



# World Meteorological Organization

Working together in weather, climate and water

## **The Second Asia/Oceania Meteorological Satellite Users' Conference Tokyo, 6-9 December 2011**

### **Session 6: Severe weather and precipitation**

## **WMO support for monitoring and prediction of severe weather in Asia and the Pacific**

**Kuniyuki Shida**

**Regional Office for Asia and the South-West Pacific**

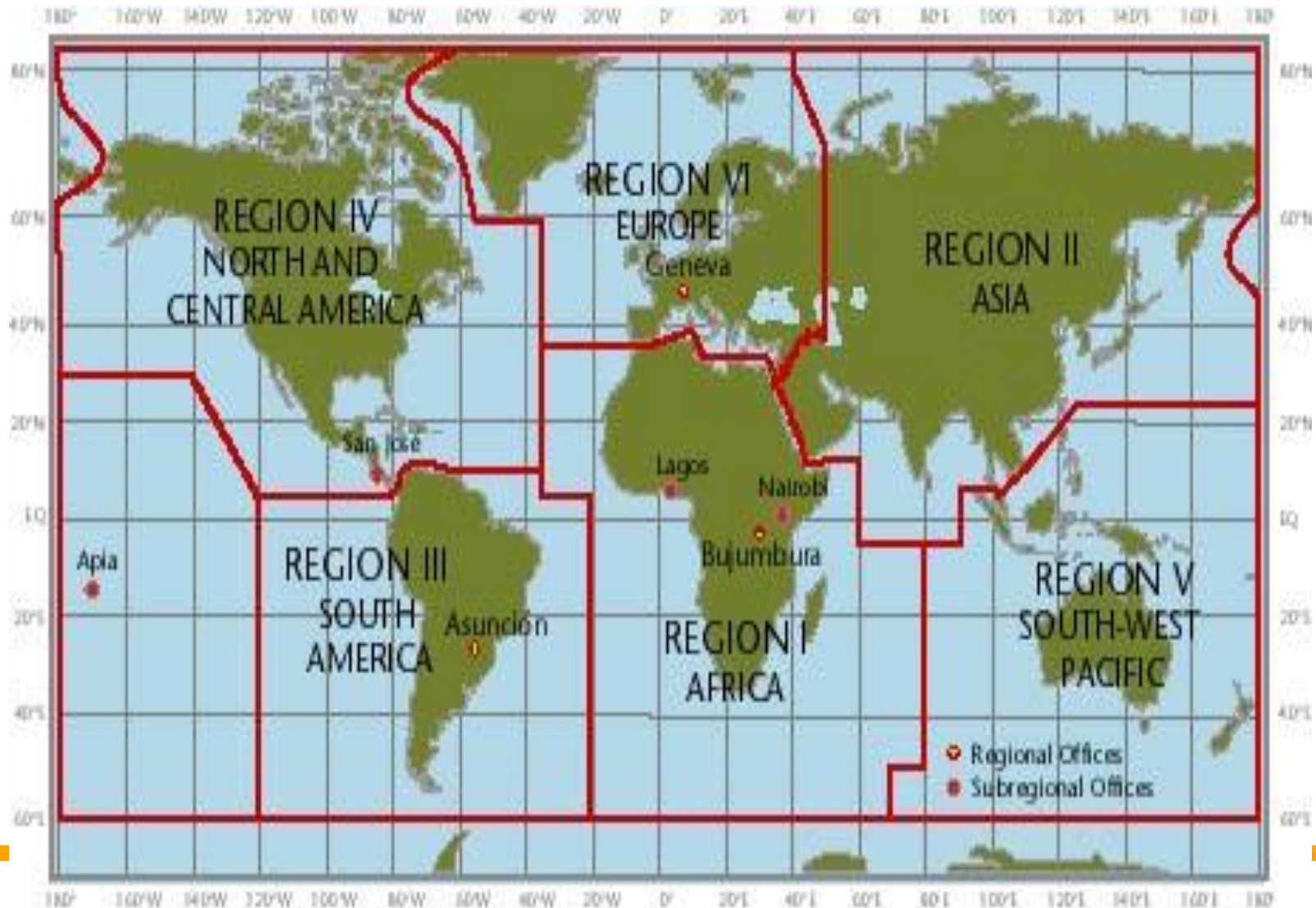
**kshida@wmo.int**



- 
- **Capacity development for NMHSs in Asia and the Pacific**
  - **Severe Weather Forecasting Demonstration Project (SWFDP)**
-



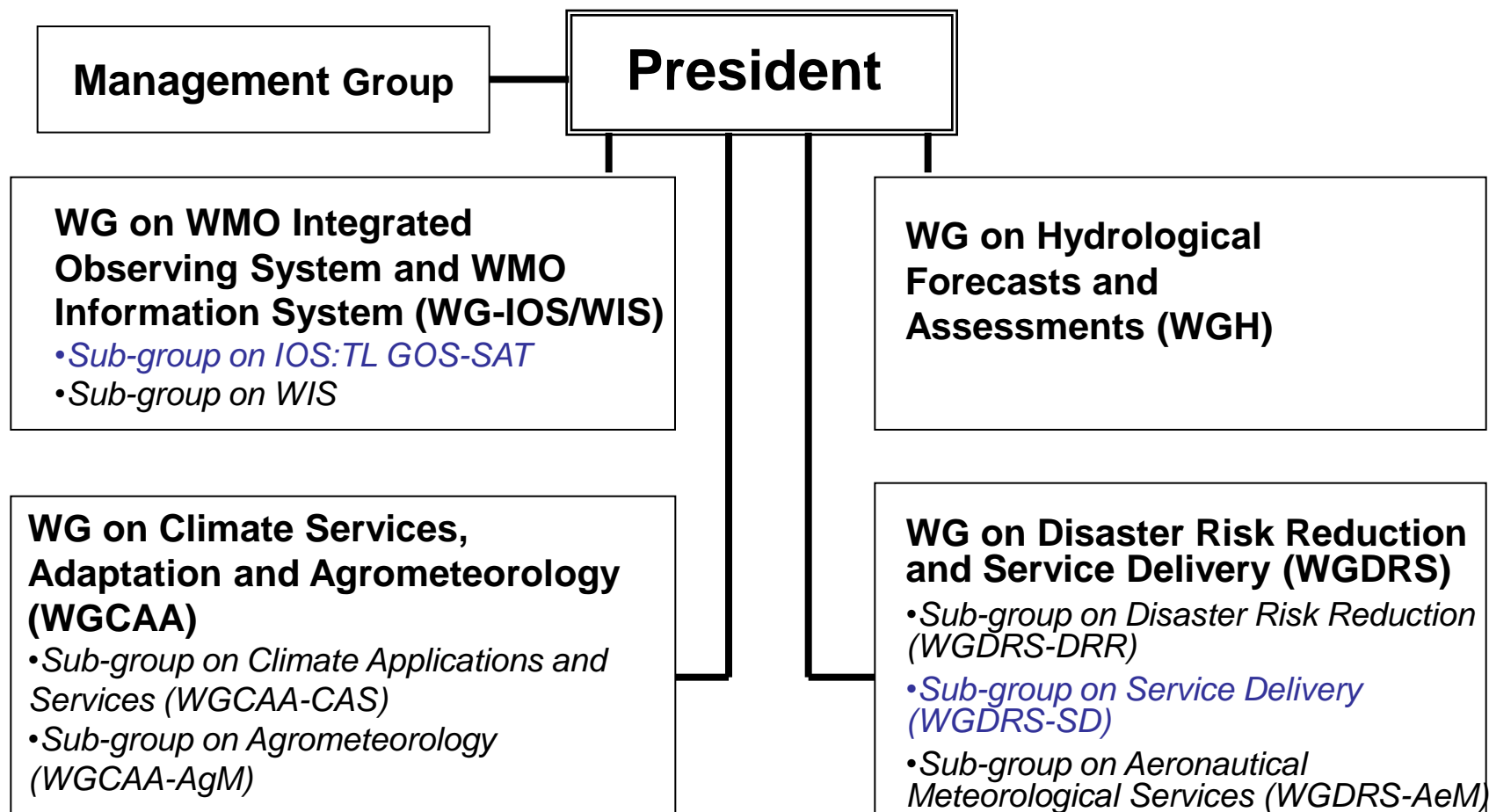
# WMO Regional Associations





# Working Mechanism of RA II

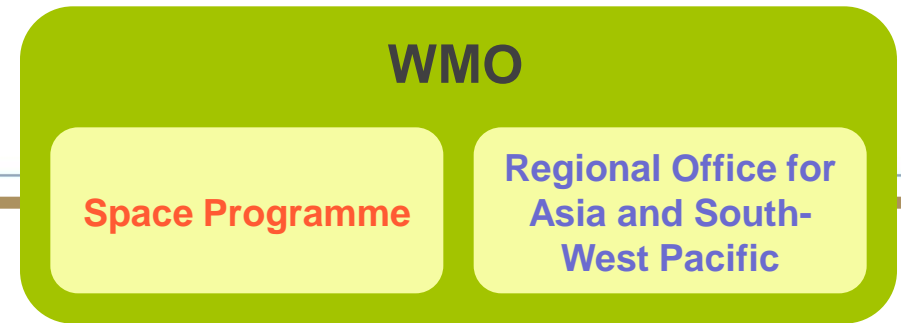
decided at XIV-RA II (Tashkent, December 2008)



Chairs, coordinators, theme leaders and expert volunteers

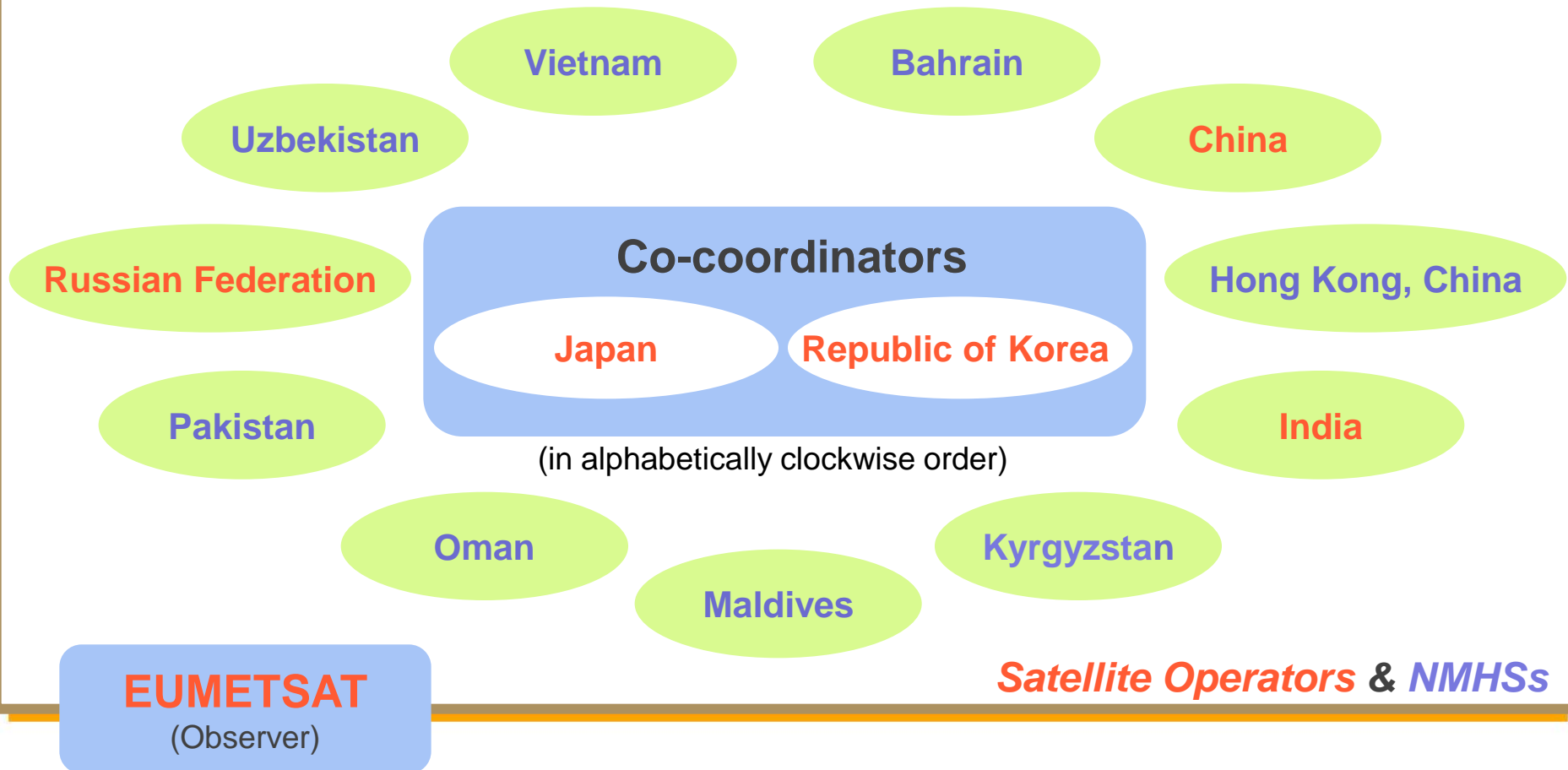


# RA II Pilot Project Coordinating Group Members



## Coordinating Group

(13 countries as of 31 May 2011)





# First and Second-Phase Accomplishment

First phase: September 2009 – August 2010

Second phase: September 2010 to August 2011

---

1. The 1st Meeting of the Coordinating Group of the RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training, Tokyo, Japan, 21 – 23 February 2011.
  2. Issuance of bi-monthly newsletters for RA II Members.
  3. Establishment of pilot project web pages on the WMO Space Programme (WMOSP) website (hosted by WMOSP)
-



# Third-phase Action Plan of the RA II Pilot Project

**(Third phase: September 2011 – August 2012)**

1. Ongoing issuance of Quarterly newsletters for RA II Members
2. Enhancement of Pilot Project web pages on the WMO Space Programme website includes;
  - “Portal Site” for accessing satellite imagery, data and products as well as training
3. Enhancement of a mailing list for RA II Members and another one for Coordinating Group members
4. Identification of requirements from RA II Members
  - Implementation of web-based RA II Pilot Project Questionnaire System on the RA II Pilot Project web pages with a computerized answer sheet
5. Alignment of pilot project activities with Virtual Lab activities to optimize assistance to NMHSs in RA II
6. Planning of the 2nd Meeting of the Coordinating Group of the RA II Pilot Project to be held in 2012
  - KMA will host the 2nd Meeting of CG of RA II PP in the 4th quarter of 2012
  - RA-II PP training workshop/users meeting as joint meeting
7. Creation of the fourth-phase working plan (by August 2012).



# Support to Island Developing States in the Pacific

---

Under the WMO **Voluntary Co-operation Programme (VCP)** with the financial support from USA,, 18 LRIT receivers and software were procured at the end of June 2008 and delivered to 16 benefiting countries and territories by May 2009.

- American Samoa
- Cook Islands
- Fiji Islands
- Federated States of Micronesia
- Kiribati
- Marshall Islands
- Nauru
- Niue
- Palau
- Papua New Guinea
- Samoa
- Solomon Islands
- Tokelau Islands
- Tonga
- Tuvalu
- Vanuatu



# Training Events

- **International Training Events Organized by the WMO RTCs during 2008-2011**
  - Training Course on “Satellite & Radar Meteorology”, from 15 to 29 September 2008, RTC in Nanjing, CHINA
  - Training Course on "Satellite Meteorology", from 8 to 17 October 2008, RTC in Beijing, CHINA
  - Training Workshop on “MSG/MetOp Applications and Nowcasting” from 15 to 19 May 2010, RTC in TURKEY.
  - Training Course on "Satellite Meteorology", from 22 June to 2 July 2010, RTC in Beijing, CHINA
  - 2nd EUMETSAT Workshop on “Drought and Forest Fires”, from 4 to 7 April 2011, RTC in Antalya, TURKEY
  - Training Course on “Satellite Meteorology”, from 18 to 29 April 2011, RTC in Nanjing, CHINA

**ETR Office is continuously updating the training database, and all available courses related to the “Satellite” can be seen through the website at:**

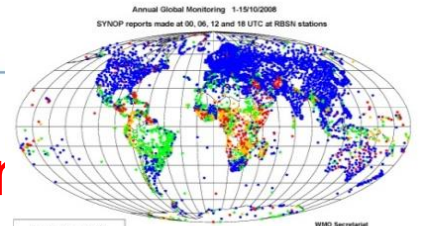
[http://192.91.247.60/etr/aspscripts/result\\_subject\\_n.asp?subject\\_for\\_m=%3D%27Satellite%27](http://192.91.247.60/etr/aspscripts/result_subject_n.asp?subject_for_m=%3D%27Satellite%27)



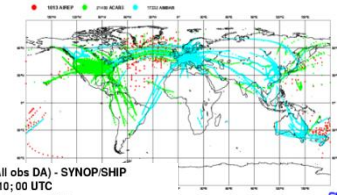
# WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

## Background: WMO Global Observing System

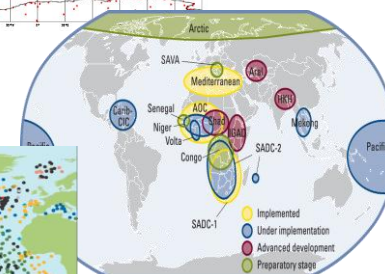
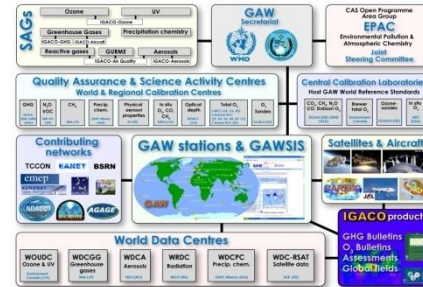
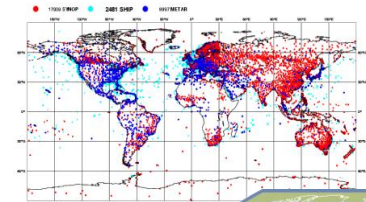
- Global Observing Systems (WWW/GOS)
  - RBSN, RBCN (>10,000 stations, 1,000 upper-air)
  - AMDAR (39754/day)
  - Ship & Marine obs (30417/day)
  - Surface-based remote sensing
  - Meso-scale networks
- WMO Space Programme
- Global Atmospheric Watch (GAW)
- World Hydrological Cycle Observing System (WHYCOS)
- WMO Co-sponsored Observing System
  - GCOS, GOOS, GTOS



ECMWF Data Coverage (All obs DA) - AIRCRAFT  
05/NOV/2009; 06 UTC  
Total number of obs = 39754



ECMWF Data Coverage (All obs DA) - SYNOP/SHIP  
19/APR/2010; 00 UTC  
Total number of obs = 30417



## Regional WIGOS Implementation Plans

Argo Network, as of April 2005

- AUSTRALIA (56)
- CANADA (72)
- GERMANY (112)
- INDIA (40)
- MAURITIUS (2)
- NETHERLANDS (3)

1811 Active Floats



# Severe Weather Forecasting Demonstration Project (SWFDP)

## **SWFDP Main Goals**

- ✓ Improve Severe Weather Forecasting
- ✓ Improve lead-time of warnings
- ✓ Improve interaction of NMHSs with users, including media, disaster management and civil protection authorities, and user communities in the various socio-economic sectors (e.g. agriculture, fisheries, etc.)

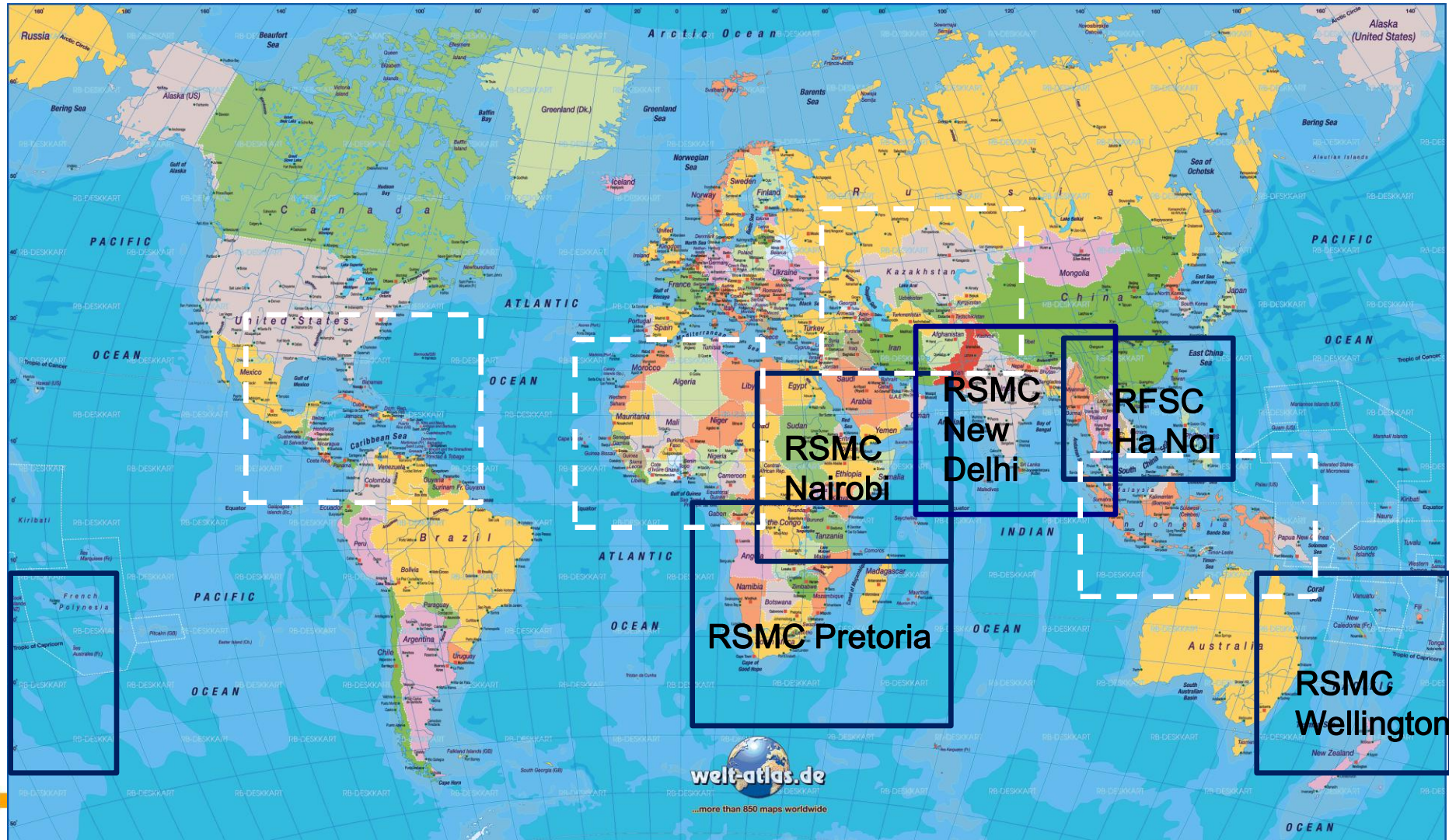
***SWFDP provides a practical and beneficial platform for preparation and dissemination of multi-hazard, early warnings***

## **SWFDP Regional Subprojects**

- ✓ Southern Africa (ongoing; 16 countries; RSMC Pretoria)
- ✓ South Pacific Islands (ongoing; 9 Island States; RSMC Wellington)
- ✓ Southeast Asia (in development, 4 countries; RFSC Ha Noi; start-up Dec 2011)
- ✓ Eastern Africa (in implementation, 6 countries; RSMC Nairobi; start-up Sept 2011)
- ✓ Bay of Bengal (in development, 6 countries; most likely RSMC New Delhi)
- ✓ Others being considered



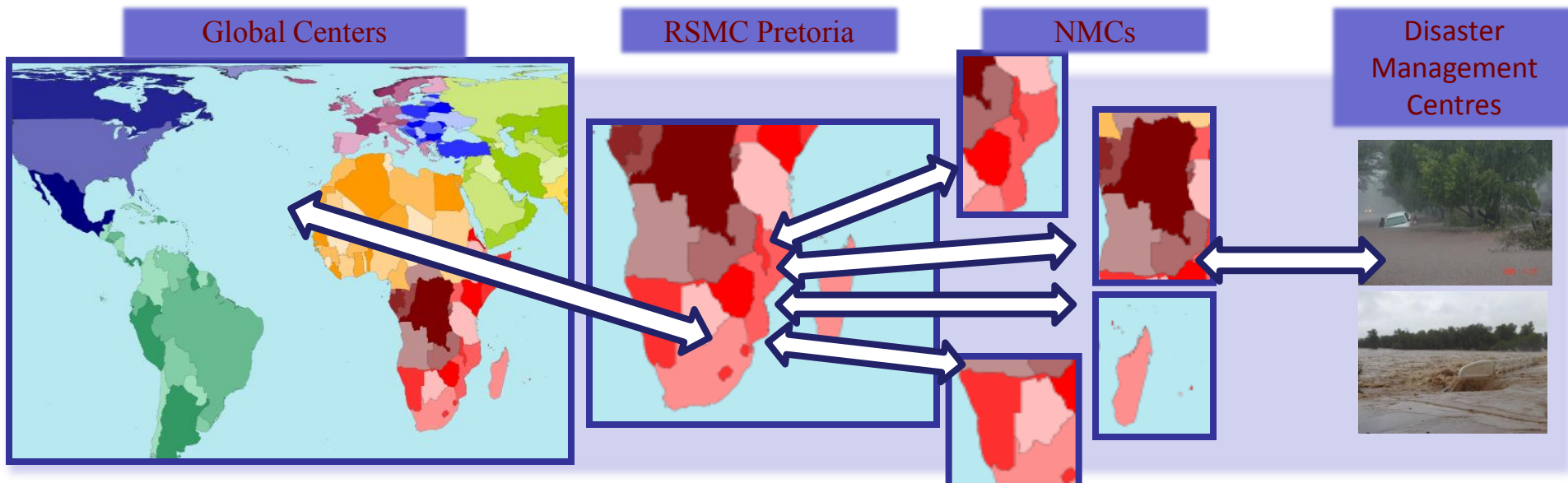
# SWFDP Regional Subprojects / GDPFS Centres





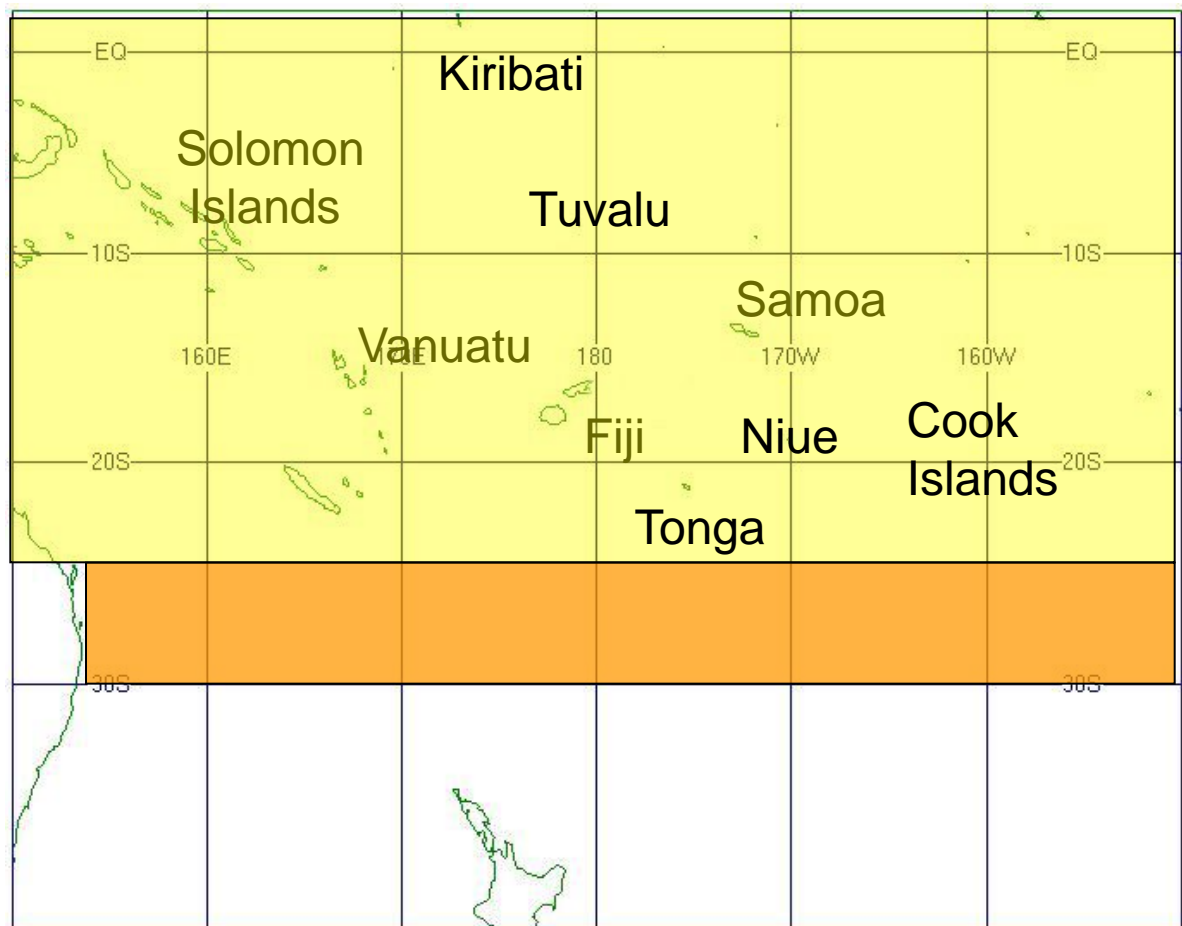
# SWFDP Cascading Forecasting Process

- Global NWP centres to provide available NWP and EPS products, including in the form of probabilities, cut to the project window frame;
- Regional centres to interpret information received from global NWP 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 Disaster Management, 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.





# South Pacific 'Window'

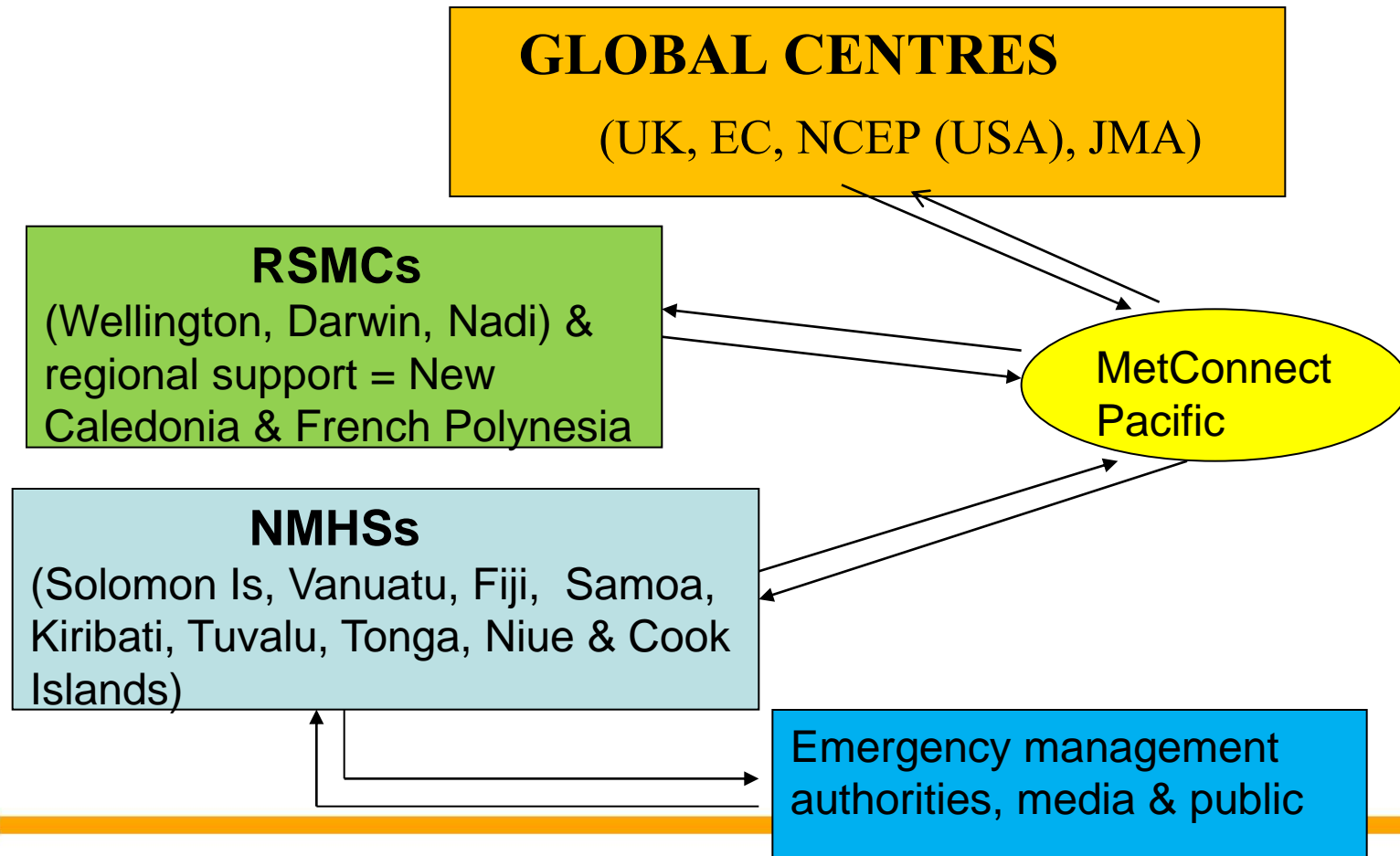


***150°E to 150°W,  
2°N to 25(30)°S***

[Back](#)



# Cascading Forecasting Process





# SWFDP – South-west Pacific

South Pacific Guidance | MetService - MetConnect Pacific / SWFDDP - Windows Internet Explorer provided by World Meteorological

http://www.swfddp.metservice.com/?q=rsmc-wellington-spg

File Edit View Favorites Tools Help

★ Favorites Intranet Web Slice Gallery

South Pacific Guidance | MetService - MetConnect Pac...

METSERVICE

MetConnect Pacific  
SWFDDP

Search

Logged in as: Nairobi Log Out

Global RSMC NMHS Satellite Observations Charts Links Archive Evaluation News Contact

RSMC Wellington RSMC Darwin RSMC Nadi

## South Pacific Guidance

For Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP).  
Issued at: 02:57 28 Apr 2011 UTC  
Valid at: 12:00 27 Apr 2011 UTC  
A trough extending east from the Coral Sea to Southern Vanuatu is becoming more active.

South Pacific Guidance  
... User Help  
Guidelines for RSMC  
... Wellington Lead Forecasters

Marine Warnings

THORPEX: Southern Hemisphere

THORPEX: WMO

Introduction - RSMC

271200-281200UTC  
Large Waves:  
Southsoutheast swell  
2.5-3m, T=13s  
Easing  
Confidence High

Done

Internet 100%



# Examples of products made available through the SWFDP – South-west Pacific

**ECMWF** Home Your Room Login Contact Feedback Site Map Search:

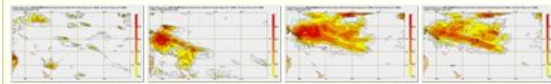
**About Us** Overview Getting here Committees  
**Products** Forecasts Order Data Order Software  
**Services** Computing Archive PrepIFS  
**Research** Modelling Reanalysis Seasonal  
**Publications** Newsletters Manuals Library  
**News&Events** Calendar Employment Open Tenders

Home > Products > Forecasts > Medium range forecast > Special > Severe Weather Forecast Demonstration Project for Pacific (SWFDP) > Ensemble Prediction System

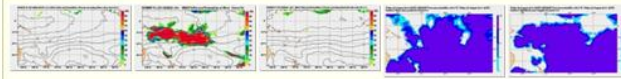
## Ensemble Prediction System

- **Epsgrams:** [Australia](#) [Cook Islands](#) [Fiji](#) [Kiribati](#) [New Zealand](#) [Niue](#) [Samoa](#) [Solomon Islands](#) [Tonga](#) [Tuvalu](#) [Vanuatu](#)
- [Tropical Cyclones](#)

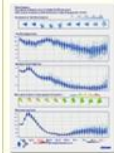
## Extreme Forecast Index



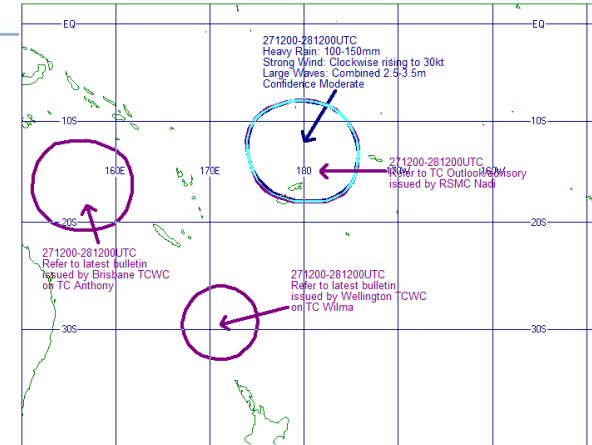
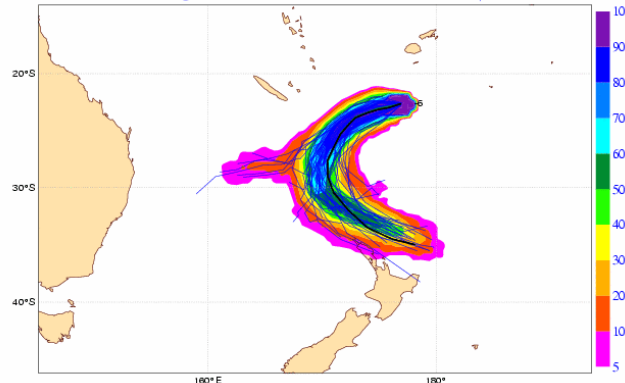
## Probabilities



## Wave products



20110126 0 UTC  
 Probability that WILMA will pass within 120km radius during the next 120 hours  
 tracks: black=OPER, green=CTRL, blue=EPS numbers: observed positions at t+.h



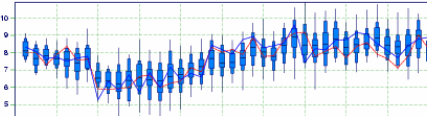
Kiribati - South-West of Christmas Island Fri 26 Aug 2011 00UTC

Wave Epsgram  
 Kiribati (South-West of Christmas Island) 0.08°N 158.06°W (EPS see point)  
 Deterministic Forecast and EPS Distribution Friday 26 August 2011 00 UTC

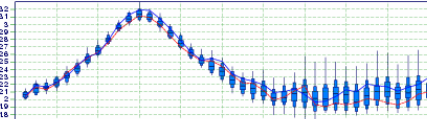
Distribution of 10m Wind Direction



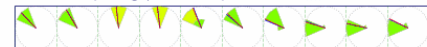
10m Wind Speed (m/s)



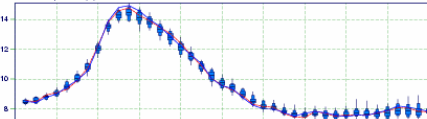
Significant wave height (m)



Mean wave direction ( oceanographic convention )



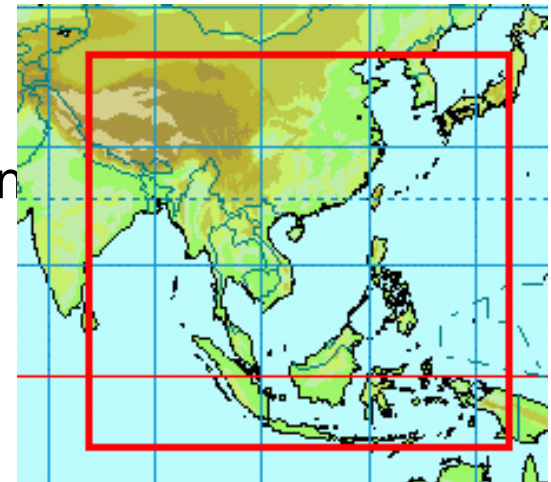
Mean wave period (s)





# SWFDP – Southeast Asia (status/progress)

- ✓ Project develop in progress (draft Implementation Plan available at: [http://www.wmo.int/pages/prog/www/CBS-Reports/documents/Report\\_SWFDP-SeA\\_IP\\_Sep2010.pdf](http://www.wmo.int/pages/prog/www/CBS-Reports/documents/Report_SWFDP-SeA_IP_Sep2010.pdf))
- ✓ Focus on strong winds and heavy precipitation (mainly TC-related) and associated hazards (e.g. flooding, landslides, storm surges, swell)
- ✓ Domain: 10° S, 40° N, 80° E and 140° E
- ✓ Global Centres: CMA, JMA and KMA (NWP guidance material)
- ✓ Regional Centres: Viet Nam (Regional Forecasting Support), RSMC Tokyo and RSMC New Delhi (TC forecasting support), and HKO (training and technical support)
- ✓ National Met. Centres: Cambodia, Lao PDR, Thailand and Viet Nam
- ✓ Start-up Dec 2011





# SWFDP – Southeast Asia



World Meteorological Organization

## Regional Specialised Meteorological Center (RSMC) Ha Noi



NCHMF

National Center for Hydro  
Meteorological Forecasting

Logout

Note: The webpage is under-developing and some materials are testing

### Guidance Products

Short-range (1-2 days)

Medium-range (3-5 days)

### Satellite-based 0-24 Hour Products

Global NWP Products

Global EPS Products

Regional NWP Products

Regional EPS Products

Tropical Cyclone Products

Training Website

RSMC Guidance Archive

air dados de www.swfdp-sea.com.vn...

Issue Date:

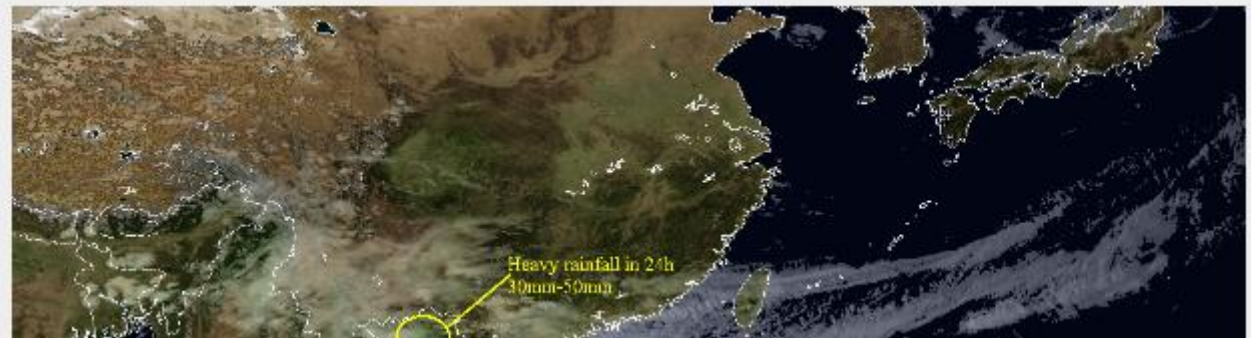
Reload

1st Map

2nd Map

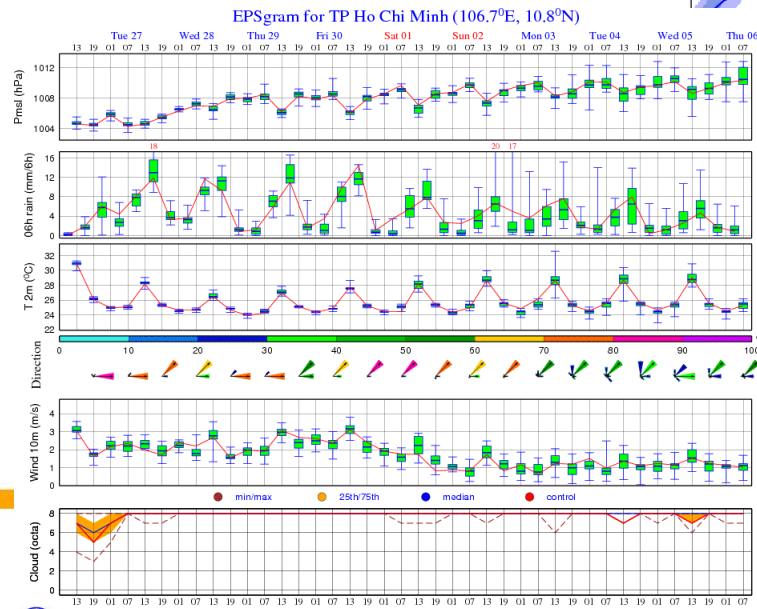
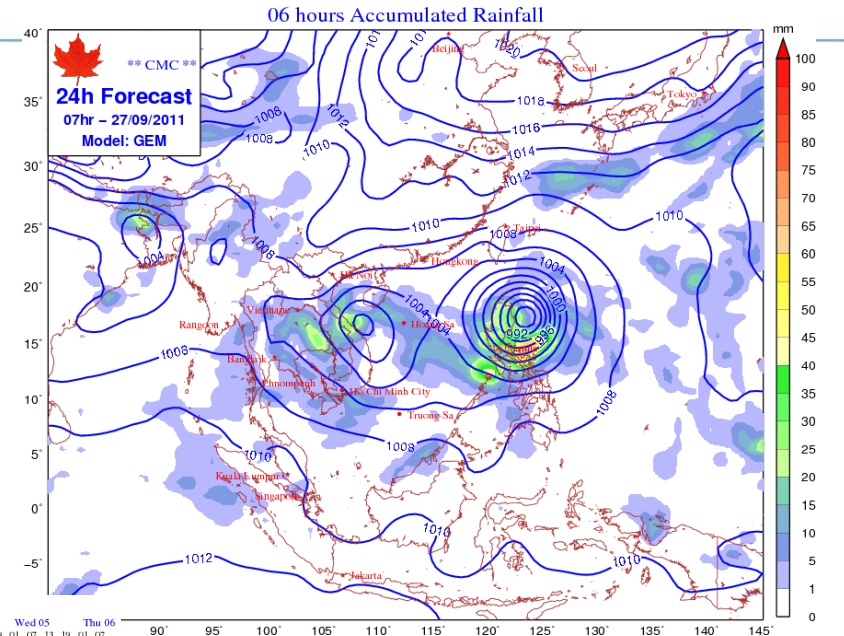
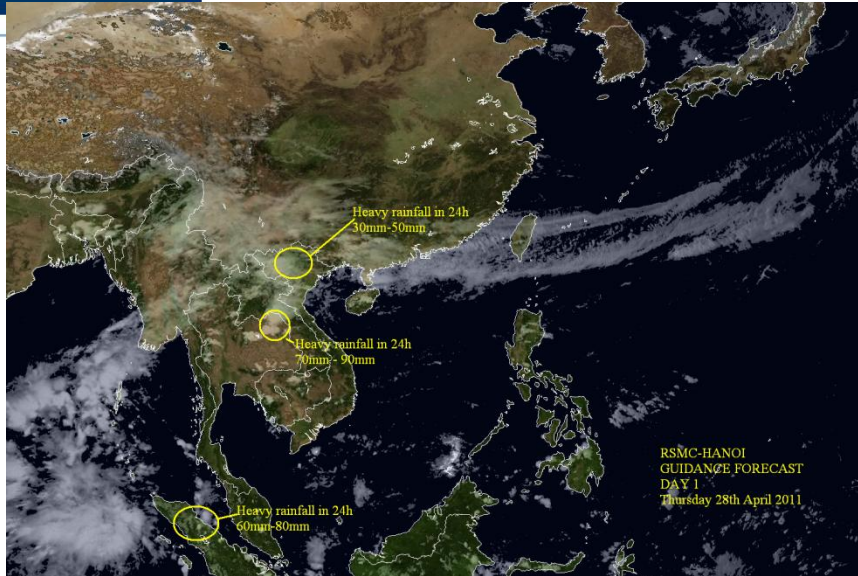
Risk Tables

Discussion





# Examples of products made available through the SWFDP – Southeast Asia





# **SWFDP for South Asia**

---

**WMO- RIMES Collaborative Regional Project  
Supported by UN ESCAP**

**“Reducing risks of tsunami, storm surges, large waves  
and other natural hazards in low elevation coastal zones”**

**Approach to Improve Forecasting Capabilities to  
Generate Location-Specific, Tailored Warning Information  
for User Communities (Project Activity 4)**

**Target: Bangladesh, India, Maldives, Myanmar,  
Sri Lanka, Thailand**

---



# Project Activity 4

## **WMO Approach to Improve Forecasting Capabilities to Generate Location-Specific, Tailored Warning Information for User Communities (Project Activity 4)**

### **4. Capacity building for the generation of location-specific warning information products**

4.1 Analysis of available global NWP/EPS, and satellite-based products, including those for marine forecasting, and enhance capacity of a suitable WMO Regional Centre, to provide daily severe weather and related forecasting guidance

4.2 Data and products assessment for generating location-specific disaster risk information products

4.3 Evaluation of selected NWP/EPS, and satellite-based products, including those for marine forecasting, and definition of the guidance products to be made available by the WMO Regional Centre, through the project

4.4 Downscaling for high-resolution location-specific disaster risk information

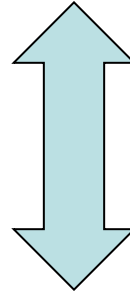
4.5 Training NMHSs in generation of tailor-made location-specific disaster risk information



# Project Activity 4

---

**WMO Approach to Improve Forecasting Capabilities to Generate  
Location-Specific, Tailored Warning Information for User  
Communities (Project Activity 4)**



**Severe Weather Forecasting Demonstration Project  
(SWFDP)**

---



# SWFDP links and synergies

Flash Flood  
Guidance

HWR

AgM, MMO,  
AeM, etc.

Tailored Forecasting  
Products for Specialized  
Applications

PWS

Global Centres

Global NWP/EPS and  
Sat-based products

RSMCs-TC

TC

Regional Centre

Guidance  
Products  
(risk/probability)

National Met Centres  
(Forecast D / D+5; Bulletins)

Specific Comm. Systems

SMS; Weather Radio  
Systems; Public Web; etc.

E-mail; etc.

Media

Radio; TV

General Public  
and spec. users  
(Agriculture,  
Fisheries,  
Marine Safety,  
Aviation, etc.)

Specific Communication  
Systems

Disaster  
Management  
and Civil  
Protection

GDPFS

WWRP

Research Projects

WMO SP

Satellite Imagery  
and Tools



# World Meteorological Organization



A United Nations Specialized Agency  
Working together in Weather, Climate and Water



# *Thank you!*