



WMO Strategy for Improving Severe Weather Forecasting in Developing Countries

DPM Steering Committee
(May 2007)

Strategy for Improving Severe Weather Forecasting in Developing Countries

Overview

- ❖ **Vision**
- ❖ **Planning Concept**
- ❖ **Severe Weather Forecasting Demonstration Project**
- ❖ **Way forward**



Improving Severe Weather Forecasting in Developing Countries

Vision

*“NMHSs in developing countries are able to **implement and maintain reliable and effective routine forecasting and severe weather warnings programmes through enhanced use of NWP products and delivery of timely and authoritative forecasts and early warnings, thereby contributing to reducing the risk of disasters from natural hazards.**”*

Improving Severe Weather Forecasting in Developing Countries

Link to WMO Strategic Plan

- ✓ Improved forecasts and warnings (ER 1)
- ✓ Improved information services (ER 8)
- ✓ Disaster prevention and mitigation (ER 6)
- ✓ Capacity-building (ER 9)

Improving Severe Weather Forecasting in Developing Countries

Planning Concepts: 4-step process

1. **Establish regional partnership to improve severe weather forecasts and warnings in developing countries**
2. **Plan and develop prototype demonstration project – concept-of-operations and supporting infrastructure**
3. **Implement demonstration project for representative period – generally, 1 year**
4. **Broaden and sustain successful prototypes**

Planning Concept

1) *Regional Partnerships*

❖ **Partnerships**

- ✓ Among NMHSs of developing and developed countries of a region,
- ✓ Between RSMC(s) and associated NMCs
- ✓ NMHSs and Disaster Management Authorities

❖ **Regional demonstration projects**

- ✓ Ownership by developing countries
- ✓ Commitment leading to operational implementation and sustained results

❖ **Collaboration/support from developed countries**

- ✓ Collaboration with global NWP products centres
- ✓ Coordinated voluntary initiatives focused on optimizing weather forecasting and warning services in developing countries

Planning Concept

2) *Plan and develop demo project*

Necessary steps:

- **Recruit Demo Project management team**
 - In-region project leader
 - Link to WG PIW
 - Representatives from each developing country
 - Representatives from supporting developed countries
 - Cross-cutting Secretariat support team
- **Develop Demo Project implementation plan**
 - Define goal, develop KPIs and KPTs
 - Develop concepts of operation
 - Define requirements – infrastructure, training, etc
 - Develop milestones – includes pre- and post-project actions
- **Initiate planning for post-project actions to sustain successful prototypes**

Planning Concept

2) Plan and develop demo project

Other considerations:

❖ **“Cascading forecasting process”**

- ✓ Global products centres -> RSMC -> NMHSs
- ✓ Complementary efforts to improve the end product

❖ **Include assessment of:**

- ✓ Local data processing and display needs
- ✓ Data communications capabilities
- ✓ Training needs

❖ **Involvement of relevant national civil protection and disaster management authorities**

- ✓ Create benefits for protection of life and property through the reduction of risk to severe weather hazards
- ✓ Enhance the visibility of NMHSs

Planning Concept

3) *Implement demo project*

- **Conduct preparatory training**
Focus on needs: use of NWP, operational procedures, product preparation and delivery, feedback (for evaluation)
- **Produce, deliver operational products for demo period**
- **Conduct reviews to identify and correct problems where possible**
- **At project completion, evaluate end-result, identify lessons-learned and decide future courses of action**
- **Accountability of management team**

Planning Concept

4) *broaden and sustain successful prototypes*

Continuing the prototype

- Planning must begin prior to the demo project
 - Assuming success, what is needed to sustain continued operations?
 - Includes resource mobilization to address infrastructure shortfalls

Broadening the prototype

- Can the prototype be exported to other countries within demo sub-region or other sub-regions?
 - Which are *natural* regional partnerships ...

SWFDP RA I – Southeast Africa Regional Subproject



SWFDP – SE Africa

Goal: *improve severe weather forecasting and warning in Southeast Africa by improving the availability and use of NWP output*

- Focus: Improve Forecasts/Warnings for Heavy Rain/Strong Winds

Regional Partnership:

- Regional Centres: RSMCs Pretoria & La Réunion, ACMAD
- NWP Product users: NMCs of Botswana, Madagascar, Mozambique, Tanzania, Zimbabwe
- Collaboration with global NWP providers: ECMWF, Met Office UK, NCEP/Africa Desk USA
- Lead Regional Centre: RSMC Pretoria (South Africa)
- WG PIW Liaison: William Nyakwada (Kenya)
- CBS OPAG DPFS: Bernard Strauss (France)

Performance Targets:

- Improved accuracy of severe weather warnings
- Improved lead-time for severe weather warnings
- Reduced false alarms
- Improved collaboration between NMCs and DPM decision makers

Demo Project Duration: Nov. 2006 to Nov. 2007

SWFDP – SE Africa

Concept of Operations:

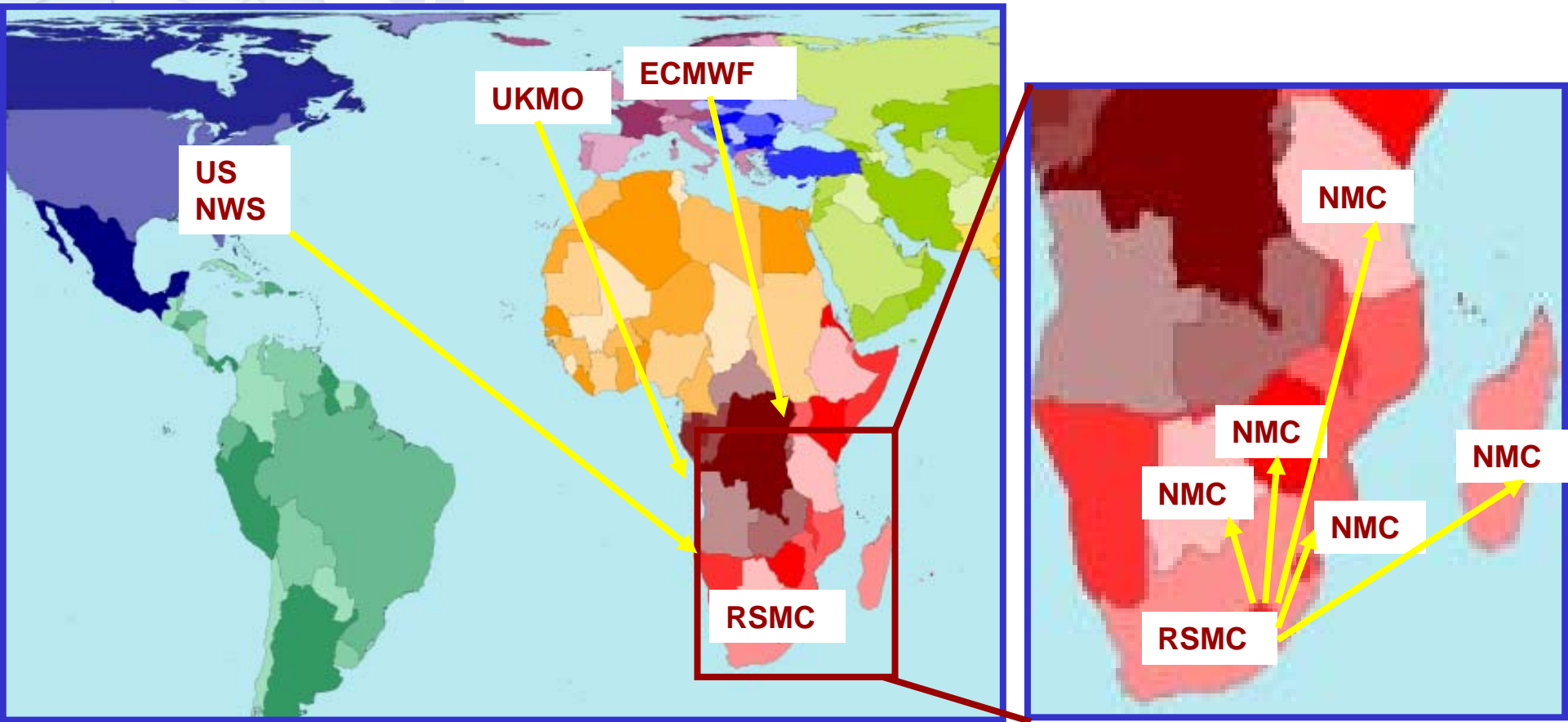
- Global NWP provided to RSMC Pretoria and NMHSs daily
- RSMC Pretoria runs Mesoscale NWP for southern Africa, prepares, distributes severe weather forecasting guidance products to targeted NMHSs daily (out to day-5)
- 5 targeted NMHSs use guidance to forecast weather and produce rain and wind warnings, and deliver services to public and civil/DPM authorities
- Supporting infrastructure
 - ✓ International data exchange through WIS/GTS
 - ✓ Local processing and display to use observations and NWP output
- Initial focus: Improved use of existing NWP products (e.g. EPS)
- Option to acquire, install, operate/sustain limited area NWP models to meet unique needs

Requirements:

- Training focused on exploitation of NWP for severe weather forecasting
- Improved telecommunications between RSMC Pretoria and NMHSs
- Local data processing and display at NMHSs

- **Cascading principle:**

- Special products from *Global centres* to RSMC-Pretoria
- RSMC prepares guidance forecasts for next 5 days and disseminates daily to 5 NMCs
- NMCs use guidance forecast in preparing warnings when appropriate to disaster management authorities



SWFDP – SE Africa

Training:

- ❖ Focus on available NWP products, with emphasis on particular forecasting problems particular to region
- ❖ Integrate separate capacity building training initiatives to improve overall impact

SWFDP – SE Africa

Milestones:

- Preparatory training – Nov. 2006
- Project start – 6 Nov 2006
- Review 1 – Apr 2007
- Review 2 - Jul 2007
- Final review - Dec 2007

Issues:

- Telecommunications between RSMC and Developing countries
- Forecaster NWP training
- Operational status of critical components, sustainability



Regional Specialised Meteorological Center (RSMC) Pretoria



Guidance Products

NWP & EPS Products

Regional Models

- [UM SA12](#)
- [UM Africa LAM](#)
- [NCEP Medium-range Forecasts](#)

Global Products

- [ECMWF: EPS](#)
- [Met Office](#)
- [NOAA: GFS & EPS](#)
- [SAWS: EPS \(NCEP\)](#)

Training Website

- [Met-eLearning](#)

Additional Products

Contact RSMC

Logout

Guidance Products

Short-range (1-2 Days)

- [Map Day 1](#)
- [Map Day 2](#)
- [Risk Tables](#)
- [Discussion](#)

Medium-range (3-5 Days)

- [Map Day 3](#)
- [Map Day 4](#)
- [Map Day 5](#)
- [Prob Tables](#)
- [Discussion](#)

SWFDP Evaluation Form

- [Click Here](#)

Regional and International Centers

- [ECMWF](#)
- [NCEP](#)
- [UK Met Office](#)
- [WMO](#)
- [RSMC - Reunion](#)
- [ACMAD](#)

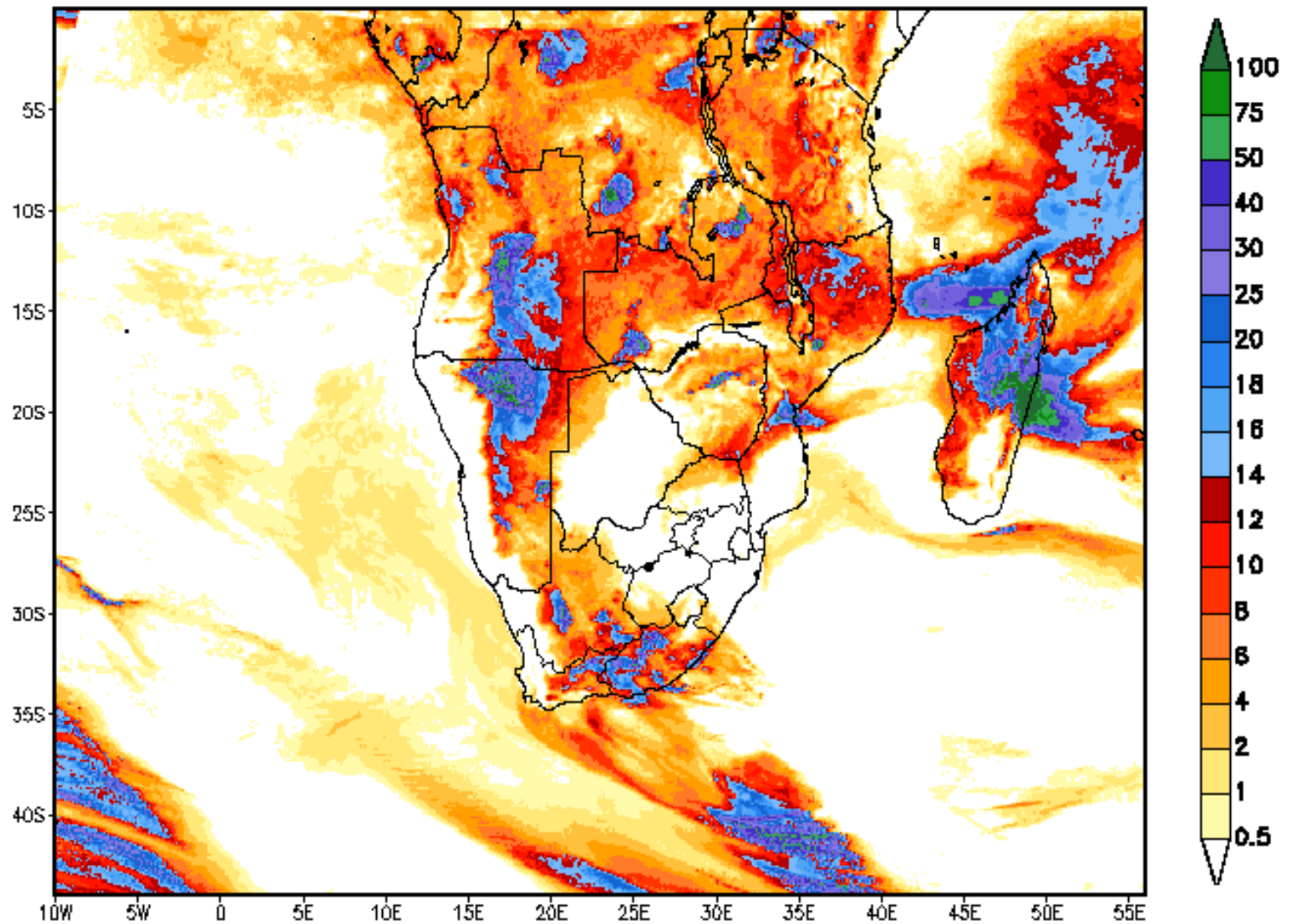
SADC Countries

- [SADC Countries National Meteorological Services](#)

Other Services and Products

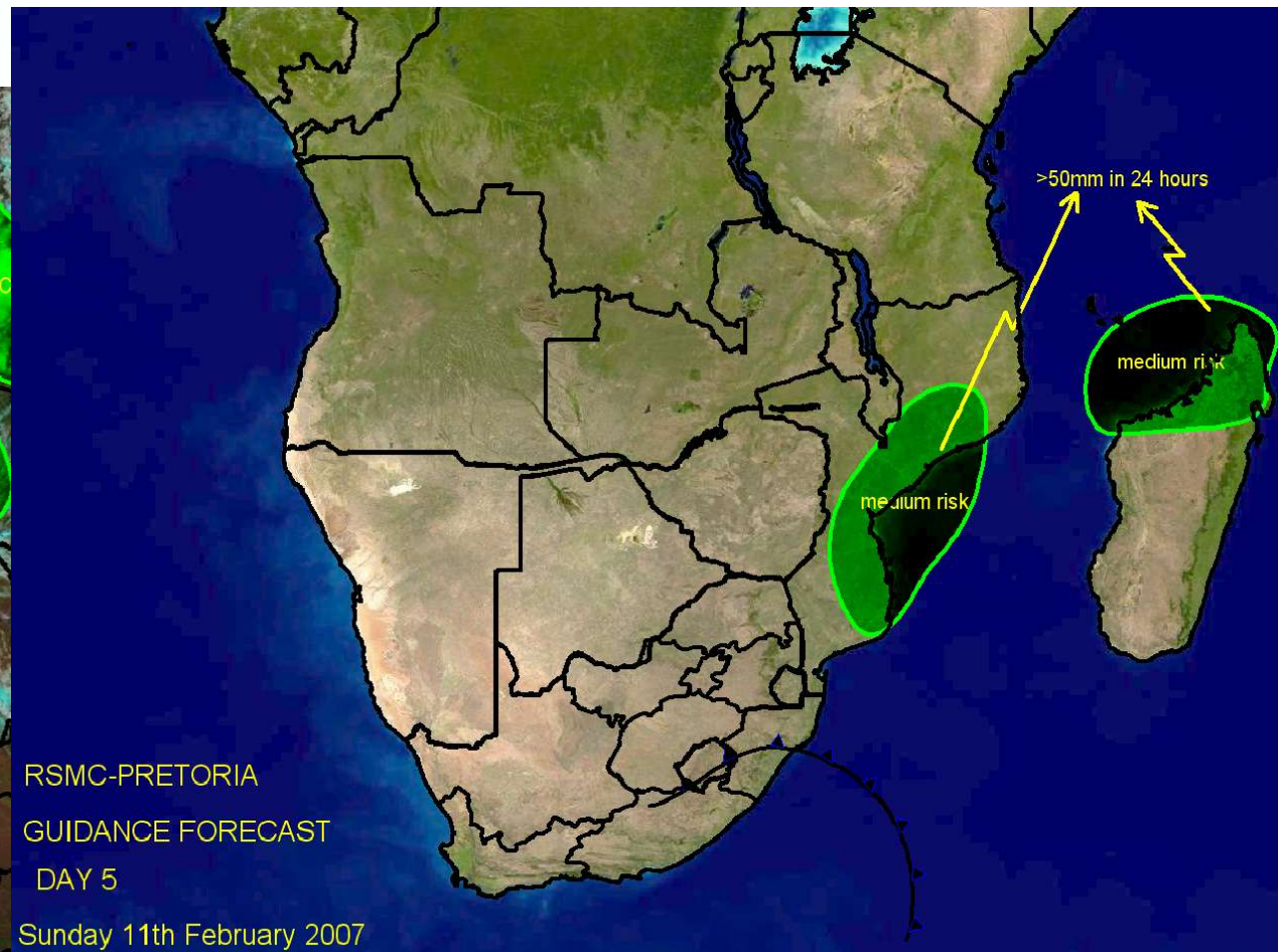
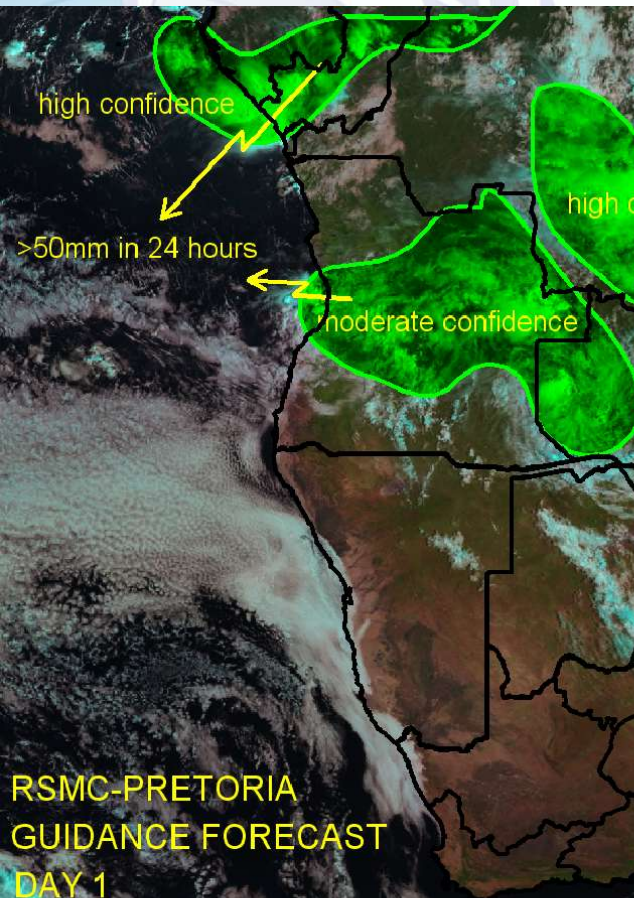
- [Short-range](#)
- [Long-range \(Seasonal\)](#)

UM 12km horizontal resolution – xaana Run:
Accumulating Precipitation for past 24 hours (mm)



Total precipitation of 01Z to 24Z, 26 JAN – Initiated 00Z 26 JAN 2007

Selected Guidance Products from RSMC-Pretoria to NMCs available on a special RSMC-Pretoria website



SWFDP RA I – SE Africa

Status (March 2007)

Good signs:

- Global NWP charts framed over southern Africa are useful; probabilistic charts, EPS-grams and limited-area model products are new and useful;
- Daily guidance from RSMC Pretoria very pertinent;
- Single Web portal at RSMC Pretoria for all SWFDP-related Web-sites is convenient;
- NMHS improving its confidence in their warnings;
- NMHS improving relations with civil protection authorities.

SWFDP RA I – SE Africa

Status (April 2007)

Challenges (attention needed):

- NMHSs are still learning to use new products; more training needed;
- Poor Internet access - difficulty downloading key products;
- Localized and short-lived strong winds and heavy precipitation are missed by NWP;
- Lack of Nowcasting tools;
- Consistent feedback from NMHSs;
- Archiving and case studies.

Improving Severe Weather Forecasting in Developing Countries

Additional concepts being pursued:

- ❖ **Integration of Severe Weather Forecasting Demo Project into existing plans, projects and initiatives as part of broader WMO initiative**
 - ✓ Linkages to WMO Flood Forecasting initiative – win-win potential
- ❖ **Initiate NMHS partnership with DPM agency in country**
 - ✓ PR support – possibly, WMO Secretariat assistance
- ❖ **Coordinated contributions from developed countries to improve overall impact**
 - ✓ Training
 - ✓ Existing NWP products for targeted regions
 - ✓ Support for installation and maintenance of limited area NWP models
 - ✓ Research focused on forecast needs of Region, e.g. THORPEX Africa

Way Forward

- **Expand regional partnerships in sub-region of Demo Project of SE Africa, beyond the demo:**
 - additional countries
 - other meteorological hazards
 - other hazards where meteorology is a factor
 - civil protection agencies
- **Implement in other sub-regions of Africa**
- **Implement in other regions of the World**



Merci !

Vision -

“NMHSs in developing countries are able to implement and maintain reliable and effective routine forecasting and severe weather warnings programmes through enhanced use of NWP products and delivery of timely and authoritative forecasts and early warnings, thereby contributing to reducing the risk of disasters from natural hazards.”