



# Severe Weather Forecasting Demonstration Project across Africa: Background and WMO perspective

**Stephanie Landman\***

Contributions from RSMC's and WMO

*\*member of WMO Joint Working Group for Forecast Verification Research*





# Outline of Talk

## Three Parts

1. Early Warning Systems
2. WMO and the Severe Weather Forecasting Demonstration Project (SWFDP)
3. SWFDP across Africa

### Friday's Talk:

#### Four Parts

Data and Products

Case Studies

Verification Practices

Project Evaluation





# Early Warning Systems

## Weather related disasters in the future

- Weather related disaster likely to increase in future due to:
  - Climate change
  - Increased vulnerability, particularly of growing urban populations
- Number of people affected is increasing in Africa (CRED)
- IPCC Special Report on Extreme Events (SREX): Call for more and improved Early Warning Systems (EWS) as a low-regrets measure

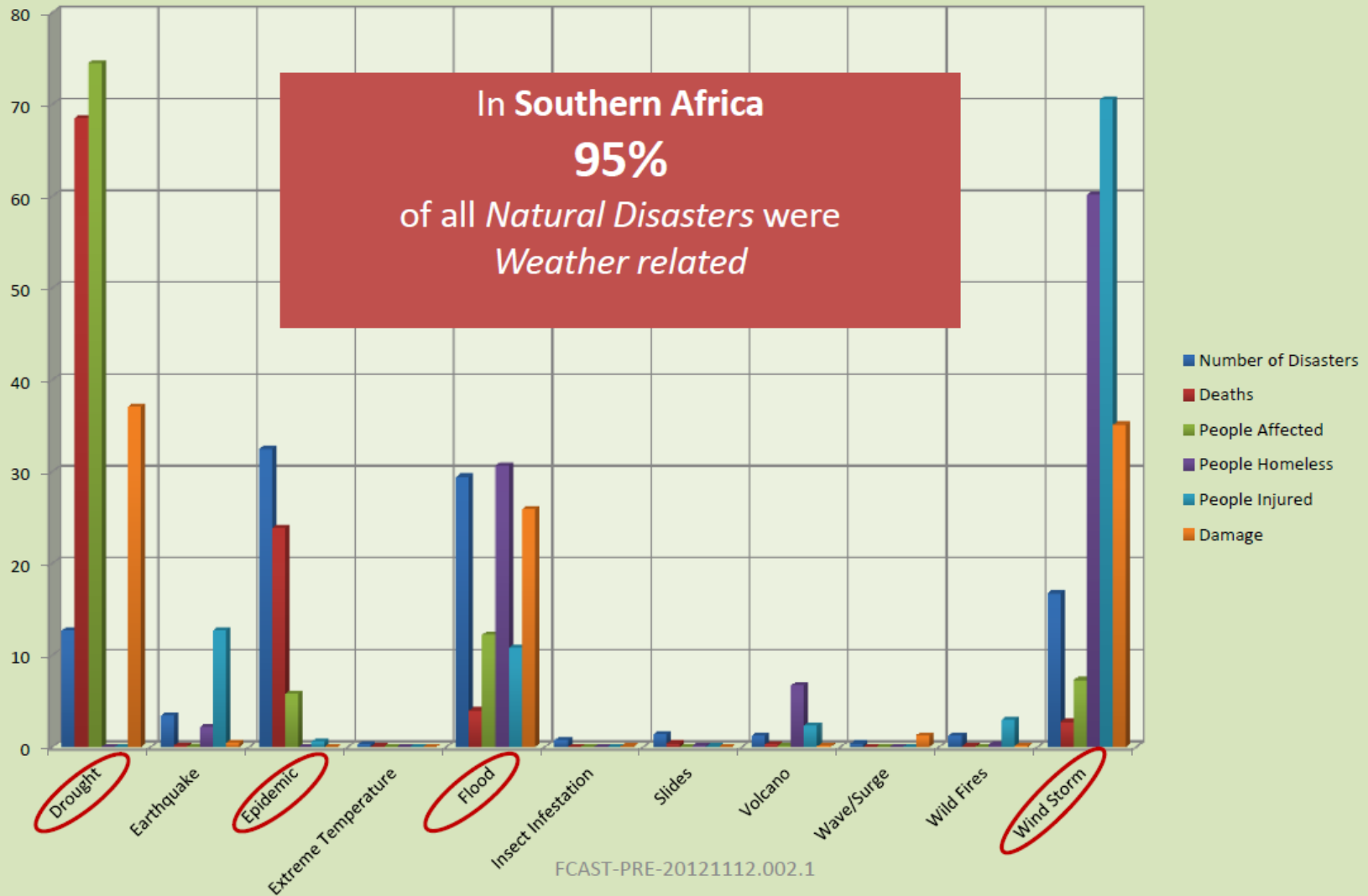


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Weather Service**



# Early Warning Systems

**% IMPACT OF NATURAL DISASTERS ON SOUTHERN AFRICA: 1920-2008**  
(Source: CRED)





# Early Warning Systems

## Challenges to Forecasting Services

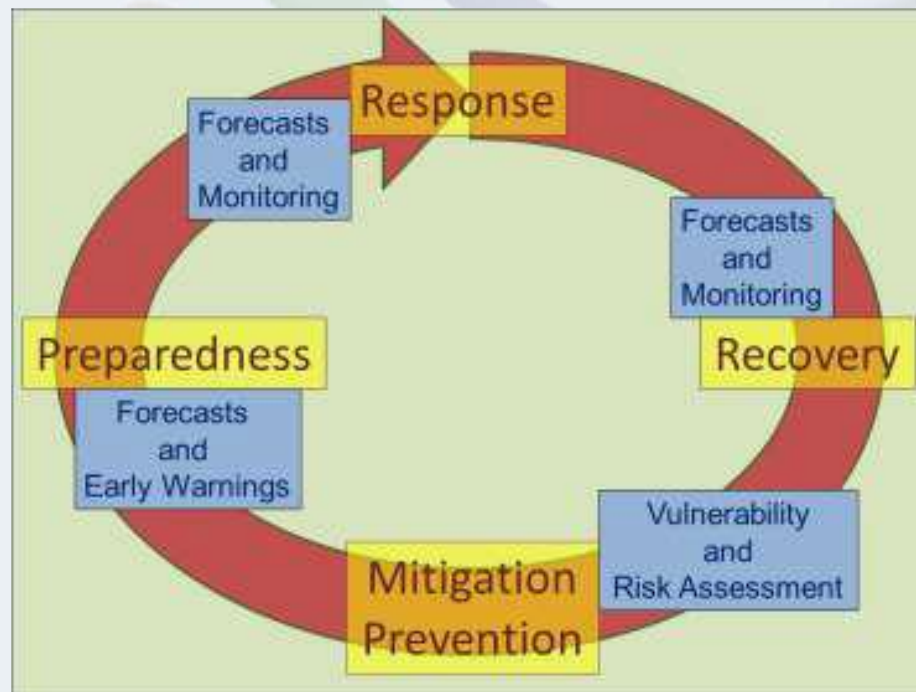
- There are significant changes in the environment of weather service delivery (the science, technology, user needs)  
 (“What the weather will **BE**, to what the weather will **DO**”)
- What does the future hold for weather forecasting and forecasting services?
- How can weather forecasting and warning services adapt to **reduce the threat of weather** related natural disasters and increase community **resilience**?



# Early Warning Systems

## What is the role(s) of National Met Services in Disaster Risk Reduction?

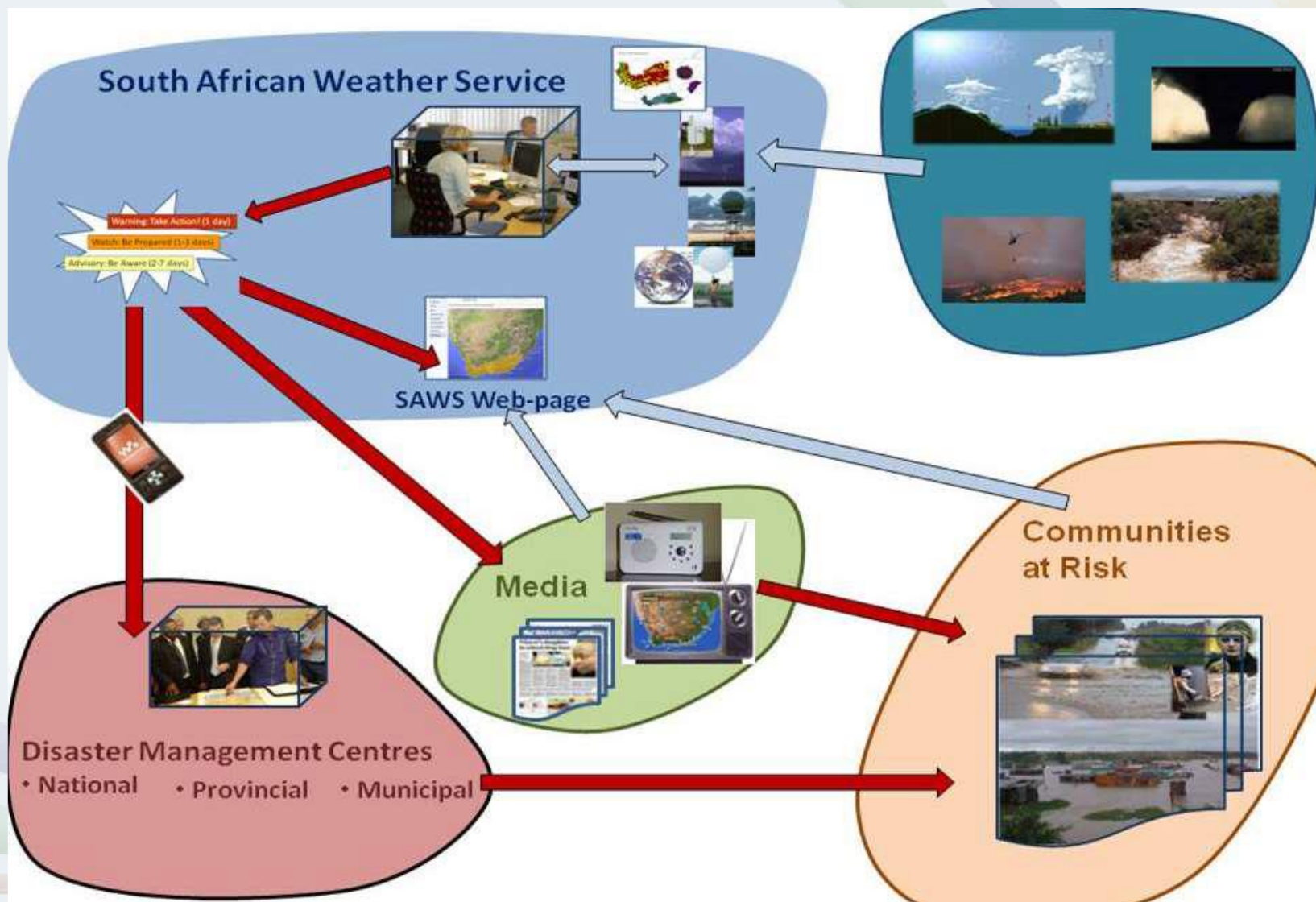
- NMSs involved in all the phases of DRR at **all time scales**
- Main focus in services related to **hazardous weather**
- Primary users are **local communities and disaster management** structures
- Services must be closely **integrated with stakeholders**
- Activities should be covered by appropriate **legislation**





# Early Warning Systems

## EWS is an End-to-End Warning System





# Early Warning Systems

## Main Participants in EWS

- *Technical Monitoring Agencies*
  - Key national agencies to issue early warnings (like NMHSs)
  - Usually the *single official national* voice for early warning information
- *Authorities Concerned with Impact*
  - Emergency management departments, disaster management centers
    - Responsible for declaring disasters
    - Coordinate response and recovery activities
    - Undertake preventative mitigation and preparedness activities

- *Communities*

EWS will fail if communities are not involved in risk assessment, dissemination, preparedness and response – **react and respond**

- *Political Role Players, administrators*

Their support is crucial to make it work – **Legislation and funding**







# Early Warning Systems

## The Multi Dimensions of EWS

An EWS can distinguish between different dimensions with its own roles and impacts:

- **National** early warning system
  - Mandated agency (e.g. the national meteorological service)
  - Based on scientific monitoring systems
- **Community** based early warning system
  - Functions at the community level
  - Utilizes community based techniques or systems and knowledge
  - Local research projects and monitoring systems

Essential that all dimensions are integrated to  
**avoid conflicting information**

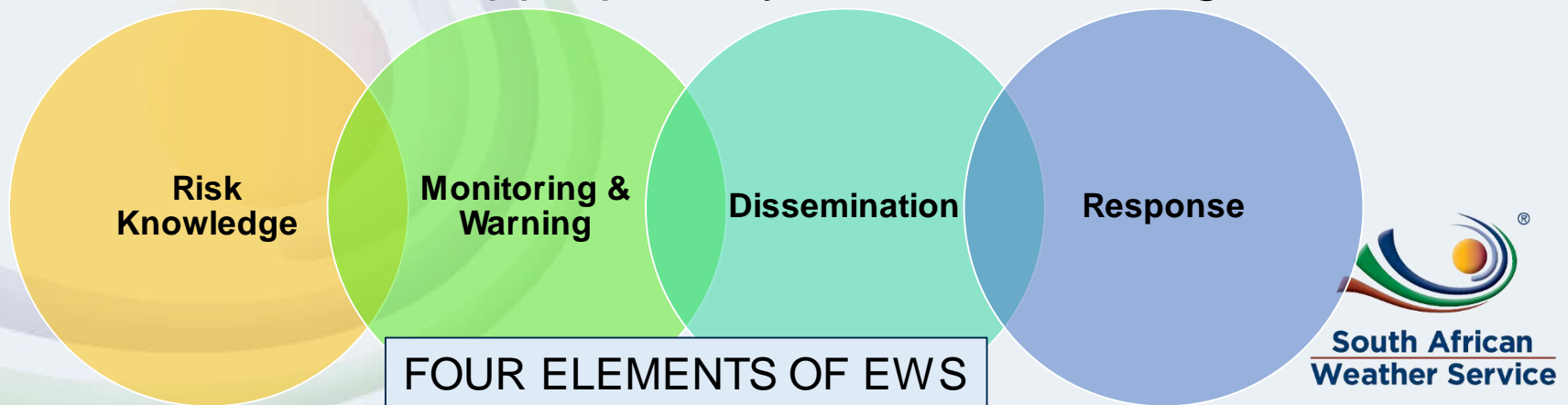


# Early Warning Systems

## Effective Early Warning Systems

### Three essential requirements

- **Technology:** State-of-the-art hazard monitoring technology and **effective dissemination** capabilities and procedures
- **Coordination:** **Excellent coordination** between all role players, Met Services, DMCs, Media, Local Communities
- **Information sharing:** Communities at risk **must receive**, understand and appropriately react to warnings





# Background on WMO members

## ***WMO Operational weather forecasting***

- WMO's World Weather Watch System (Observations, Telecommunications, Forecasting)
- Numerous advanced global NWP Centres
- Many low-capacity NMHSs in developing and least developed countries

## ***Role of National Meteorological Hydrological Services***

- *Daily forecasts, weather warnings, information/data gathering*
- *Delivery of meteorological services (routine, specialized)*
- *Delivery of **authoritative warnings***

*general public, disaster managers, civil protection authorities, important societal sectors (e.g. transportation)*



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# Severe Weather Forecasting Demonstration Project

- WMO program to improve ability of National Meteorological Services (NMSs) in developing countries to **forecast severe weather events for the next 5 days** using *existing* technology – to close the technology gap
- To improve coordination of NMSs with Disaster Management Agencies and the media
- SWFDP is about ***enhancing delivery of warning services as adaptation against a likely increase of disasters due to climate change and socio-economic vulnerabilities***





# Severe Weather Forecasting Demonstration Project

## Vision for improving severe weather forecasting and warning services in developing countries

“NMHSs in developing countries are able to implement and maintain **reliable and effective routine forecasting and severe weather warning 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.**”

## WMO Strategic Thrusts

### *Improved Service Quality and Service Delivery*

- ✓ Improved delivery and access to high quality weather, water, related environmental predictions, information, and services
- ✓ Reduced risks and potential impacts of hazards

### *Strengthening Capacity Building*





# Severe Weather Forecasting Demonstration Project

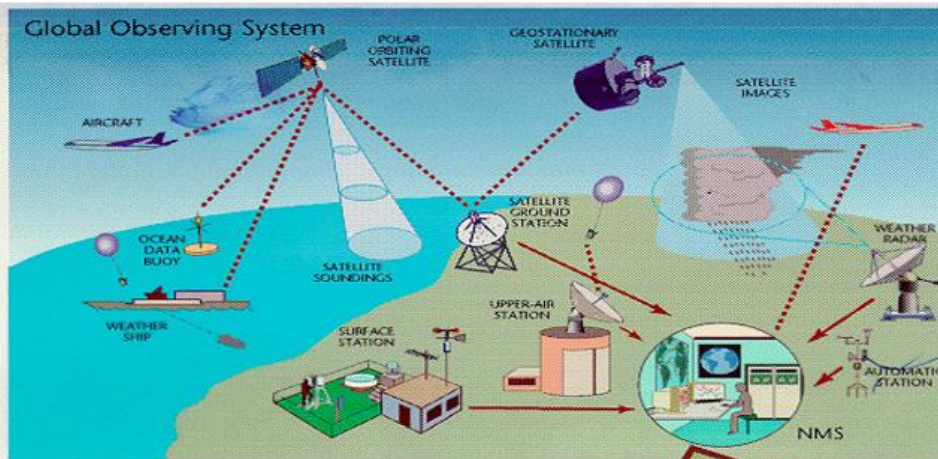
- The SWFDP is implemented in close collaboration with the Public Weather Services (PWS) Programme in order to **improve severe weather forecasting and warning services**.
- It has also been coordinating with other WMO technical commissions and programmes to **extend the range of applications and broaden the benefits** to other user sectors in society.
- The SWFDP is built on and collaborated with:
  - Global Data Processing and Forecasting System programme,
  - Public Weather Services programme,
  - the Agricultural Meteorology programme, and
  - Hydrology and Water Resources Programme for developing synergies and linkages with Flash Flood Guidance System (FFGS) in various regions.





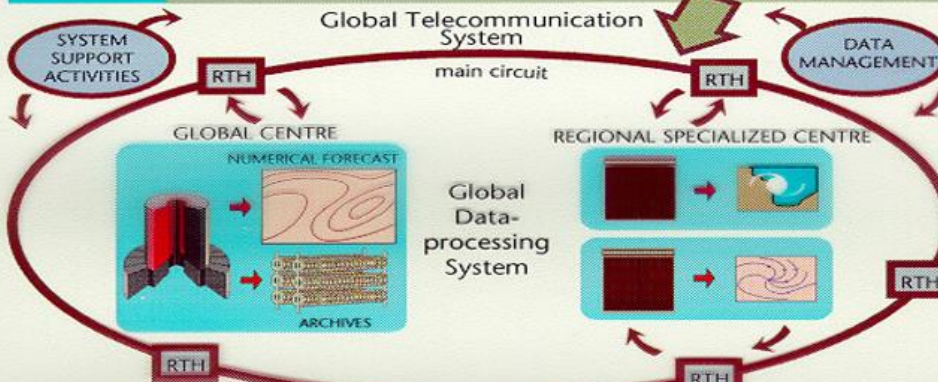
# Severe Weather Forecasting Demonstration Project

WIGOS



191 NMHSs: satellites, land, ships, buoys, and aircraft contribute to Global Observing every day

WIS

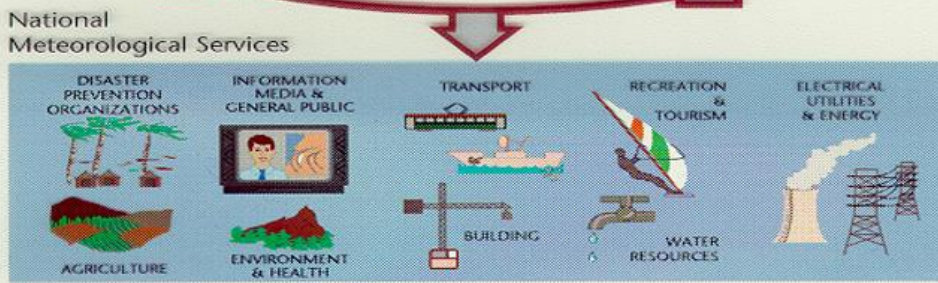


Global Telecom with Regional Hubs – becoming the WMO Information System (WIS)

GDPFS

**The GDPFS:**  
Global, Regional Specialized Met. Centres (RSMC, RCC), and National Centres

Service delivery



NMHSs deliver analyses, forecast and early warning services



WMO



WMO / OMM



# Severe Weather Forecasting Demonstration Project

Regional SWFDP's contribute to capacity building by:

- helping developing countries access and make use of **existing NWP products** for improving hazardous weather warnings,
- encouraging operational forecasters to use **relevant standard or newly developed** products and procedures
- **Training** is also carried out in service delivery principles and practices including user focus, **communication skills** and user satisfaction assessment.



**South African  
Weather Service**





# Severe Weather Forecasting Demonstration Project

- Participating countries benefit from advances in the **science of weather forecasting**, especially the dramatic development in NWP and EPS which give guidance in advance of potential hazardous weather conditions for issuance of alerts and warnings.
- NMHSs in a geographical region typically need similar products, and SWFDPs **coordinate requirements**. Generally, the limited bandwidth is taken into account, with the file sizes of guidance products being minimal.



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Weather Service**



# Severe Weather Forecasting Demonstration Project

## Global Centres:

centres **provide** available NWP and EPS products, including in the form of probabilities for a specific time frame

## Regional Specialized Meteorological Centres (RSMCs):

interpret information received from global centres, **prepare daily guidance products** (1-5 day) for distribution to National Meteorological Centres (NMCs) and maintain the regional centre web site

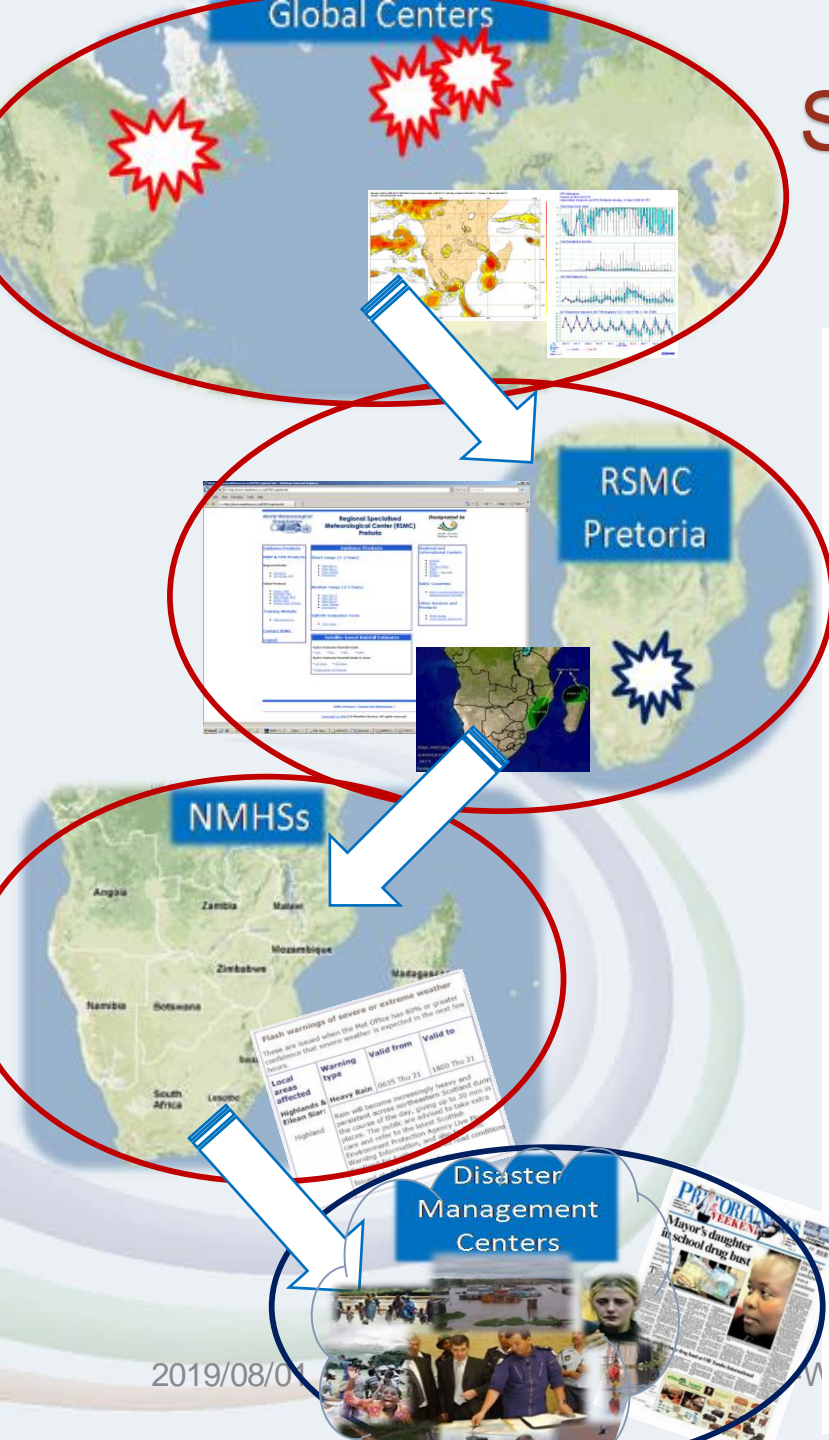
## National Meteorological Centres (NMCs):

- **issue alerts**, advisories, severe weather warnings to public via the media and other dissemination channels;
- **liaise with disaster management**, and certain economic sectors, and contribute feedback and evaluation of the project.



# SWFDP Framework backbone: “Cascading of Information”

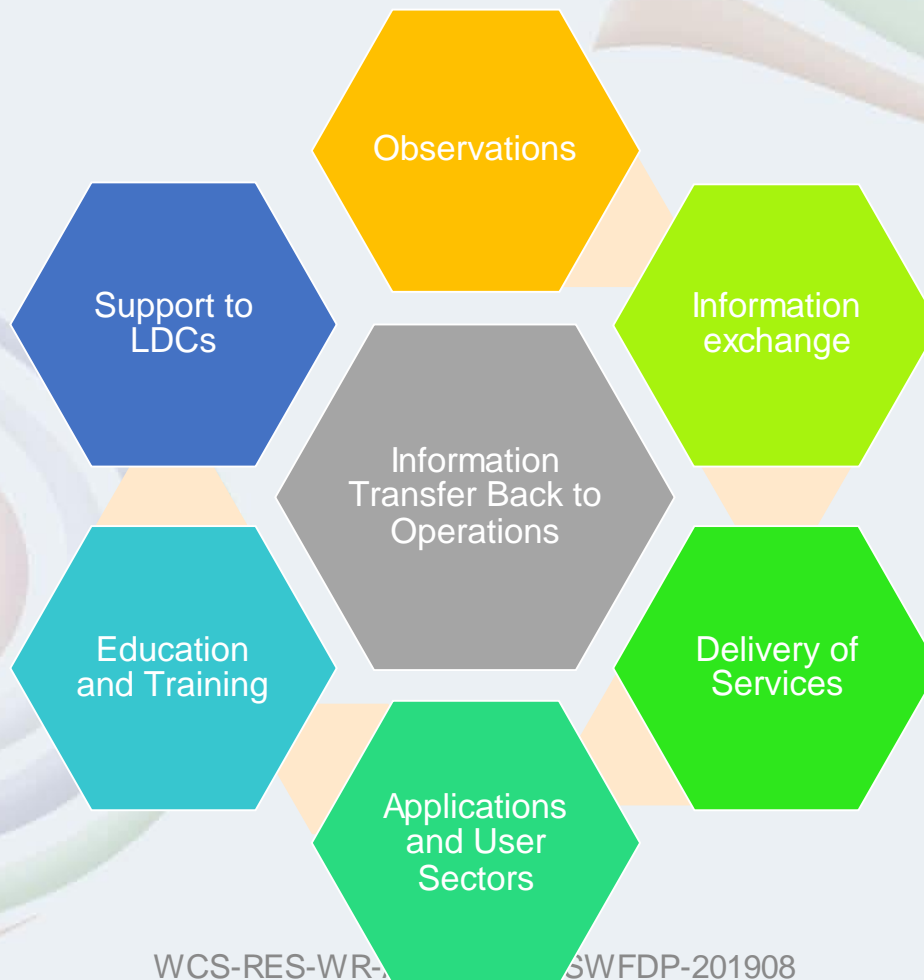
- Global Centres
  - Provide specialized forecast products
- Regional centre
  - Provide these products to NMSs through a dedicated web page
  - Provide guidance forecasts of potential severe weather for next 5 days, every day
- National Meteorological Services
  - Assess the products and guidance
  - Issue national warnings with up to 5 days lead time
- Underpinned by regular training
- No complex technology required





# Severe Weather Forecasting Demonstration Project

**SWFDP as an end-to-end cross-programme collaborative activity**





# Severe Weather Forecasting Demonstration Project

## Phases of the SWFDP

### **Phase I: Pilot**

Overall Project Planning

### **Phase II: Demonstration**

Regional Subproject Implementation Planning and Executing

### **Phase III: Full Demonstration**

Regional Subproject Evaluation

### **Phase IV: Sustainability and Development**

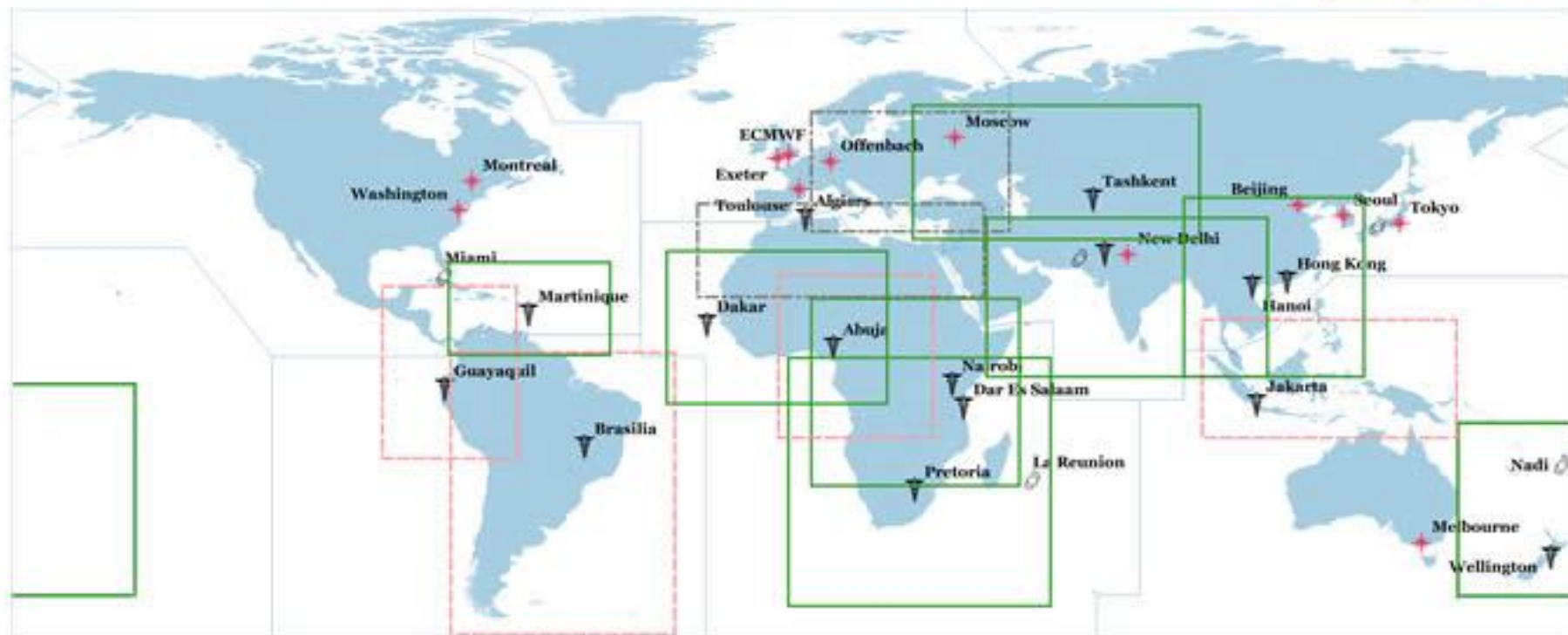
Regional Subproject Long-Term Sustainability and Future Developments



# WMO's Severe Weather Forecasting Demonstration Project (SWFDP)

Strengthening capacity of NMHSs in improving forecasts and warnings of meteorological hazards since 2006

Updated on 13 February, 2019



## Legend

- ✦ Global Contributing Centres (12)
- ▼ Regional Contributing Centres or potential regional centres (15)
- RSMC/TC (5)

Green (solid-line) color boxes represent the domains of existing SWFDP regional subprojects. Pink (dash-line) and Brown (dash-dot-line) color boxes signify the regions for future SWFDP subprojects which will be developed within next 1-2 years and 3-5 years respectively.

Contributing Global and Regional Centres including RSMCs for Tropical Cyclones (RSMCs TC) for existing SWFDP regional subprojects as well as potential global & regional centres for future subprojects are also shown.

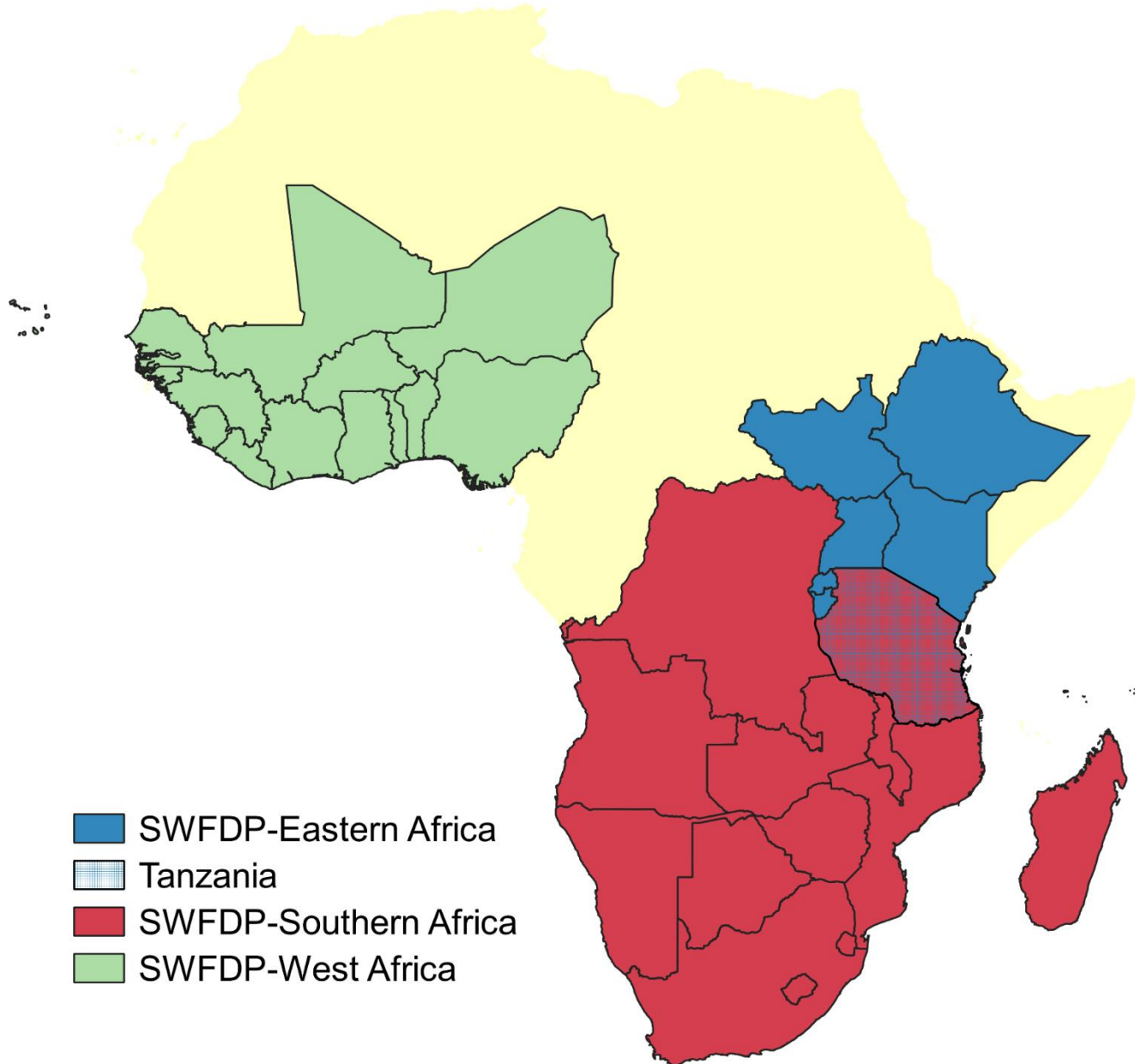
## DESIGNATIONS USED

The depiction and use of boundaries, geographic names and related data shown on maps and included in lists, tables, documents, and databases on this web site are not warranted to be error free nor do they necessarily imply official endorsement or acceptance by the WMO.





# SWFDP Regions across Africa



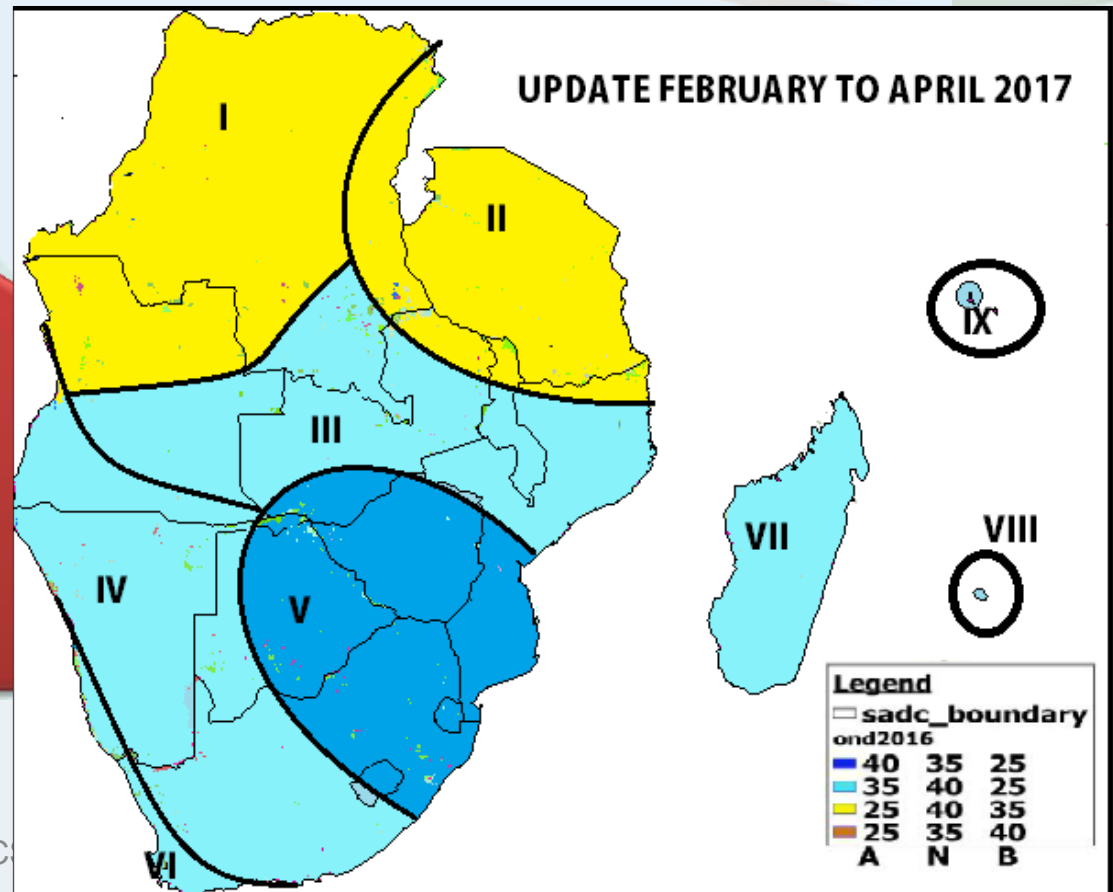
- SWFDP-Eastern Africa
- Tanzania
- SWFDP-Southern Africa
- SWFDP-West Africa



# Southern Africa

6 months

SARCOF: Consolidated seasonal climate forecasts in September on the likelihood of above / below normal rain for the coming summer season over SADC



Late 1990's

2019/08/01

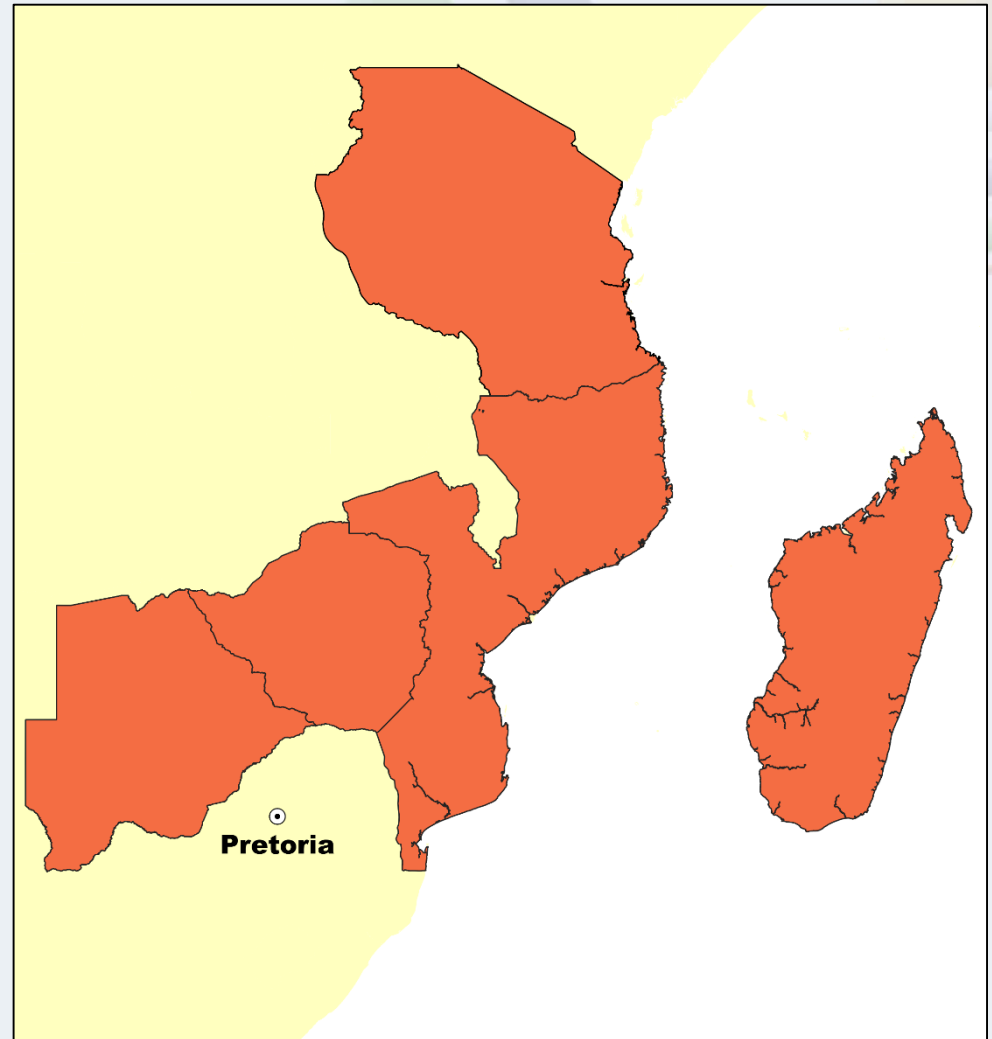
WC





# Southern Africa

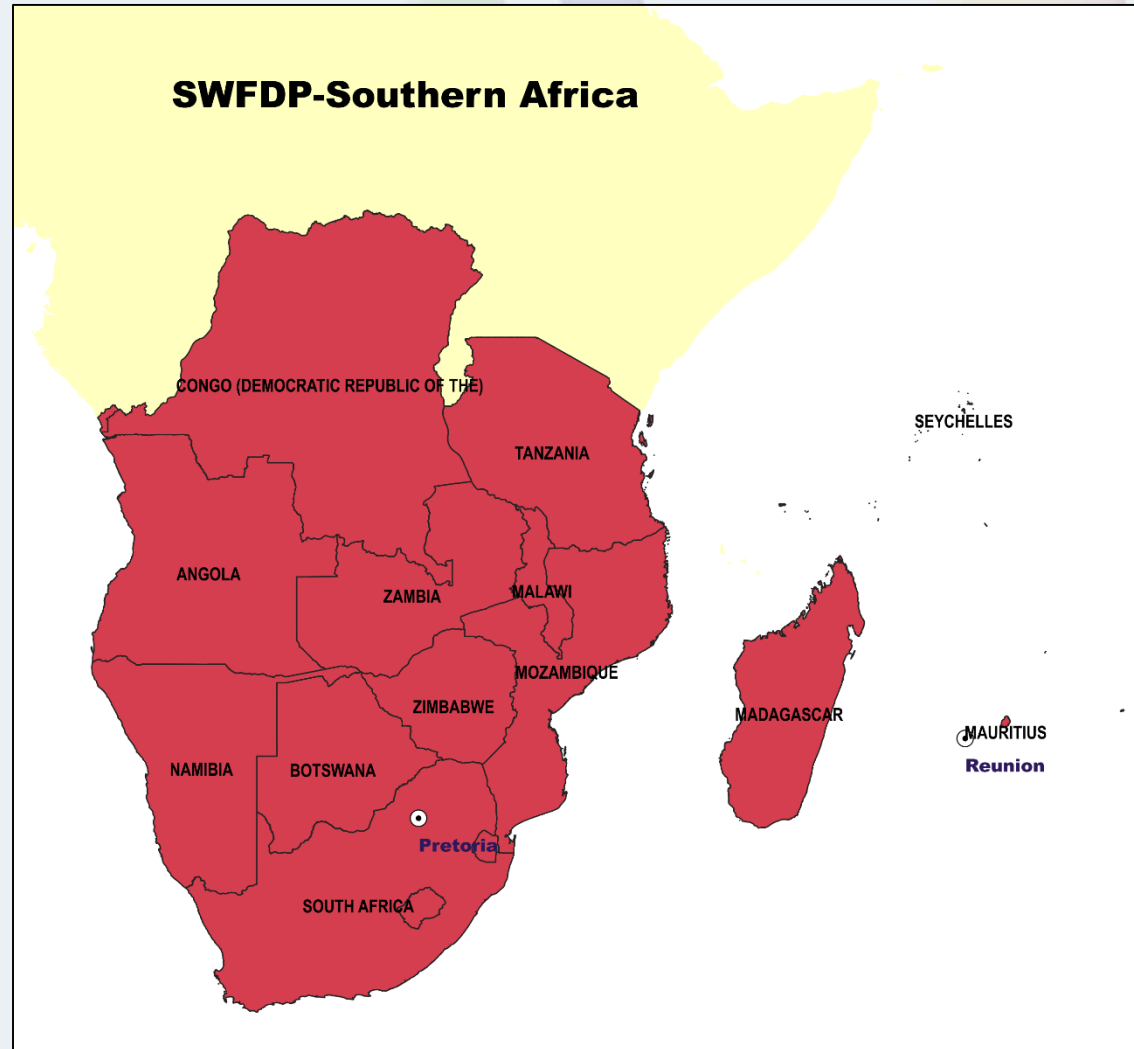
- SWFDP was started in 2006 in Southern Africa with involvement of just **5 countries**.
- Based on its success, the subproject was expanded to include all **16 SADC countries** in the sub-region in 2008.
- CBS/WMO recommended the **involvement of DMs** to improve severe weather warning services (part of PWS)
- In Phase-IV (**sustain operations** and continue development) since January **2012**





# Southern Africa

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# Southern Africa

Lead **RSMC: Pretoria** (SAWS)  
TC support RSMC: La Réunion

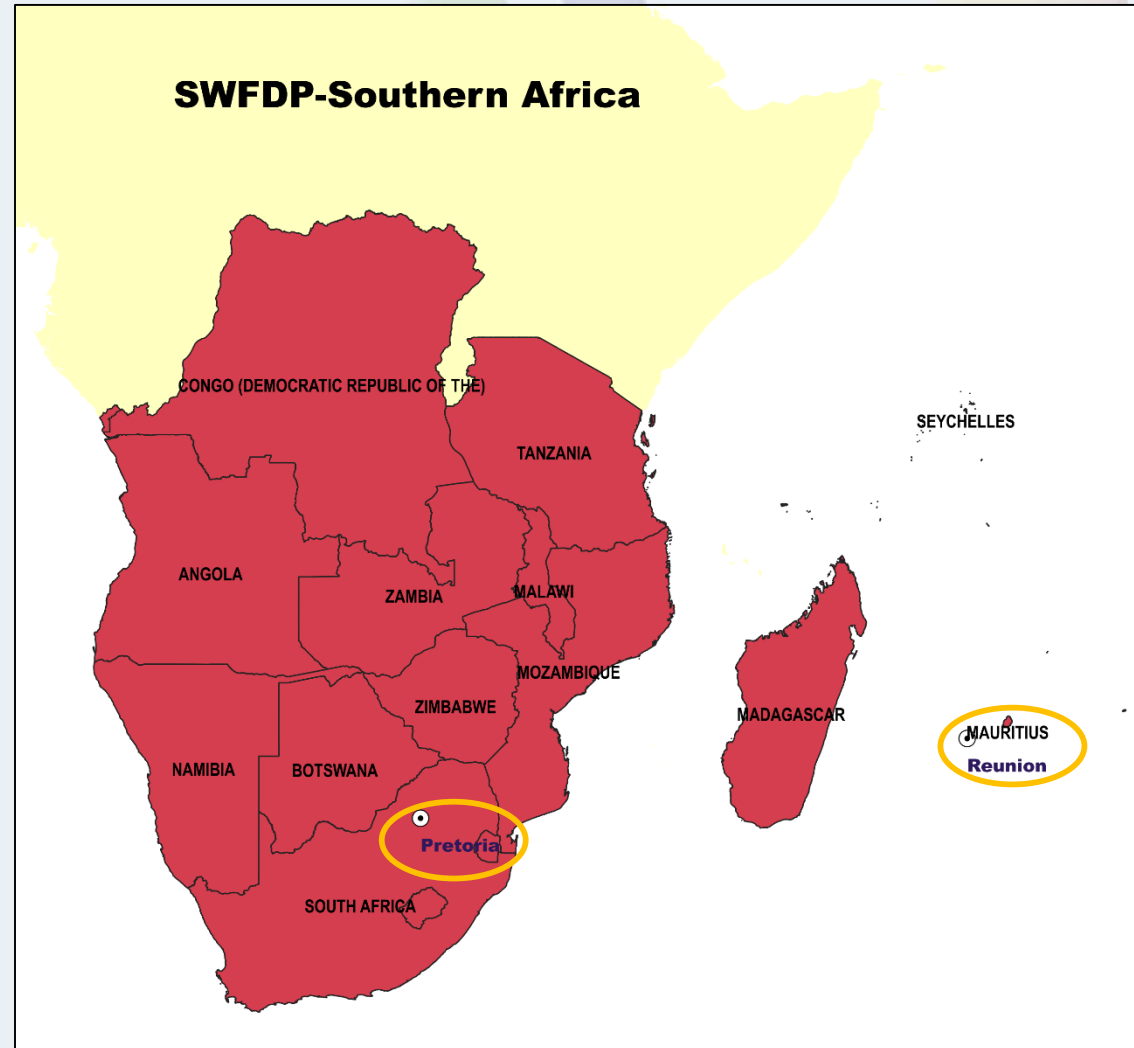
**16** Southern Africa countries

Global Centre contributions:

- UK Met Office
- ECMWF
- NCEP/NOAA
- EUMETSAT (satellite products)
- MeteoFrance (TC region)

SAWS:

- UM 4 km regional model forecasts
- Nowcasting products
- Issuing of guidance products





# Southern Africa

Subproject website since 2006:

RSMC Pretoria: <http://rsmc.weathersa.co.za/login.php>



Regional Specialized Meteorological Center(RSMC) Pretoria



**Guidance Products**

**NWP & EPS Products**

**Regional Models**

- UM SA4 00 UTC
- UM SA4 12 UTC
- Arome La Reunion
- Met Office: Africa Web Viewer

**Global Products**

- NOAA
- ECMWF: EPS
- Met Office: EPS
- SAWS: EPS (NOAA)

**Training Website**

- Met-eLearning

**SWFDP Training Nov 2012**

- GDPFS
- PWS

**SWFDP Training Nov 2013**

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- PWS

**SWFDP Training Nov 2014**

- GDPFS
- PWS

**SWFDP Training Nov 2015**

- GDPFS
- PWS

**SWFDP Training Nov 2017**

- SARFFG
- GDPFS
- PWS

**RSMC Guidance Archive**

**Contact RSMC**

**Logout**

**Guidance Products**

**Short-range (1-2 Days)**

- Map Day 1
- Map Day 2
- Site reviews
- Discussion

**Medium-range (3-5 Days)**

- Map Day 3
- Map Day 4
- Map Day 5
- Prob Tables
- Discussion

**SWFDP Evaluation Form**

- Click Here

**Nowcasting Products**

**Satellite-Based Rainfall**

Hydro-Estimator Rainfall Totals

- 1hr
- 2hr
- 6hr
- 24hr

Hydro-Estimator Rainfall Totals In Days

- 10 Days
- 30 Days
- Archive
- Description of Product

Hail Forecasts from UM SA12

- 10 UTC
- 12 UTC
- 14 UTC

Lightning information

- Forecast Today
- Forecast Tomorrow

**Convective Thunderstorm Forecasts**

Probability of Convective Thunderstorms

- CI
- Description of Product

Rapidly Developing Thunderstorms

- RTD SADC
- RTD SA
- RTD Specific Maps
- Description of Product

Convective Rainfall Rate (CRR) - CBS

- Description of Product

Hydro-estimator Storm Tracks

- SADC
- SADC NW
- SADC NE
- SADC SW
- SADC SE
- Thunderstorm
- South Africa

**Guidance Products**

**Flash Flood Guidance**

- SARFFG Portal

**Regional and International Centers**

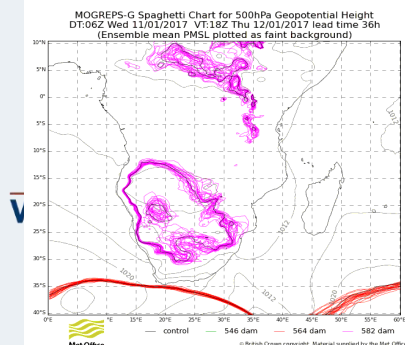
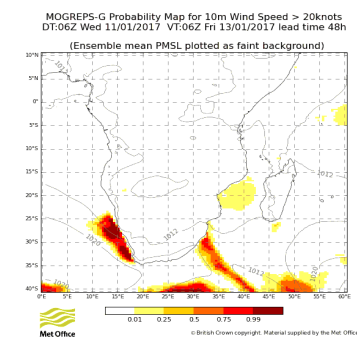
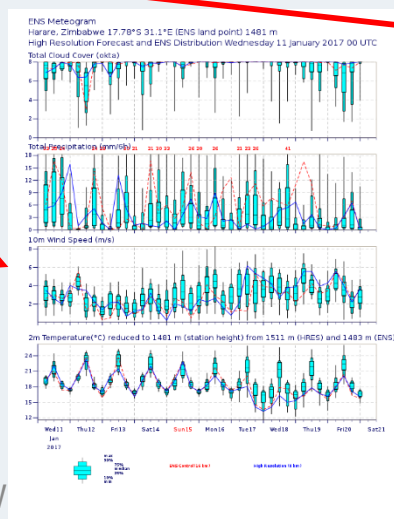
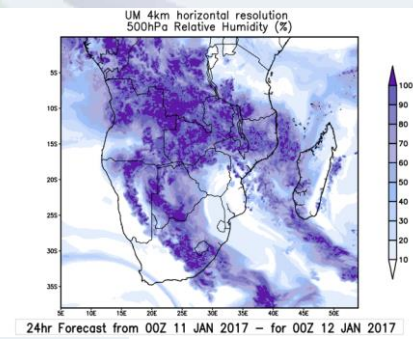
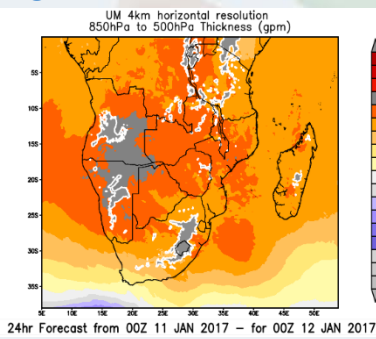
- ECMWF
- NCEP
- UK Met Office
- WMO
- RSMC - Reunion
- ACMAD

**SADC Countries**

- SADC Countries
- National Meteorological Services

**Other Services and Products**

- Short-range
- Long-range (Seasonal)





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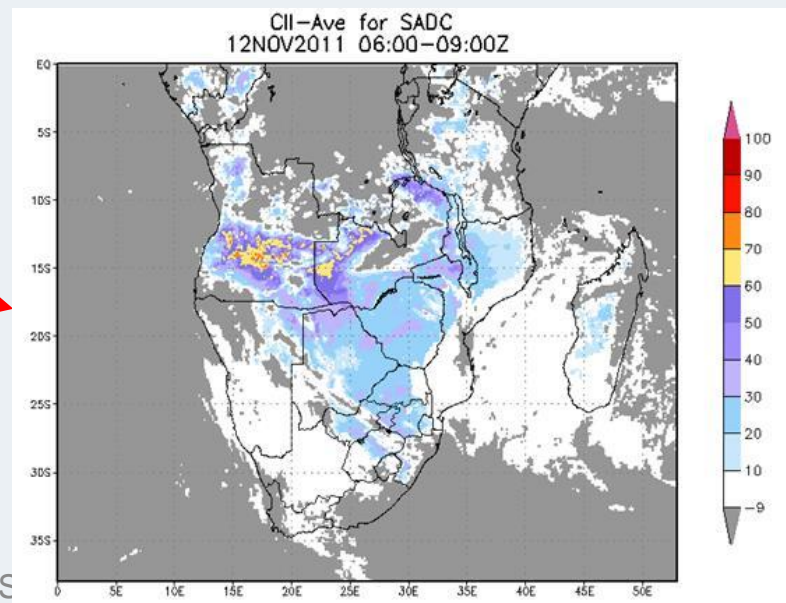
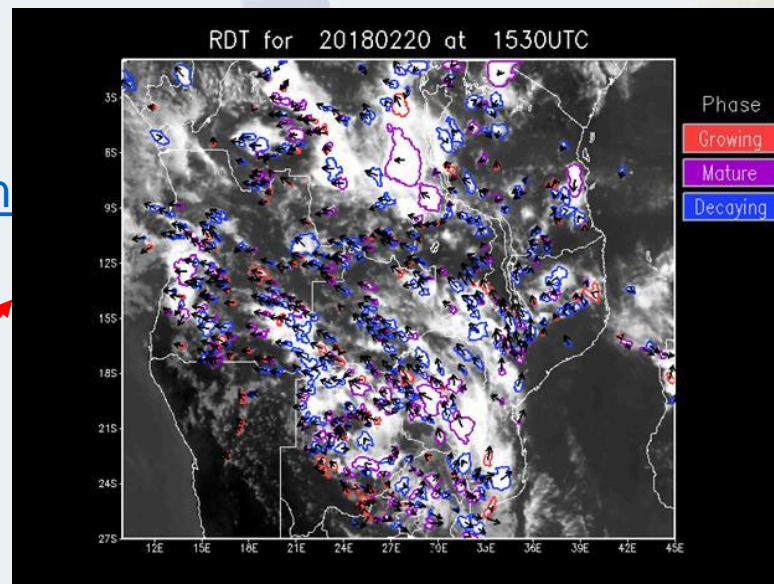
Regional Specialized Meteorological Center (RSMC) Pretoria

WMO South African Weather Service

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      - SADC SE
      - Thunderstorm South Africa

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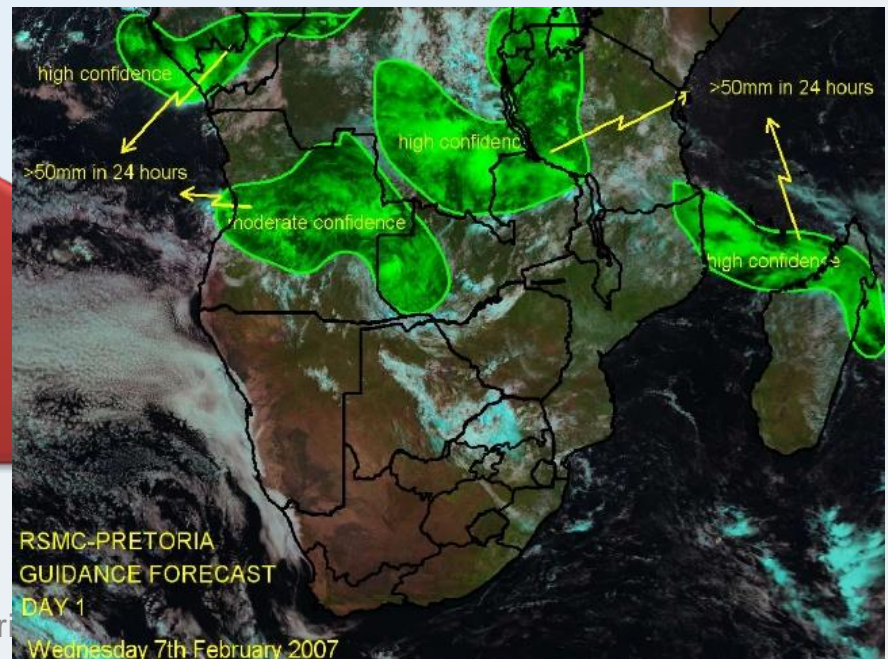
DAYS

Late 1990's

2006

2019/08/01

WCS-RES-WR-Afr





# Southern Africa

Heavy rain, strong winds, large waves, severe thunderstorms

Regional Specialized Meteorological Center (RSMC) Pretoria



- Guidance Products**
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- Regional Models**
- UM SA4 00 UTC
  - UM SA4 12 UTC
  - Arome La Reunion
  - Met Office: Africa Web Viewer
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- Probability of Convective Thunderstorms

**Day 3: Friday 13<sup>th</sup> January 2017**

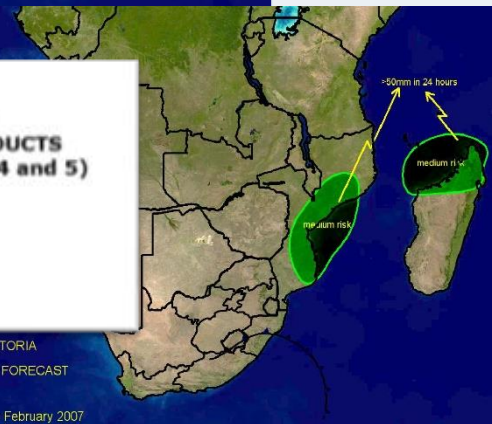
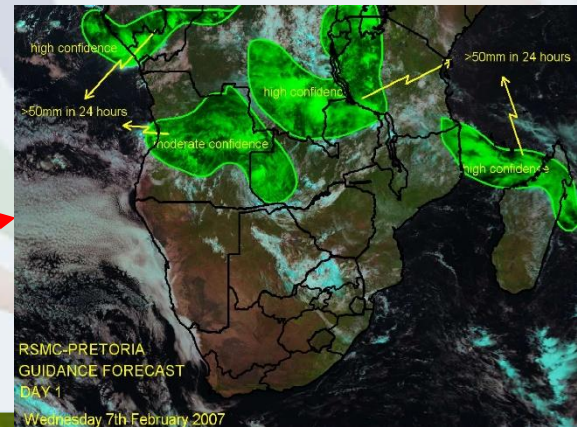
RISK	No risk	Low risk	Medium risk	High risk	No risk	Low risk	Medium risk	High risk
<b>Heavy Rain</b>								
<b>Angola</b>	X				X			
<b>Botswana</b>	X				X			
<b>DRC</b>	X				X			
<b>Comoros</b>	X							
<b>Lesotho</b>	X				X			
<b>Madagascar</b>	X				X			
<b>Malawi</b>	X				X			
<b>Mauritius</b>	X				X			
<b>Mozambique</b>	X				X			
<b>Namibia</b>			Extreme N interior					
<b>Seychelles</b>			X		X			
<b>South Africa</b>	X						S+SW+ E coasts	
<b>Swaziland</b>	X				X			

**RSMC-PRETORIA SWFDP GUIDANCE PRODUCTS MEDIUM-RANGE (DAYS 3, 4 and 5)**

**Issue Date: 11<sup>th</sup> January 2017**

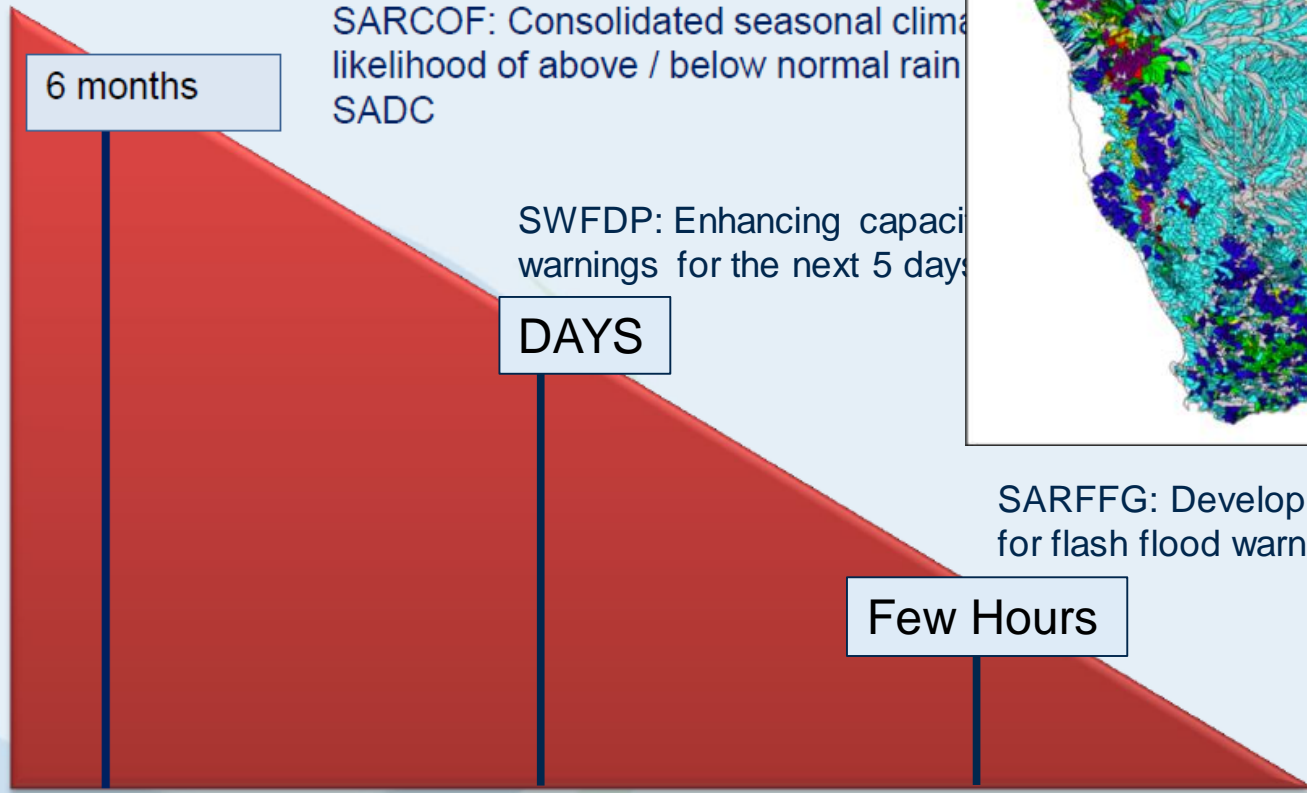
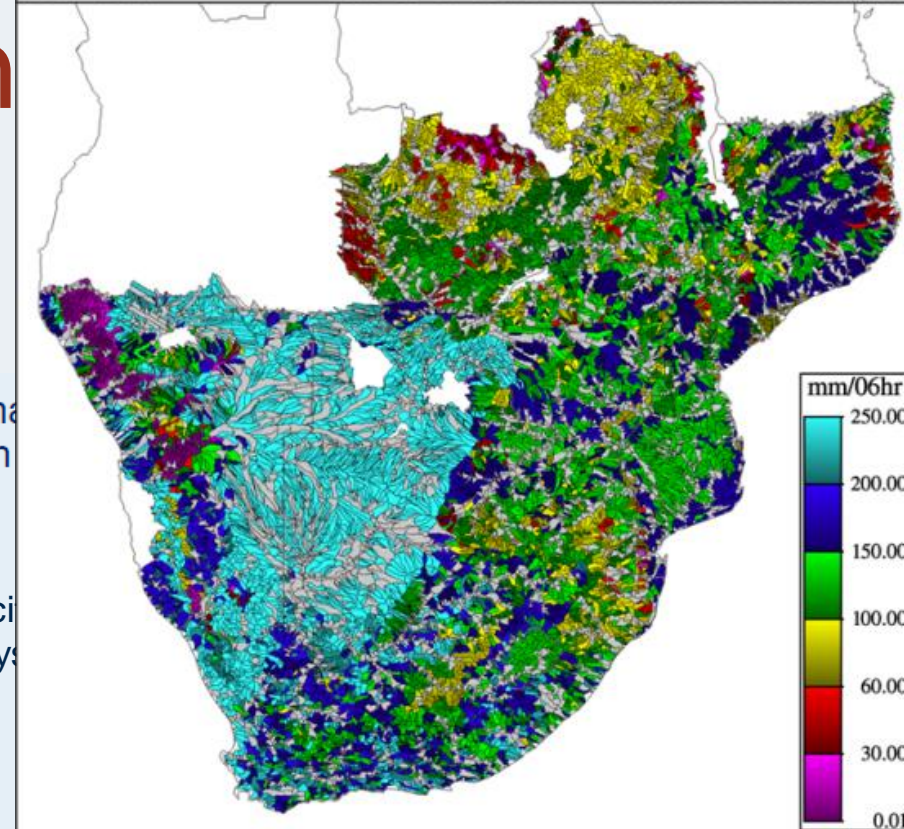
**SYNOPSIS OF EXPECTED WEATHER PATTERNS**

**Day 3: Friday 13<sup>th</sup> January 2017**





# Southern



SARCOF: Consolidated seasonal climate likelihood of above / below normal rainfall SADC

SWFDP: Enhancing capacity for warnings for the next 5 days

SARFFG: Developing technology for flash flood warnings

Late 1990's

2006

2012/2013



**South African  
Weather Service**



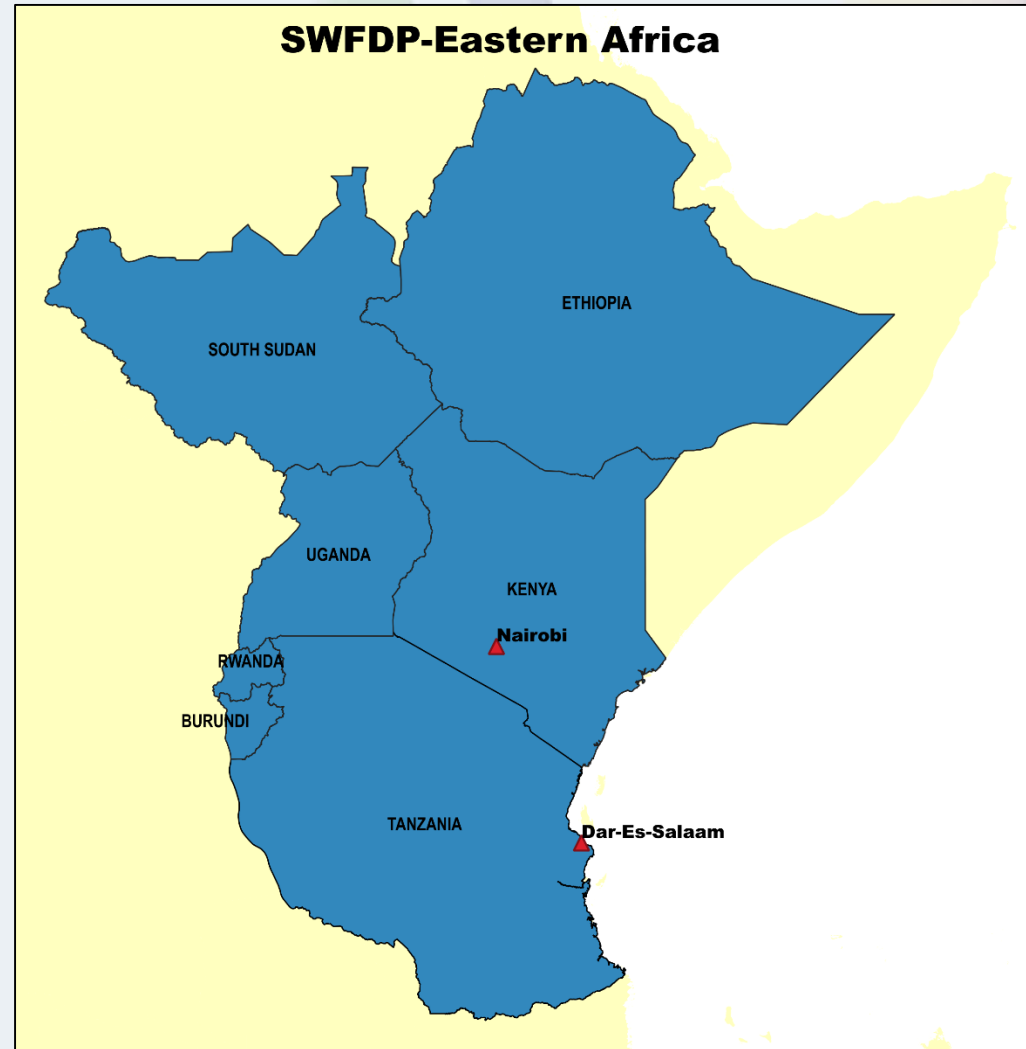


# Eastern Africa

- SWFDP Eastern Africa started in 2010
- Originally 6 countries with support from Nairobi and Dar Es Salaam
- South Sudan joined in 2013
- Currently in Full Demonstration phase (III; Field phase) since September 2013

## Training workshops:

- Tanzania (2010 & 2011)
- Uganda (2012)
- Burundi (2013)
- Rwanda (2014)
- Ethiopia (2015)
- Kenya (2019)





# Eastern Africa

Lead **RSMC: Nairobi** (KMA)

LV support RFSC: Dar Es Salaam (TMA)

7 Eastern Africa countries

Global Centre contributions:

- UK Met Office
- ECMWF
- NCEP/NOAA
- DWD
- EUMETSAT (satellite)

KMD and TMA support:

- Regional WRF forecasts
- Guidance Maps

**Heavy rain, strong winds, large waves (coastal areas of western Indian Ocean and Lake**

**Victoria), Dry spells** WCS-RES-WR-AfricanSwift-SWFDP-201908





# Eastern Africa

## Lake Victoria SWFDP – RFSC: Dar Es Salaam



**TANZANIA METEOROLOGICAL AGENCY**

**REGIONAL FORECASTING SUPPORT CENTRE (RFSC)**

**LAKE VICTORIA BASIN**

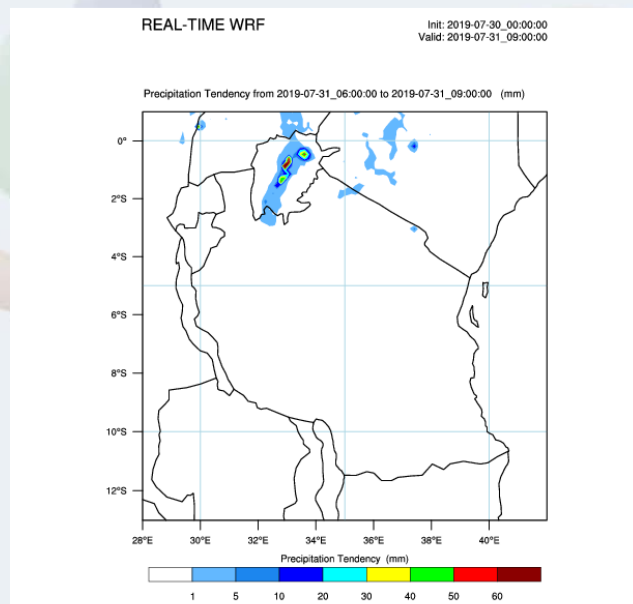


**LAKE VICTORIA PRODUCTS**

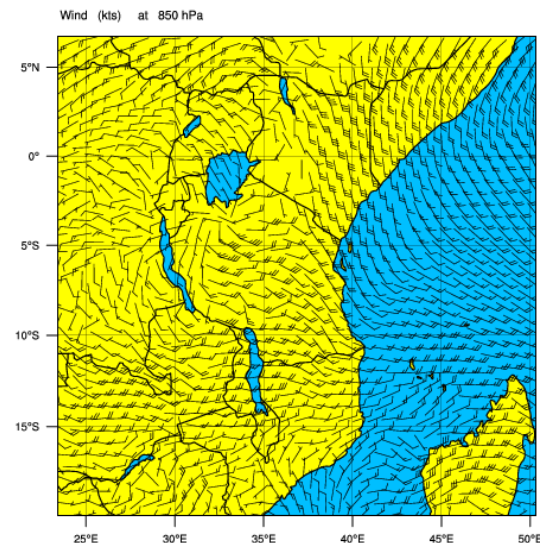
<p><b>TMA Products:</b> <span style="border: 2px solid red; border-radius: 50%; padding: 2px;">EAC</span> &amp; <a href="#">NEST</a></p> <p><b>Marine Products</b></p> <p><a href="#">Uk met office (Password Hint)</a></p>	<p style="text-align: center;"><i>Short-range (1-2 Days)- GUIDELINES</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Forecast</th> <th style="width: 50%;">Verification</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> <li><a href="#">Map Day 1</a></li> <li><a href="#">Map Day 2</a></li> </ul> </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> <li><a href="#">Day 2</a></li> <li><a href="#">Tropical Rainfall Measuring Mission (TRMM)</a></li> </ul> </td> </tr> <tr> <td colspan="2" style="text-align: center;"> <p><a href="#">Risk Table</a></p> <p><a href="#">Discussion</a></p> </td> </tr> </tbody> </table>	Forecast	Verification	<ul style="list-style-type: none"> <li><a href="#">Map Day 1</a></li> <li><a href="#">Map Day 2</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Day 2</a></li> <li><a href="#">Tropical Rainfall Measuring Mission (TRMM)</a></li> </ul>	<p><a href="#">Risk Table</a></p> <p><a href="#">Discussion</a></p>	
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<p><i>Agrometeorology Products</i></p> <ul style="list-style-type: none"> <li><a href="#">2 Days</a></li> <li><a href="#">Dekadal</a></li> </ul>	<p style="text-align: center;"><i>Real Time Radar and Satellite Imagery</i></p> <ul style="list-style-type: none"> <li><a href="#">RADAR</a></li> <li><a href="#">SATELLITE</a></li> </ul>						

Click here to view [SWFDP Archive Products](#)

Regional Forecasting Support Center (RFSC) @ [By Tanzania Meteorological Agency](#)



REAL-TIME WRF (issued by TMA-Tanzania) 2019-07-30\_00:00:00  
Valid: 2019-07-31\_00:00:00





# Eastern Africa

## Lake Victoria SWFDP – RFSC: Dar Es Salaam

**TANZANIA METEOROLOGICAL AGENCY**  
**REGIONAL FORECASTING SUPPORT CENTRE (RFSC)**  
**LAKE VICTORIA BASIN**



**LAKE VICTORIA PRODUCTS**

**TMA Products:** [EAC](#) & [NEST](#)

**Marine Products**  
[Uk met office \(Password Hint\)](#)

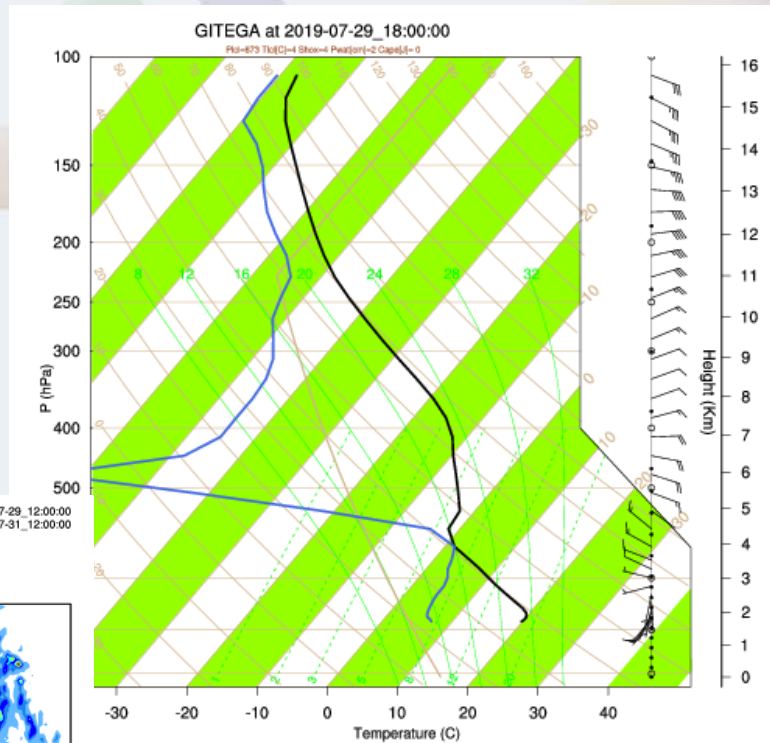
**Agrometeorology Products**

- [2 Days](#)
- [Dekadal](#)

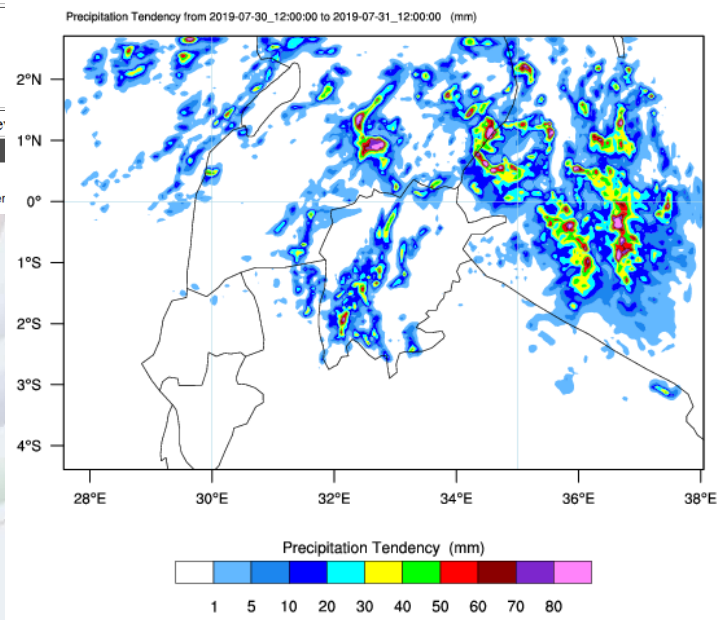
[Click here to view](#)

Short-range (1-2 Days)- GUIDELINES	
Forecast	Verification
<ul style="list-style-type: none"> <li>• <a href="#">Map Day 1</a></li> <li>• <a href="#">Map Day 2</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Day 2</a></li> <li>• <a href="#">Tropical Rainfall Measuring Mission (TRMM)</a></li> </ul>

REAL-TIME WRF



Init: 2019-07-29\_12:00:00  
 Valid: 2019-07-31\_12:00:00



Regional Forecasting Support Cen





# Eastern Africa

## Lake Victoria SWFDP – RFSC: Dar Es Salaam

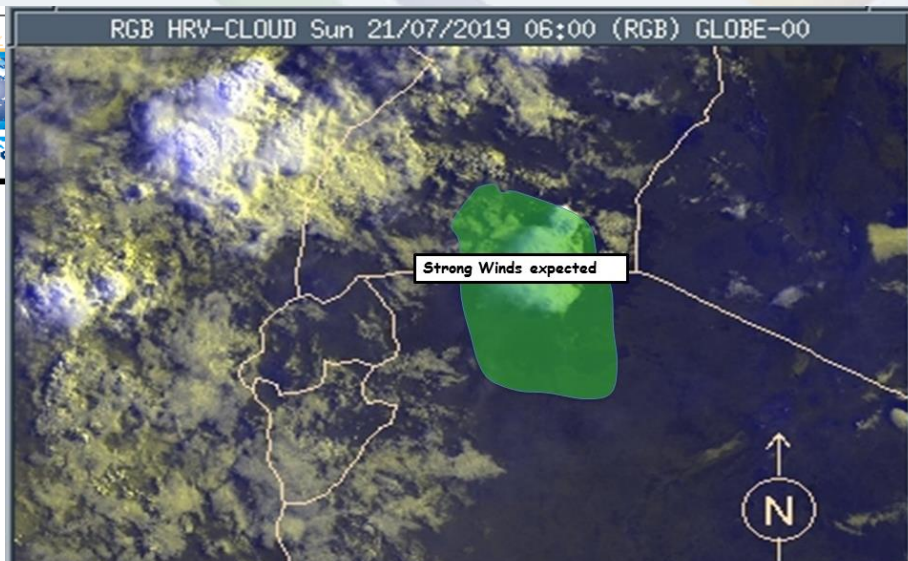


**TANZANIA METEOROLOGICAL AGENCY**

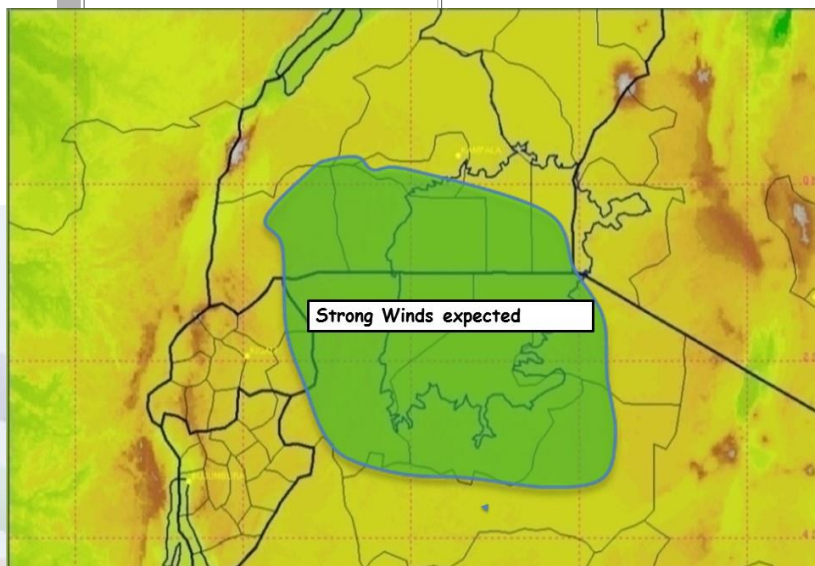
**REGIONAL FORECASTING SUPPORT CENTRE (RFSC)**

**LAKE VICTORIA BASIN**





LAKE VICTORIA PRODUCTS						
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<a href="#">Risk Table</a> <a href="#">Discussion</a>						



RFSC, Dar es Salaam, day 2, 22<sup>nd</sup> July, 2019

Day 1: Friday 26<sup>th</sup> July, 2019.

COUNTRY	HEAVY RAIN				STRONG WINDS				LARGE WAVES			
	RISK				RISK				RISK			
	No	Low	Medium	High	No	Low	Medium	High	No	Low	Medium	High
BURUNDI	X				X				X			
KENYA	X				X				X			
RWANDA	X				X				X			
TANZANIA	X				X				X			
UGANDA	X				X				X			

Day 2: Saturday 27<sup>th</sup> July, 2019.

COUNTRY	HEAVY RAIN				STRONG WINDS				LARGE WAVES			
	RISK				RISK				RISK			
	No	Low	Medium	High	No	Low	Medium	High	No	Low	Medium	High
BURUNDI	X				X				X			
KENYA	X				X				X			
RWANDA	X				X				X			
TANZANIA	X				X				X			
UGANDA	X				X				X			



# West Africa

- SWFDP West Africa was initiated February 2015
- Seed funding from the Korean Meteorological Administration (KMA)
- Currently in Demonstration phase (II) since **January 2019**

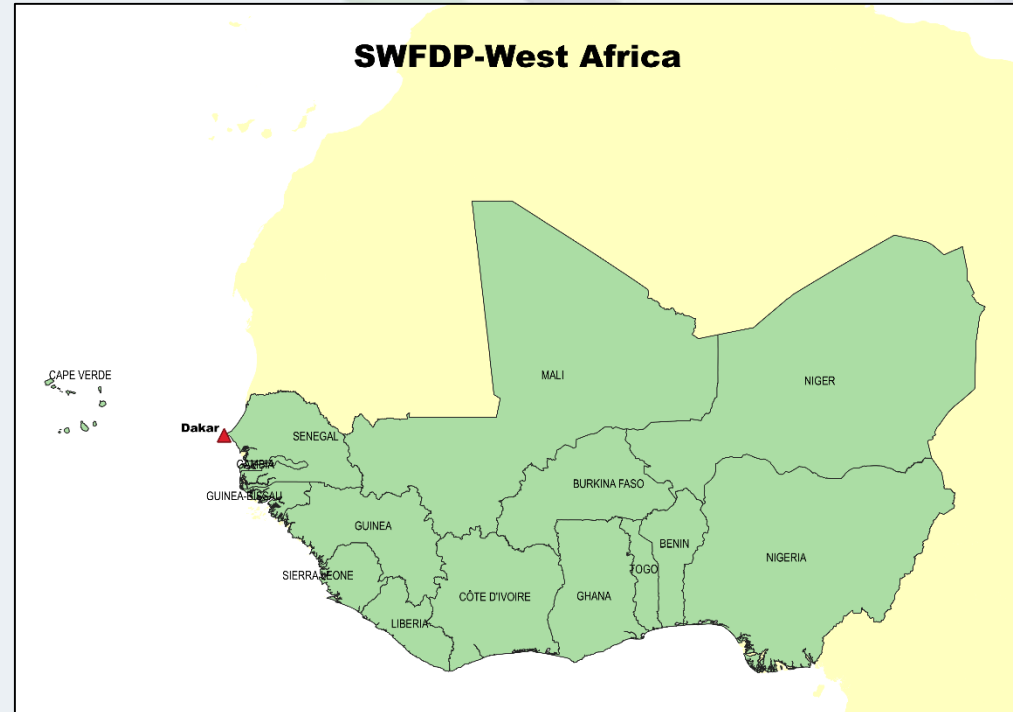
RSMC: Dakar

WRF Regional Model

Wave Watch III

Global Centre Contributions:

- UK Met Office
- ECMWF
- NCEP/NOAA
- Environment Canada
- MeteoFrance



**South African  
Weather Service**



# West Africa

Français English



## Regional Specialised Meteorological Center (RSMC) Dakar



Home

**Products**

**Guidance Products**

**NWP & EPS Products**

**Regional Products**

- WW3 Senegal
- Met Office: Africa Web Viewer
- ANACIM WRF Model WA

**Global Models**

- NOAA
- ECMWF: EPS
- Met Office: EPS
- Env CANADA : EPS
- Météo France
- Environnement CANADA

**Other Products and Services**

- Seasonal forecasts

**RSMC-Dakar Guid**

**Guidance Products**

**Short Range (1-2 days)**

- Map Day1
- Map Day2
- Risk tables
- Discussion

**Medium Range (3-5 days)**

- Map Day3
- Map Day4
- Map Day5
- Prob tables
- Discussion

**SWP Evaluation Form**

- Click here

**Nowcasting Products**

- RDT
- EUMETSAT Products

**Organization**

**Disaster Management Organizations**

**Global and international:**

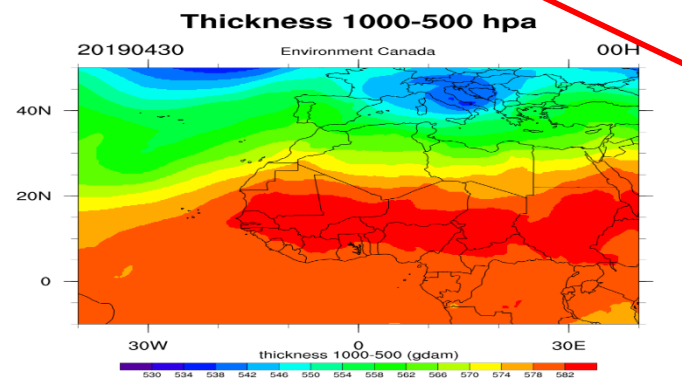
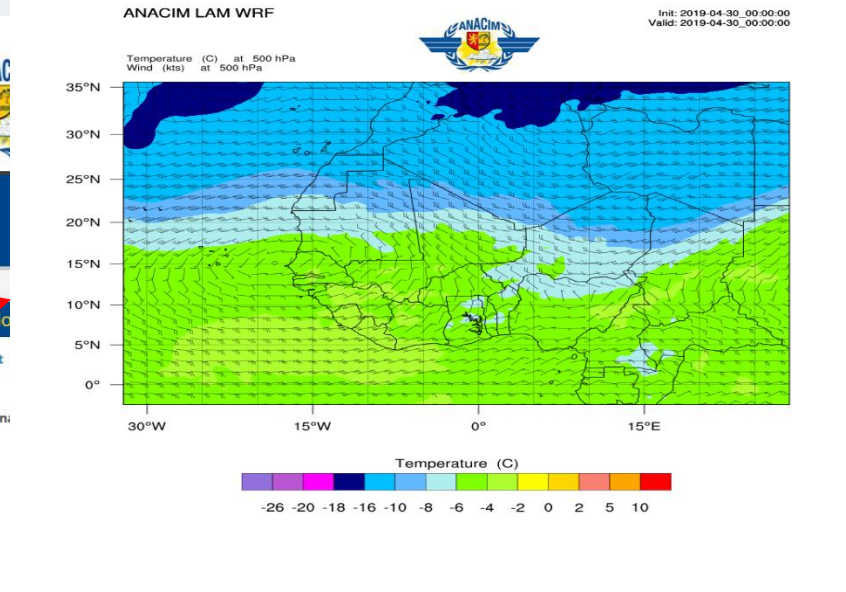
- ECMWF
- NOAA
- UK MET
- ASECNA
- WMO

**Regional Centers**

- ACMAD
- AGRHYMET
- Maroc Météo
- NIMET

**Training**

- SWFD training
- Met e-Learning



Met Office Africa Web Viewer

SATELLITE Colour Enhanced IR RGB Full Disc Sat: 18:45 UTC

- Africa - UM Global Model
- East Africa - UM 4km model
- Satellite Imagery and ATD Lightning
- ATDNET Service 15mins
- SATELLITE Colour Enhanced IR RGB Full Disc**
- SATELLITE Dual RGB Full Disc
- SATELLITE False Colour 321 RGB Full Disc
- SATELLITE Infrared 10.8 Full Disc
- SATELLITE Night RGB Full Disc
- SATELLITE Visible 0.8 Full Disc
- SATELLITE Water Vapour 6.2 Full Disc

2019/0



# West Africa

Environment Canada  
Environnement Canada

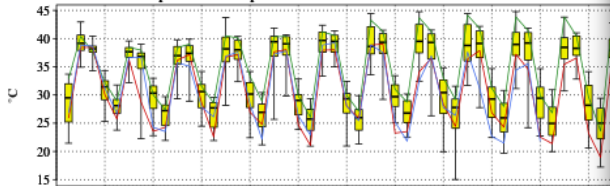
NAEFS  
SPENA



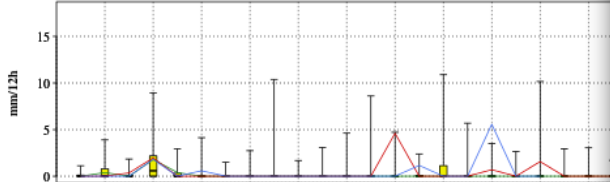
Ensemble and Deterministic Forecasts issued 30 April 2019 00 UTC  
Prévision d'ensemble et déterministe émises le 30 Avril 2019 00 UTC  
for/pour

**Bamako (MAL19) 12.53 N 7.95 W/O**

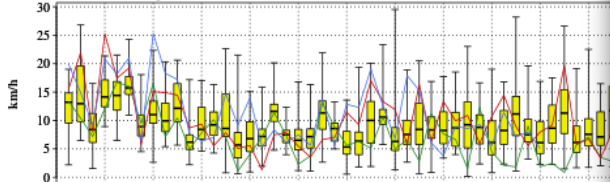
Surface air temperature/Température de l'air à la surface



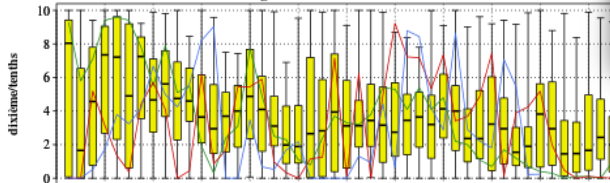
Précipitations/Precipitation



Surface wind speed/Vitesse du vent à la surface



Total cloud cover/Couvert nuageux



April/Avril 2019

May/Mai 2019



Rechercher dans la page 41.82.208.179    Aucun résultat    Options ▾

MSG 2018-11-18T13:00Z : RDT and overshoot

History graphs

OPIC\_SAT\_20181118131500\_00937\_ahrw  
Level: BT  
ContourTemp: 0°C / Tmin: -65.0°C  
Surface: 3520(km2)  
Duration: 90 (min)  
Stage: Decroissance  
Severity: unknown  
Mvt: 7.4 (ms) 94 (deg/North)  
CoolingRate: 12.6 (°C/h)  
ExpansionRate: 1467(km2/h)  
TopPressure: 111 (hPa)  
CloudPhase: glace  
MaxRainRate: 10 (mm/h)  
Lightning Pos: 0 / Neg: 0 / Intra: 0

Taper ici pour rechercher

1333  
18/11/2018







# West Africa

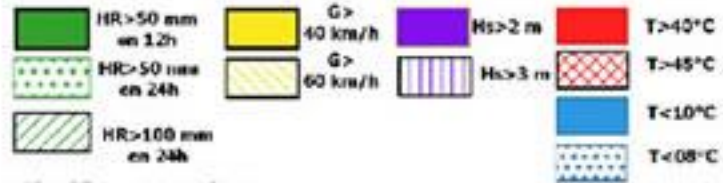
Heavy rain, strong winds, high sea (swell),  
Max. temperature (heat waves conditions),  
Min. temperature (cold waves conditions)

## DAKAR - SMRC Guidance Forecast

Day: 1

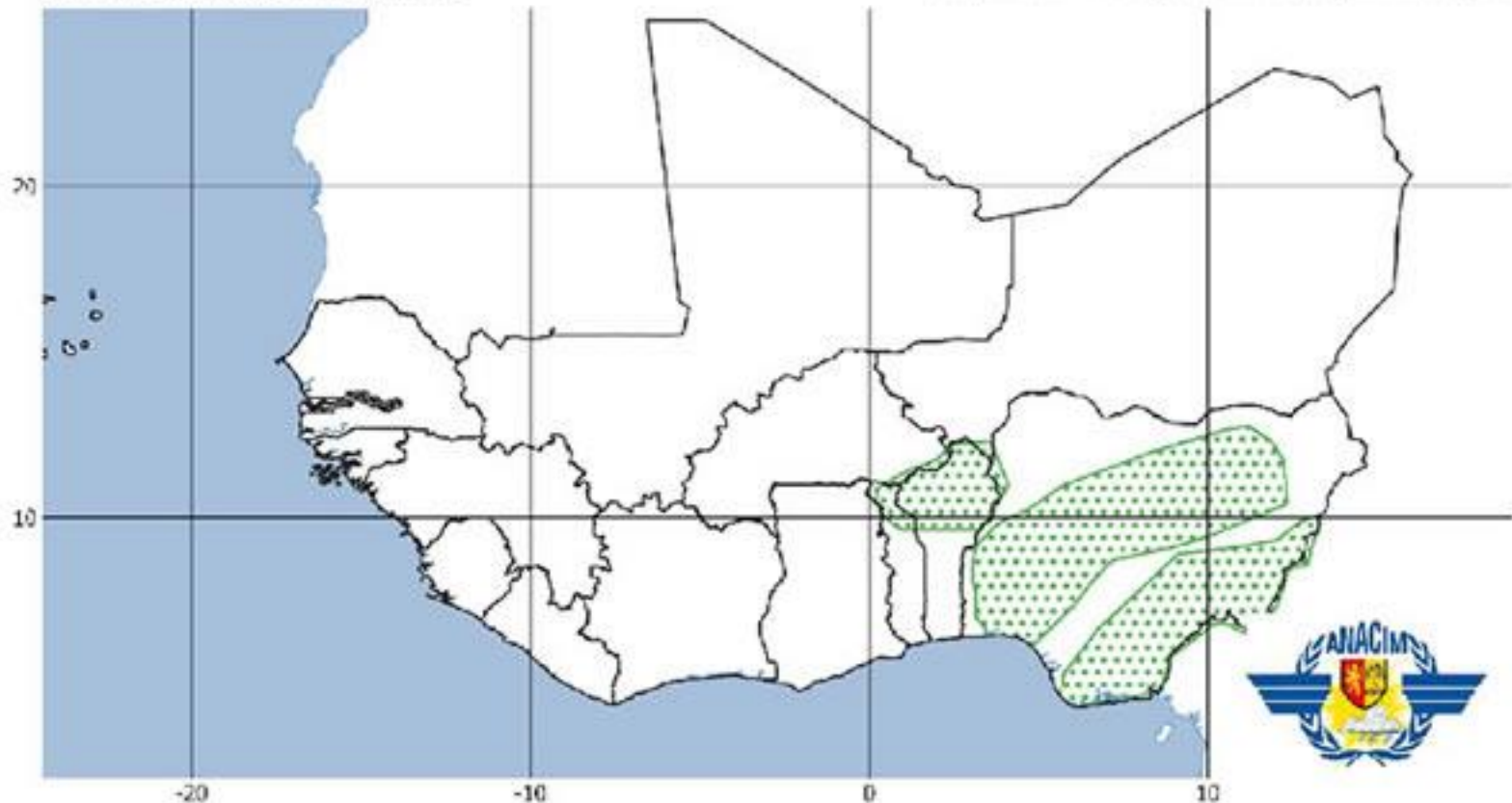
Date: Wednesday 29 May 2019

### Legend



NSW = No Significant Weather

- Heavy Rain: HR - Wind Speed: G - waves Significant Height: Hs





# Donors

- All SWFDPs including in Africa are supported by various donors (governments, development agencies etc.)
- WMO also attempts for synergistic efforts to maximize benefits for benefiting countries (e.g. SWFDP-West Africa workshop in November 2018 (Lome, Togo) was organized in collaboration with African-SWIFT)
- SWFDP-Eastern Africa workshop (Nairobi, Kenya) in January/February was organized in collaboration with UKMO through HIGHWAY project





# Donors

## Southern Africa:

- Mainly Norwegian funds up to 2014
- USAID/OFDA funds during 2014-2016 for twining of SWFDP & FFGS in South(ern) Africa

## Eastern Africa:

- Mainly Norwegian funds during 2011-2015
- Mainly through HIGHWAY-LVB project funds since 2017

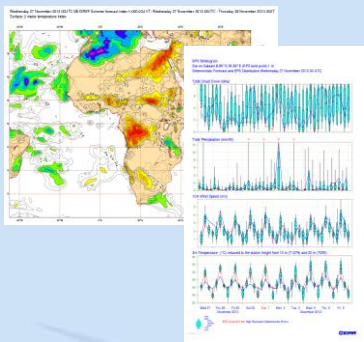
## West Africa:

- During 2015-2017, Korean Meteorological Administration (KMA) provided seed funding to kick start the process
- Since 2018, Climate Risk & Early Warning Systems (CREWS) initiative through its project for West Africa and its in-country projects in the sub-region.





# Feedback and Verification



Global NWP/EPs and Sat-based products

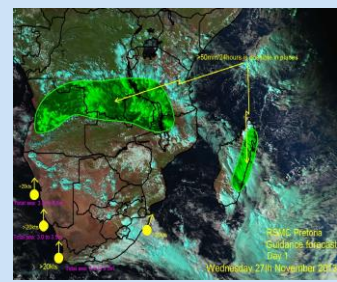
Global Centres

RSMCs-TC



TCP

Regional Centre (RSMCs, RFSC, RCCs)



LAM & Guidance Products (risk/probability)

National Met Centres

PWS

Alerts and Warnings

General Public, media, disaster management and civil protection authorities

GDPFS

Capacity Development, including Training



# In Conclusion: OUTCOMES OF PROJECTS

- Enhanced capability for NMHSs to **forecast severe weather and issue warnings at the national level**, including improved accuracy and longer lead-times;
- Established **warning processes agreed with national disaster management** and civil protection authorities, along with planned responses for protection of lives and property;
- Established forecast processes and Quality Management Systems (QMS), and **strengthened forecast capabilities in support of other user sectors in society** (such as water, DRR, agriculture and food security, aviation, marine safety and transportation, etc.) at the national level;
- **Raised awareness of the value of NMHSs with national governments** and their agencies, leading in the long-term to greater national support and investment and leading, in turn, to improved supply of observations and feedback into the GDPFS; and
- **Reduced loss of life and damage to property and infrastructure**, and contributions to the UN 2030 Agenda for Sustainable Development (Sustainable Development Goals) and Sendai Framework for DRR<sup>®</sup> in achieving their respective goals and targets.



# In Conclusion: OUTCOMES OF PROJECTS

- The SWFDP's across Africa have proven to improve the lead-time and reliability for alerts and warnings about high-impact events such as heavy precipitation, strong winds and high waves.
- It has been strengthening engagement of NMHSs with users including media, disaster management and civil protection agencies and local communities for improved disaster risk reduction (DRR) and decision making process by users.
- The projects are benefiting to various socio-economic sectors as well, including agriculture, fisheries, aviation, and marine transportation.



THANK YOU

***Merci***

***Dankie***

