvements to improve the skill of products from GDPFS Centres through feedback from NMCs.

1.2. The cascading process

In the framework of the general organization of the Global Data-Processing and Forecasting System (GDPFS), the SWFDP implies a co-ordinated functioning among three types of GDPFS centres. Conceptually, it should involve one global centre, one regional centre and a small number of NMHSs located within the area of responsibility of the regional centre.

According to the conclusions of CBS-XIII, the proposed SWFDP is an excellent way to apply the cascading approach for forecasting severe weather in three levels, as follows:

- global NWP centres to provide available NWP products, including in the form of probabilities;
- regional centres to interpret information received from global NWP centres, run limited-area models to refine products, liaise with the participating NMCs;
- NMCs to issue alerts, advisories, severe weather warnings; to liaise with DMCPAs and to contribute to the evaluation of the project.

The SWFPD will implement a cascading forecasting process implying the participation of selected centres chosen within a geographical area affected by an agreed type of severe

weather event. The cascading process aims to ensure the real-time distribution of the relevant available information produced by both a Global Centre(s) and a Regional Centre(s) to selected NMHSs. Moreover it is necessary to continue the cascade by making the final authoritative products of hazardous conditions (advisories or warnings) produced by the NMHSs available to the final users such as local Services in charge of hydrology and/or DMCPAs.
The cascading process concerns both short-range and medium-range products. In the framework of the Regional Subproject described hereafter short-range is defined as up and including day-2 while medium- range is defined as day-3 up to and including day-5.

A near real-time evaluation will be conducted, based on observations of the meteorological parameters collected at local meteorological stations as well as information gathered on the impacts of the severe weather phenomena as reported by DMCPA Services. This evaluation of the performance of the cascading process will then be provided as feedback to the participating centres to further fine tune the process itself.

1.3. The framework of the Regional Suproject in RA I

CBS-XIII agreed that the DPFS programme should coordinate the implementation of the two types of projects; one that is aimed at improving the forecasting of the severe weather associated with Tropical Cyclones, and another project focusing on improving heavy precipitation/strong wind forecasts (not associated with Tropical Cyclones).

A Project Steering Group (PSG) was established to advise the Chair of the OPAG on DPFS on the planning of the SWFDP.

The SWFDP cab be divided into three phases as follows

- Phase I: Overall Project Planning. This phase includes the preparatory work necessary to prepare the project specifications and the work of the technical Project Steering Group (PSG) to identify the possible participating centres and to select suitable regional subprojects.

- Phase II: Regional Project Implementation Planning and Execution. This phase begins with the preparation of the detailed specifications allowing the representatives of the participating centres to develop a specific Regional Subproject Implementation Plan (RSIP), to manage its implementation and then to carry out the experimentation itself that is likely to last about one year.

- Phase III: Regional Project Evaluation and Conclusion. This phase includes the analysis and the evaluation of the entire subproject as well as contributing to the evaluation of the overall SWFDP with respect to the goals proposed initially.

The Project Steering Group recommended the following regional subproject most suitable for implementation in 2006, which is envisaged to possibly involve the following participants:

- NMHSs: Botswana, Madagascar, Mozambique, Tanzania, Zimbabwe;
- Regional Centres: Pretoria, La Réunion, ACMAD;
- Global Centres: Exeter, Washington, ECMWF.

Given that the season when severe events are likely to occur in this part of southern Africa is from November to May, there should be sufficient time left for the preparation of the subproject,

including the provision of essential preparatory training, in order to start the field phase in November 2006.

GDPFS and national centres to develop the specific subproject implementation plan and to manage its implementation and then to carry out the experimentation itself which is likely to last about one year.

2. The Regional Subproject Management Team

The Regional Subproject Management Team (RSMT) is set up with the aim of preparing the implementation of the project, managing and controlling its execution. The management of the Regional Subproject is the responsibility of the Management Team and within the activities of CBS. The main responsibilities of the RSMT are defined as follows:

- to prepare the Regional Subproject Implementation Plan;
- to manage the implementation of the regional subproject;
- to control the execution during the field phase;
- to report on a quarterly basis on status;
- to evaluate the system.

2.1. Members of the RSMT

The Regional Subproject Management Team is chaired by:

Mr Mnikeli Ndabambi assisted by Mr Eugene Poolman (RSMC Pretoria)

The proposed provisional list of the members of the RSMT representing the participating centres, which has to be approved by the respective Permanent Representatives, is the following:

Mr Othata Mmolotsi (NMHS Botswana)
Mr Helder Sueia (NMHS Mozambique)
Mr Philbert Tibaijuka (NMHS Tanzania)
Mr Leornard Unganai (NMHS Zimbabwe)
Mrs Sahondrarilaia Raveloarisoa (NMHS Madagascar)
Mr Yassine Kadri (RSMC La Réunion)
Mr Mumba Zilore (ACMAD)
Mr Ian David Lisk (Met Office UK)
Mr Horst Boettger (ECMWF)
To be determined (NCEP, USA)

The contact person of the Project Steering Group (PSG) is:

Mr William Nyakwada (Kenya).

2.2. Responsibilities of the Members of the RSMT

The RSMT is responsible for the elaboration of an implementation plan for the regional subproject. The Regional Subproject Implementation Plan (RSIP) must include the following actions with milestones:

- to gather the participants to develop the RSIP;
- to submit the RSIP to the PSG;
- to conduct preparatory training for the participants;
- to start of the field phase;
- to conduct mid-term project review;
- to submit the final report to PSG.

2.2.1. The Management Team lead by its Chairperson:
will undertake the following tasks during the preparation phase of the SWFDP:

- to draft a detailed regional subproject implementation plan;
- to develop preparatory training requirements specifically for participating operational forecasters who will be involved in the demonstration project and to provide information to WMO Secretariat;
- to report on the Project.

2.2.2. The lead person for each participating centre (Member of Management Team):

- to coordinate all aspects of project implementation and execution at their respective centres;
- to evaluate possible data-processing developments (e.g. work required to adjust or tailor NWP products);
- to arrange for forecasters in the centres to receive or have access to the agreed products;
- to identify preparatory training requirements.

2.2.3. The contact person of the SWFDP Project Steering Group (PSG):

- to liaise with the PSG on aspects of the regional subproject.

3. Requirements of NMHSs

3.1. Data and products issued from the Global Centres

3.1.1. Current Deterministic NWP fields

Up to 2 days at 6h Intervals (12h intervals beyond 2 days). The domain of the area of coverage is defined as follows: 10°W, 5°N, 65°E, 40°S. NWP forecasts should be updated every 12 hours. In addition to the daily production all the forecasts should be archived for a minimum of 7 days.

Products that are not routinely transmitted through the GTS should be provided in graphical form (Web pages) via Internet for rapid display and dissemination, and may also be made available by other methods (FTP).

The recommended products include:

- charts to depict the large-scale flow (MSLP, 950/850/700/300/200 hPa wind, geopotential height, temperature and humidity);
- charts of vorticity at 500/300 hPa, vertical velocity at 700/300 hPa, 850 hPa wet-bulb temperature, 100-500 hPa thickness;
- surface weather elements: 6-hour accumulated precipitation, 10m wind-speed, 2m minimum and maximum temperatures, relative humidity;
- atmospheric column characteristics: precipitable water, CAPE, theta-e, Lifted Index, K index, total totals, CIN;
- Thermodynamic diagrams e.g. tephigrams, skewT/logP issued from the model at several locations.

3.1.2. Probabilistic Forecast Products based on EPS

- Probability charts of severe weather events such as precipitation and wind higher than the following thresholds: 50mm/6h and 100mm/24h for precipitation and 20 knots and 30 knots for wind; these charts are required up to 5 days;
- "spaghetti" plots": 500hPa geopotential height in extra-tropics, precipitation with threshold of 50mm/6h and with threshold of 20 knots and 30 knots at 6h intervals;
- thumbnails of probability of accumulated precipitation in excess of 50mm/6 hours at 6h intervals up to 5 days;
- EPSgrams for weather elements (2m temperature accumulated precipitation) at selected locations;
- Extreme Forecast Index (EFI) for heavy precipitation and strong wind.

3.1.3. Climatic anomaly analysis

- Daily 10-day running accumulative precipitation anomaly maps.

3.2. Data, products and services issued from Regional Centres

3.2.1. Current deterministic Limited Area Model

Up to 2 days at 6h intervals. The requested fields are the same as those proposed for the outputs from global models, where available.

Products that are not routinely transmitted through the GTS should be provided in graphical form (Web page) via Internet for rapid display and dissemination, and may also be made available by other methods (e.g. FTP).

3.2.2. Interpretation with respect to severe weather occurrence

Interpretation of fields available from global and regional centres synthesized in the form of two daily guidance bulletins:

- a short-range (up to and including day 2) guidance mainly based on the interpretation of NWP models, issued during the morning.
- a medium-range (up to and including day 5) guidance mainly based on the interpretation of EPS products, issued during the afternoon.

3.2.3. Training required

The training that is requested by the NMHSs will deal mainly with the interpretation of NWP deterministic, probabilistic and EPS products for forecasting severe weather in the region of interest.

The NMHSs were requested to assess each its current capacity in the use of NWP products and provide this information to Met-Office UK to assist in the development of the preparatory training.

4. Products to be provided

4.1. Products which will be provided by the Global Centres

Global NWP products that can be made available by the three global centres ECMWF, NCEP, Met Office UK, should be "cut" and formatted to fit the project area (as required by the NMHSs in the framework of the project). The table of the Annex A below gives the comprehensive list of the products and indicates which global centre(s) will provide them; the list comprises mainly:

- deterministic forecasts: 6-hourly up to 48 hours, then 12-hourly up to 120 hours;
- ensemble forecasts: 12-hourly up to 120 hours;
- EPSgrams at selected locations listed in Annex B.

4.2 Products to be provided by the Regional Centre(s)

4.2.1 RSMC Pretoria:

- fields given by the Limited Area Model (LAM) running at RSMC Pretoria. This model will take its lateral boundary conditions from the Met Office Unified Model;
- guidance for short-range and medium-range as requested by the NMHSs (An example of the content of the guidance bulletins is given in Annex C). This daily guidance has to be archived.
- archives of all products relevant to the project on case-to case basis (when severe weather event is either observed or forecast).

4.2.2 RSMC La Réunion:

(Presently produced)

- fields given by the LAM running at RSMC La Réunion covering the responsibility area for tropical cyclones in the western part of the Indian Ocean;
- an interpretation of numerical model fields in form of a graphical guidance for analysis and short-range forecasts covering the same area as mentioned before;
- tropical cyclone warnings issued in the framework of the current activity of the RSMC La Réunion.

4.2.3 ACMAD:

(Presently produced)

- short-range interpretation of NWP output synthetic analysis and forecast in graphical form with accompanying texts;
- medium-range guidance in graphical form with text summary.

- archives of all products relevant to the project on case-to case basis (when severe weather event is either observed or forecast).

5. Preparatory Training

5.1. Overview

Training will be delivered in the use of NWP and EPS products just prior to the demonstration phase of the project. The training course will be hosted by the SAWS training centre at RSMC Pretoria. A NWP training module, being developed by ACMAD and the Met-Office UK will incorporate the results of a training needs analysis of the staff at the participating NMHSs. The aim of the training is, "To position operational forecasters in the participating NMHSs to take optimum advantage of the state of the art NWP model output". The Met Office UK, ECMWF and NCEP (Africa Desk) as well as RSMC Pretoria and ACMAD will be contributing to the course development.

5.2. Training topics for the course

- Overview of the different types of atmospheric models e.g. climate, limited area, global;
- overview on how NWP and EPS models work;
- general characteristics, strengths and weaknesses and biases of the different atmospheric models e.g. ECMWF, UKMO, GFS etc.;
- formulating best practice techniques for the interpretation of NWP and EPS products;
- how to use probabilities in the preparation of weather forecasts;
- understanding and interpretation of specialized NWP products for forecasting severe weather events:
  - K Index,
  - Total Totals Index,
  - Lifted Index,
  - vertical velocity,
  - CAPE,
  - precipitable water,
  - Theta-e
  - CIN;
- model verification as part of the forecasting process;
- interpretation of RSMC Pretoria guidance products;
- guidance on the completion of the SWFDP evaluation form;
- constructing a case-study.

5.3. ACMAD involvement in training

ACMAD is exploring ways of getting forecasters from eastern and southern Africa on project-related work at the Centre, subject to NMHSs making their personnel available.

6. Implementation

6.1. Implementation at the Global Centres (work and duties)

- To provide the products, according to the lists given in Annex A and Annex B, to enrich the guidance assessed by RSMC Pretoria;
- to examine the requirements of the regional centres and to propose a way to make the requested products available (e.g. tailored windows);
- to evaluate the time necessary to be able to complete this work;
- to indicate its level of participation in the preparatory training (essentially for medium range products, including EPS).

6.2. Implementation at the Regional Centres (work and duties)

- To list duties and procedures for operational forecasters and systems staff (e.g. access to global centres' products, daily production of guidance coordination among participating centres, develop the daily short-range and medium-range guidance products, develop archiving procedures;
- to participate in providing preparatory training

6.3. Implementation at the NMHSs (work and duties)

- To ensure necessary telecommunication is in place (e.g. Internet access, operational e-mail);
- to list of duties and procedures for operational forecaster (e.g. evaluation, acknowledgement of receipt of guidance from Regional centre);
- to develop suitable warning bulletins for DMCPA services (if not already implemented) and to agree with them on the feedback procedure.
- to be ready for archive of relevant products and information when severe weather event is either forecast or observed, as per local/national needs.

7. Evaluation

The purpose of the evaluation is:

- to verify the efficiency of the forecast issued from the NMHS (comparison between the forecast and the reality each time a severe weather event occurs (occurrence and intensity, lead-time, false alarm ratio, probability of detection)
- to assess the guidance issued by the Regional Centres
- to provide feedback from DMCPA services, e.g. impacts of the severe event, usefulness of warnings/ bulletins

To achieve this an evaluation bulletin will be filled in by the NMHS and transmitted to the RSMC Pretoria. A template of such an evaluation bulletin is given in the Annex E (final form will be produced by RSMC Pretoria as soon as possible). The evaluation bulletin will need to be formatted in a convenient form (Excel file) in order to simplify the processing and archiving of the data. The products that have been used in the production of severe weather forecasts must also be archived for use in future case studies.

8. Timetable of implementation and execution of the Regional Subproject

- Preparatory work,
- Training (4 days, week beginning 30th of October at RSMC Pretoria),
- Starting the field phase (6th November 2006),
- Continuous control of the cascading process, with quarterly reporting (first report on status as of 31st of December 2006)
- Mid-term review (February 2007),
- Continuing the field phase, next quarterly report 31st March 2007)
- Final evaluation and proposals for to continue or to make operational the cascading process (October 2007).

9. Evaluation of the costs

For the purpose of evaluating the total cost of the regional subproject, participating centres are required to estimate all additional costs associated with the SWFDP. This should include human costs (equivalent person-months) as well as expenditures of funds if any directly related to the project.

In the final evaluation of the regional subproject, a qualitative assessment will be made of the success of the SWFDP related to the specific benefits of the Project and in particular the measurable improvements that have been noted in the warning services that are provided to the national DMCPAs.

10. List of the Annexes

- Annex A: Availability of Minimum Required NWP Products from Global Centres;
-
- Annex B: Provisional list of the stations where EPSgrams are required by the participating NMHSs;
-
- Annex C and Annex D: Example of the guidance on short-range and medium-range forecasts, respectively, to be provided by RSMC Pretoria in the framework of the SWFDP (to be finalized).
-
- Annex E: Model of the evaluation form of the guidance provided by RSMC Pretoria (in form of an Excel file).

ANNEX A

Availability of Minimum Required NWP Products from Global Centers

For the Southeastern Africa SWDFP

Note that tbd means : to be determined

Deterministic Forecasts: 6-hourly out to 72 hours, then 12-hourly up to 144 hours	Availability ECMWF	UK Met	NCEP
Levels: sfc, 925mb, 850mb, 700mb, 500mb, 300mb, 200mb Parameters: wind (streamlines and speed/direction), temperature, geopotential height, humidity Purpose: General forecasting parameters to gain a perspective on the overall atmosphere. For determination of frontal system and pressure maxima locations.	tbd	yes	yes
Level: 500mb, 300mb Parameter: vorticity Purpose: Determination of frontal and low pressure system locations. Crucial in locating potential severe weather outbreak locations. Can be used in determination of severe weather type.	tbd	no	yes
Level: 850mb, 700mb, 300mb Parameter: vertical velocity Purpose: Determination of mesoscale patterns of rising and sinking air masses (convective updrafts)	tbd	no	yes
Level: 850mb Parameter: 850mb wet bulb potential temperature Purpose: Frontal position diagnosis and change in airmass	tbd	yes	yes
Level: sfc Parameters: instantaneous and accumulated precipitation, minimum temperature, maximum temperature, sea level pressure, relative humidity Purpose: General forecasting parameters.	tbd	yes	yes
Level: partial atmospheric column Parameter: 1000-500mb thickness Purpose: Freezing level determination and air mass distinguishing	tbd	yes	yes
Level: atmospheric column Parameter: precipitable water	tbd	no	yes

Purpose: Determination of total liquid water in the atmosphere and thus potential rainfall			
Level: atmospheric column	tbd	no	yes
Parameter: convective available potential energy (CAPE), Theta-E Purpose: Amount of energy available in the atmosphere for storm production			
Level: stability index	tbd	no	yes
Parameter: lifted index, K index, total totals index Purpose: Pre-calculated indices to generalize severe weather potential			
Level: stability index	tbd	no	yes
Parameter: convective inhibition (CIN) Purpose: Strength of force preventing convective initiation. The amount of energy (frontal forcing or daytime heating) that is needed to begin convection.			

Ensemble Forecasts:	**Availability**		
12-hourly out to 144 hours	**ECMWF**	**UK Met**	**NCEP**
Probability of 6-hour accumulated precipitation exceeding 50mm and 100mm threshold value	tbd	yes-T+72	yes
Probability of 24-hour accumulated precipitation exceeding 100mm threshold value	tbd	yes-T+72	yes
Probability of 10-meter wind speed exceeding 20kts and 30kts threshold value	tbd	yes-T+72	yes
Ensemble Prediction System meteograms for specified locations (ECMWF-5 to 10 per country & UK MOGREPS-10 total)	yes	yes-T+72	no
Spaghetti diagrams for 500mb geopotential height	tbd	yes-T+72	yes
Spaguetti diagrams for isolines corresponding to accumulated precipitation greater than 50mm/6h at 6 hours intervals	tbd	tbd	tbd
Spaguetti diagrams for winds greater than 20 knots and 30 knots at 6 hours intervals	tbd	tbd	tbd
Thumbnails of probability of precipitation in excess of threshold of 50mm/6h at 6 hours intervals	tbd	tbd	tbd

ECMWF Extreme Forecast Index for precipitation and wind	yes		no

Other Forecasts / Analyses:	Availability ECMWF	UK Met	NCEP
10-Day running daily accumulated precipitation (total, anomaly, percent normal, mean) from the CPC Africa Rainfall Climatology (ARC)			yes

Other REQUESTED Products:	Availability ECMWF	UK Met	NCEP
SKEW-T logarithmic forecast plots for selected grid points based on NWP output (out to 144 hours, 12-hourly)	tbd	tbd	rbd

Recommendations:	Availability ECMWF	UK Met	NCEP
Severe weather guidance bulletin from the regional center (SAWS) should be available through the internet and via email.			
Products not routinely transmitted on GTS network should be provided in graphical format vie web page and/or ftp server for rapid display and dissemination. As UKMet data is likely available only via ftp server, NCEP may be able to ingest their data and display via webpage.	tbd	tbd	yes
Domain of the area of coverage should be extended to cover from 5 degrees north to as far as practicable south.	tbd	yes	yes
NWP forecasts should be updated every 12 hours.	tbd	tbd	yes
All forecasts should be archived for a minimum of 7 days.	tbd	tbd	yes

ANNEX B

List of the stations where Global Centres will provide EPSgrams in the framework of SWFDP

Note that station coordinates have to be verified and confirmed

I - Botswana

I.1 - List of stations for EPSgrams from ECMWF

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1		Selibe Phikwe	22^0 03’	27^0 49’	982
2		Mahalapye	23^0 07’	26^0 50’	991
3		Sir Seretse Khama Airport	24^0 33’	25^0 60’	1000.5
4		Goodhope	25^0 27’	25^0 35’	1291
5		Jwaneng	24^0 36’	24^0 42’	1188.7
6		Ghanzi	21^0 42’	21^0 39’	1131
7		Francistown	21^0 09’	27^0 29``	1000.6
8		Letlhakane	21^0 25’	25^0 35’	984
9		Pandamatenga	17^0 49’	25^0 38’	1071
10		Tsabong	26^0 03’	22^0 27’	930

I.2 - List of stations for EPSgrams from Met-Office UK

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1		Francistown	21^0 09``	27^0 29``	1000.6
2		Sir Seretse Khama Airport	24^0 33``	25^0 60``	1000.5

I.3 – Operational e-mail address of the Central Forecast office to b used during the Regional Subproject experimentation phase : Botswana National Meteorological Services (Weather Forecasting Division): **fforecasting@meteo.gov.bw**

II - Madagascar

II.1 - List of stations for EPSgrams from ECMWF

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1		Antananarivo	18°54’	47°32’	
2		Morondava	20°17’	44°19’	
3		Mahajanga	15°40’	46°21’	
4		Farafangana	22°48’	47°50’	
5		Fianarantsoa	21°27’	47°06’	
6		Mahanoro	19°50’	48°48’	
7		Toamasina	18°07’	49°24’	
8		Taolagnaro	25°02’	46°57’	
9		Toliara	23°23’	43°44’	
10		Antsiranana	22°48’	47°50’	

II.2 - List of stations for EPSgrams from Met-Office UK

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1		Antsirabe	19°47’	47°04’	
2		Maintirano	18°03’	44°02’	

II.3 – Operational e-mail address of the Central Forecast office to b used during the Regional Subproject experimentation phase: **meteo@simicro.mg**

III - Mozambique

III.1 - List of stations for EPSgrams from ECMWF

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1		Maputo Airport	25^0 55’	32^0 34’	39.0
2		Beira Airport	19^0 48’	34^0 54’	8.0
3		Chimoio	19^0 07’	32^0 28’	731.0
4		Lichinga	13^0 18’	35^0 14’	136.5
5		Pemba	12^0 59’	40^0 32’	101.0
6		Nampula	15^0 06’	39^0 17’	438.0
7		Quelimane	17^0 53’	36^0 53’	6.0
8		Mapulanguene	24^0 29’	32^0 05’	418.0
9		Inhambane	23^0 52’	35^0 23’	14.0
10		Tete	16^0 11’	33^0 35’	149.0

III.2 - List of stations for EPSgrams from Met-Office UK

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1		Maputo Airport	25°55’	32°34’	39.0
2		Chimoio	19°07’	32°28’	731.0

III.3 – Operational e-mail address of the Central Forecast office to b used during the Regional Subproject experimentation phase: **mozmet@inam.gov.ms**

IV - Tanzania

IV.1 - List of stations for EPSgrams from ECMWF

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1	63756	Mwanza	2°47’	32°92’	
2	63789	Arusha	3°37’	36°63’	
3	63801	Kigoma	4°88’	29°67’	
4	63894	Dar es Salaam	6°87’	39°20’	
5	63862	Dodoma	6°17’	35°77’	
6	63832	Tabora	5°08’	32°83’	
7	63870	Zanzibar	6°22’	39°22’	
8	63932	Mbeya	8°93’	33°47’	
9	63962	Mahenge	8°75’	36°80’	
10	63971	Mtwara	10°35’	40°18’	

IV.2 - List of stations for EPSgrams from Met-Office UK

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1	63894	Dar es Salaam	6°87’	39°20’	
2	63756	Mwanza	2°47’	32°92’	

IV.3 – Operational e-mail address of the Central Forecast office to b used during the Regional Subproject experimentation phase: **cfo@meteo.go.tz**

V - Zimbabwe

V.1 - List of stations for EPSgrams from ECMWF

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1	67765	**Karoi**	16°51’	29°37’	
2	67779	Mount Darwin	16°47’	31°35’	
3	67775	Harare Airport	17°55’	31°08’	
4	67853	Hwange	18°38’	27°00’	
5	67881	Rusape	18°32’	32°08’	
6	67965	Bulawayo Airport	20°01’	29°37’	
7	67975	Masvingo	20°04’	30°52’	
8	67983	Chipinge	20°12’	32°37’	
9	67861	Gokwe	18°13’	28°55’	
10	67991	Beitbridge	22°13’	30°00’	

V.2 - List of stations for EPSgrams from Met-Office UK

N°	WMO id.	Station Name	Latitude (South)	Longitude (East)	Altitude (Metres)
1	67775	Harare Airport	17°55’	31°08’	
2	67965	Bulawayo Airport	20°01’	29°37’	

V.3 – Operational e-mail address of the Central Forecast office to b used during the Regional Subproject experimentation phase: **wforecast@weather.utande.co.zw** and **hamo_met@comone.co.zw**

ANNEX C

GUIDANCE TO BE ISSUED BY THE RSMC PRETORIA TOWARD THE NMHSs FOR SHORT-RANGE SEVERE WEATHER FORECASTING UP TO 48 H

The severe weather short-range guidance comprises the following parts:

- Part A: Text; depiction of the expected evolution of the weather up to 48 h and comments about the more representative short range products that are used with reference to figures included in the part B or to charts clearly identified (model, parameter, level, forecast range).

- Part B: Figures; charts or graphics coming essentially from deterministic models (global or LAM).

- Part C: The assessment of the degree of confidence of the forecast by the forecaster.

- Part D: Two tables (for 24 h and 48 h, respectively), summarizing the risk of severe weather as assessed by the RSMC Pretoria as proposed below. 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.

Country	No risk	Low risk	Medium risk	High risk
Botswana	**Heavy precip.**			
	Strong Winds		**N**	
Mozambique	**Heavy precip.**			
	Strong Winds	**X**		
Etc…				

This table is only a sample and has to be precisely defined by the RSMC Pretoria. The separation of the evaluation of the risk into four categories (no risk, low risk, medium risk and high risk) is only given as an example.

- Part E: Two geographical maps (for 24 h and 48 h, respectively) including the boundaries of the countries with contours identifying the areas that are likely to experience the severe weather event(s).

Important : NMHS are required to acknowledge the reception of this bulletin, immediately upon receipt.

ANNEX D

GUIDANCE TO BE ISSUED BY THE RSMC PRETORIA TOWARD THE NMHSs FOR MEDIUM-RANGE SEVERE WEATHER OUTLOOK FOR DAYS D+3, D+4 and D+5

- Part A: Text; depiction of the expected evolution of the weather for day 3, day 4 and day 5 and comments about the more representative medium range products that are used with reference to figures included in the part B or to graphics clearly identified (EPS charts or EPSgrams).
-
- Part B: Figures; charts or graphics coming essentially Ensemble Prediction Systems (EPS).

- Part C: The assessment of the degree of confidence of the forecast by the forecaster.

- Part D: Three tables (for day 3, day 4 and day 5, respectively), summarizing the probabilities of precipitation and wind higher than a given threshold as proposed below. In order to provide more detailed information about the geographical location of probabilities 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.

Country	Probability	< XX%	> XX% and < YY%	> YY80%
Botswana	Prec.> 50mm/6h	N		
	Winds > 30 kt		N	
Mozambique	Prec.> 50mm/6h	X		
	Winds > 30 kt			X
Etc…				

This table is only an example and has to be definitively defined by the RSMC Pretoria(number of columns, lower and upper limits).

- Part E: Three geographical maps (for day 3, day 4 and day 5, respectively) including the boundaries of the countries with contours identifying the probabilities areas for the occurrence of the weather event.

Important : NMHS are required to acknowledge the reception of this bulletin, immediately upon receipt.

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ANNEX E

EVALUATION FORM (Page 1)
SEVERE WEATHER EVENT OBSERVED

Identification of the severe event

NMHS:		Alphabetic	
Region affected:		Alphabetic	
Event Number:		Numeric	
Type of event:		Numeric	(put the right number in the cell)

1: Heavy Precipitation (indicate the most significant phenomenon,
2: Strong wind either heavy precipitation or strong wind)

Severe convection		Numeric	(put 1 if extreme phenomena are the consequence of severe convection or 0 otherwise)

Severe Weather Observed (to be filled even if no severe weather has been forecast)

Start of the event: | | | | at | | | UTC
JJ MM AA HH MM

End of the event: | | | | at | | | UTC
JJ MM AA HH MM

Max. observed value: | Numeric | Alphabetic | Unit

(According to the event: accumulated precipitation or gusts)

Information from the end-users

short text explaining the consequences and possibly some figures
(number of interventions, casualties, damages, usefulness of the warning)

EVALUATION FORM (Page 2)
SEVERE WEATHER FORECAST EVENT

Severe Weather Forecast / (to be filled even severe weather did not occur)

Time of the warning toward DMCPA [ ][ ][ ] (JJ MM AA) at [ ][ ] (HH MM) UTC

Start of the event; forecaster assessment [ ][ ][ ] (JJ MM AA) at [ ][ ] (HH MM) UTC

End of the event; forecaster assessment [ ][ ][ ] (JJ MM AA) at [ ][ ] (HH MM) UTC

Max. observed value: [Numeric][Alphabetic] Unit

(According to the event: accumulated precipitation or gusts)
accumulated precipitation or gusts)

Level of risk as appreciated by RSMC (put 1 in the chosen cell)

		No	Low	Med.	High
Level of risk	1 day before:				
Level of risk	2 days before:				

Probabilities of medium range outlooks as appreciated by RSMC

Probability	3 days before:	%
Probability	4 days before:	%
Probability	5 days before:	%

Mark for usefulness of regional centre severe weather forecast (put 1 in the chosen cell)

A = Very useful	(basis of the warning)	A
B =Useful	(aided guidance confidence)	B
C = Neutral	(not useful)	C
D = Negative	(misleading)	D

Comment including information on usefulness and applicability of used tools

Annex 1

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS
OPAG DPFS

MEETING OF SEVERE WEATHER FORECASTING DEMONSTRATION PROJECT - REGIONAL SUBPROJECT RA I

PRETORIA, SOUTH AFRICA
31 JULY – 3 AUGUST 2006

CBS-DPFS/RA I/SWFDP/Doc. 2.1(1)

(20.V.2006)

Item: 2

ENGLISH ONLY

AGENDA

1. **Opening**

2. **Organization of meeting**

   2.1 Approval of agenda
   2.2 Agreement of working arrangements

3. **Introduction – Severe Weather Forecasting Demonstration Project (SWFDP)**

   3.1 The SWFDP Overall Project Plan
   3.2 The SWFDP Guidebook on Planning Regional Subprojects

4. **Development of the RA I Regional Subproject Implementation Plan**

5. **Any other business**

6. **Closing**

Annex 2

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS
OPAG DPFS

MEETING OF SEVERE WEATHER FORECASTING DEMONSTRATION PROJECT - REGIONAL SUBPROJECT RA I

PRETORIA, SOUTH AFRICA
31 JULY – 3 AUGUST 2006

CBS-DPFS/RA I/SWFDP/Doc. INF. 2

(27.VI.2006)

ENGLISH ONLY

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