

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

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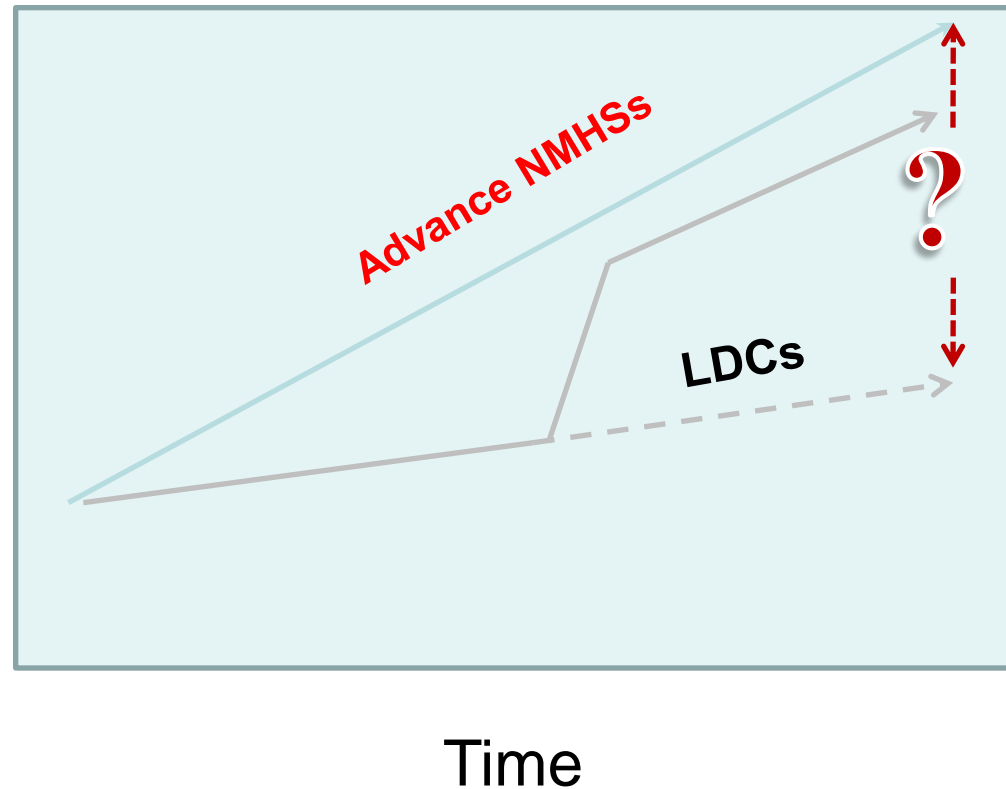
WMO OMM

World Meteorological Organization  
Organisation météorologique mondiale

# Why a project on severe weather forecasting?

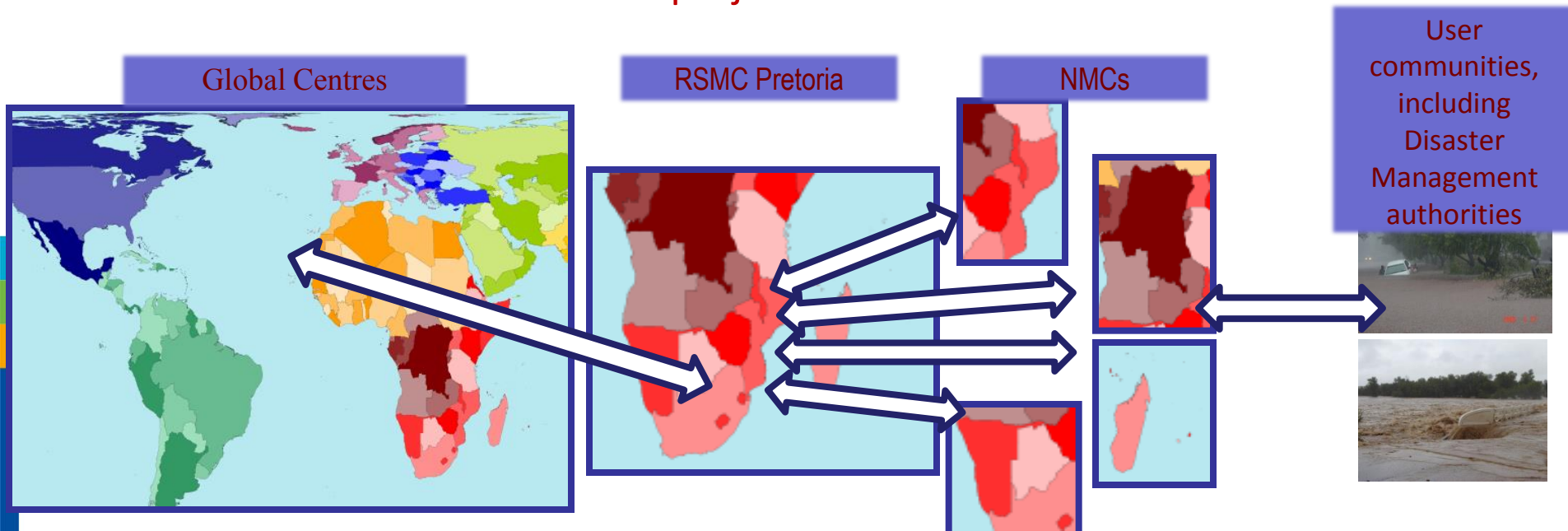
- Dramatic developments in weather and climate prediction science
- Leading to improved alerting of hydro-meteorological hazards, at ever-increased precision, reliability, and lead-times of warnings
- Developing countries, including LDCs and SIDSs, saw little progress
- Increasing gap in application of advanced tools and technology in forecasting and early warnings
- WMO SWFDP attempts to close this gap, by applying the 'Cascading Forecasting Process' (regional frameworks)

Accessibility to high value information



# SWFDP 'Cascading Forecasting Process'

- Global NWP centres to provide available NWP/EPS and sat-based products, including in the form of probabilities, cut to the project window frame;
- Regional centres to analyses and interpret information received from global centres, prepare daily guidance products (out to day-5) for NMCs, run limited-area model to refine products, maintain RSMC Web site, liaise with the participating NMCs;
- NMCs have access to all products, and maintained responsibility and authority over national warnings and services; to issue alerts, advisories, severe weather warnings; to liaise with user communities, and to contribute feedback and evaluation of the project.



# SWFDP

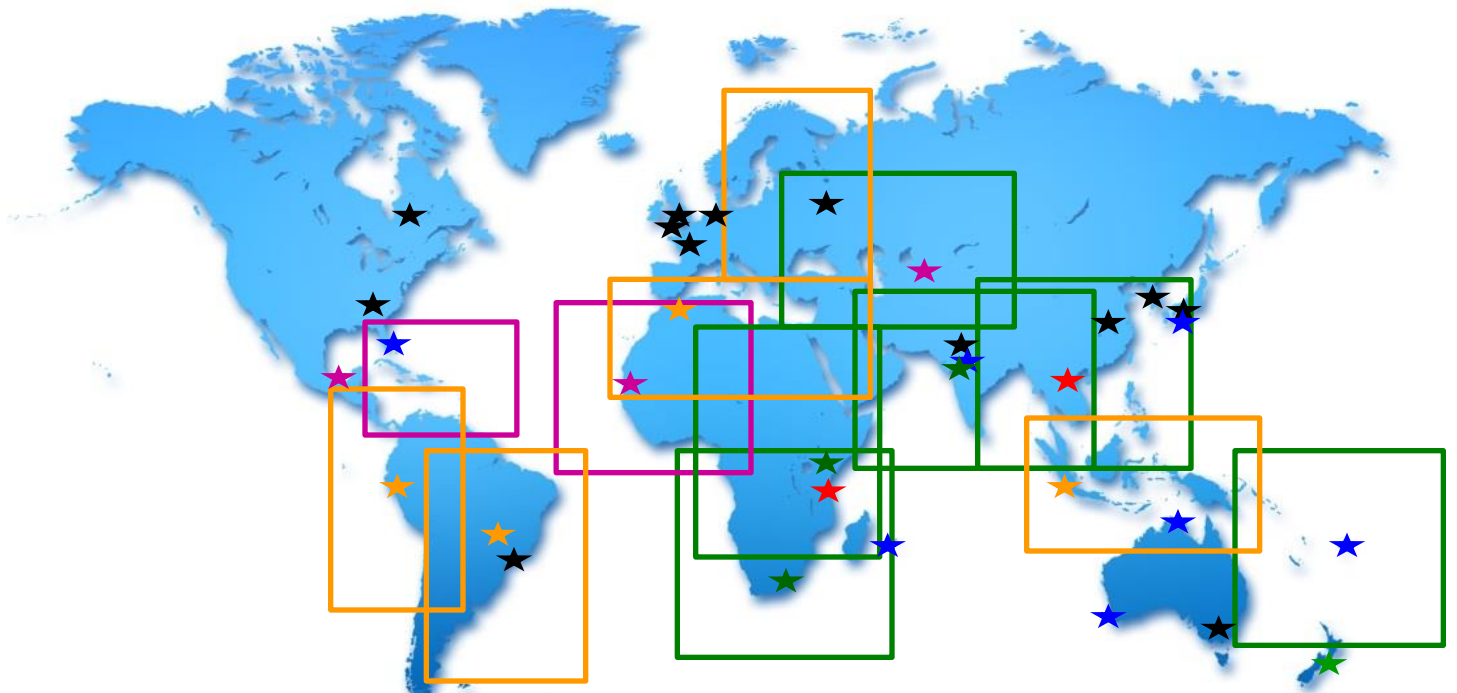
(ongoing regional subprojects and future directions)

## SWFDP

### Strengths

- Cost effective;
- Simplicity;
- NMHSs need internet only;
- Highly operational focus;
- Capacity development with improved forecasts and lead-time of warnings

Subject to availability of resources, the number of benefiting developing countries including LDCs and SIDS may grow to over 100 in next 3-5 years



**Green** color boxes - the existing SWFDP regional subprojects.

**Pink** color boxes - the SWFDP regional subprojects in development.

**Orange** color boxes - the subprojects that may be developed within next 3-5 years.

# SWFDP Guidance and products for NMHSs

## (including through RSMCs website)

- Nowcasting products

(Generally, satellite based information and SCOPE NWC precipitation products. In Southern Africa additional products including RDT, CRR, etc. are available)

- Global and regional NWP products, and RSMC/RFSC Guidance for Short-range forecast (for day 1 and day 2)
- Global and regional NWP products, and RSMC/RFSC Guidance for Medium-range forecast (for day 3, day4 & day5)

# SWFDP

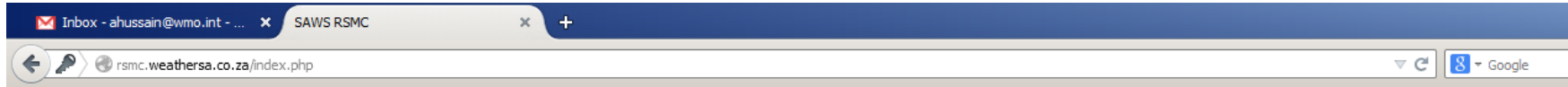
## Regional Subprojects



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# SWFDP in RA I (Southern Africa)

(in operational phase, SWFDP and SARFFGS Integration since 2014)



- ✓ 16 countries
- ✓ RSMC Pretoria
- ✓ RSMC-TC La Réunion
- ✓ ECMWF, NOAA/NCEP, UKMO

- RSMC analysis forecast information
- Severe Weather Guidance for Short-range (1-2 days) and Medium-range (3-5 days)
- Hazards: heavy rain, strong wind, high seas and swell, severe winter weather
- Flash Flood Guidance
- Guidance info including Global Regional NWP links made available through dedicated Webpage to NMCs
- Links to RSMC La Réunion TC forecasting

**World Meteorological Organization**  
Weather · Climate · Water

**Regional Specialised Meteorological Center (RSMC) Pretoria**

**Designated to**  
**South African Weather Service**

**Guidance Products**

**NWP & EPS Products**

**Regional Models**

- [UM SA12](#)
- [UM Africa LAM](#)
- [Aladin La Reunion](#)

**Global Products**

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

**Training Website**

- [Met-eLearning](#)

**SWFDP Training Nov 2012**

- [GDPFS](#)
- [PWS](#)

**SWFDP Training Nov 2013**

- [GDPFS](#)
- [PWS](#)

**SWFDP Training Nov 2014**

- [GDPFS](#)
- [PWS](#)

**RSMC Guidance Archive**  
[Contact RSMC](#)

**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](#)

**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 \(Seasonal\)](#)

**Nowcasting Products**

**Satellite-Based Rainfall**

- [Hydro-Estimator Rainfall Totals](#)
- [1hr](#) • [3hr](#) • [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](#)

**Convective Thunderstorm Forecasts**

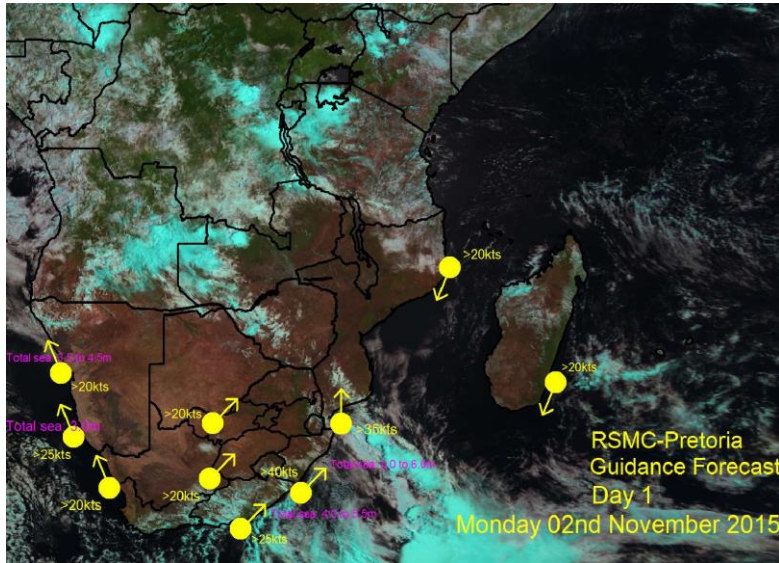
- [Probability of Convective Thunderstorms](#)
- [CIL](#) • [Description of Product](#)
- [Rapidly Developing Thunderstorms](#)
- [RDT SADC](#) • [Description of Product](#)
- [RDT SA](#)
- [Hydro-estimator Storm Tracks](#)
- [SADC](#)
- [SADC NW](#)
- [SADC NE](#)
- [SADC SW](#)
- [SADC SE](#)
- [Madagascar](#)
- [South Africa](#)



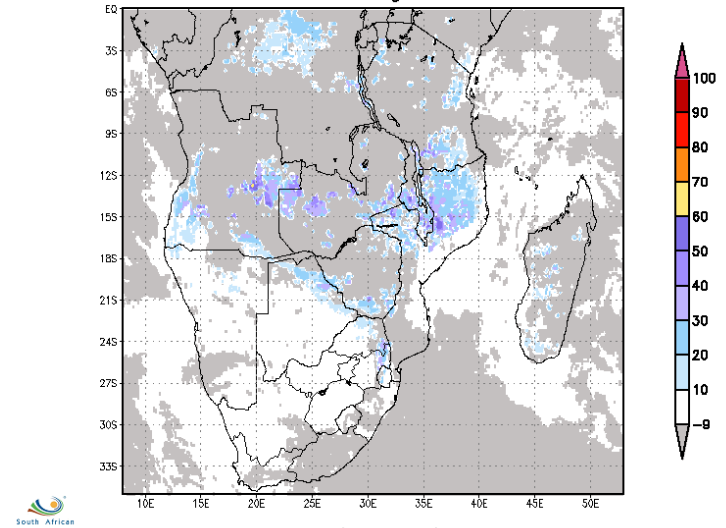
(SWFDP was supported by Norwegian funds, twinning of SWFDP and FFGS by USAID)

# SWFDP in RA I (Southern Africa)

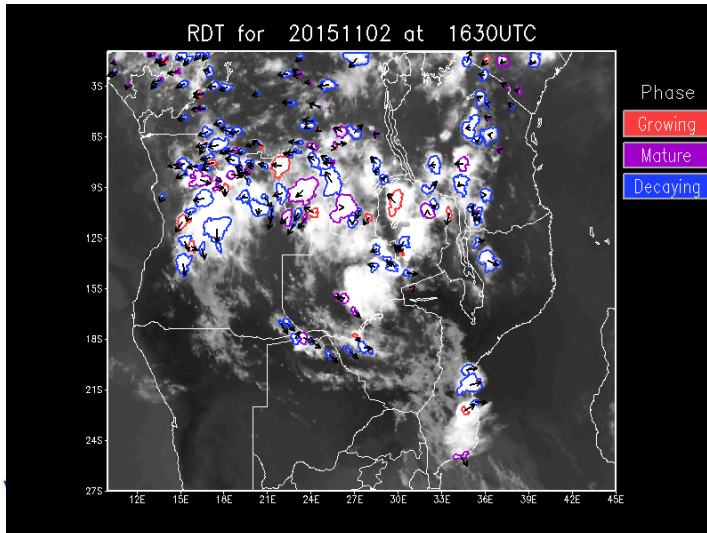
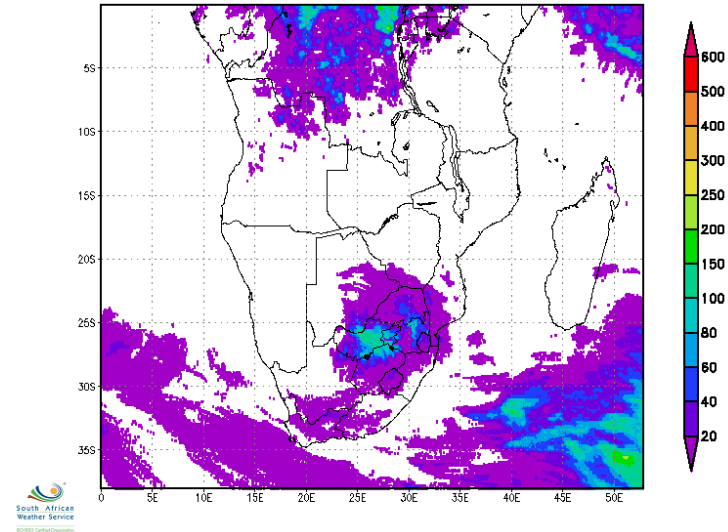
(in operational phase, SWFDP and SARFFGS Integration since 2014)



Probability for convective thunderstorms in percentages on 02NOV2015 Time average 1200-1500 UTC



10 Day Hydro-Estimator Rainfall Total mm  
20150904 06:00Z - 20150914 06:00Z



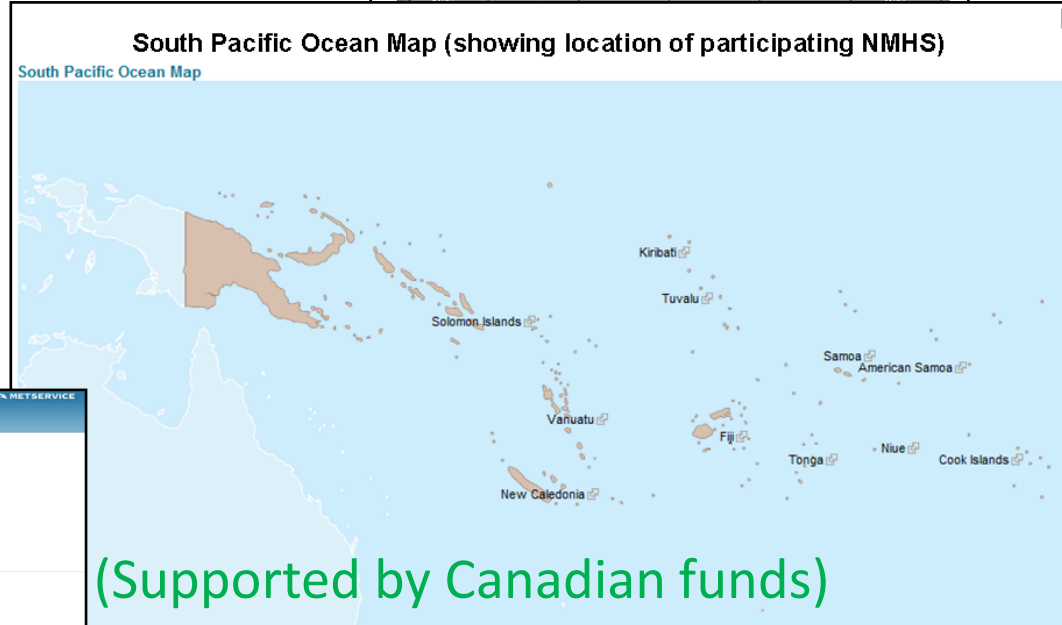
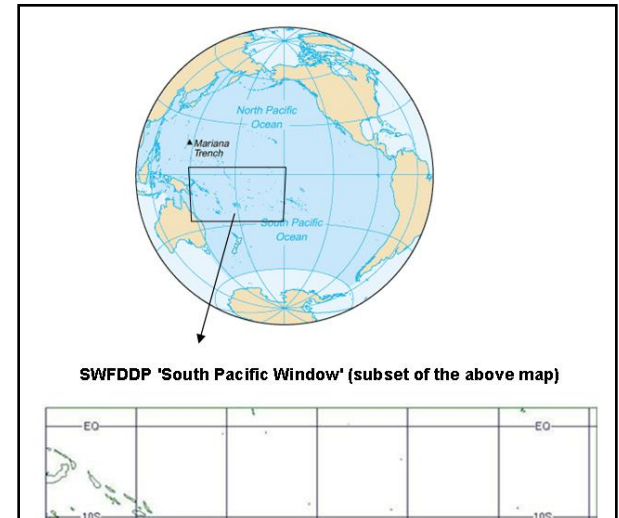


# SWFDP in RA V (South Pacific)

- 9 Island States, RSMC Wellington, RSMC-TC Nadi, RSMC Darwin
- ECMWF, Met Office UK, NWS/USA, ABoM, JMA

**RSMC Wellington Web portal since 2009**

- 9 Island States:**
- Cook Islands
  - Fiji
  - Kiribati
  - Niue
  - Samoa
  - Solomon Islands
  - Tonga
  - Tuvalu
  - Vanuatu



(Supported by Canadian funds)

# SWFDP – Southeast Asia

(RFSC Ha Noi web portal since 2011)

7 countries:  
Cambodia  
Lao PDR  
Viet Nam  
Philippines  
Thailand

The screenshot shows the web portal interface for the Regional Forecasting Support Centre (RFSC) Hanoi. The header includes the WMO logo and the NCHMF logo. The main content area displays a risk map for day 1 from 12z 22/04/2015 to 12z 23/04/2015. The map shows Southeast Asia with various weather hazards indicated by colored patterns. A key on the right side of the map defines the symbols: green diagonal lines for Rainfall >50mm/24h, solid green for Rainfall >100mm/24h, red diagonal lines for Strong winds > 30kts, and solid orange for Strong winds > 50kts. The map shows a green diagonal pattern over the Gulf of Thailand and the southern part of Vietnam, indicating heavy rainfall. Other cities like Bangkok, Phnom Penh, Ho Chi Minh City, and Hanoi are labeled. The interface also includes a sidebar with navigation links and a top navigation bar with a date and time display.

Demonstration phase since January 2016

## Regional Centres:

- RFSC Ha Noi (Lead centre)
- RSMC Tokyo (typhoon forecast support)
- RSMC New Delhi (TC forecast support)

## Global Centres:

- CMA, JMA, KMA, ECMWF and DWD (for LAM support)

## Hazards:

Heavy rain, strong wind, high seas and swell



(Funding from UN ESCAP through RIMES in 2015)

# SWFDP- RA II Bay of Bengal

(development planning started in 2012, now ready to start demonstration)



SEVERE WEATHER FORECASTING DEMONSTRATION PROJECT (SWFDP) -BAY OF BENGAL  
REGIONAL SPECIALIZED METEOROLOGICAL CENTRE- NEW DELHI



Project website since September 2015

[Home](#) | [Logout](#)

Guidance Prod. **Satellite** Global/Regional NWP Prod. Global EPS Prod. Ocean Forecast BOB-NWS Links SWFDP-BOB Links

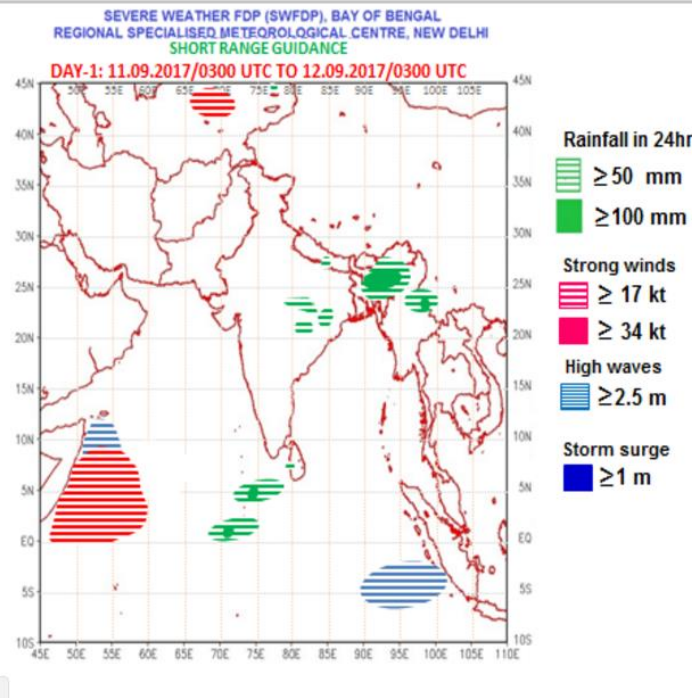
Images -->  
Rainfall Products -->  
Nowcast -->  
**new**  
SCOPE-Nowcasting

9 Countries:

**Bhutan, India, Maldives,  
Myanmar, Nepal, Pakistan,  
Sri Lanka & Thailand**

Focus :

**Heavy rainfall, Strong  
winds, High waves, storm  
surges, swell**



Domain:

**10° S, 35° N,  
45° E and 110° E**

Global Centres:

**IMD, ECMWF, UKMO,  
NOAA/NCEP (NWP  
guidance material,  
satellite products)**

Regional Centres:

**RSMC New Delhi**

(Funding from UN ESCAP through RIMES during 2012-2015)



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(First meeting of RSMT likely in 2018 subject to availability of funds)

# SWFDP- RA II Central Asia

Technical Planning Workshop in Almaty, Kazakhstan , 25-27 April 2015

SWFDP Workshop on analysis and interpretation of NWP products, Moscow, Russia, 6-10 July 2015

Workshop on Forecasting and Public Weather Services (PWS) for Forecasters and Users, Almaty, Kazakhstan, 22 Feb. to 4 March 2016

## Focus

**Heavy Rain and associated hazards (e.g. flooding)**

**Heavy Snow**

**Strong winds**

**Snow storms/blizzards**

**Extreme temperatures**

**Dry spells**

## Domain

29° N - 60° N

25° E - 90° E

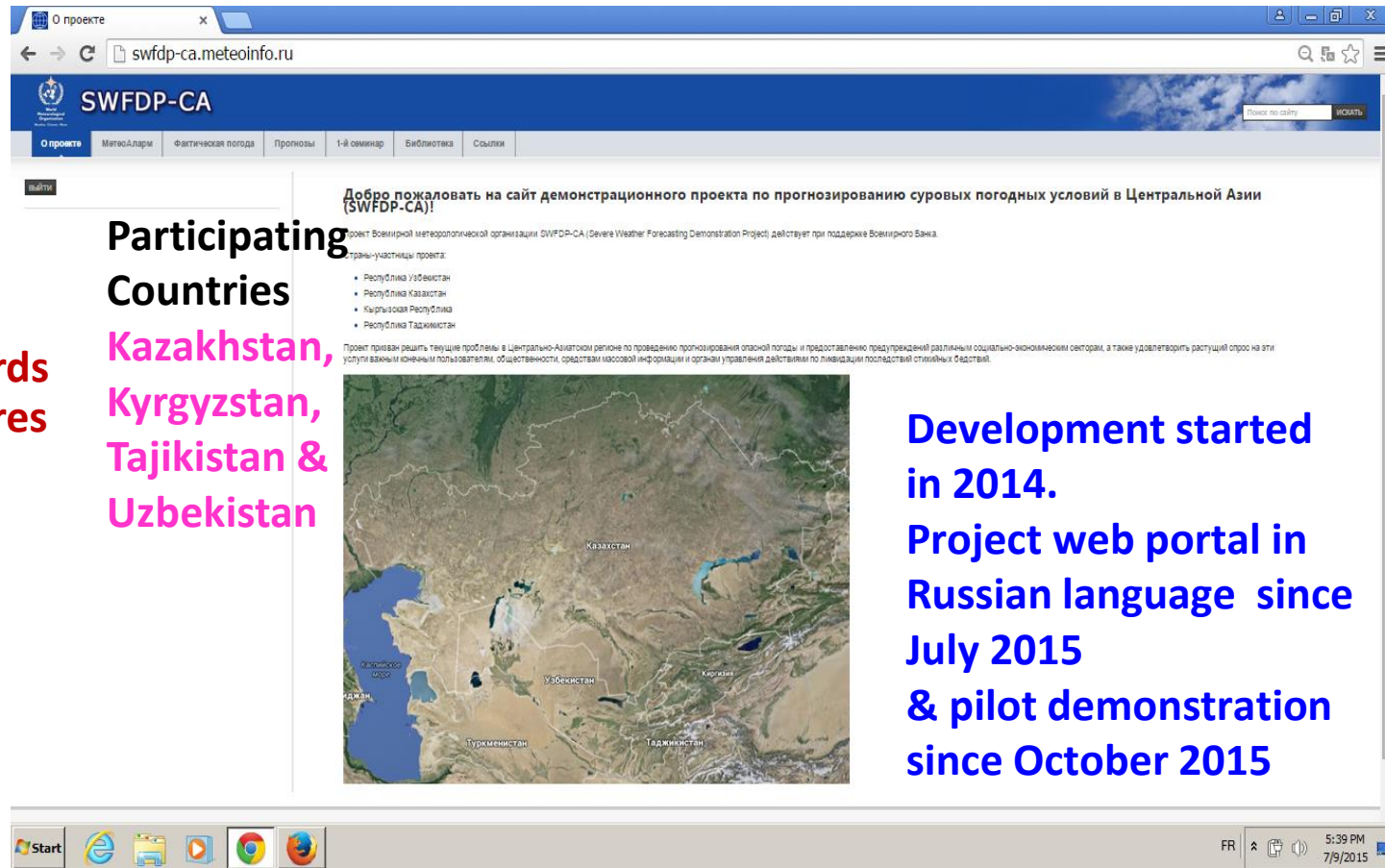
For Mountainous Region

36° N - 45° N

63° E - 82° E

Regional Centre

RSMC Tashkent



## Participating Countries

**Kazakhstan,  
Kyrgyzstan,  
Tajikistan &  
Uzbekistan**

**Development started in 2014.**

**Project web portal in Russian language since July 2015**

**& pilot demonstration since October 2015**

**Global Centres**

**RosHydromet, ECMWF, CMA, JMA, KMA**

**Funding: World Bank**

# Capacity Development through SWFDP Training Programmes

Based on the regional and national needs, the following approach is followed for designing the SWFDP training programmes

- *Two-week SWFDP training workshops for each region (such training workshops are to be held regularly and preferably rotated among the participating countries in a region)*
- *RSMC Training Desk (e.g. at RSMC Pretoria Training Desk for countries in Southern Africa)*
- *In-country training (e.g. for countries in Southwest Pacific)*



# Capacity Development through SWFDP Training Programmes

In addition

- ECMWF annual training for WMO Members
- DWD annual training on COSMO (aligned with SWFDP)
- Regional Training Centres (training programmes on forecasting aligned with the SWFDP)
- NOAA/NCEP Desks

# SCOPE - Nowcasting

Co-Ordinated Processing of Environmental Satellite Data for Nowcasting



## Products [Read More](#)

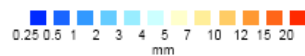
Current rain rates (mm/h)

Date/Hour: 2017-09-13 - 08:00:00

Opacity:

Animation:

Label:



## Nowcasting [Read More](#)

- 60min lead time(mm/h)
- 120min lead time(mm/h)
- 180min lead time(mm/h)

## Accumulated Precipitation (mm)

new

[Read More](#)

- Last 24 hours
- Last 48 hours
- Last 72 hours

## Additional Layers [Read More](#)

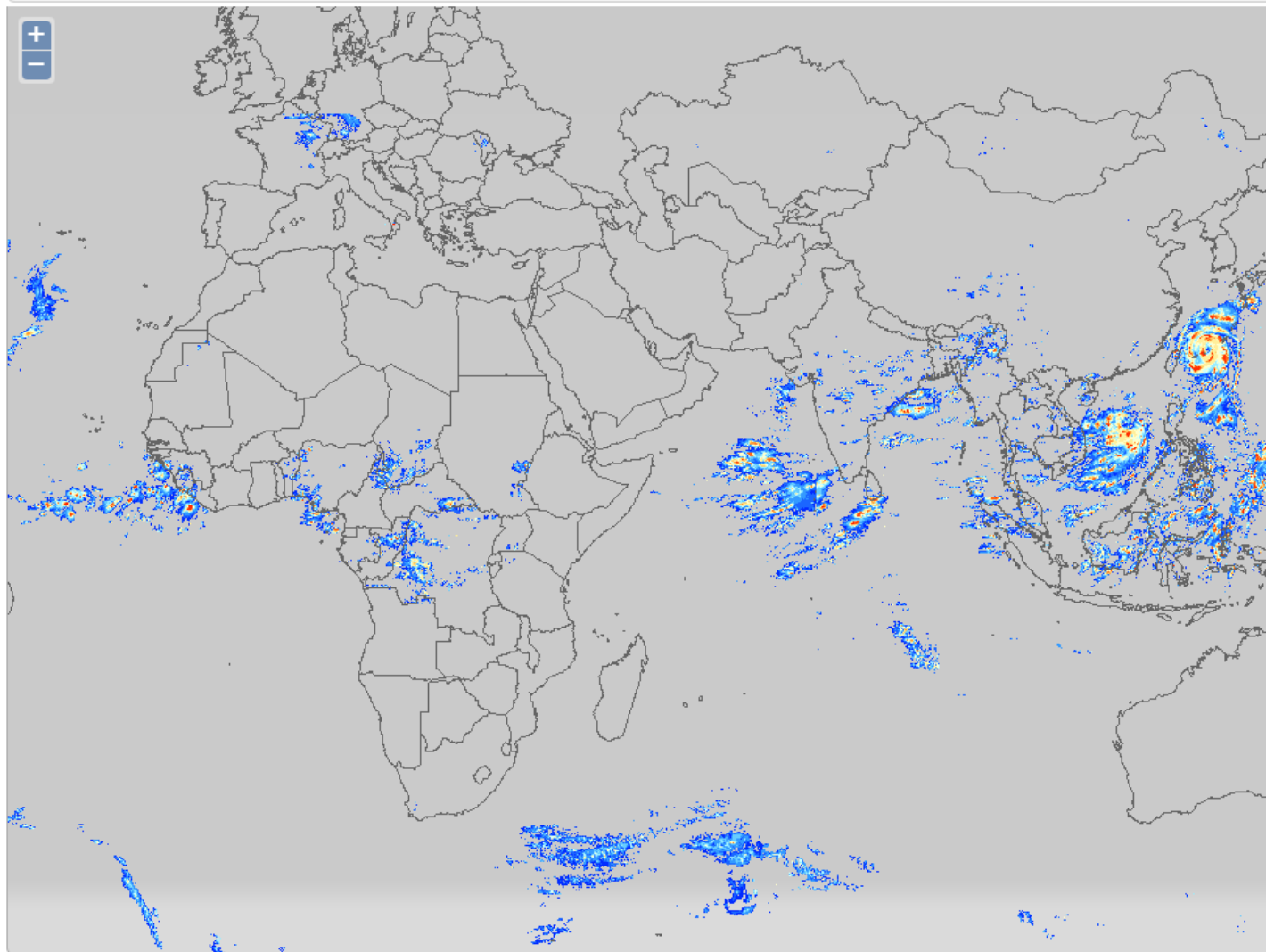
- Countries
- States
- Distance calculator

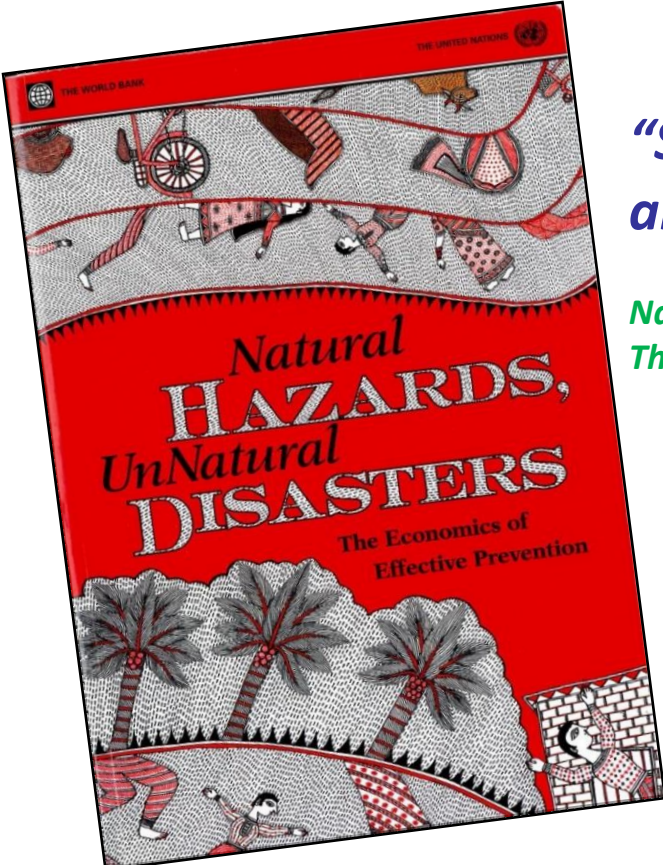
## SWFPD Regions [Read More](#)

- Southern Pacific
- South Eastern Asia
- Bay of Bengal
- Southern Africa
- Eastern Africa

## Documents

Algorithms' Description





*“Spending on improving weather forecasting and sharing data have high returns.”*

*Natural Hazards UnNatural Disasters –  
The Economics of Effective Prevention, WB, UN (2011)*

# Thank you Merci

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