# Severe Weather Forecasting Demonstration Project (SWFDP) : Bay of Bengal

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INDIA METEOROLOGICAL DEPARTMENT

# *Severe Weather Forecasting Demonstration Project (SWFDP)*

## *SWFDP Main Goals*

- ✓**Improve Severe Weather Forecasting**
- ✓**Improve lead-time of Warnings**
- ✓**Improve interaction of NMHSs with users: media, disaster management, civil protection authorities, public**

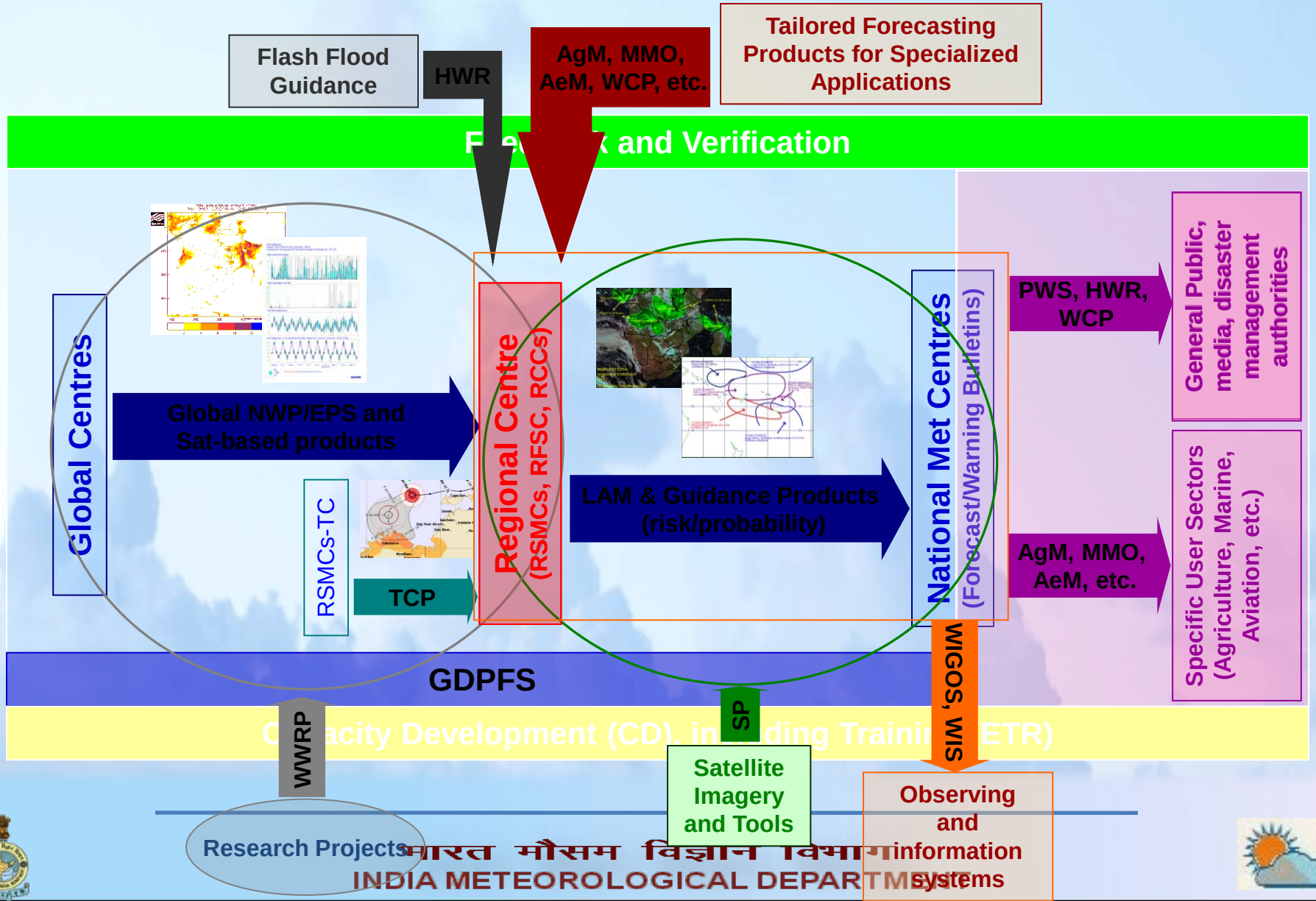
## *SWFDP Regional Subprojects*

- ✓**Southern Africa (ongoing; 16 countries; RSMC Pretoria, RSMC La Réunion)**
- ✓**Southwest Pacific Islands (ongoing; 9 Island States; RSMC Wellington, RSMC Fiji)**
- ✓**Eastern Africa (ongoing, 6 countries; RSMC Nairobi, RFSC Dar)**
- ✓***Southeast Asia (in development, 4 countries)***
- ✓***Bay of Bengal (in development, 6 countries)***

# SWFDP Cascading Forecasting Process

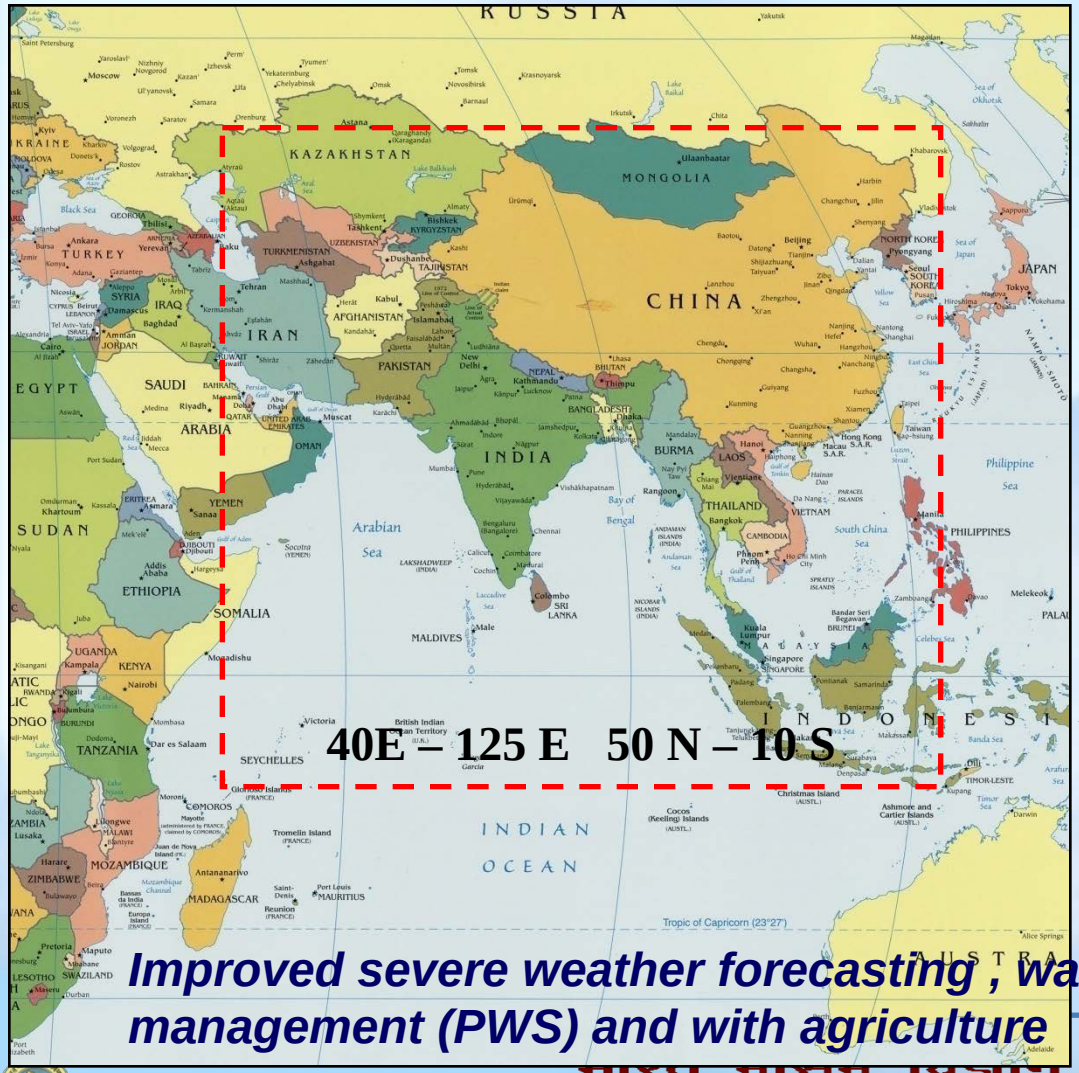
- ***Global NWP*** **centres to provide available NWP/EPS and sat-based products, including in the form of probabilities, cut to the project window frame;**
- ***Regional centres*** **to interpret information received from global centres, prepare daily guidance products (out to day-5) for NMCs, run limited-area 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: a cross-cutting activity involving multiple Progs, concerning prediction of hydro-meteorological hazards



# SWFDP – Bay of Bengal

***Focus: Coastal communities and activities***




- Bangladesh
- India
- Maldives
- Myanmar
- Sri Lanka
- Thailand
- Bhutan (later)
- Nepal (later)
- Afghanistan (later)
- Pakistan (later)

*Severe Weather from TCs, severe thunderstorms and monsoon:*
Heavy precipitation, Strong winds
Large waves / swell, Storm Surge

***Improved severe weather forecasting , warning services to disaster management (PWS) and with agriculture***

# Targeting severe weather events

**Recognizing regional dominant and common hazardous weather conditions and associated impacts (such as flooding, drought, high waves and swell etc), SWFDP-BoB project shall focus on the following severe weather events in order of decreasing priority**

- **Heavy rain (due to tropical cyclone, thunderstorm, monsoon, etc) /flooding;**
- **Strong winds (due to tropical cyclone, thunderstorm, monsoon, etc);**
- **Deficit of precipitation/dry spells;**
- **High waves / swells;**
- **Storm surge;**
- **Heat waves and cold waves / frost;**
- **Fog;**

# Targeting severe weather events

- The following thresholds values shall be used in the RSMC Daily Severe Weather Forecasting Guidance:
- Heavy rain
  - 50mm
  - 100mm
    - Strong winds
  - 17 knots
  - 34 knots
- High waves / swells
  - 2.5 m
    - Storm surge
  - 1 m

# SWFDP – BOB : Global Centres

**The following Global centres will provide NWP/EPS products to regional centre**

**IMD (NWP, Satmet) , NCMRWF, INCOIS, , IITM**

**NCEP, USA**

**ECMWF, UK**

**UKMO, UK**

**JMA, Japan**

# Project Implementation : Gobal Centres

- to provide the other centres with medium-range NWP guidance and EPS output including probabilistic products specially adapted to the concerned severe weather events;
- to tailor products to the requirements of the Regional Centres including the provision of sub-domain and probabilistic products.
- to suggest suitable existing satellite imagery and satellite based products that are helpful in assessing the current meteorological situation, and therefore also assess the quality of global NWP/EPS products;
- to maintain a dedicated Web site to provide satellite, NWP guidance and EPS products;
- to evaluate the efficiency of products dedicated to medium-range severe weather forecasting through the feedback provided by the other centres.

# Role and Responsibility of Global centre and RSMC

- ***The lead person for each participating Global Centre and RSMC will be responsible for:***
- **coordinating all aspects of project implementation and execution at their respective centres;**
- **evaluating possible data-processing developments (e.g. work required to adjust or tailor NWP products);**
- **arranging for verification of products from his/her global centre.**

# RSMC Daily Severe Weather Forecasting Guidance

- **Daily Severe Weather Forecasting Guidance should be issued by RSMC New Delhi once per day at 0800UTC to indicate the likelihood of severe weather occurrence. It will have five parts**
- **a short range (up to 48 h) guidance, including the risk-table, and a medium range (up to 5 days) guidance.**
- **This guidance contains:**
- **Synopsis of weather (analysis and forecast);**
- **the interpretation of deterministic and ensemble NWP products from the Global and Regional Centres;**
- **severe weather predictions (risk or probability estimates) including tropical cyclone information and storm surge**

# Project Implementation : National Centre

**The responsibilities of the National Meteorological Centres of the NMHSs are:**

- **to interpret the guidance provided by the global centre and the regional centre;**
- **to issue special bulletins and warnings as required by the users (hydrological services, Disaster Management Civil Protection Authorities (DMCPA) services, media…) for dissemination to the end users when severe weather is expected;**
- **to use available nowcasting tools (satellite imagery or satellite based products, radar products) to update warnings;**
- **to exchange information on warnings between participating NMHSs, and between NMHSs and RSMC;**
- **to provide regional and global centres with a feedback on the efficiency of the global and regional products;**
- **to develop a communication strategy and plan with the media and end users to ensure effective response when warnings are issued;**
- **to establish contacts with DM services and end users prior and during severe weather events;**

# Project Implementation : National Centre

- to obtain feedback from media, the public and other users as appropriate after the event (opportunity of warning, usefulness of warnings, lead time, degree of impacts)
- to obtain feedback from the disaster risk management agencies on utilization/benefits of warnings issued by NMHSs (under the SWFDP);
- to prepare a compiled report on the severe weather events that contains all the data needed to perform the evaluation of both RSMC Daily Severe Weather Forecasting Guidance relevant to the country, and actual warnings issued by NMHSs;
- to evaluate the warnings;
- to develop training to facilitate improved communication with the users;
- to develop a generic basic set of standard operational procedures between a NMHS and disaster risk management agencies to ensure effective use of the SWFDP products.

# *regional PWS representative Responsibility*

- promote the awareness of the SWFDP-BoB to stakeholders (disaster management centre, agriculture and fisheries sectors, media and the public), including through existing forums and organizations;
- enable and assist staff of participating NMHSs to build effective dialogue with stakeholders for service provision;
- in liaison with stakeholders, identify improvements and changes to products for consideration of the NMHSs' forecasting team;
- advise participating NMHSs on methods of evaluation of public forecasts and warnings and their use by stakeholders.
- **Each of the participating NMHSs are requested to involve their respective national PWS focal point nominated at the invitation of WMO in the SWFDP-BoB to also act as the PWS focal point for the project. Where such a national focal point has not been nominated yet, the NMHSs concerned are invited to do so and inform the Secretariat.**

# swfdp-bob WEB PORTAL - home page

Inbox (475) - cwdhq2008 | IMD - Intra IMD Portal | India Meteorological Dep | 202.54.31.51/mme/fdp-bc

202.54.31.51/mme/fdp-bob/short-rangepro.php

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

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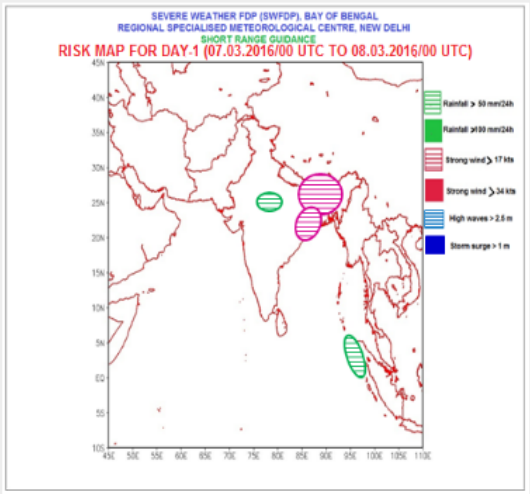
Guidance Prod. | Satellite | Global/Regional NWP Prod. | Global EPS Prod. | Ocean Forecast | BOB-NWS Links | SWFDP-BOB & RSMC Links

SWFDP-BOB Guidance Products (1-2 days) (click to download the file)




Disclaimer : The country boundaries shown here do not necessarily correspond to the political boundary

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# swfdp-bob WEB PROTAL ....
# Available links:

## SATELLITE:

- INSAT-3D imageries
- QPE products
- INSAT-3D Nowcast products
- SCOPE Nowcast products

## NWP:

- IMD
- NCMRWF
- JMA
- NCEP
- ECMWF
- IITM
- UKMO

## EPS:

- NGEFS WIND
- NGEFS RAIN PROB
- NGEFS EPS GRAMS

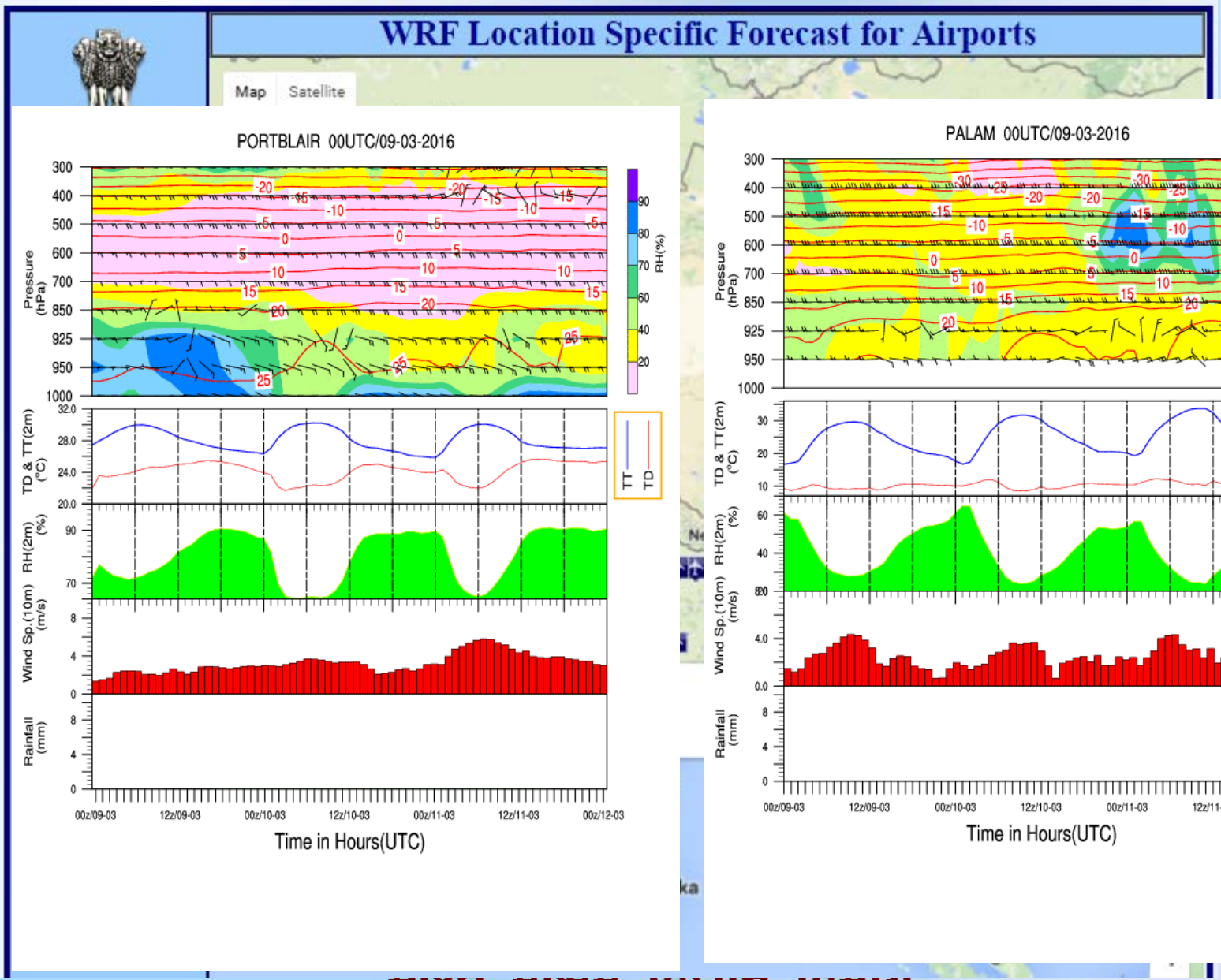
## BOB-NMHSs:

- INDIA
- BANGLADESH
- MYANMAR
- MALDIVES
- SRI LANKA
- THAILAND

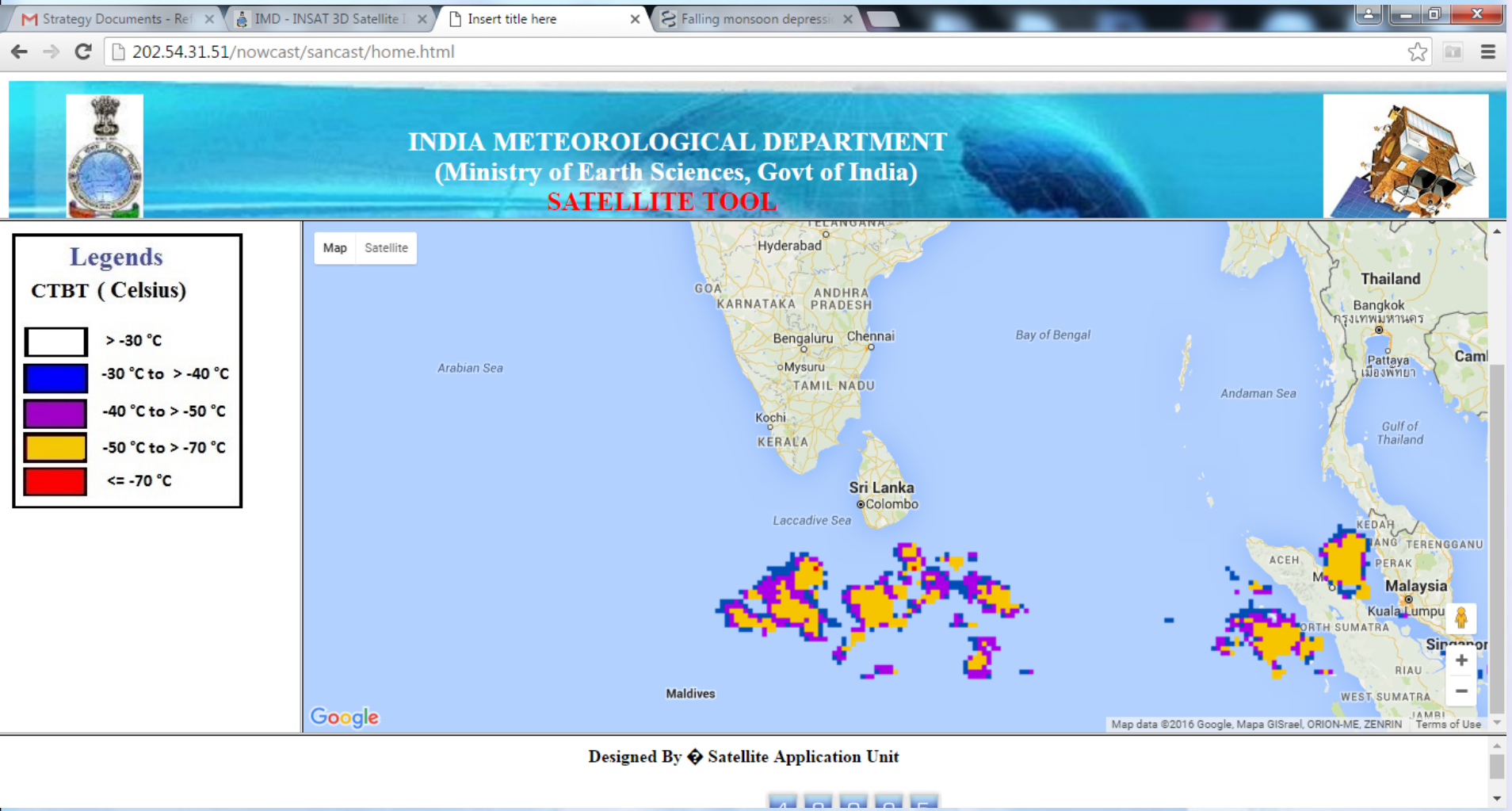
## OCEAN FORECASTS:

- INCOIS

# LINK TO IMD-WRF Meteograms



# LINK TO SATELLITE BASED NOWCAST PRODUCTS

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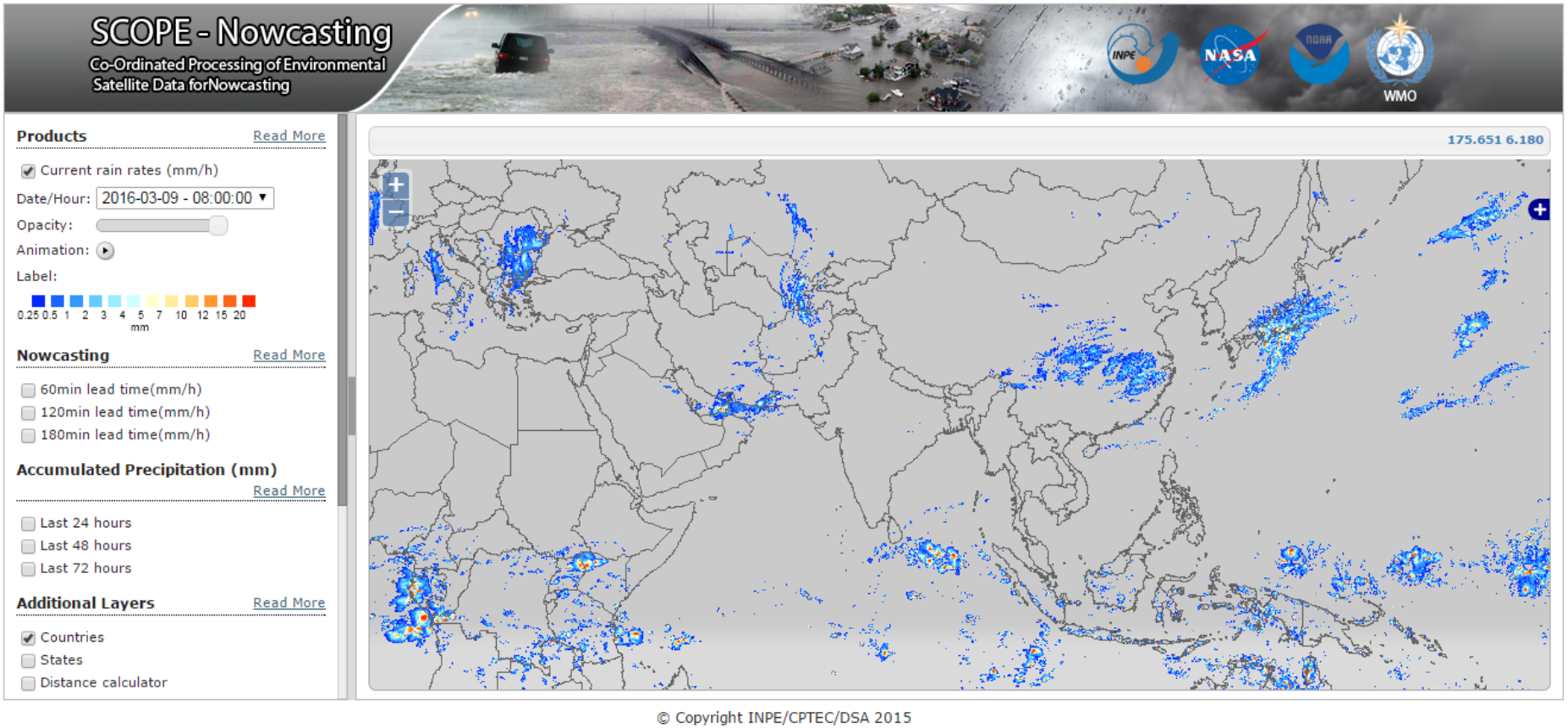
# Link to SCOPE-NOWCAST page




http://sigma.cptec.inpe.br/scope/

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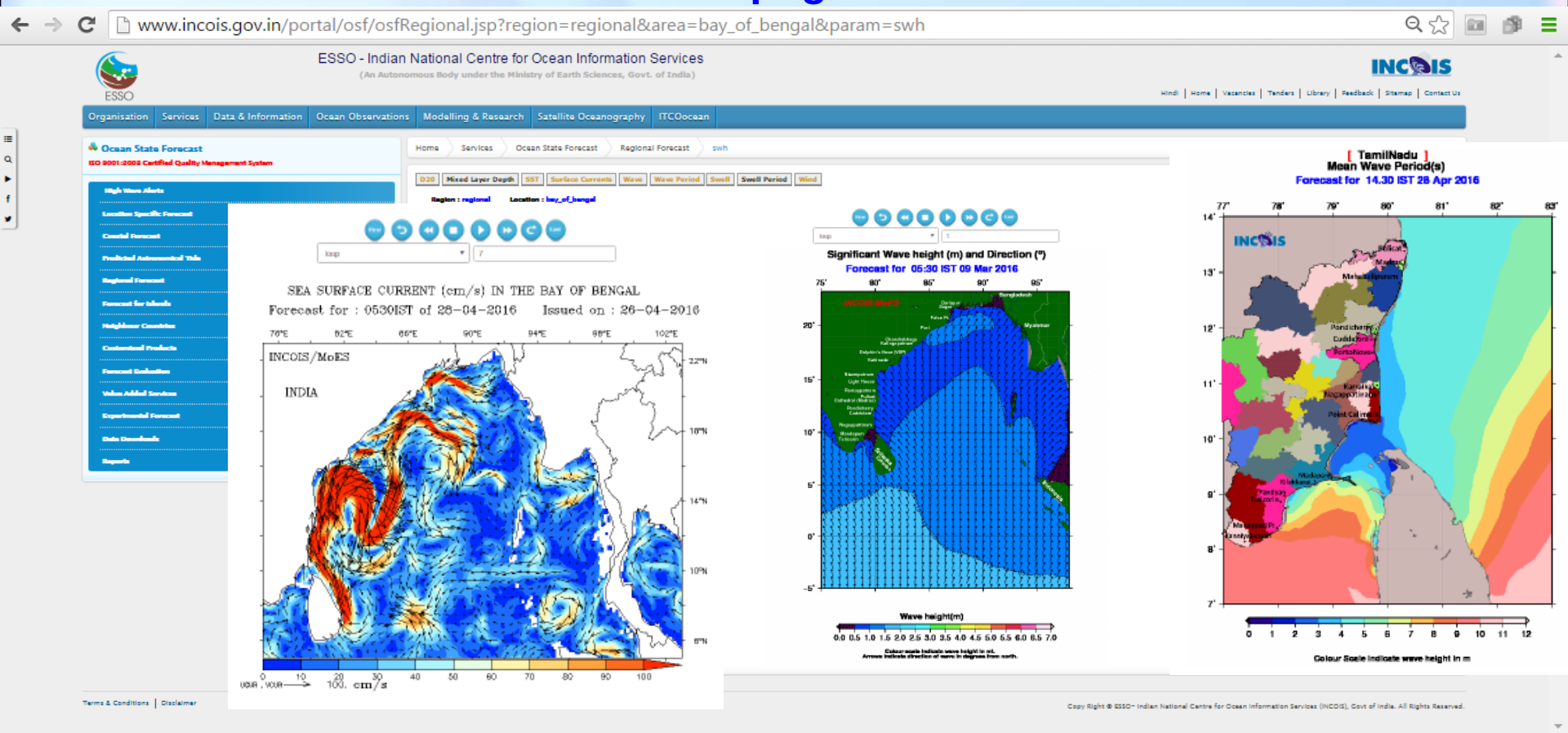
# INCOIS-OCEAN FORECAST PRODUCTS

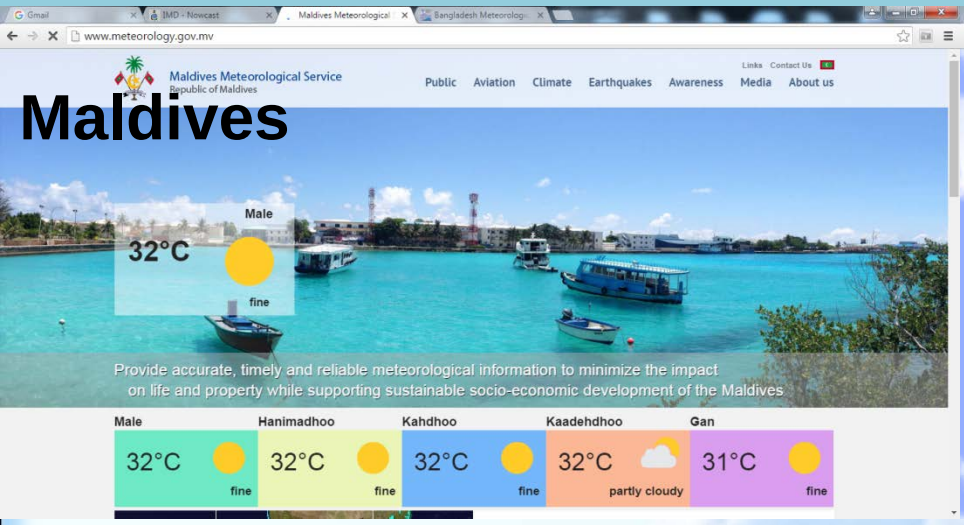
✓ **Linked to SWFDP-BOB web page**



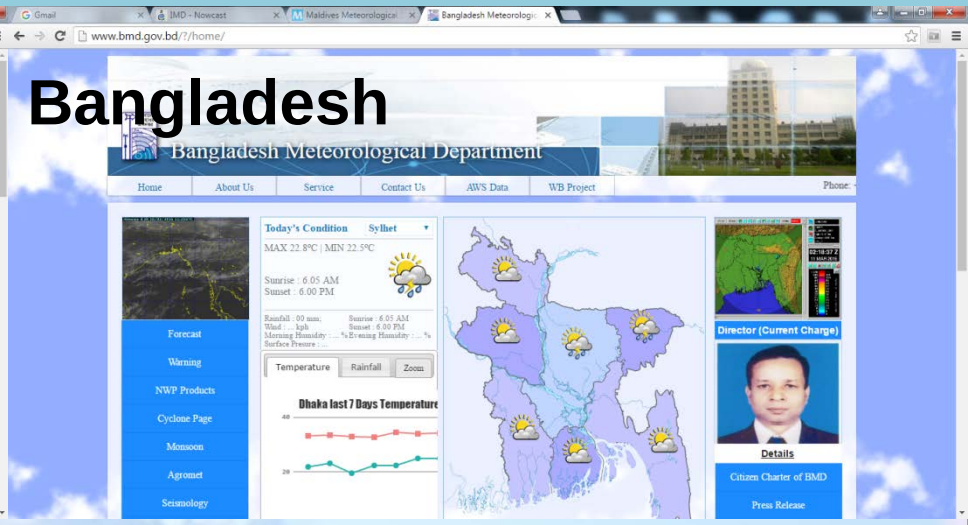

**High Wave Alerts,**
**Ocean State forecasts: Wave height, wave period & wind forecasts**
**Coastal forecasts**
**BOB SST, D20, Sea surface current etc.**

# LINKS TO NMHS

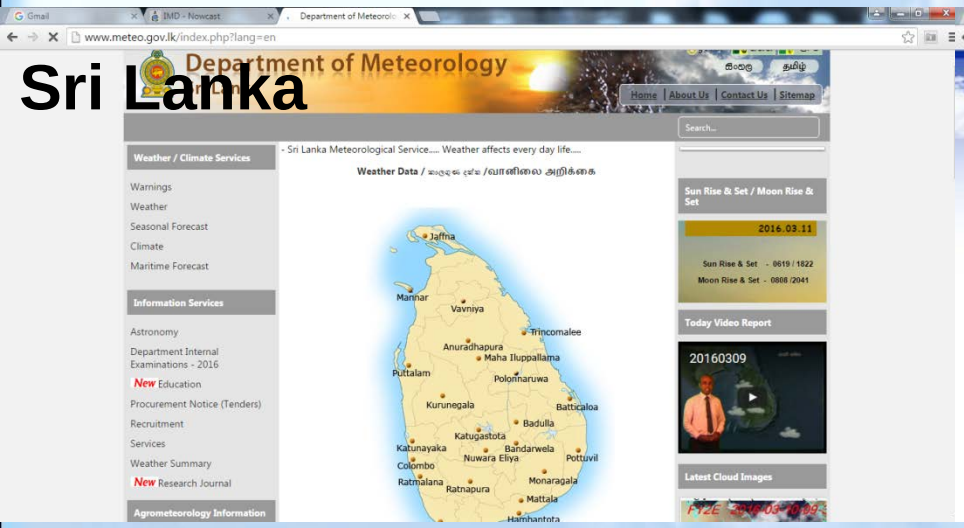
## Maldives



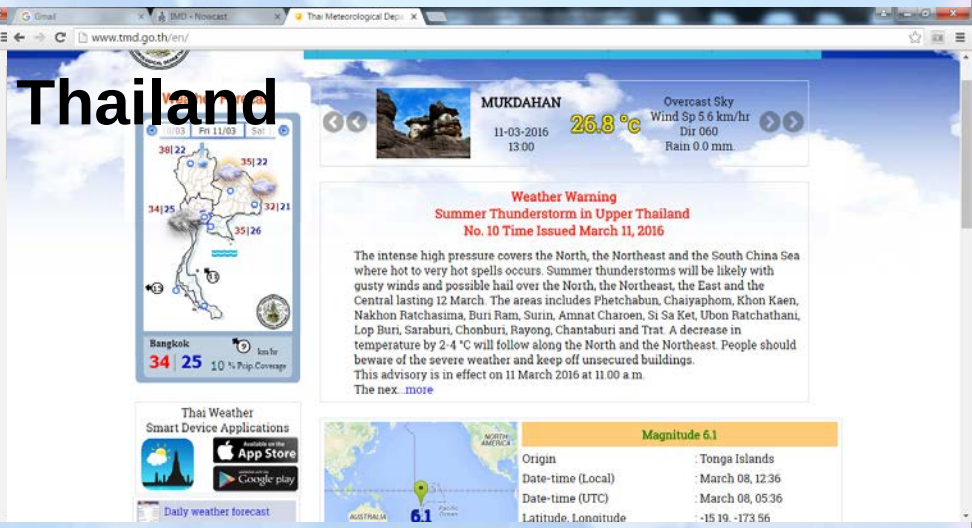

## Bangladesh




## Sri Lanka



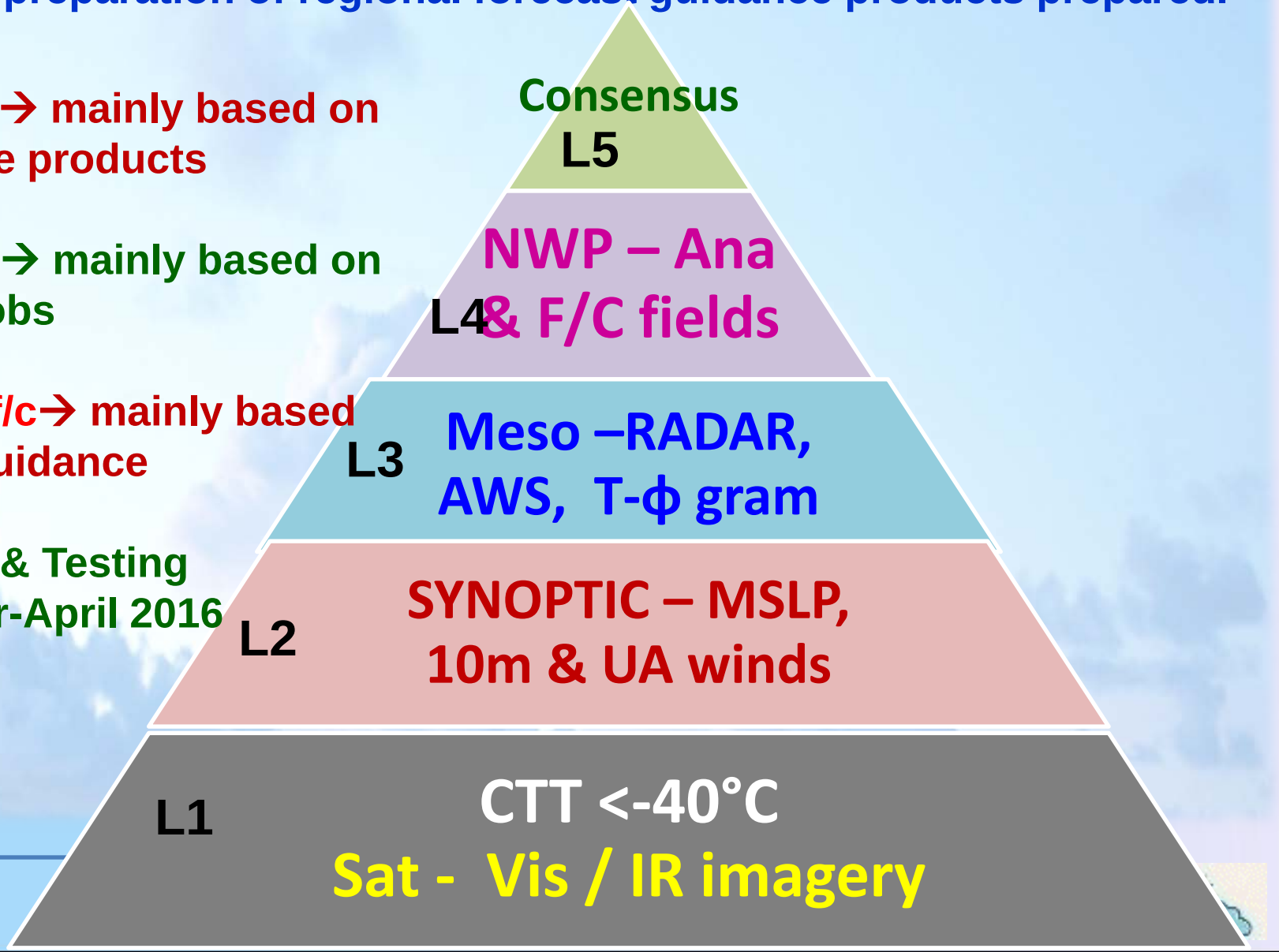

## Thailand



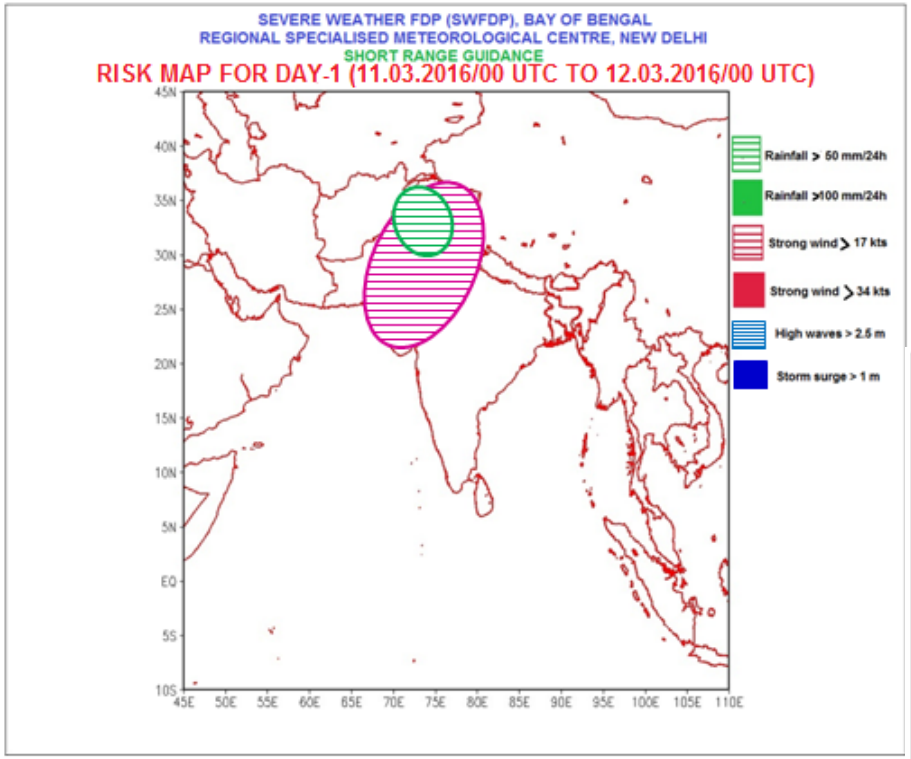
# SOP for preparation of regional forecast guidance products

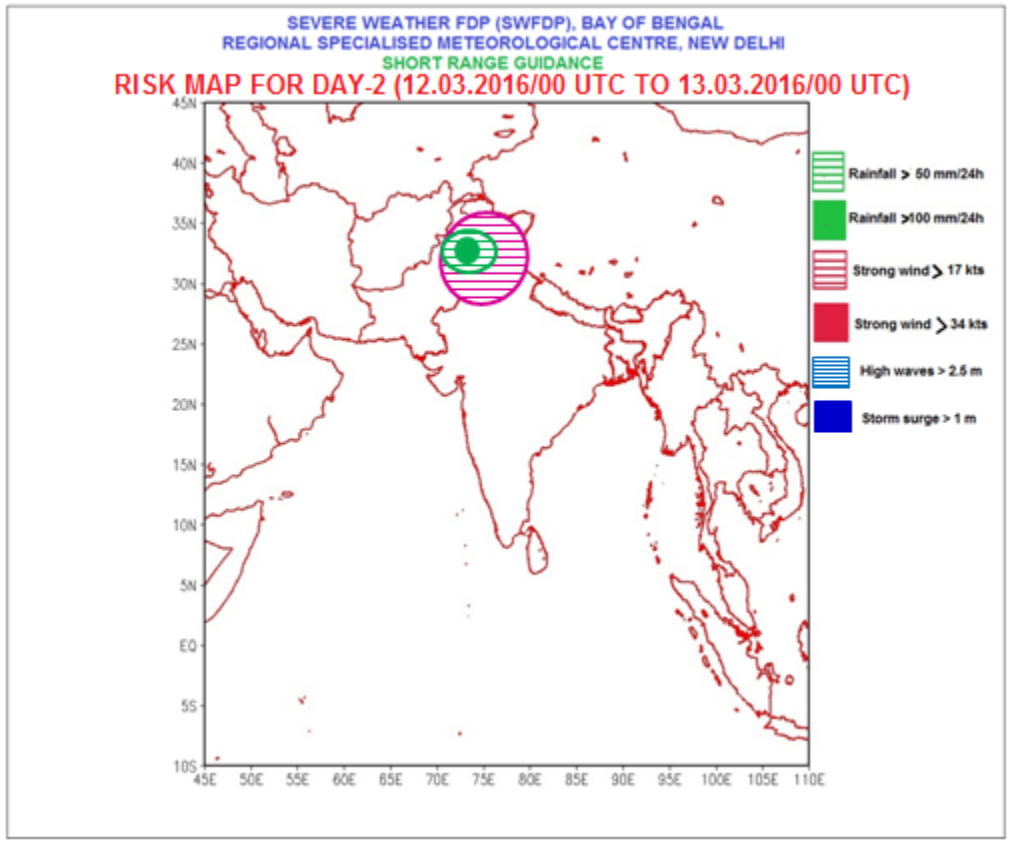
- SOP for preparation of regional forecast guidance products prepared.

- Nowcast→ mainly based on Meso scale products
- Day-1 f/c→ mainly based on Synoptic obs
- Day-2-5 f/c→ mainly based on NWP guidance
- Training & Testing during Mar-April 2016

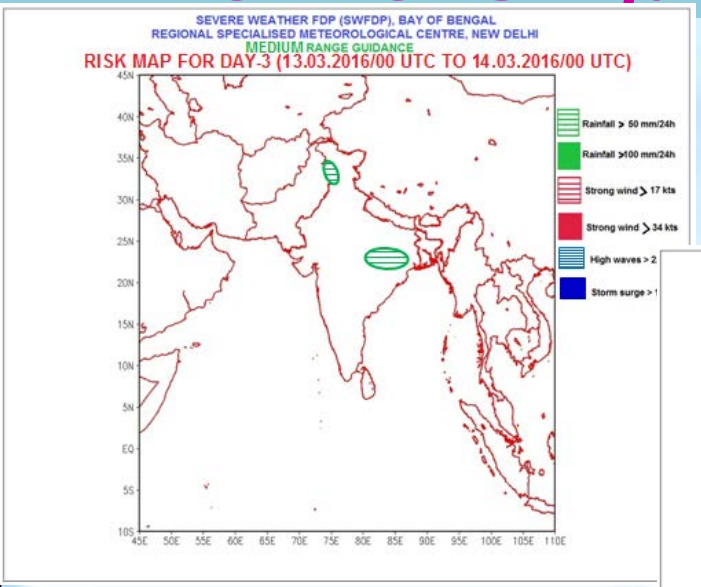


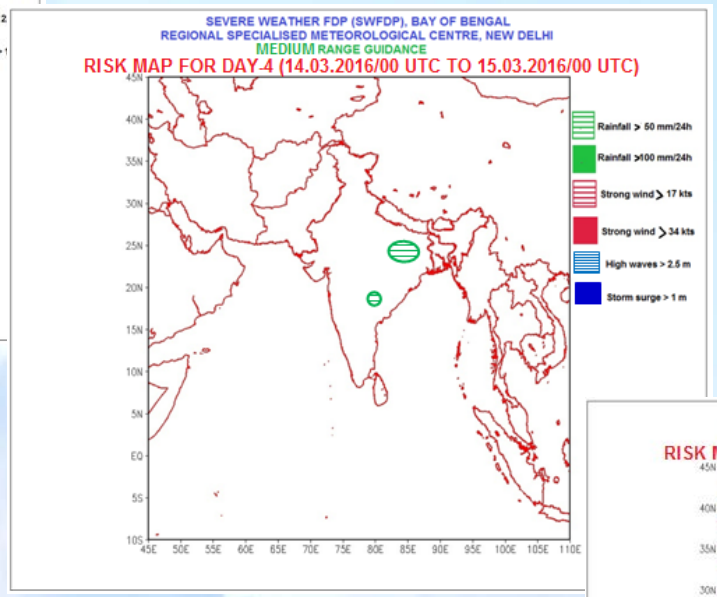
# Sample Short range FORECAST guidance : Day-1 & day-2

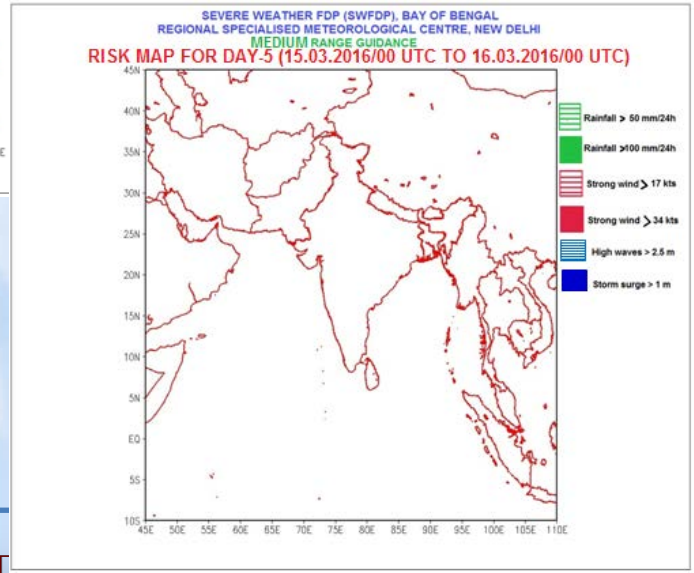


# SAMPLE MEDIUM range FORECAST guidance : Day-3, DAY-4 & day-5



# Initiation and training

- 1st training workshop on Severe Weather Forecasting and Warning Services (GDPFS/PWS) was held in Macao, China during 8-19 April, 2013 - jointly organised for SWFDP-BoB and SWFDP- Southeast Asia.

- 2nd training was organised in Bangkok, Thailand during 14-19 September, 2015.

- Further training programmes will be planned as and when suggested by WMO

# Thank you