Third Meeting of the Flood Forecasting Initiative Advisory Group (FFI AG 3)
Geneva, Switzerland, 5-7 December 2017

WMO's Severe Weather Forecasting Demonstration Project (SWFDP)

Status and Summary of Experience

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Ata HUSSAIN

Data Processing and Forecasting Systems (DPFS) Division
WDS Department, WMO Secretariat

WMO OMM
World Meteorological Organization
Organisation météorologique mondiale

WMO's Severe Weather Forecasting Demonstration Project (SWFDP)

- SWFDP was started in 2006 with its first regional subproject in Southern Africa with involvement of just 5 countries. Later, the subproject was expanded in 2009 to benefit all 16 countries in the sub-region.

- Now SWFDP covers eight sub-regions (Southern Africa, South Pacific, Eastern Africa, Southeast Asia, Bay of Bengal, Central Asia, Eastern Caribbean and West Africa) and involves over 75 developing countries including around 45 LDCs and SIDS.

Why a project on severe weather forecasting?

Basic function and Mandate of NMHSs:

To provide weather information and services for protection of life, livelihood, property, and infrastructure, and for application sectors including conservation of environment

Severe weather events are mostly responsible for hydrometeorological hazards and disasters

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Why a project on severe weather forecasting?

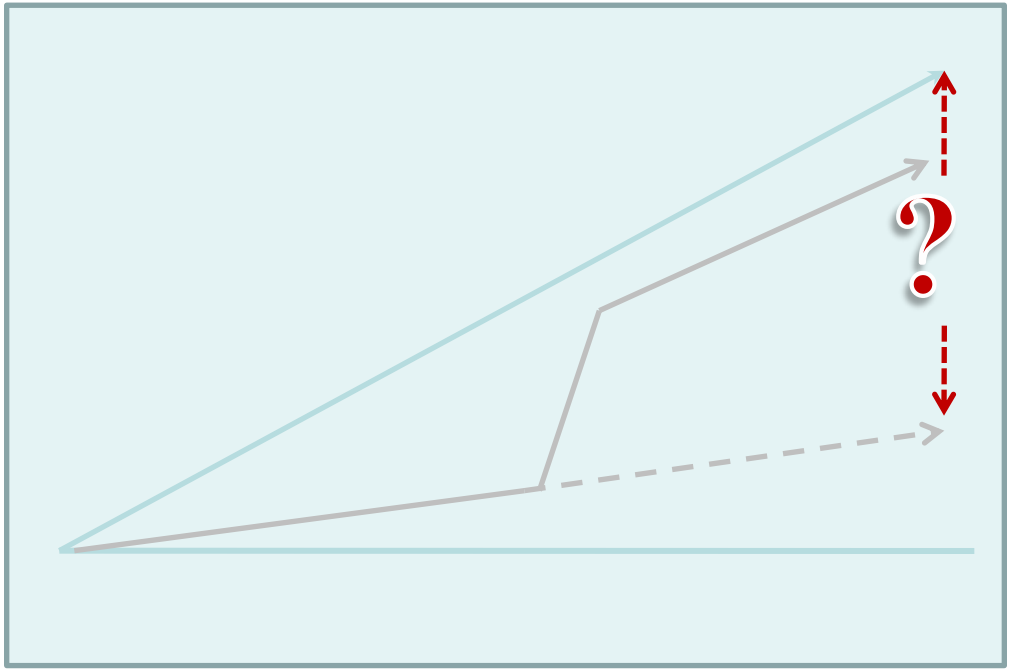
- Dramatic developments in weather and climate prediction science

- Leading to improved alerting of hydro-meteorological hazards, at ever-increased precision, reliability, and lead-times of warnings

- NMHSs in many developing countries (including LDCs and SIDS) are generally less resourced

- Gap in application of advanced technology in early warnings (NWP and service delivery)

- WMO SWFDP attempts to close this gap, by applying the *'Cascading Forecasting Process'* (by making efficient use of the GDPFS centres)



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Vision

WM Congress provided vision on NWP strategy to improve 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."

Cg-15 (2007)

Realizing the Vision

Collaboration between GDPFS Centres and involvement of Public Weather Services (PWS) and other relevant WMO Programmes

To

Implement 'Cascading Forecasting Process'

through SWFDP

(from Global to Regional to National)

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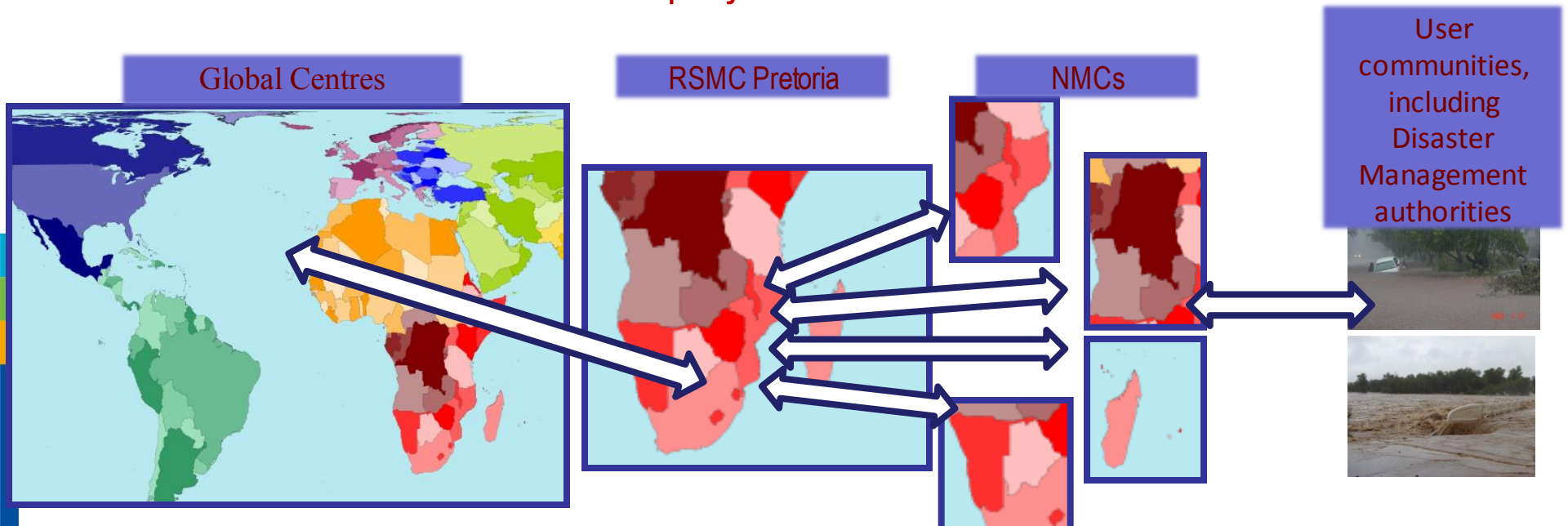
SWFDP 'Cascading Forecasting Process'

- *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 framework and guidance

SWFDP (started in 2006), is organized within the WMO Commission for Basic Systems (CBS) and guided by a CBS Steering Group for SWFDP

PSG has developed SWFDP Overall Project Plan and provide guidelines for developing SWFDP Regional Subprojects

- *SWFDP Guidebook for Planning Regional Subprojects*

The SWFDP Guidebook is reviewed and updated by the PSG. Recently, it was reviewed by the PSG during its meeting at WMO HQs in March 2016. Its latest version is available on WMO Website at the following link:

http://www.wmo.int/pages/prog/www/swfdp/index_en.html

SWFDP Implementation process

Four Phases approach

Phase I: Overall Project Planning:

Establish regional partnerships including:

- Strong commitment by the participating Members (NMHSs) in a geographical area
- Identification & commitment of the possible Global and Regional Centres
- the types of severe weather to focus on (starting with a few top hazards)
- Preparation of products by global and regional centres

Phase II: Regional Subproject Implementation Planning and Execution:

- Establishing Regional Subproject Management Teams (RSMT)
- Regional & National Implementation Plans (RSIPs & IPs)
- Start prototype demonstration focusing on short to medium-range forecasting and warning services (1-2 years)
- Capacity development through specialized training programmes on forecasting and service delivery
- **Regular reporting:** Submission of Quarterly Progress Reports by the NMHSs (verification, feedback, tracking etc.)

SWFDP Implementation process

Four Phases approach

Phase III: Regional Subproject Evaluation

- Evaluation of the progress reports
- Tracking and analysis for further improvement
- More countries, more hazards
- Continuous evaluation, training and reporting

Phase IV: Regional Subproject Long-term Sustainability and Future Developments:

- Sustain operations and expand partnerships through continuous development, regular trainings and sharing knowledge
- Future capability and technology developments, and to foster broadening of activities in synergy with other WMO Programmes
- Responsibility of management to be taken by the concerned Regional Association

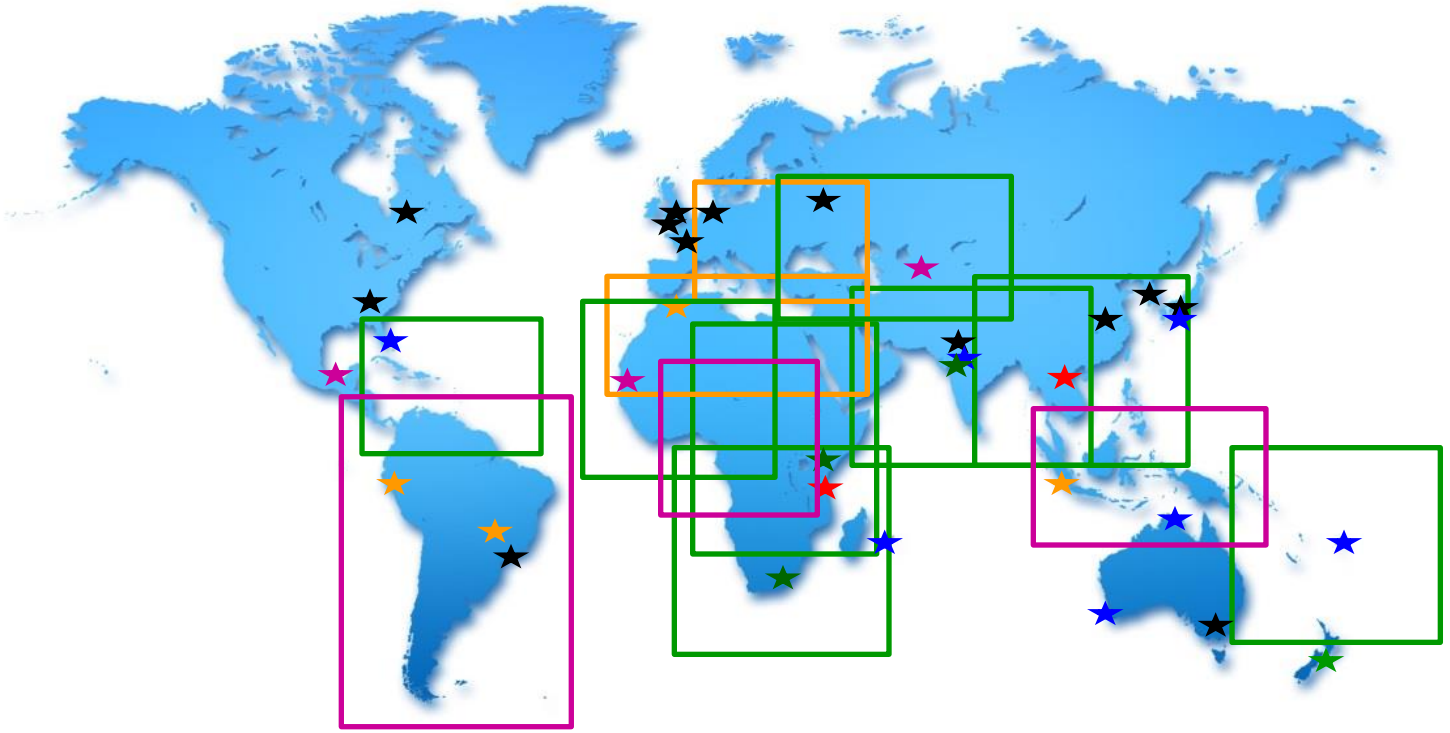
SWFDP

(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**

Currently, SWFDP involves over 75 countries including around 45 LDCs and SIDS in 8 sub-regions. Subject to availability of resources, number of benefitting countries may grow to over 100 in next 2-3 years



Green color boxes - shows the existing on-going SWFDP regional subprojects.

Pink color boxes – the regional subprojects in discussion (next 1-2 years)

Orange color boxes – future SWFDP subprojects (next 3-5 years?)

SWFDP Synergies

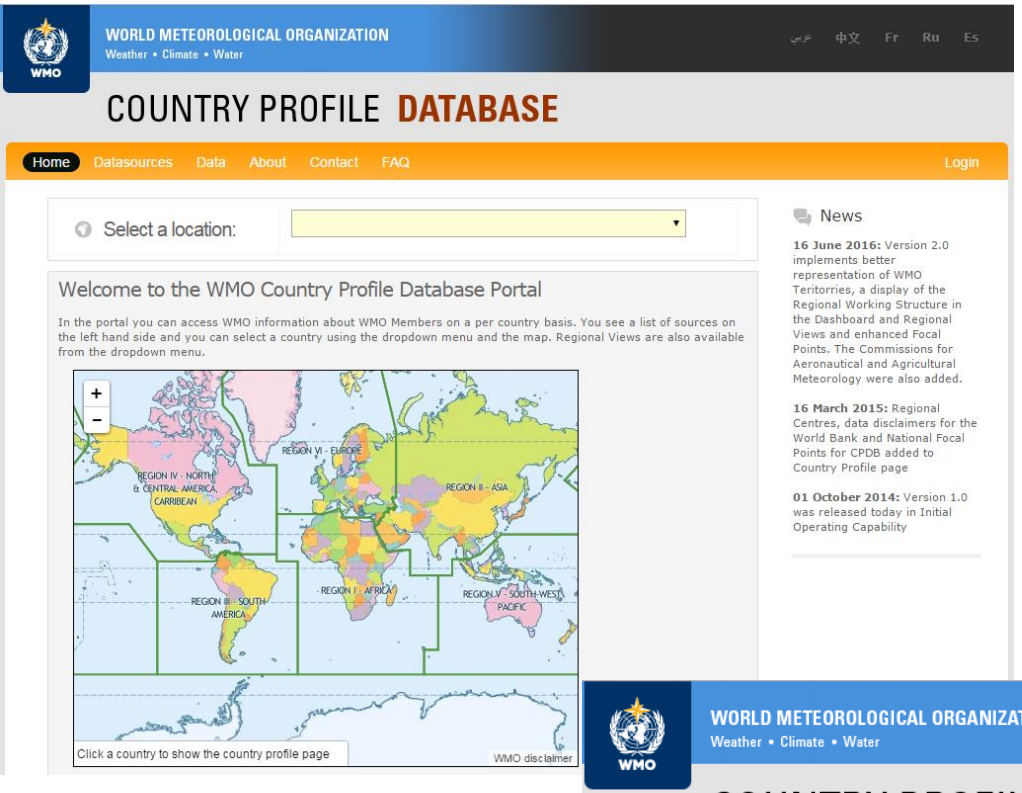
SWFDP linkages are developed with relevant programmes and projects wherever appropriate to continue further developments, and to include more hazards to provide operational support for MHEWS

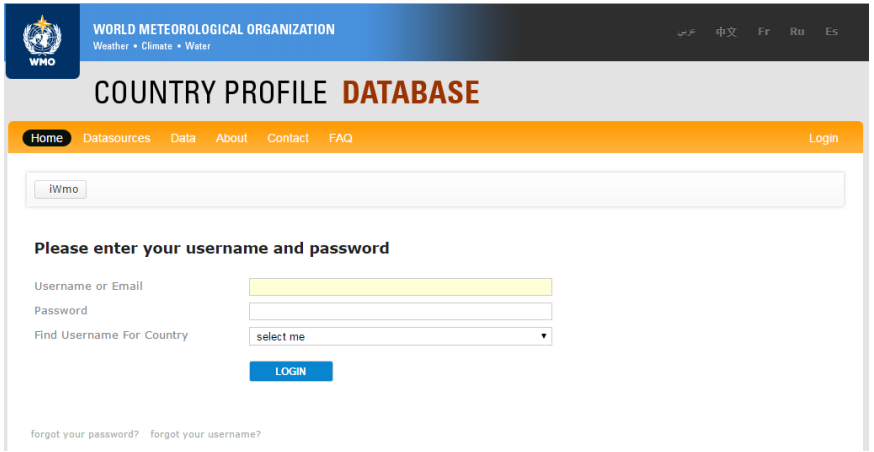
- Tropical Cyclones Programme (TCP)
- Space Programme - Nowcasting
- HWR-Flash Flood Guidance Systems (FFGS)
- MMO-Coastal Inundation Forecast Demonstration Project (CIFDP)
- WWRP

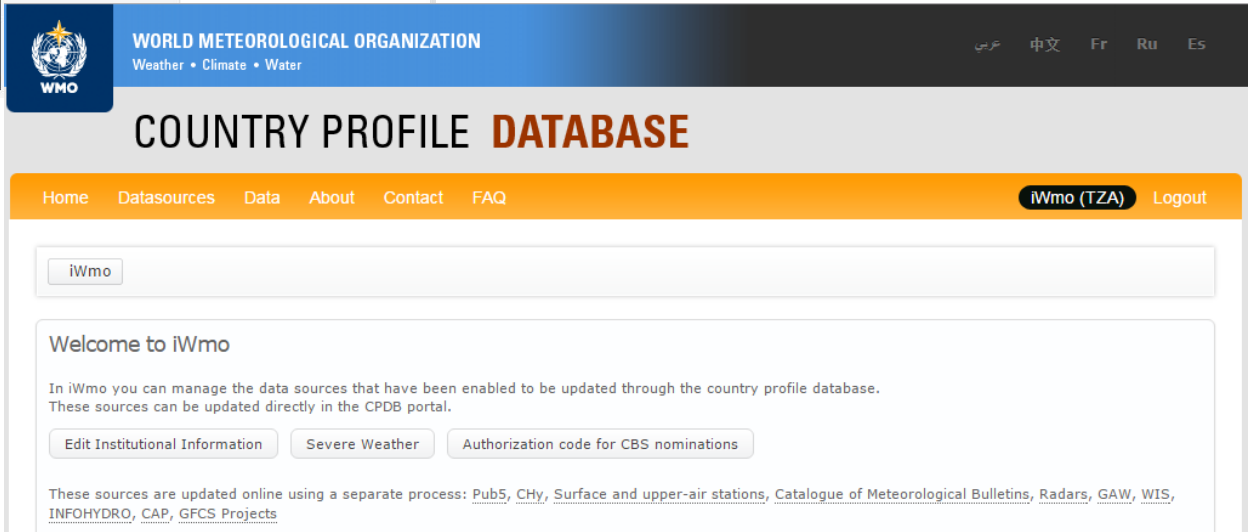
SWFDP Database

To facilitate NMCs with online reporting mechanism

https://www.wmo.int/cpdb/







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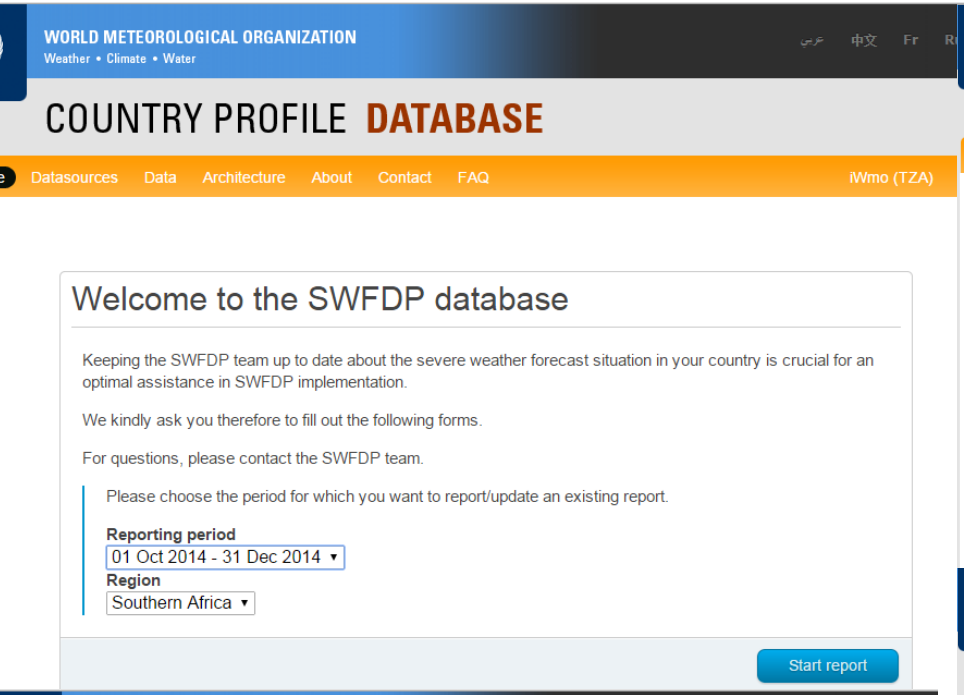
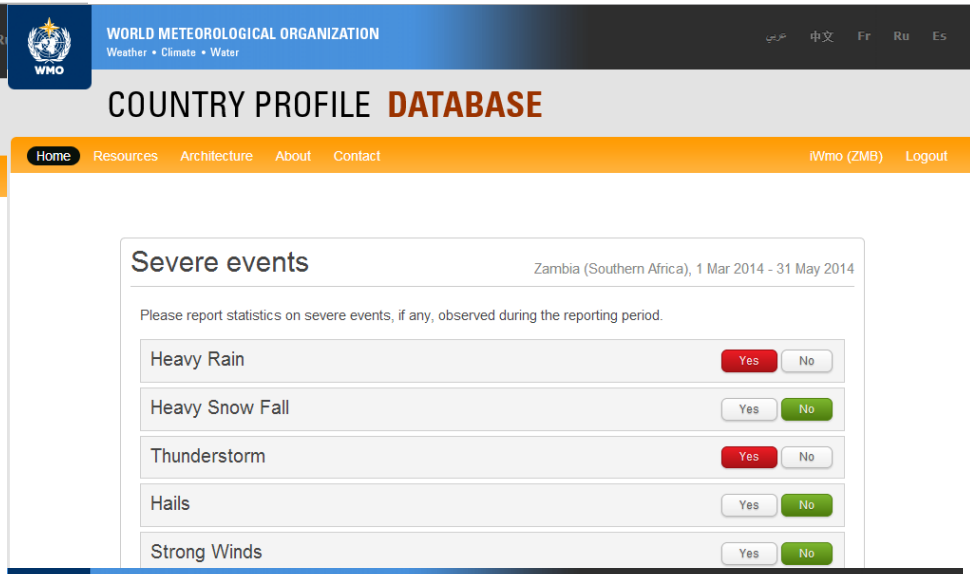
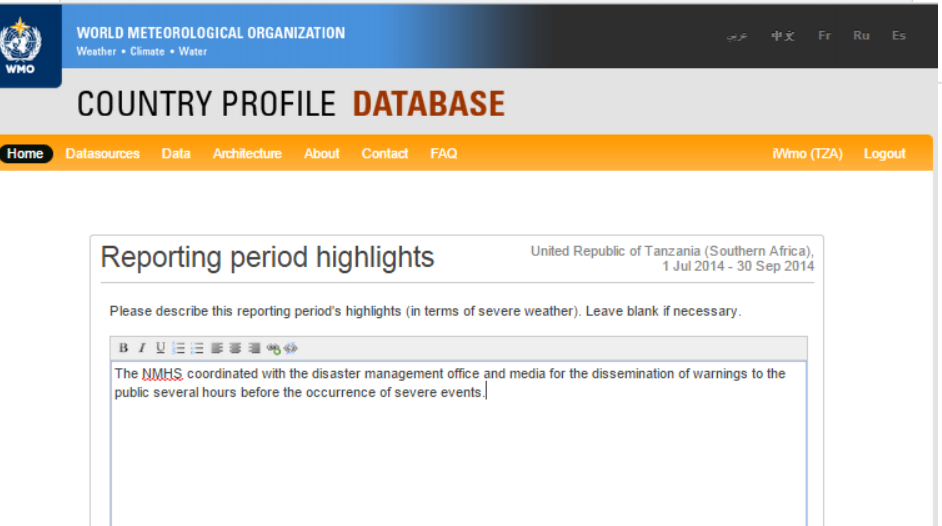
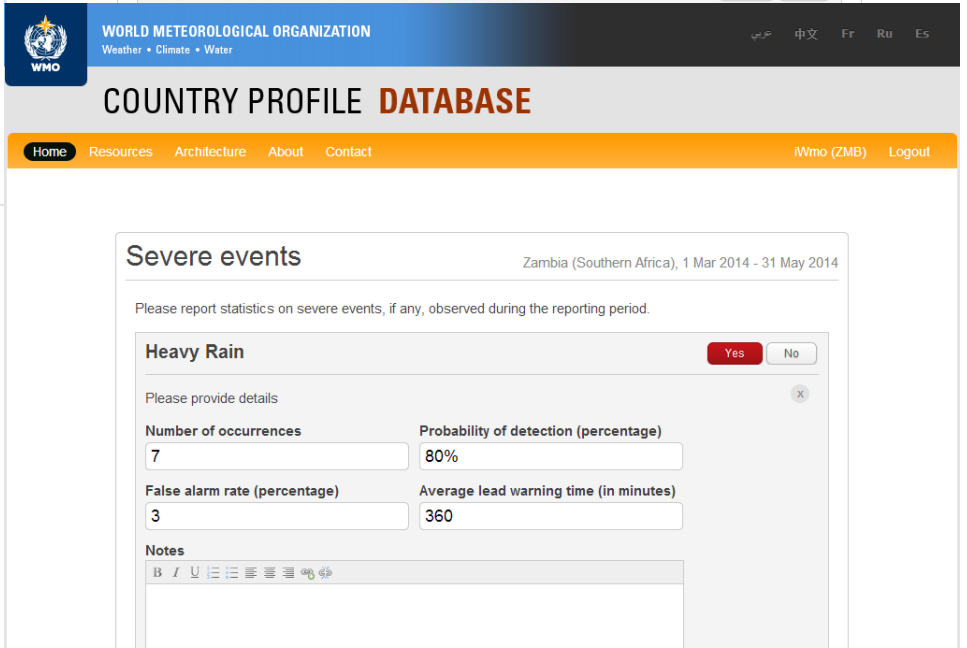
SWFDP Database

To facilitate NMCs with online reporting mechanism



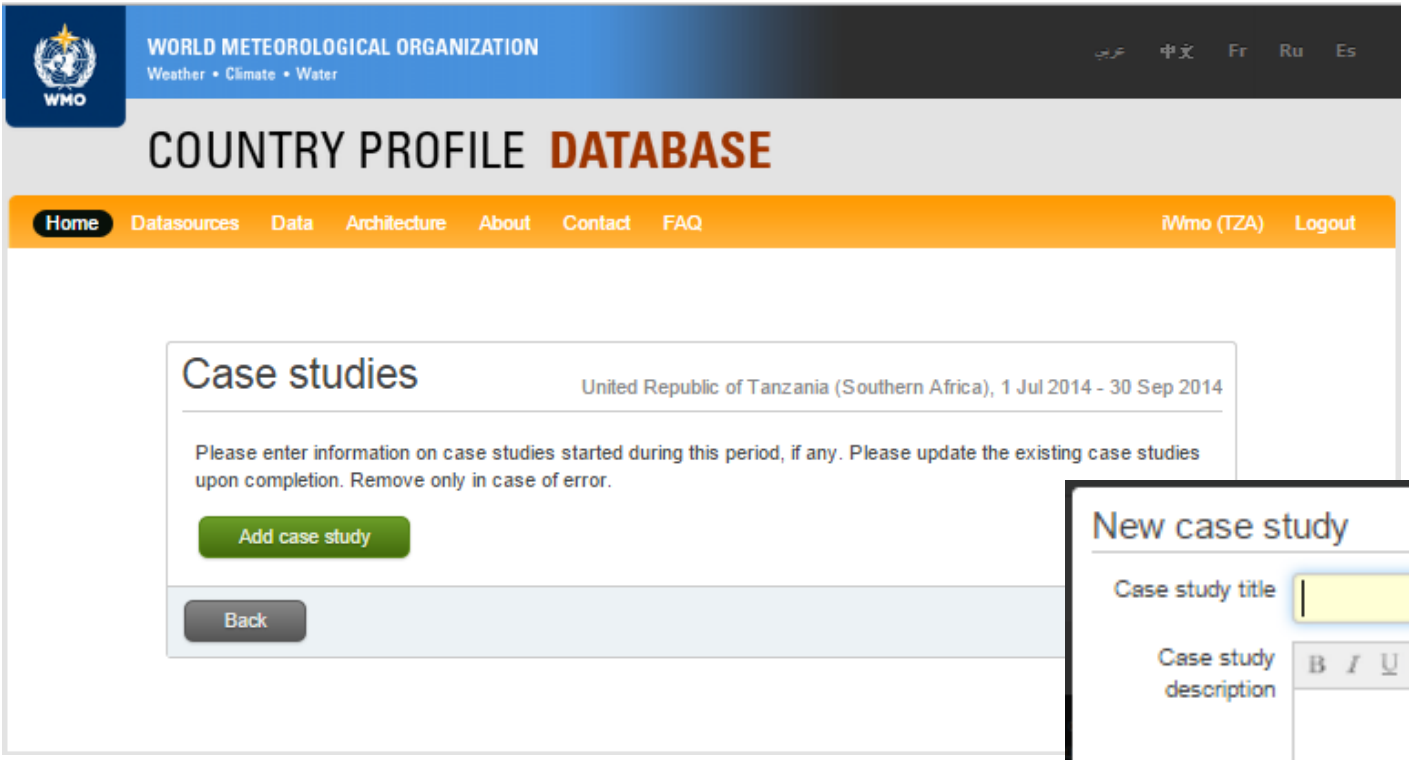


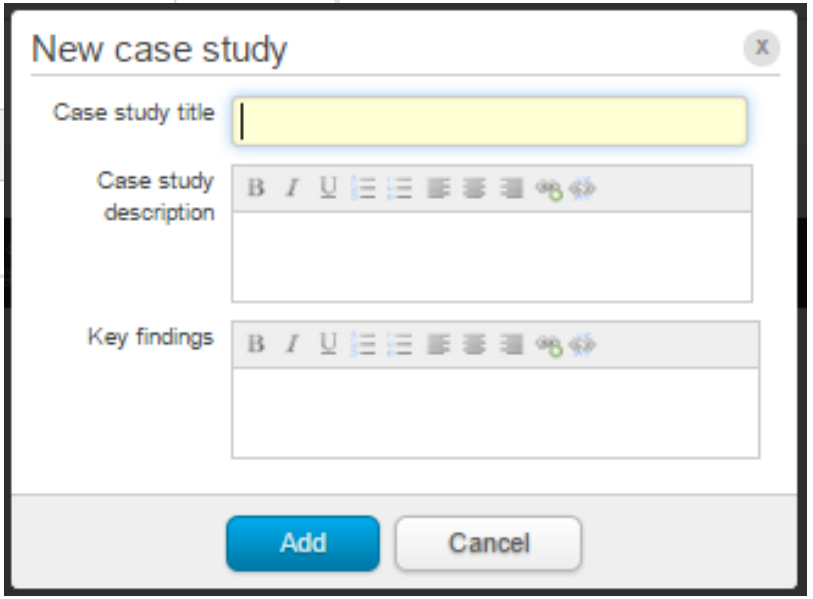




SWFDP Database

To facilitate NMCs with online reporting mechanism





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SWFDP
Regional Subprojects

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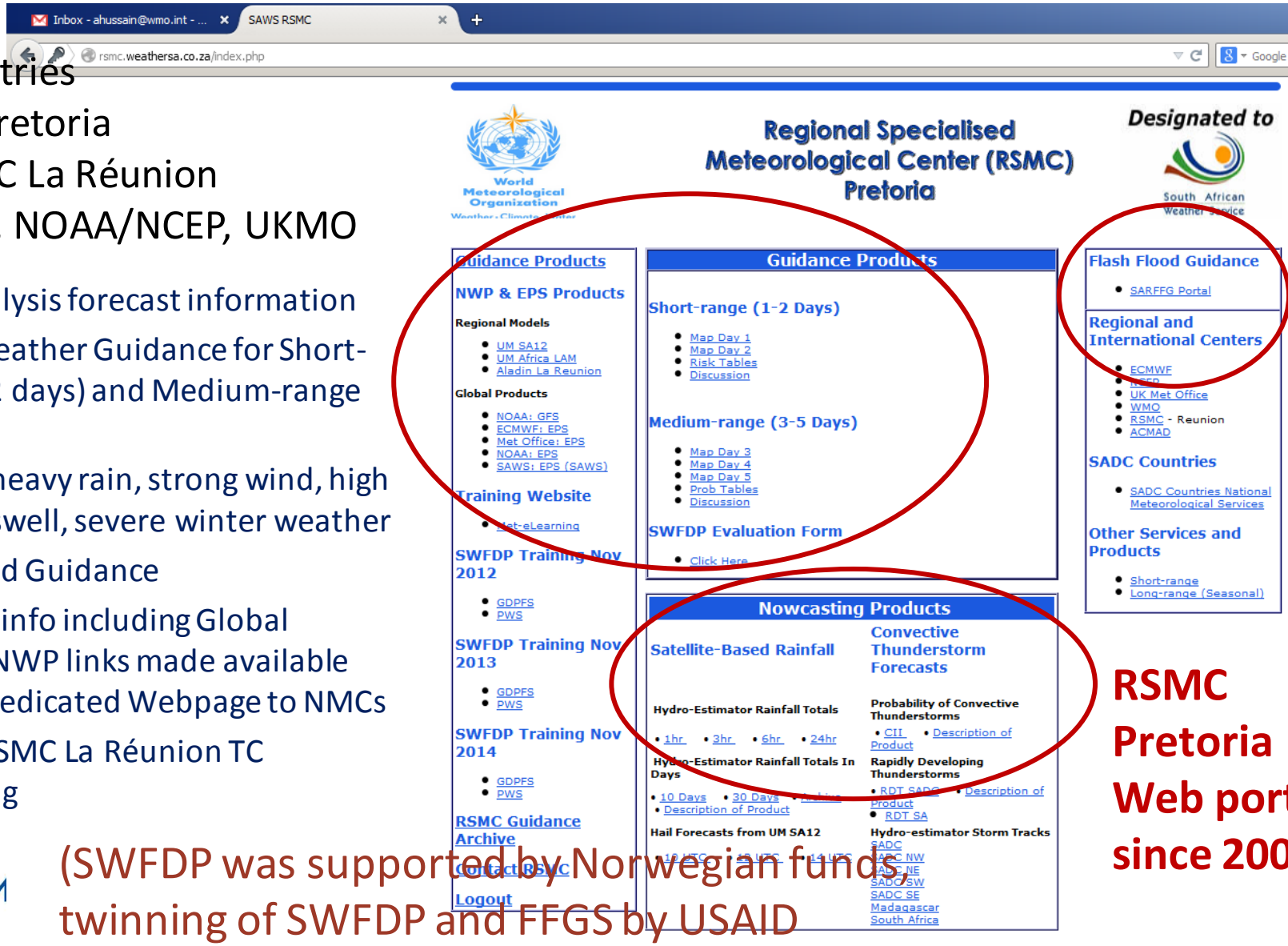
SWFDP in RA I (Southern Africa)

(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

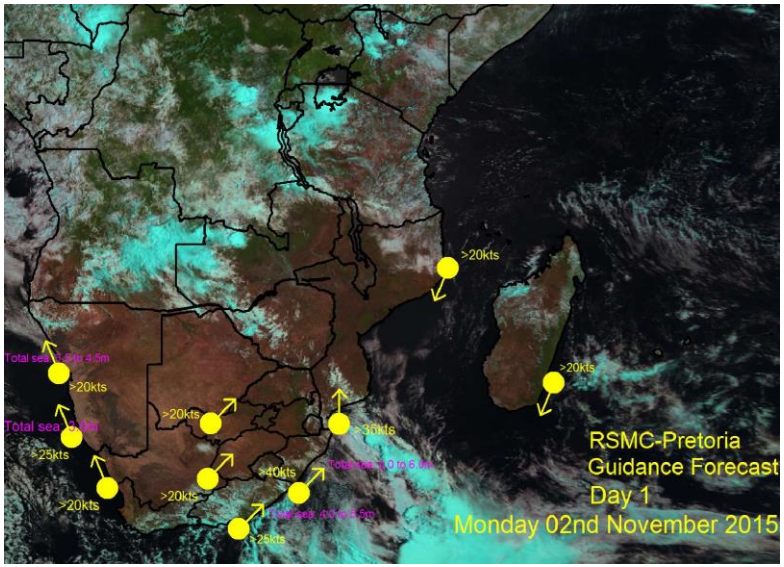


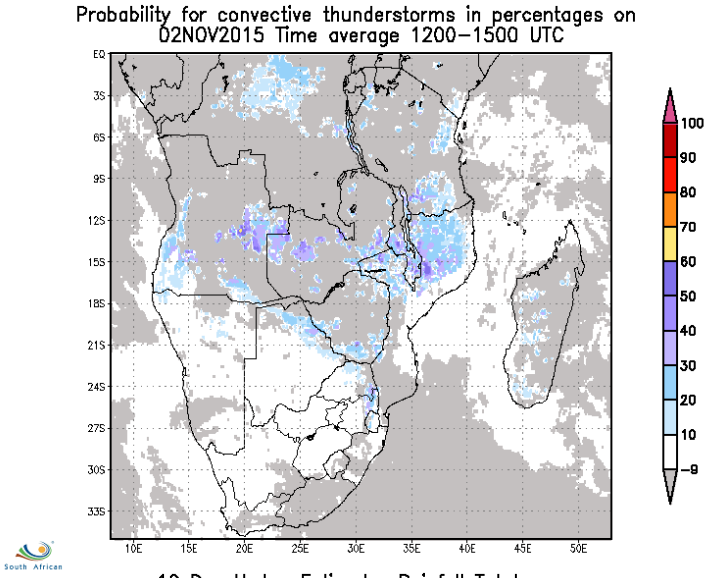
RSMC Pretoria Web portal since 2006

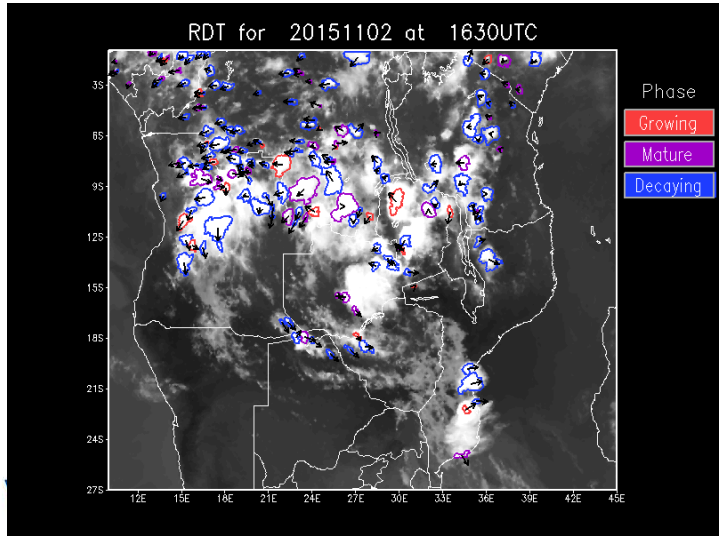
(SWFDP was supported by Norwegian funds, twinning of SWFDP and FFGS by USAID

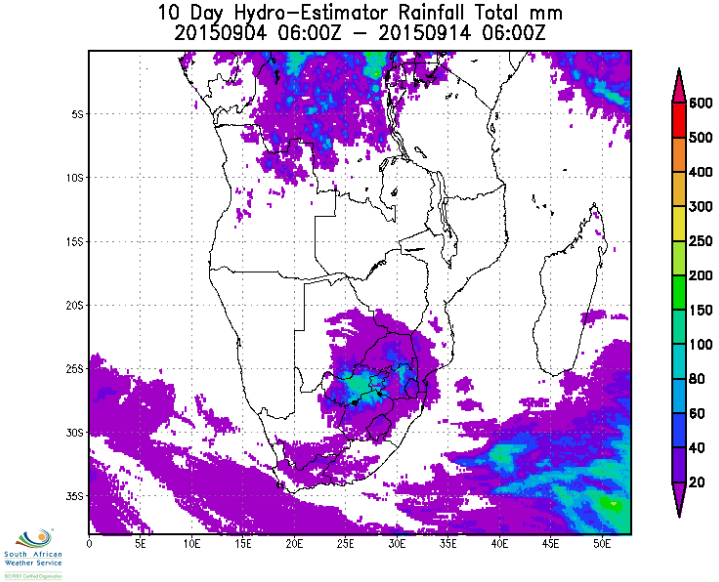
SWFDP in RA I (Southern Africa)

(in operational phase, SWFDP and SARFFGS Integration since 2014



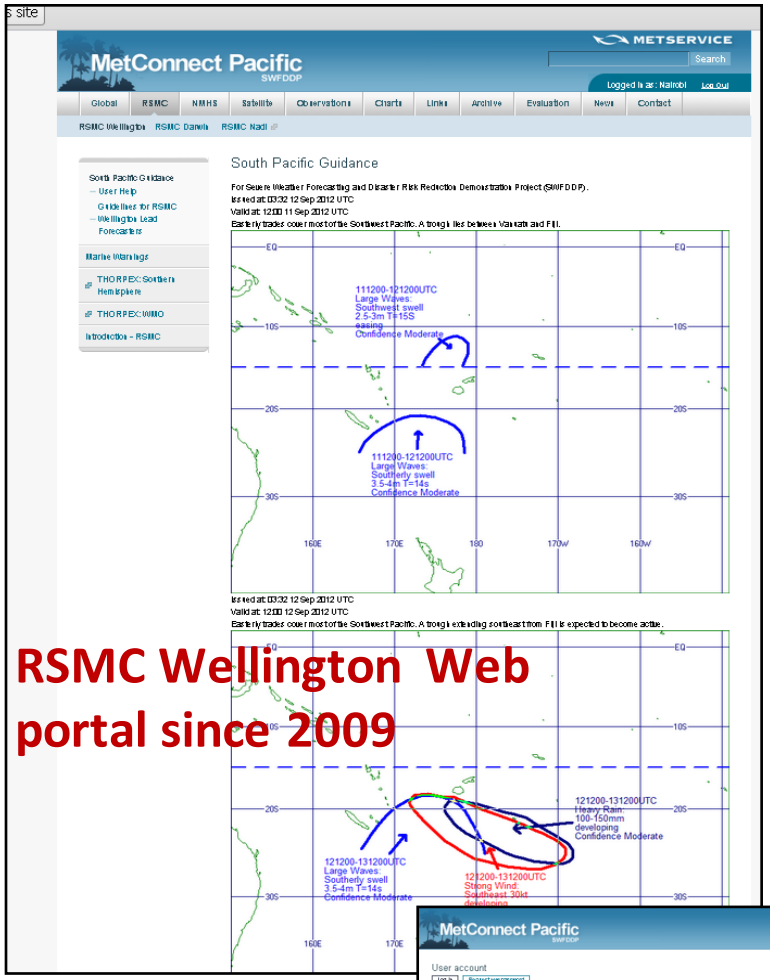






SWFDP in RA V (South Pacific)

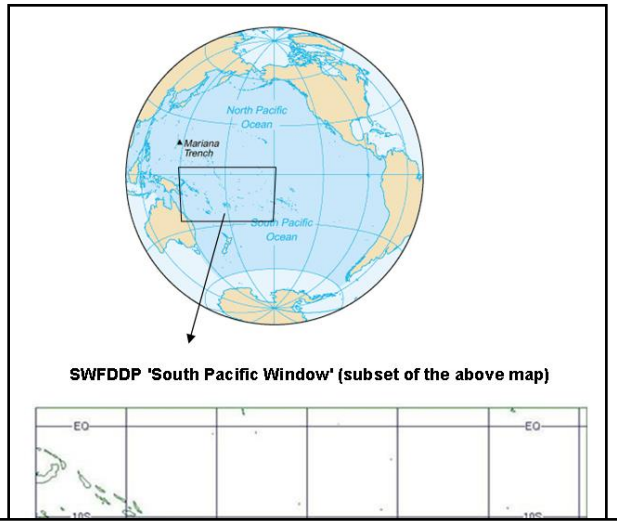
- 9 Island States, RSMC Wellington, RSMC-TC Nadi, RSMC Darwin
- ECMWF, Met Office UK, NWS/USA, ABoM, JMA

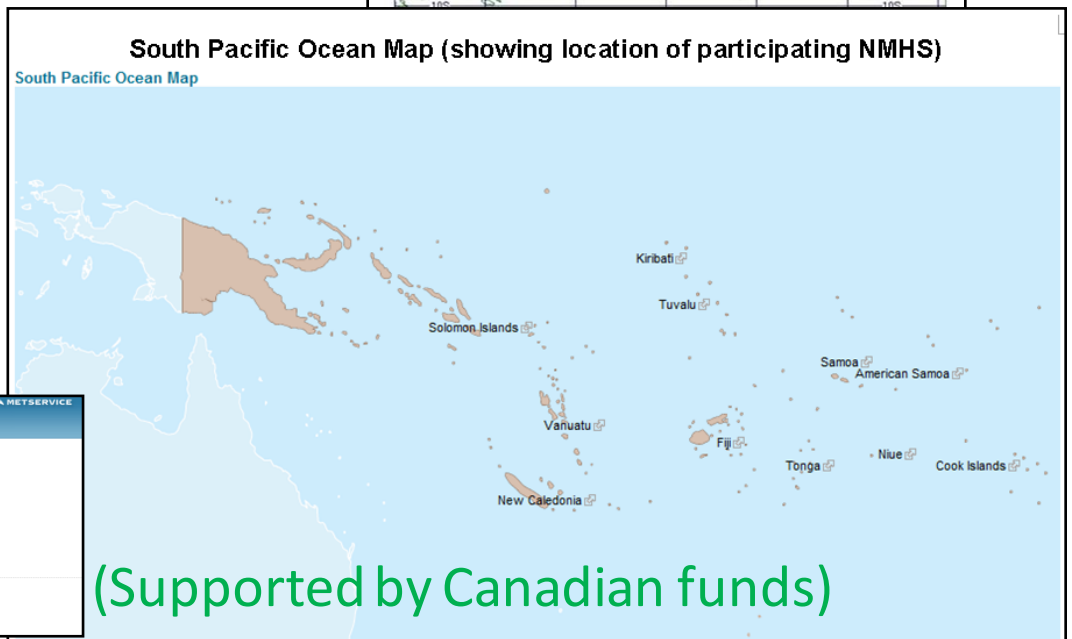


RSMC Wellington Web portal since 2009

9 Island States:

Cook Islands
Fiji
Kiribati
Niue
Samoa
Solomon Islands
Tonga
Tuvalu
Vanuatu





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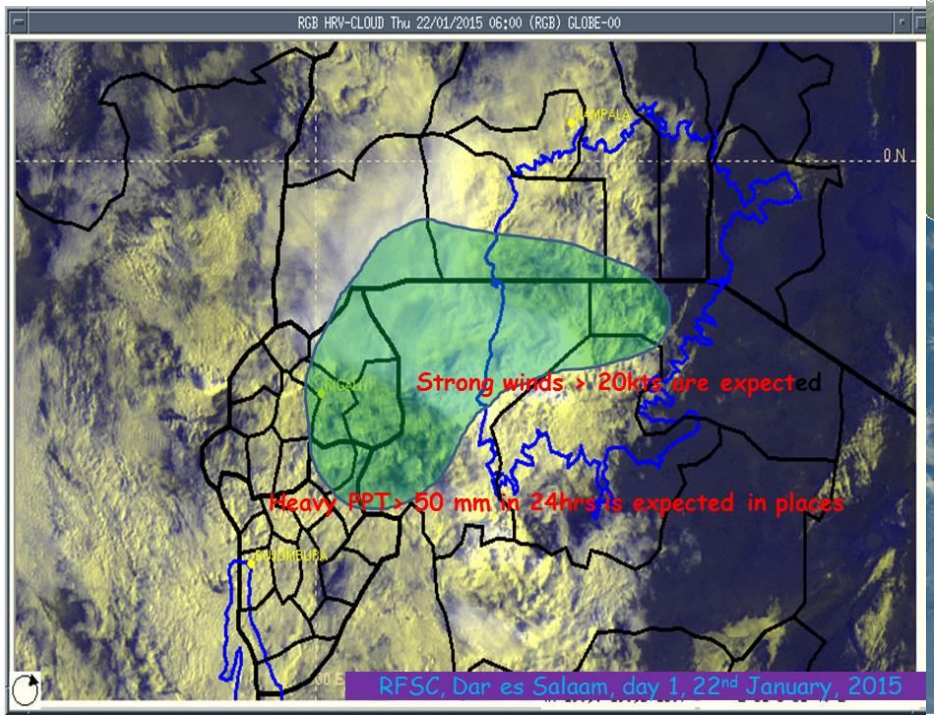
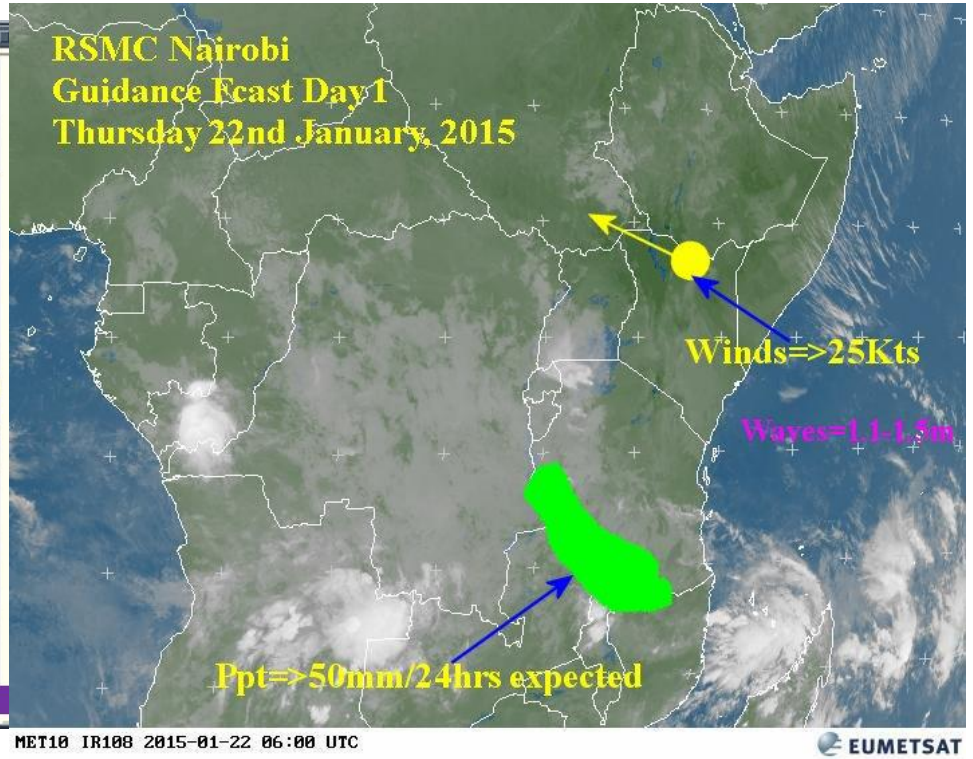
(Supported by Canadian funds)

SWFDP RA-I-Eastern Africa

(Development started in 2010, and RSMC web portal since 2011)





Benefitting Countries (7):

Burundi, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania and Uganda

Global Centres: ECMWF, UKMO, NOAA/NCEP, DWD

Regional Centre: RSMC Nairobi (for whole domain)

RFSC Dar Es Salaam (Lake Victoria basin)

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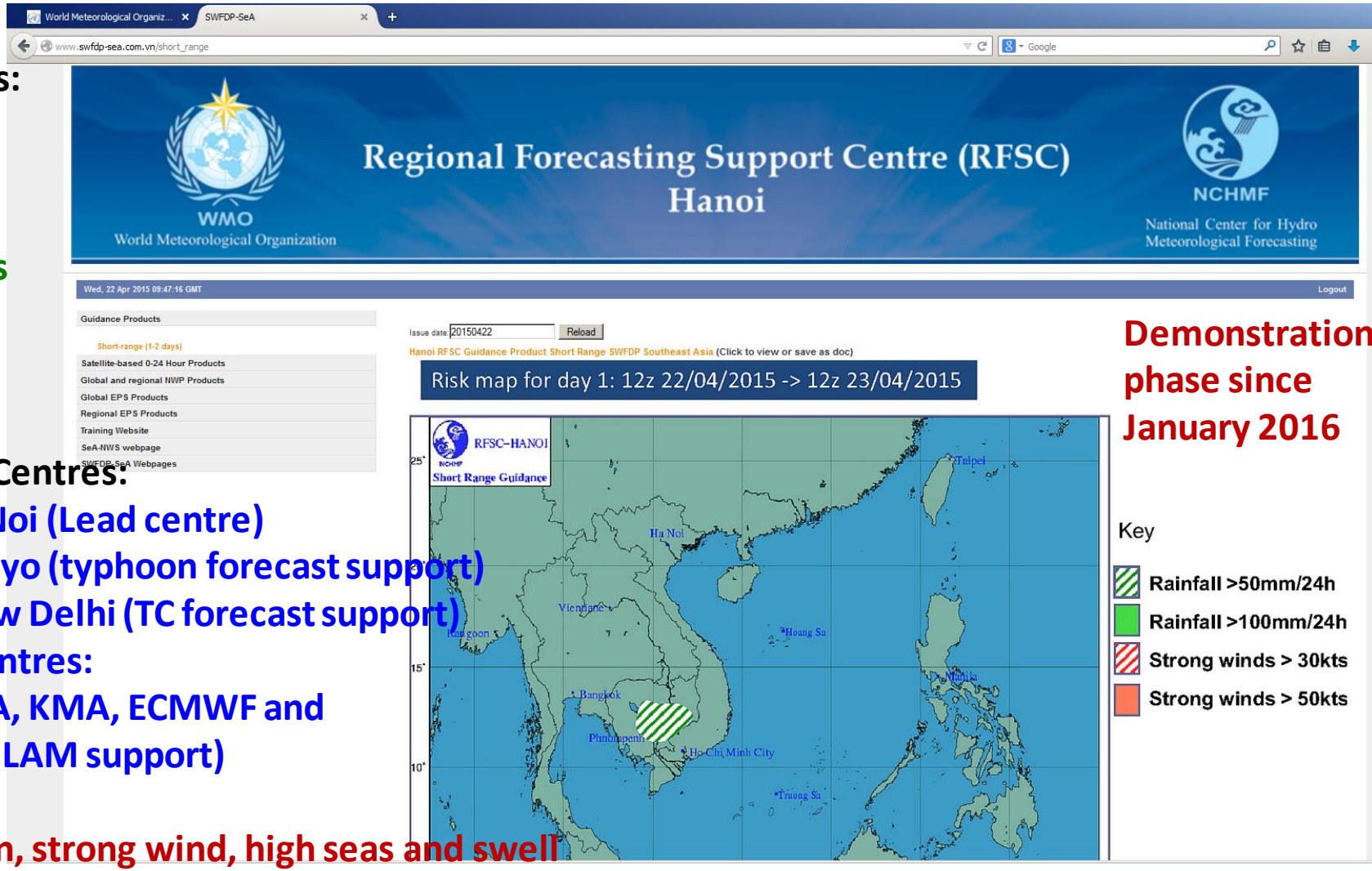
(Supported by Norwegian funds)

SWFDP – Southeast Asia

(RFSC Ha Noi web portal since 2011)

5 countries:
Cambodia
Lao PDR
Viet Nam
Philippines
Thailand



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

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Third Regional Subproject Management Team (RSMT) of SWFDP-SeA was held in Ha Noi, Viet Nam, during 20-23 November 2017 (A joint meeting of RSMT and SeAFFGS held on 23 November 2017)

Joint meeting of RSMT and SeAFFGS (23 November 2017)

Linkages between SWFDP-SeA and SEAFFGS

Requirements of SWFDP-SeA

- 5 x5 km spatial resolution NWP/QPF products up to 5 days.
- 2 x2 km spatial resolution QPF products for MR basin and four countries up to 48 hours.
- 3-hr nowcasting of QPF including satellite and Radar data.
- Post processing of QPF.
- Views on best estimation of precipitation via data assimilation.

Provision/Benefits to SWFDP-SeA

- WRF 3-4 km model.
- FFGS dashboard/Products/map server page.

Joint meeting of RSMT and SeAFFGS (23 November 2017)

Linkages between SWFDP-SeA and SEAFFGS

Strengths

- In principle representatives from all NMCs agreed to have SEAFFGS operational 24/7 in SeA (subject to agreement by the respective PRs)
- HPC upgradation at RFSC Ha Noi in 2018 for improved NWP LAM (using WRF and COSMO/ICON-LAM) with 5 Km resolution over SeA domain and 2/3 km resolution for domain over Mekong River basin and four countries
- Strengthening and upgradation of Radar Network in Viet Nam in 2018/2019
- Potential NWP LAM capacity at NMCs (DHM-Lao PDR will run WRF with 3 km resolution in future, Thailand already running WRF with 2 km resolution for 2 days and 6 km for 3-5 days)
- Satellite coverage (e.g. JMA, CMA and KMA)
- NMCs are getting support through several projects (e.g. WB, ADB, ECC-Canada USAID etc.) . Opportunity to align project actives and develop synergies

Limitations

- Poor radar coverage of SeA and lack of reliable radar data and products for use in SeAFFGS
- Capacity of NMCs e.g. DoM-Cambodia and DHM-Lao PDR

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

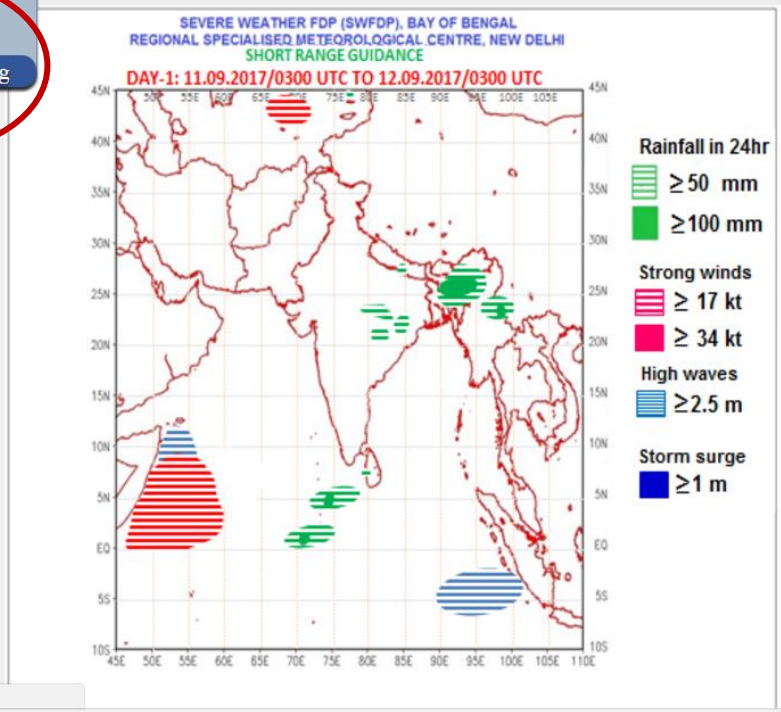
REGIONAL SPECIALIZED METEOROLOGICAL CENTRE- NEW DELHI

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 -->
- SCOPE-Nowcasting



9 Countries:
Bangladesh, 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

SWFDP_Ghana S....docx

Show all

(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

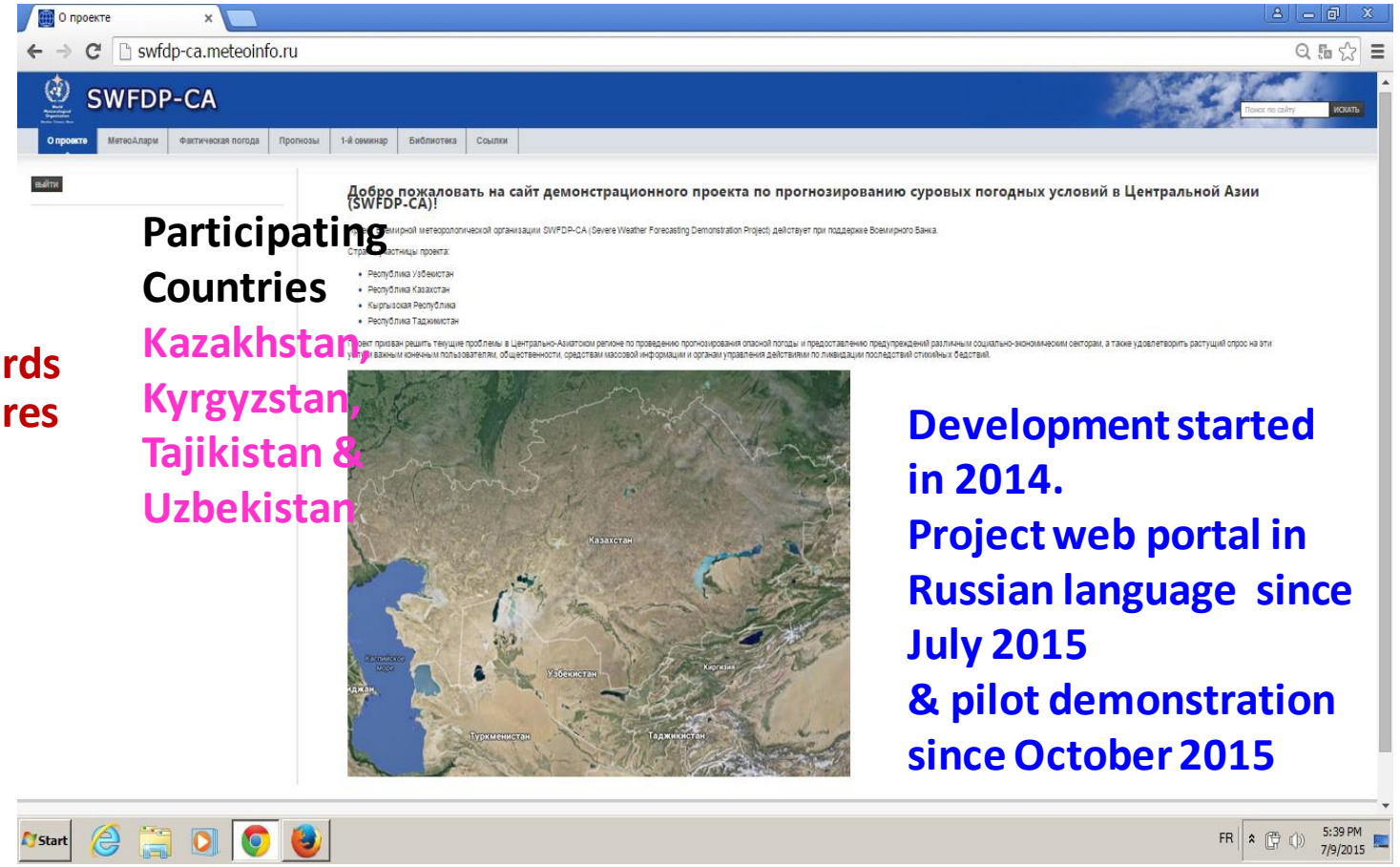
Heavy Rain and associated hazards (e.g. flooding)
Heavy Snow
Strong winds
Snow storms/blizzards
Extreme temperatures
Dry spells

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

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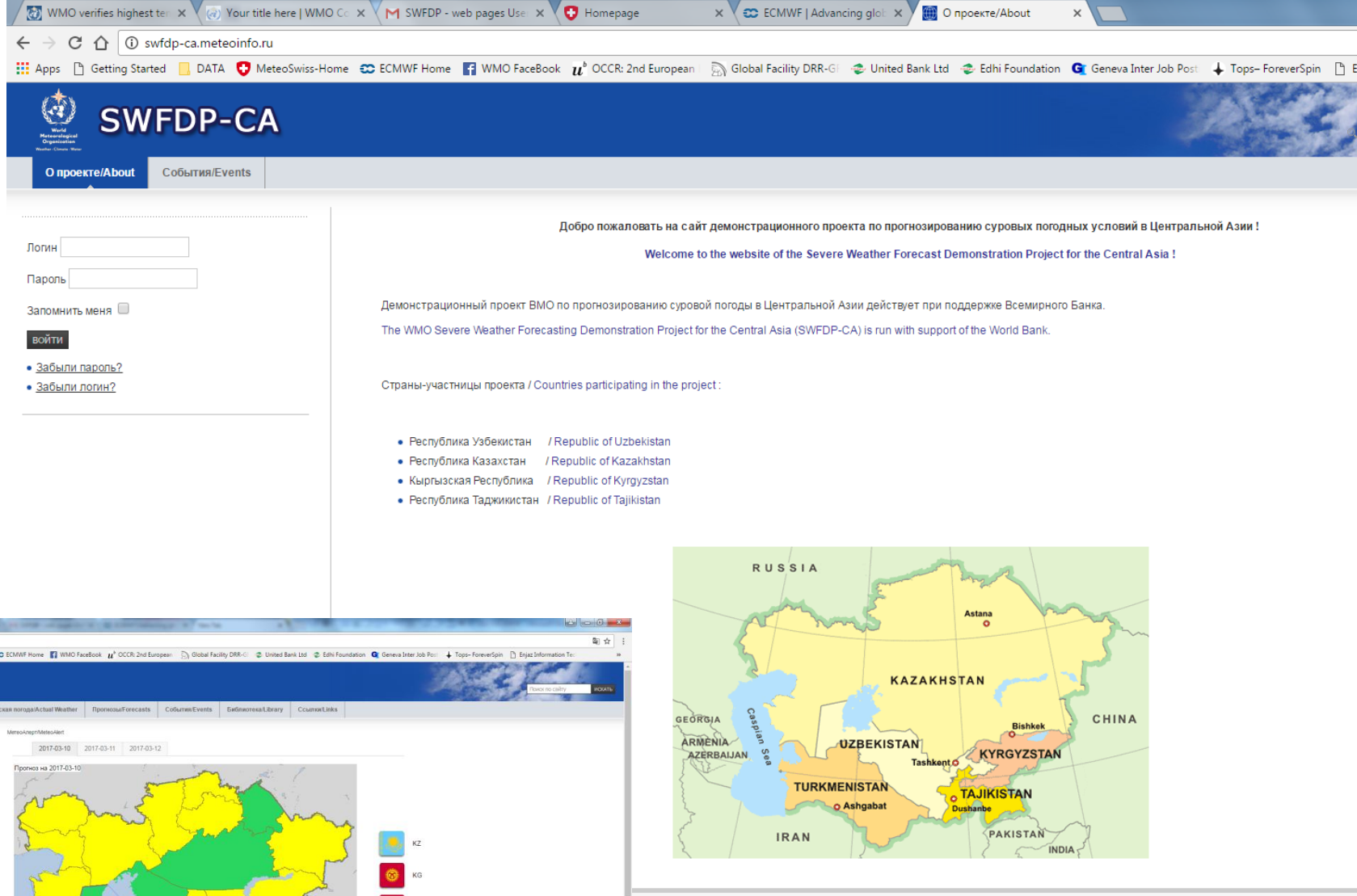
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SWFDP - web pages Use
Homepage
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О проекте/About
swfdp-ca.meteoinfo.ru
Apps
Getting Started
DATA
MeteoSwiss-Home
ECMWF Home
WMO FaceBook
OCCR: 2nd European
Global Facility DRR-Gl
United Bank Ltd
Edhi Foundation
Geneva Inter Job Post
Tops- ForeverSpin
SWFDP-CA
О проекте/About
События/Events
Логин
Пароль
Запомнить меня
ВОЙТИ
Забыли пароль?
Забыли логин?
Добро пожаловать на сайт демонстрационного проекта по прогнозированию суровых погодных условий в Центральной Азии !
Welcome to the website of the Severe Weather Forecast Demonstration Project for the Central Asia !
Демонстрационный проект ВМО по прогнозированию суровой погоды в Центральной Азии действует при поддержке Всемирного Банка.
The WMO Severe Weather Forecasting Demonstration Project for the Central Asia (SWFDP-CA) is run with support of the World Bank.
Страны-участницы проекта / Countries participating in the project :
Республика Узбекистан / Republic of Uzbekistan
Республика Казахстан / Republic of Kazakhstan
Кыргызская Республика / Republic of Kyrgyzstan
Республика Таджикистан / Republic of Tajikistan
RUSSIA
Astana
KAZAKHSTAN
GEORGIA
ARMENIA
AZERBAIJAN
Caspian Sea
UZBEKISTAN
Bishkek
CHINA
Tashkent
KYRGYZSTAN
TURKMENISTAN
Ashgabat
TAJIKISTAN
Dushanbe
IRAN
PAKISTAN
INDIA
her Forecasting Demonstration Project)

SWFDP- RA I West Africa

Technical Planning Meeting to develop Implementation Plan for SWFDP-West Africa (Abidjan, Ivory Coast, 4-8 September 2017)

RSMC Dakar

ACMAD Niamey

DMN Moroco

Global Centres:

MeteoFrance

ECMWF

UKMO?

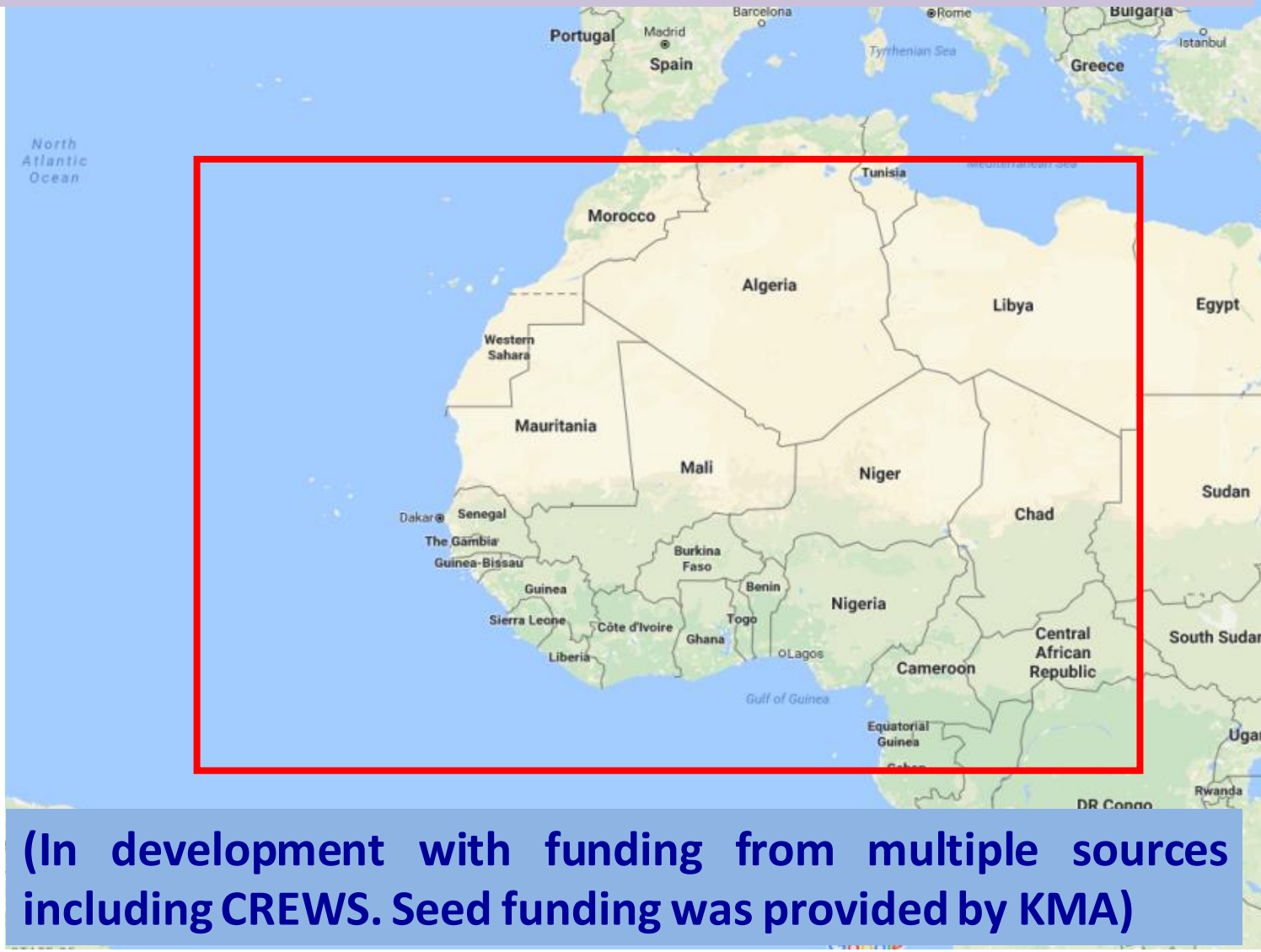
NOAA/NCEP?

Env. Canada?

Domain

0°N to 35°N

30°W to 25°E



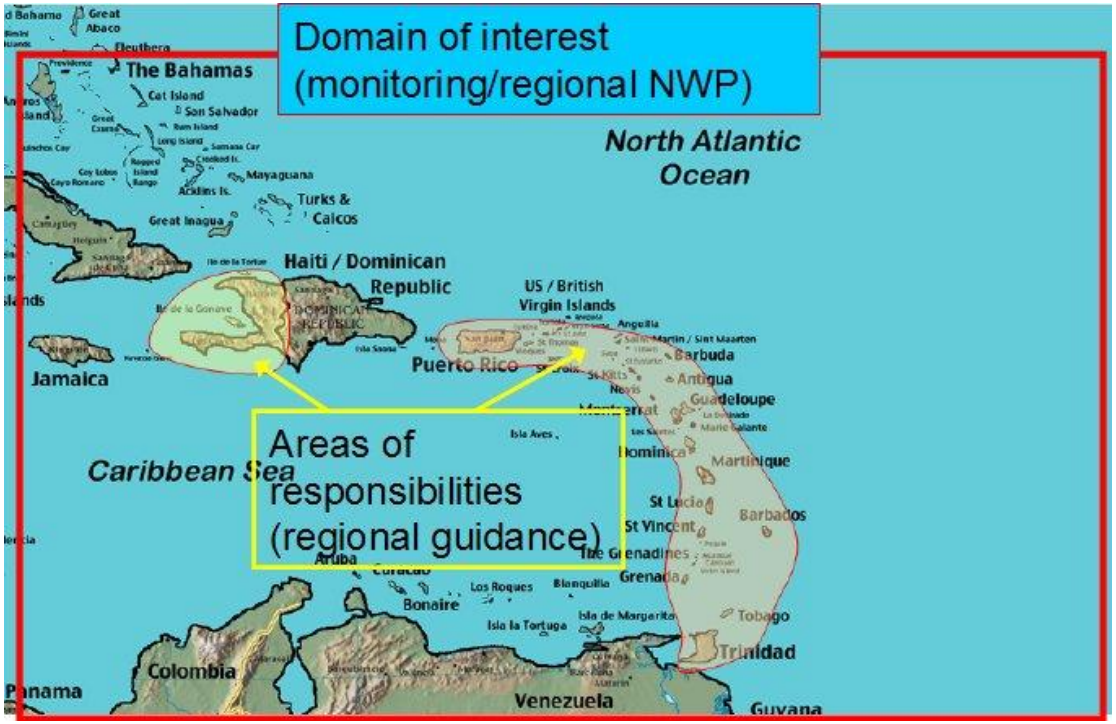
(In development with funding from multiple sources including CREWS. Seed funding was provided by KMA)

WMO OMM

SWFDP- RA III Eastern Caribbean

(Development planning started with RA III Expert Group Meeting on SWFDP in December 2016 in Martinique, and then again in Miami in May 2017)

Domain: 50°- 80° W/ 8°- 25° N



Regional Centres:

RFSF Martinique (lead centre)

RSMC Miami (for TC and hurricanes)

CIMH Barbados (for technical support)

Global Centres:

MeteoFrance/ ECMWF, NOAA/NCEP

Env. Canada

Participating SIDS/NMCs: CMO Members (Anguilla, Antigua and Barbuda, Barbados, British Virgin Islands, Dominica, Grenada, Montserrat, St. Kitts & Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad & Tobago), Haiti, Sint Maarten, Martinique/Guadeloupe/Saint-Martin/St-Barth (France), Puerto-Rico/US Virgin Isalnds (USA);

WMO OMM

(In development, seed funding provided by Canada)

Regional Subprojects in Discussion

- *Southeast Asia Oceania*

The concept SWFDP-SAO was conceived during SAOFFGS initial planning meeting, Jakarta, Indonesia during 2 to 4 February 2016. Pending formal request from P/RA-V and subject to availability of funds)

- *South America*

A Technical-Planning Workshop for RA III (South America) was held in Asunción, Paraguay during 2-3 October 2017. Workshop report is available at: http://www.wmo.int/pages/prog/www/CBS-Reports/DPFS-index.html

All the countries of RA-III would contribute to the virtual portal to be developed in the project, taking into account their knowledge and capabilities, whose functions and responsibilities would be described in the implementation plan.

- *Central Africa*

RA I in 2015 has requested to expand SWFDP in to whole Africa. Pending availability of resources

Training Programs

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 (subject to availability of resources such training workshops are held annually and rotated among participating countries in a sub-region)*
- *RSMC Training Desk (e.g. at RSMC Pretoria Training Desk for Southern Africa, RFSC Training Desk for Southeast Asia)*
- *In-country training (e.g. for countries in Southwest Pacific)*

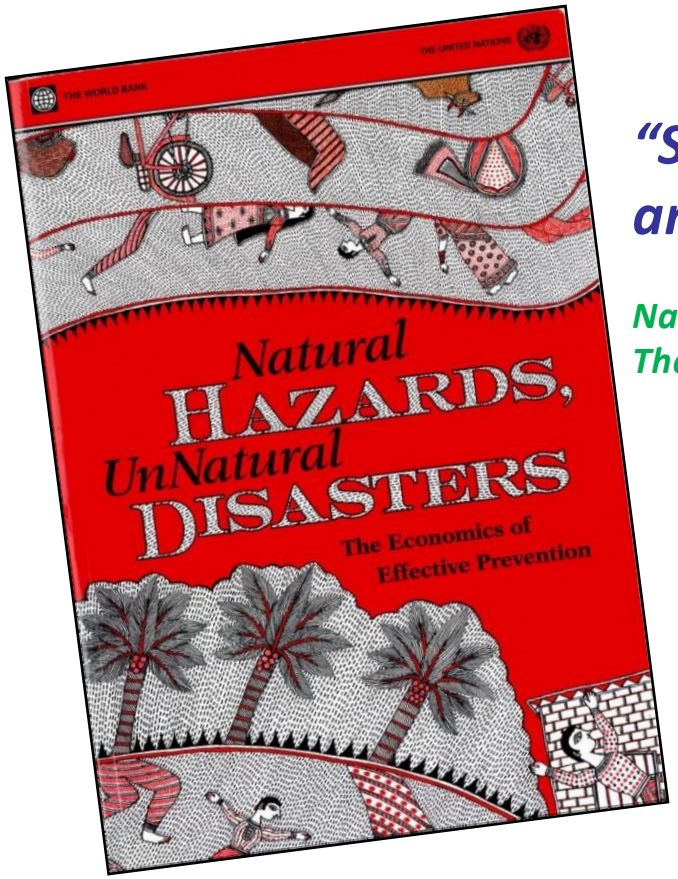
Training Programs

In addition

- ECMWF annual training for WMO Members
- DWD annual training on COSMO
- Regional Training Centres (RTC training programs on forecasting aligned with the SWFDP requirements)
- NOAA/NCEP Desks
- E-Learning (e.g. COMET)

SWFDP Training Programs

- In 2014, 103 personnel (including forecasters, hydrologists, representatives of disaster management agencies and media) were trained in Southern Africa, Eastern Africa, and Southeast Asia.
- In 2015, around 200 personnel (including forecasters, hydrologists, representatives of disaster management agencies and media) were trained in Southern Africa, South Pacific, Eastern Africa, Southeast Asia, and Bay of Bengal.
- In 2016, around 150 personnel (including forecasters, hydrologists, representatives of disaster management agencies and media) were trained in Central Asia, Southern Africa, and South Pacific



"Spending on improving weather forecasting and sharing data have high returns."

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

Thank you
Merci

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