World Meteorological Organization

Weather • Climate • Water

The WMO Severe Weather Forecasting Demonstration Project (SWFDP):

its framework, implementation and future directions

FFGS for South America – Initial Planning Meeting

Lima –Peru (16 – 18 Aug 2016)

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Why a project on severe weather forecasting?

The basic Mandate of NMHSs:

To provide meteorological information for protection of life, livehoods and property, and conservation of the environment

Why a project on severe weather forecasting?

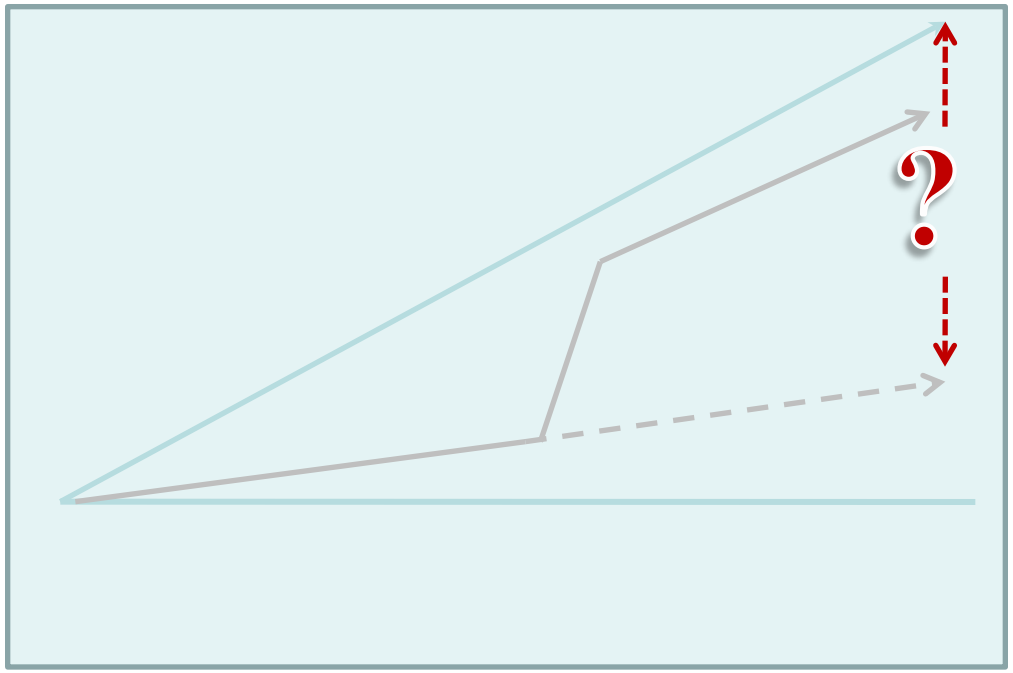
- Dramatic developments in weather and climate prediction science

- 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)



Vision

WM Congress provided 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."

Cg-15 (2007) & Cg-16 (2011)

Realizing the Vision

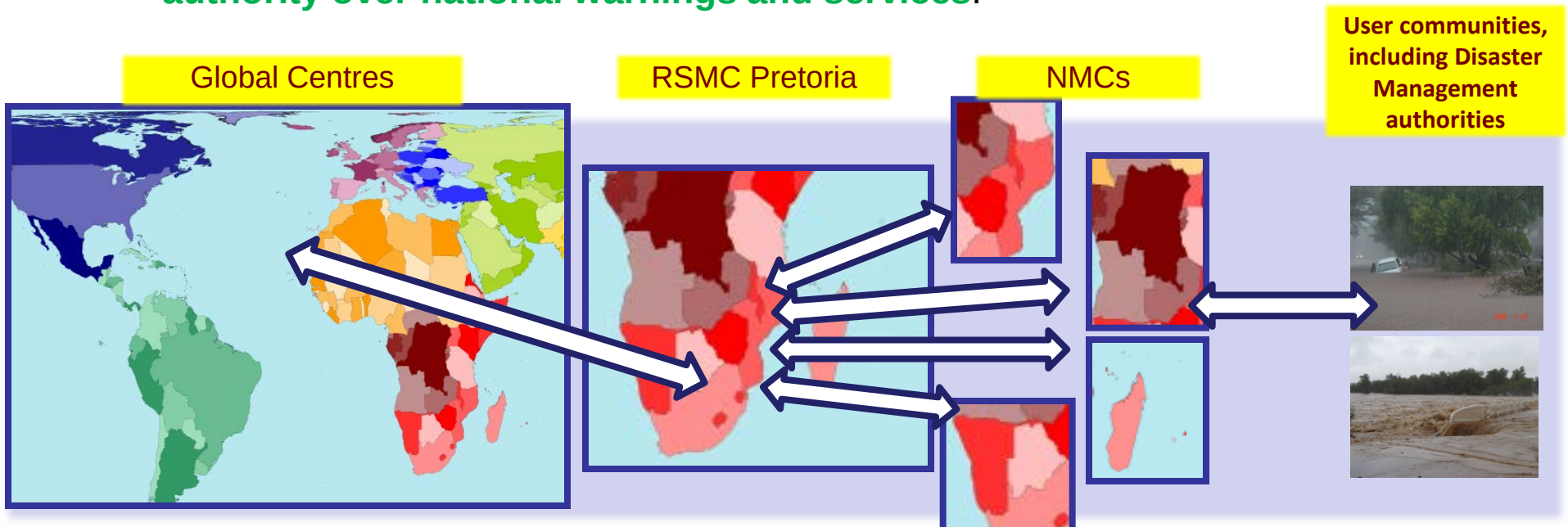
Through Collaboration between GDPFS Centres and involvement of Public Weather Services (PWS) and other Programs

To

Implement 'Cascading Forecasting Process' (from Global to Regional to National) through Severe Weather Forecasting Demonstration Project (SWFDP)

SWFDP Cascading Forecasting Process – efficient delivery of GDPFS

- *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 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* to issue alerts, advisories, severe weather warnings; to liaise with user communities, and to contribute feedback and evaluation of the project;**
- ***NMCs* have access to all products, and maintained responsibility and authority over national warnings and services**.



SWFDP Main Goals

- Implement the WMO's GDPFS three-level system – the *'Cascading Forecasting Process'*
  - ✓ International collaboration among operational centres at global, regional and national levels
  - ✓ Improve the skill of products from WMO operational centres through feedback and forecast verification
  - ✓ Continuous learning and modernization
  - ✓ Address the needs of groups of "like-countries"
- Improve lead-time of Warnings
- Improve interaction of NMHSs with their users
- Identify areas for improvement and requirements for the WMO Basic Systems

SWFDP Strengths

- Cost effectiveness;
- Simplicity;
- NMHSs need good internet only;
- Highly operational;
- Capacity development through specialized training programme
- improved forecasts and lead-time of warnings
- Country Representatitives decide on geographical area and weather elements of focus.
- Dedicated websites (Global & Regional Centres)

SWFDP framework and guidance

SWFDP is organized within the Commission for Basic Systems (CBS) and taken care of by a Project Steering Group (PSG) established by CBS at WMO

REFERENCE DOCUMENTS:

- *SWFDP Overall Project Plan (rev. 2010)*
  http://www.wmo.int/pages/prog/www/DPFS/Meetings/RAII-SeA-SWFDP-RSMT_Hanoi2011/documents/SWFDP_OverallPP_Updated_22-04-2010.pdf

- *SWFDP Guidebook for Planning Regional Subprojects (rev. 2010)*
  http://www.wmo.int/pages/prog/www/DPFS/Meetings/RAII-SeA-SWFDP-RSMT_Hanoi2011/documents/SWFDP_Guidebook_Updated_22-04-2010.pdf

SWFDP Implementation process

Four Phases approach

Phase I - Overall Project Planning: This phase includes the preparatory work necessary to prepare the project specifications, and to identify the possible participating centres and to select suitable regional subprojects according to the geographical area, the type of severe weather and the chosen period for the experimentation.

Phase II: Regional Subproject Implementation Planning and Execution.

- Preparation of the detailed specifications (data and products to be exchanged, performance measurements, reviewing and reporting)
- Country Reps (RSMT) develop subproject implementation plan, including a training programme, and to manage its implementation and then to carry out the Demonstration.

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SWFDP Implementation process

Four Phases approach

Phase III: Evaluation of SWFDP Regional Subproject :

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

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

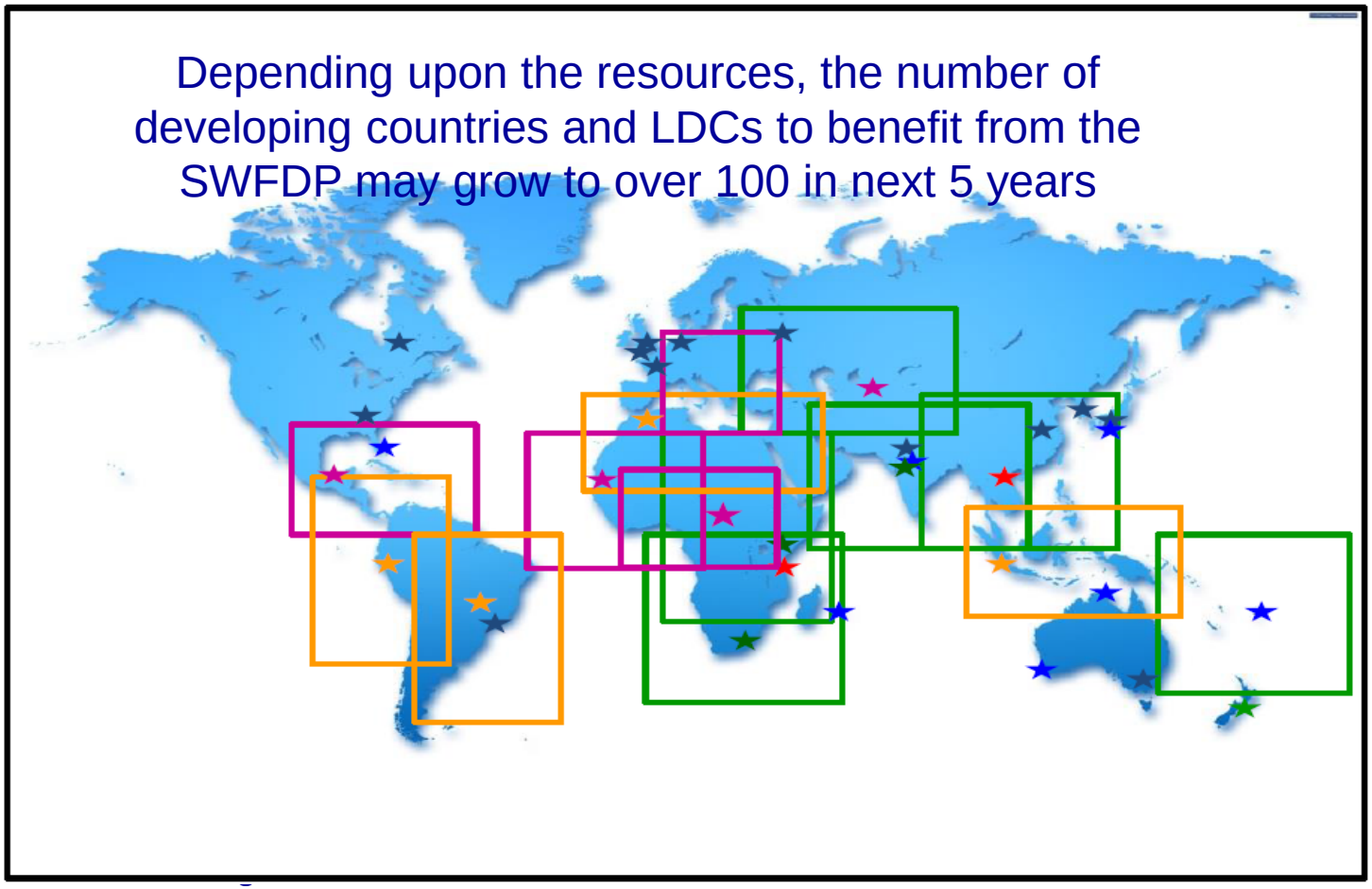
- Sustain operations and expand partnerships through continuous development, regular trainings and sharing knowledge.
- Future capability and technology developments, and to foster broadening of activities in synergy with other WMO Programmes.
- **Responsibility of management to be taken by the concerned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

Role and Responsibilities of Participating Countries

- **Identify the Country Representatives on Regional Sub-project Management Team which will develop the Implementation Plan**
  - Agreement on warning criteria for severe weather elements (Temp, Wind, Pcpn , TSTM etc)
  - Agreement on when to begin the demonstration phase (phase II) – Depends on Securing RSMC/RFSC
  - Provide quaterly reports incl some stats on their warnings- Data-based available
- **Agreement on RSMC/RFSC for the provision of guidance**

SWFDP: Existing projects and Future directions

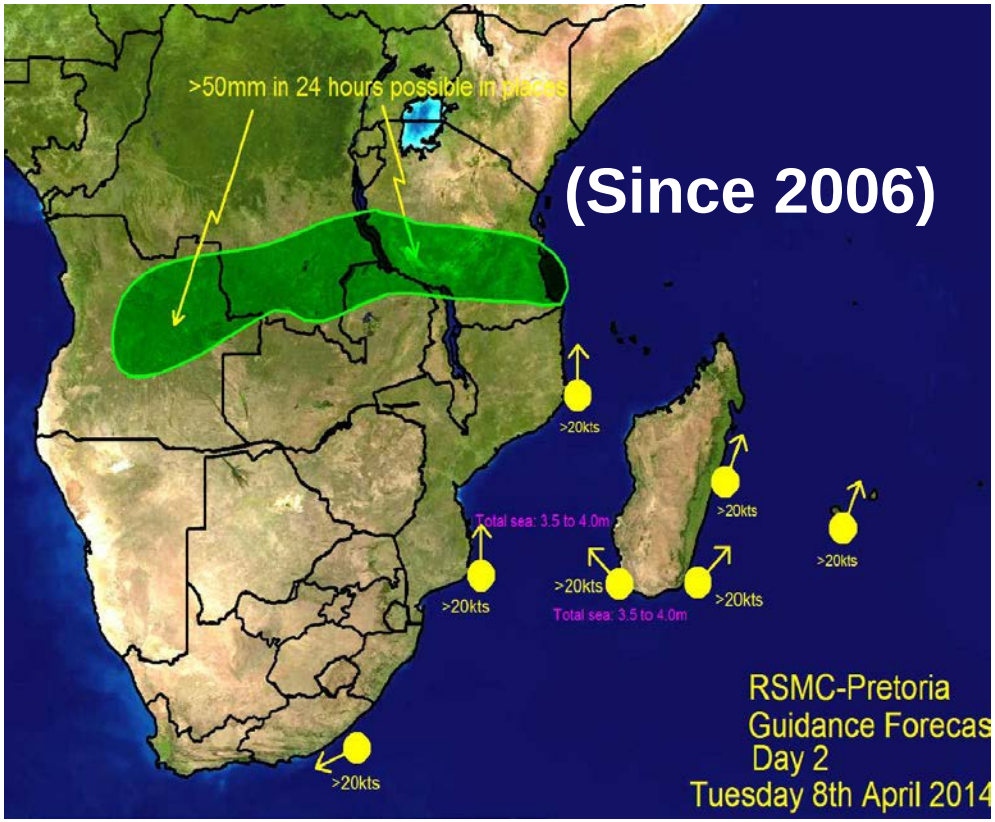
Green color boxes represent the domains of existing SWFDP regional subprojects. **Pink** and **Orange** color boxes signify the regions for future SWFDP subprojects which will be developed within next 1-2 years and 3-5 years respectively. Contributing Global Centres and RSMCs /RFSCs are also shown for each of the SWFDP regional subprojects.



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

SWFDP in RA I– Southern Africa

16 Countries: Angola, Botswana, Democratic Republic of the Congo, Malawi, Mauritius, Madagascar, Mozambique, Namibia, Lesotho, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe, Comoros



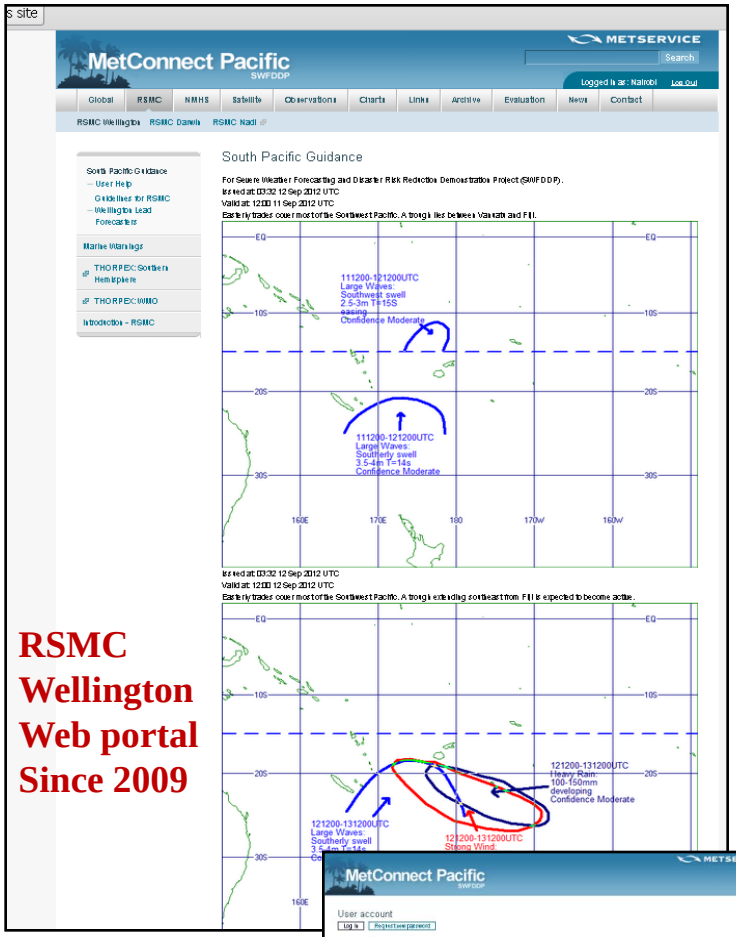
(Supported by Norwegian funds)

Global Centres: ECMWF, UKMO, NOAA/NCEP (NWP guidance material), MSG satellite products (EUMETSat products)

Regional Centres: RSMC Pretoria (supported by UKMO and DWD), RSMC La Reunion

SWFDP in RA V (Southwest Pacific)

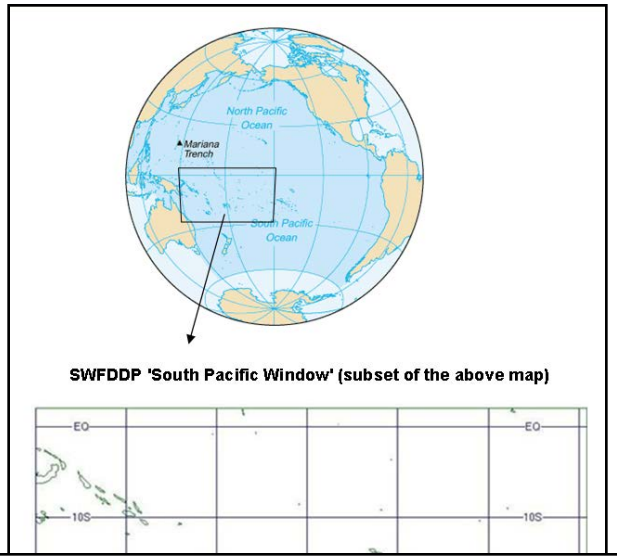
- 9 Island States, RSMC Wellington, RSMC-TC Nadi, RSMC Darwin
- ECMWF, Met Office UK, NWS/USA, ABoM, JMA

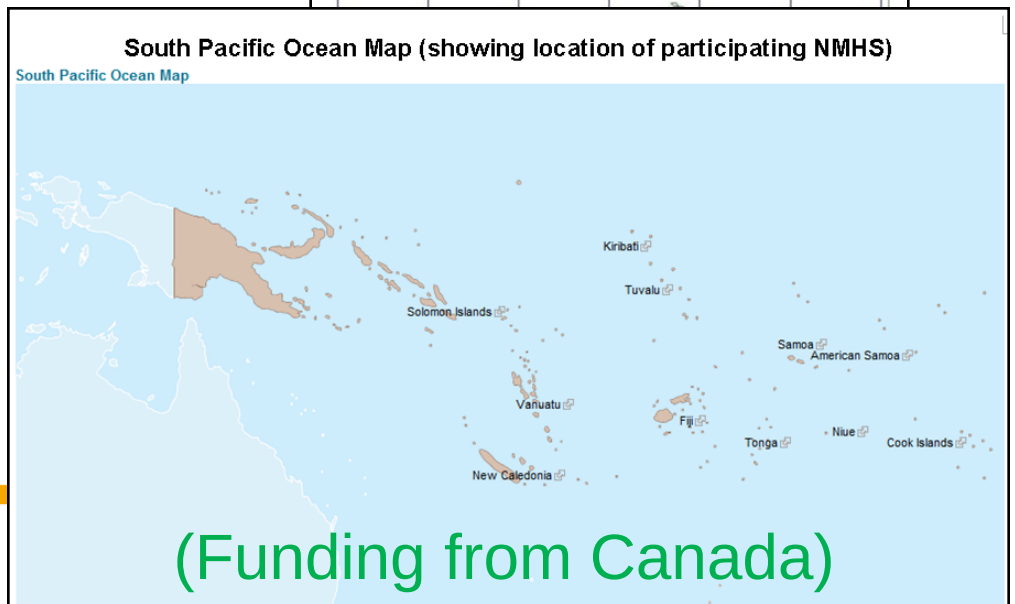


RSMC Wellington Web portal Since 2009

9 Island States:

- Cook Islands
- Fiji
- Kiribati
- Niue
- Samoa
- Solomon Islands
- Tonga
- Tuvalu
- Vanuatu

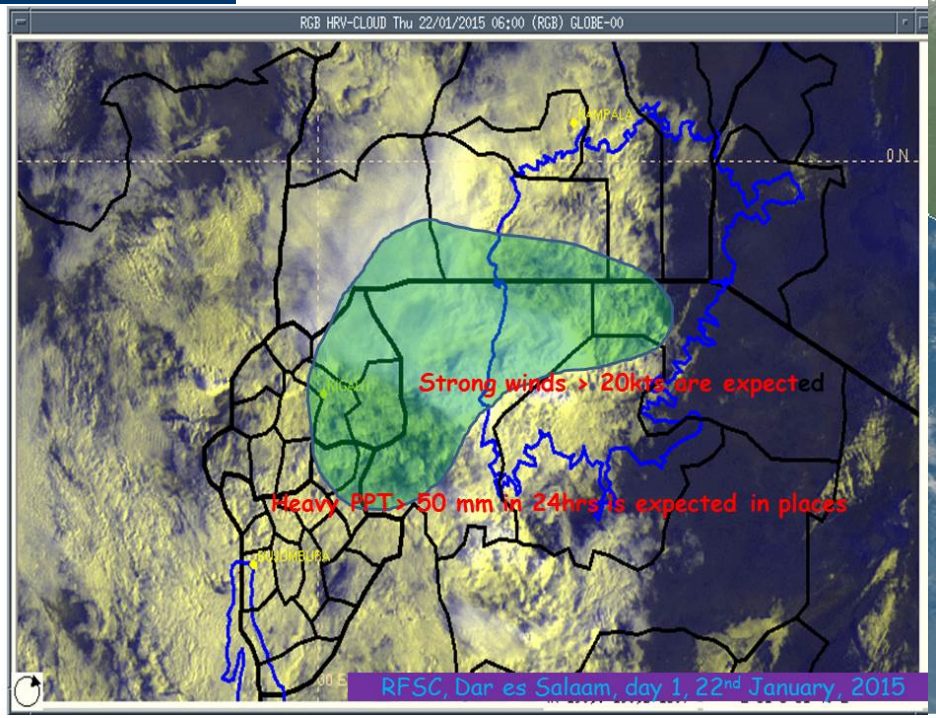


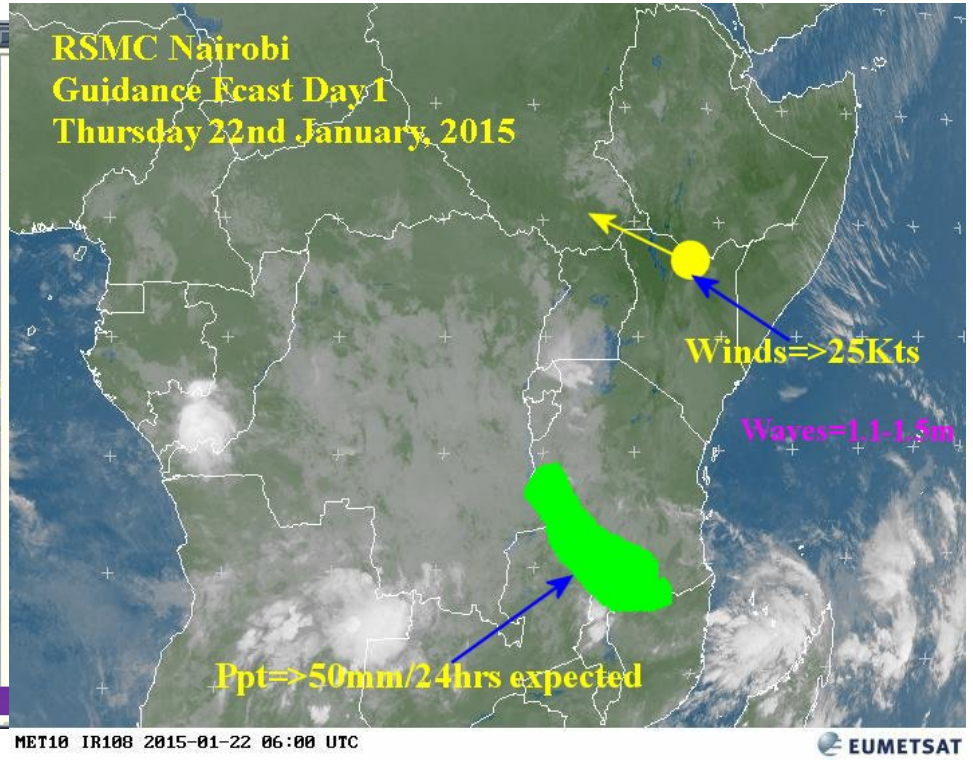


(Funding from Canada)

SWFDP RA-I-Eastern Africa

(Since 2010)





Benefitting Countries (7):

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

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

Regional Centre: RSMC Nairobi, RFSC Dar Es Salaam (Lake Victoria basin)

(Supported by Norwegian funds)

SWFDP- RA II Southeast Asia

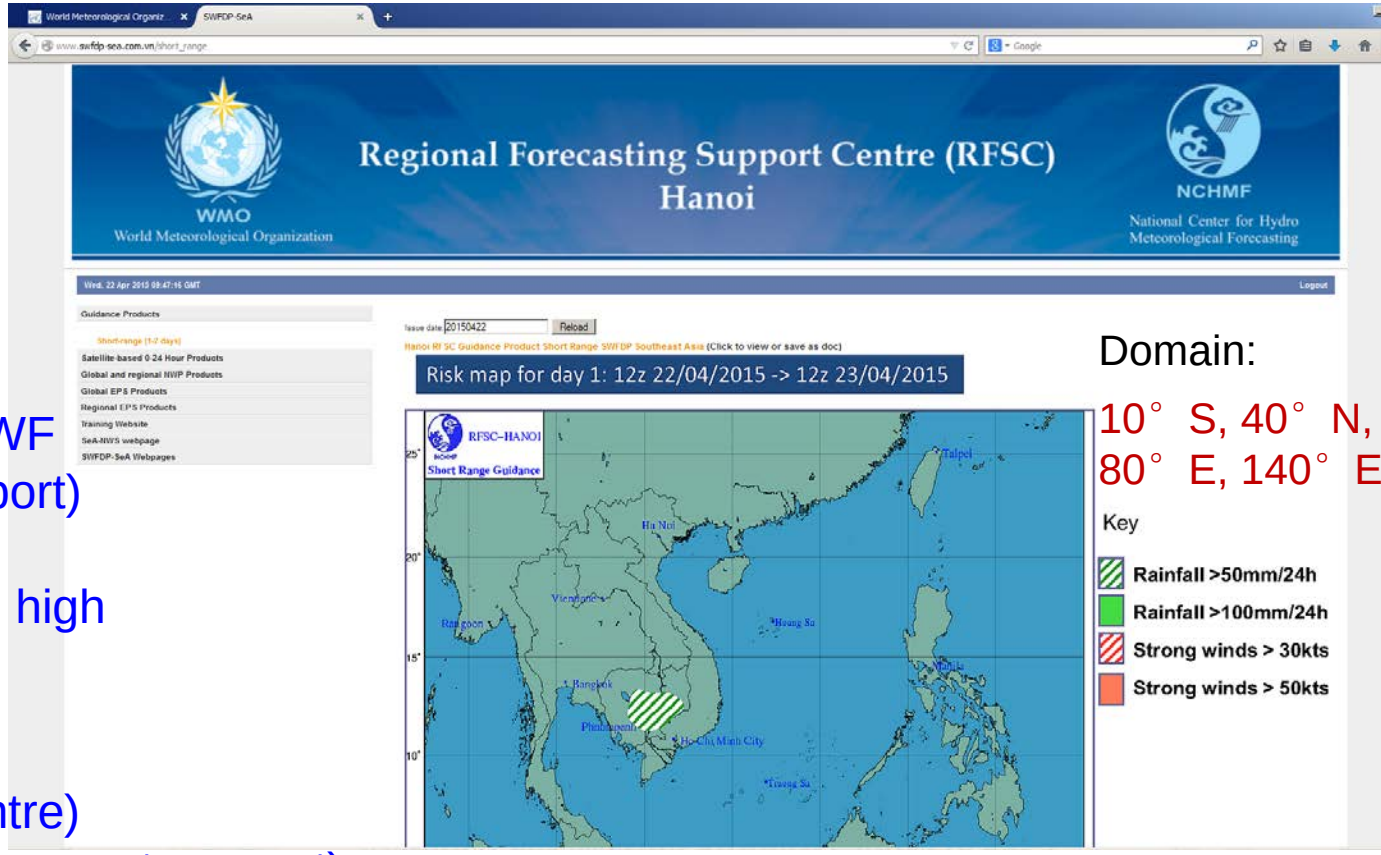
(since 2010)

7 countries:
Cambodia, Lao PDR
Viet Nam Philippines
Thailand

Global Centres:
CMA, JMA, KMA, ECMWF and DWD (for LAM support)

Hazards:
Heavy rain, strong wind, high seas and swell

Regional Centres:
RFSC Ha Noi (Lead centre)
RSMC Tokyo (typhoon forecast support)
RSMC New Delhi (TC forecast support)



Demonstration phase likely to start in 2016

SWFDP- RA II Bay of Bengal

(since 2012) (in development)

Focus on: strong winds, thunderstorm, monsoon, heavy precipitation (mainly TC-related) and associated hazards (e.g. flooding, landslides, 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

6 Countries: Bangladesh, India, Maldives, Myanmar, Sri Lanka & Thailand

Demonstration phase likely to start in 2016

(Funding from UN ESCAP through RIMES)

SWFDP- RA II Central Asia

(Technical Planning Workshop held in Almaty on 25-27 April 2015)

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

Global Centres?
RosHydromet, ECMWF
CMA, JMA

(Funding from the World Bank)

Participating Countries?
Kazakhstan, Kyrgyzstan, Tajikistan & Uzbekistan

RSMC web portal & Demonstration phase likely to start in 2015/2016 ?

SWFDP- RA IV Caribbean

(2015 planning phase)

Countries in the region ? (strating with a smaller group of countries ?)

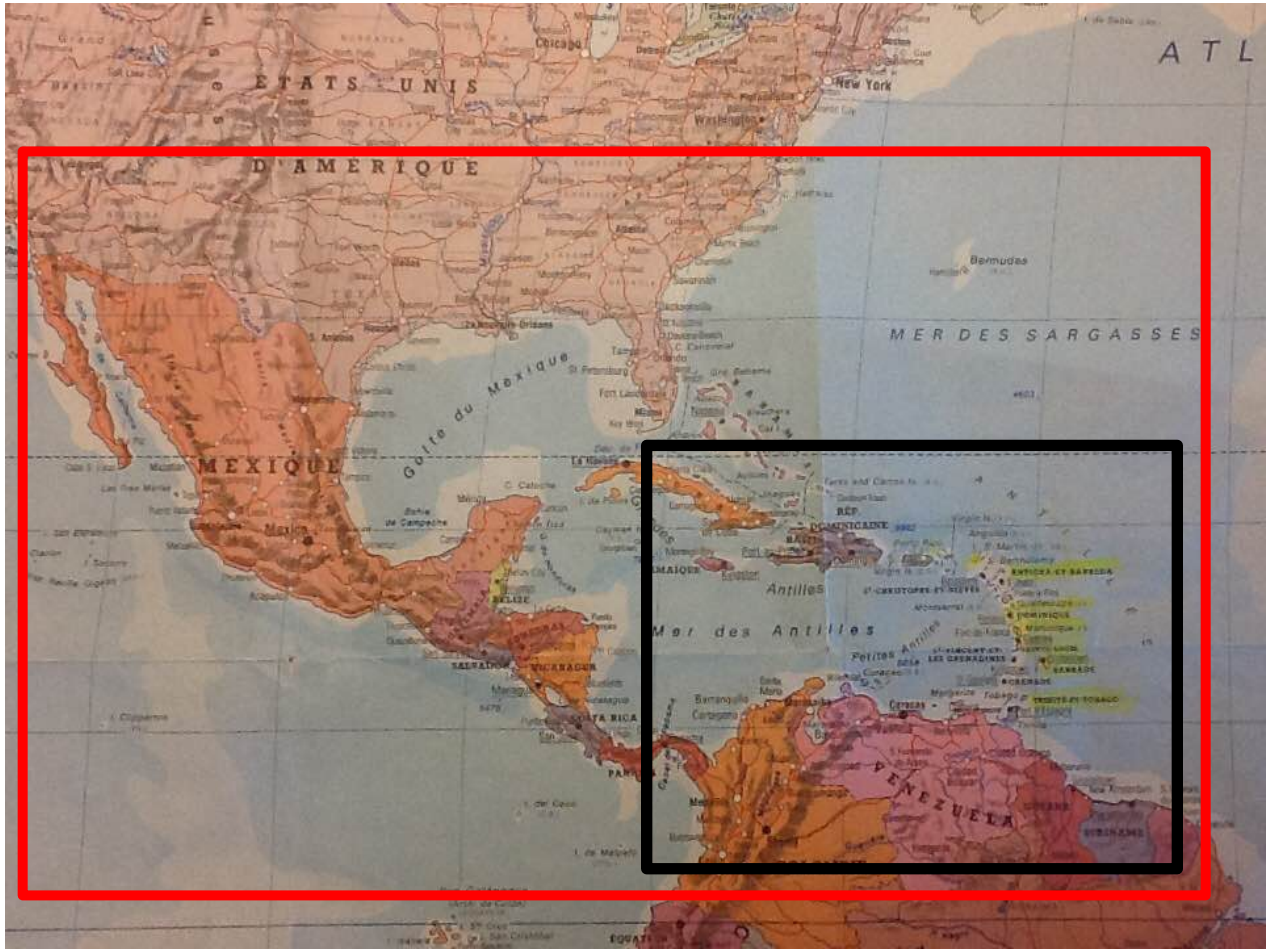
Contributing Global NWP Centres ? (NCEP/NOAA, ECMWF…?)

Contributing Regional Centres ?

- o one Regional Centre to lead ?
- o RSMC-Miami for hurricane fcst support ?

Project domain and Potential Focus ?

- Strong winds ?
- Heavy rains ?
- Hazardous waves ?



(Seed funding from Canada with potential additional resources from USAID)

SWFDP RA-I-West Africa

(Technical Planning Workshop likely early 2016)

Potential areas of Focus :

- Strong winds
- Heavy rains (African monsoon)
- Hazardous waves
- (Atlantic Ocean)

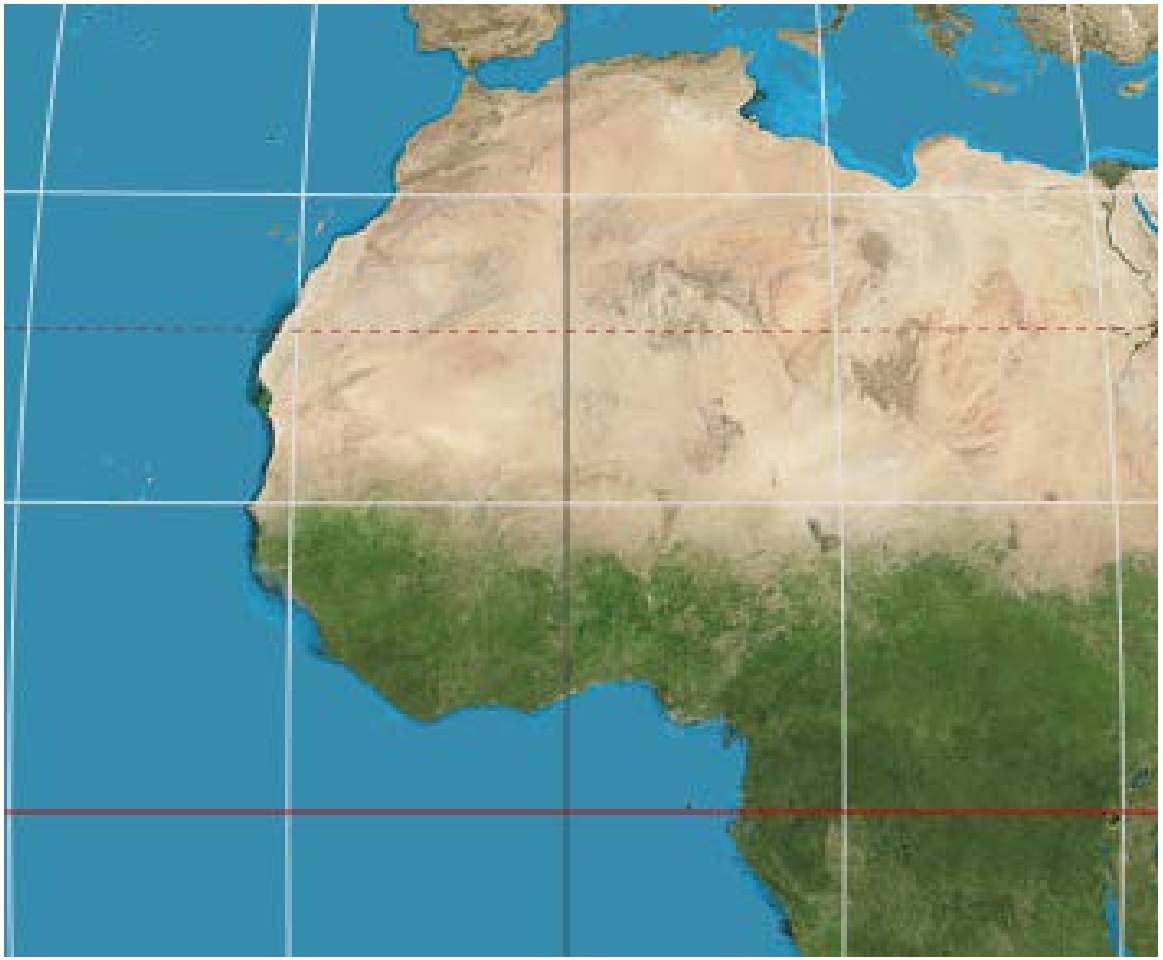
•Countries in West Africa ?

•Regional Centres ?

(RSMC Dakar ? ACMAD?)

•Global Centres ?

(ECMWF, MeteoFrance, NOAA/NCEP?)



(Initial funding from KMA)

SWFDP- RA VI South East Europe

(Consider planning)

Countries in the region ?
Strong commitment from interested countries?)

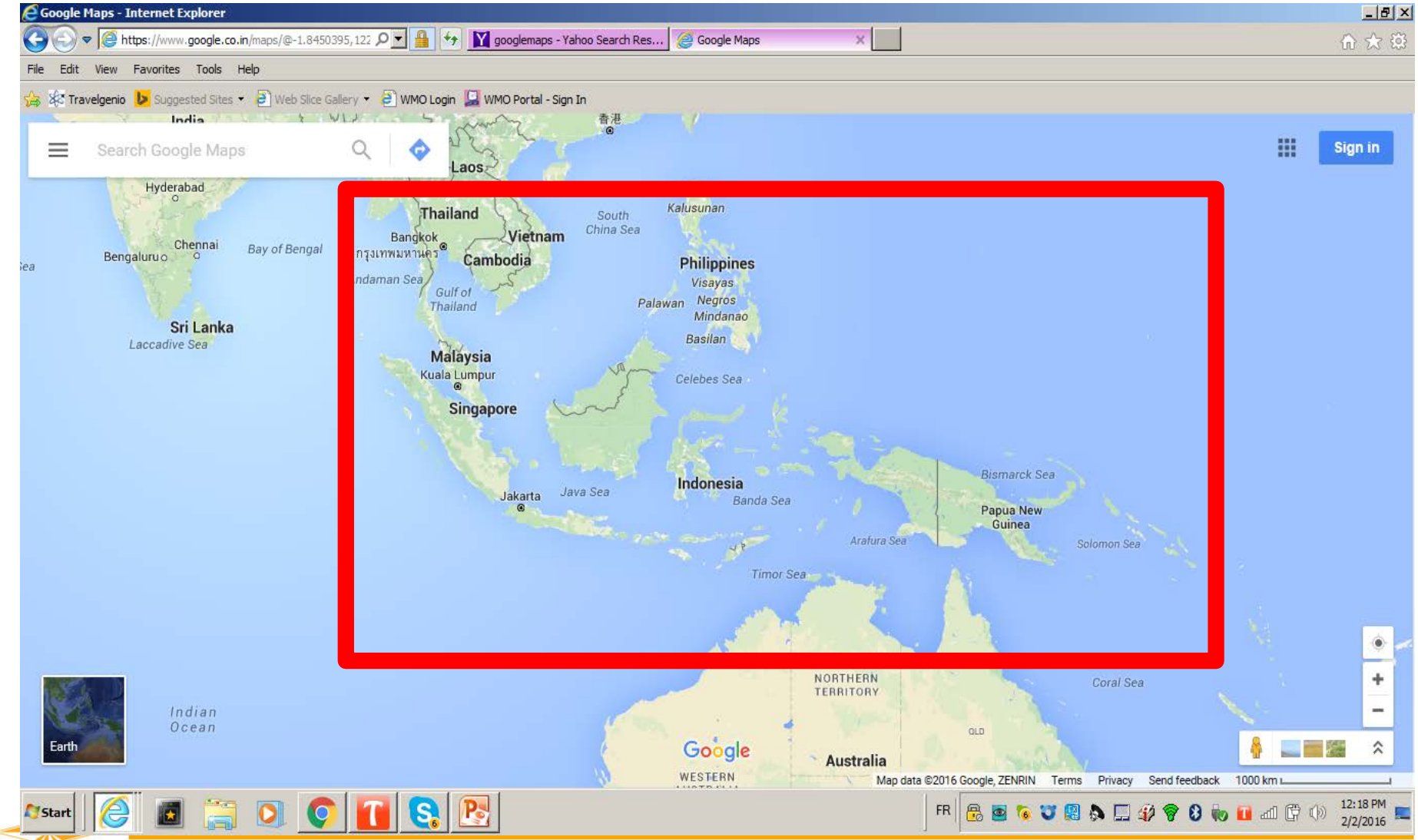
Contributing Global NWP Centres ?
ECMWF, UKMO, DWD, MeteoFrance?

Contributing Regional Centres ?
Regional Centre to lead ?

Project domain and Potential Focus ?

- Strong winds ?
- Heavy rains ?
- Severe Thunderstorms?
- Hail Storms?
- Heavy snow with blizzards ?
  ?

Southeast Asia and Oceania Flash Flood Guidance (SeAOFFG) and SWFDP – Planning Phase



SWFDP Synergies

SWFDP linkages are developed with various programmes and projects wherever appropriate

- Flash Flood Forecasts Guidance System (FFGS)
- Tropical Cyclones Programme (SWFDDP)
- SAT-Nowcasting (South Africa)
- Coastal Inundation Forecast Demonstration Project

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 preferably held every year and 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)*

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)

SWFDP Training Programmes

- **In 2014 alone, 103 personnel (including forecasters, hydrologists, representatives of disaster management agencies and media) of countries in Southern Africa, Eastern Africa and Southeast Asia were trained.**

SWFDP Trainings in 2015

- In-country training for countries in Southwest Pacific (during March-November 2015) (in progress)
- SWFDP Training Workshop for Central Asia in July 2015
- SWFDP Training Workshop for Southeast Asia and the Bay of Bengal in Bangkok, Thailand in September 2015
- SWFDP Training Workshop for Eastern Africa in Addis Ababa, Ethiopia in November 2015

SWFDP Trainings in 2015

- Training Desk at RSMC Pretoria in October/ November 2015
- Two-week SWFDP and SARFFG training workshop on Severe Weather Forecasting , Warning Services and Flash Flood Guidance in November 2015

(SWFDP and SAFFGS integration in RA I– Southern Africa)

The Process to initiate SWFDP in RA III

- Have the Region, through the RA-III, requests the implementation of SWFDP in the Region
- A letter from the Pres RA-III to SG required
- Proceed with planning
  - Identification of $$
  - Identification of Participating Countries representatives
  - Identification of Regional Centres and participating Global Centres
- Meeting of RSMT to develop the IP and decide on demonstration phase
- Identification and commitment of a Regional entity to take on responsibilities for the operational phase.

SWFDP Implementation – How to initiate it

- Constituent Body to express interest (RAs, TCs, EC and Congress)
- Funding availability from donors
- Commitments of participating Countries
- Identification and commitment of a Regional entity to take on responsibilities for the operational phase of the project

Investment during pre-disaster or Spending during post-disaster?

- **We can not stop severe weather and hydrometeorological hazards from happening, but we can prepare for it, including through improving severe weather forecasting and warning services for hydrometeorological hazards**

- **Investment during pre-disaster mode (e.g. capacity development of the NMHSs to issue impact-based forecasts and risk-based warnings, disaster management, and strengthening of community-based multi-hazard early warning and response systems etc.) save funds required during post-disaster phase (e.g. for rehabilitation activities and reconstruction etc.) through keeping the damages from disasters at minimum and ensuring safety of lives**

World Meteorological Organization

Weather • Climate • Water

Thank You

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