Meteorological Component
Sri Lanka

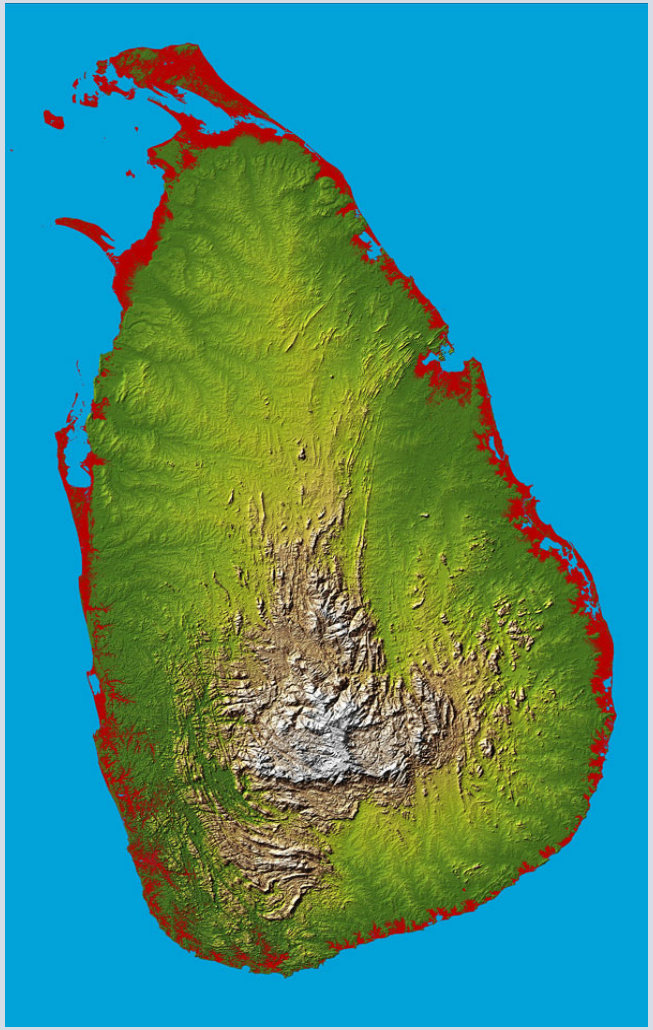
First Steering Committee Meeting of South Asia Flash Flood Guidance system Project(SAsiaFFG)
26-28 April 2016,India

Anusha Warnasooriya
Department of Meteorology
Sri Lanka

Contents

- Climate of Sri Lanka
- Roll of Department of Meteorology in Sri Lanka
- Current meteorological networks
- Local capacity for weather forecasting and nowcasting
- Organizational structure and human resources

Topography and Climate



- **Topography:**

  Mountains are confined to the Central parts of the Island

  (Maximum height-Pidurutalagale –2524m)

- **Average Rainfall – 1860 mm/year**

  Range of rainfall - 950 – 6000 mm

- **Mean Temperature – 27.5 C (lowlands)**

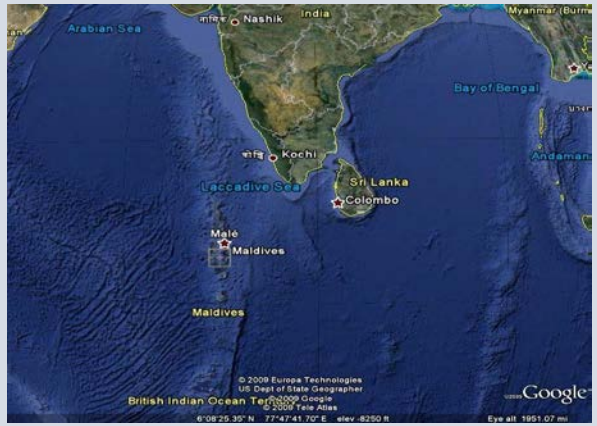
  Lower Temperatures in the highlands

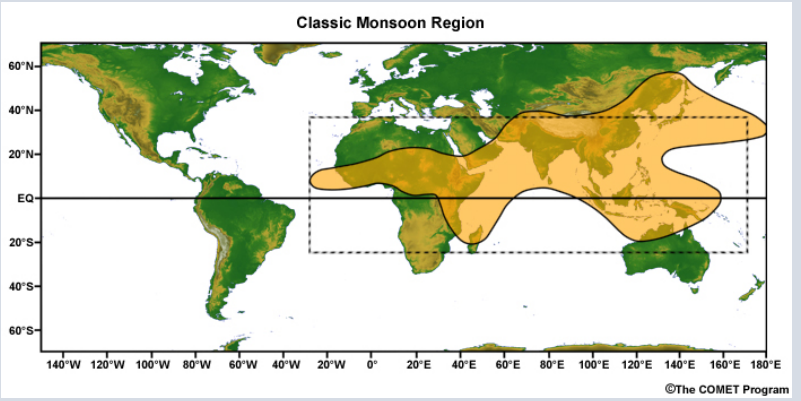
- **Mild Climate-Four Climatological seasons**

Climate of Sri Lanka

Tropical and Monsoonal

1). Sri Lanka is an island in the tropics

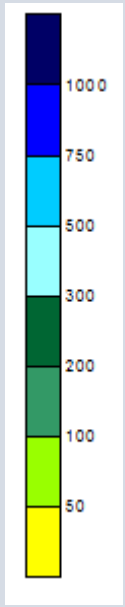




Four Climate Seasons

First Inter-monsoon (FIM)	**March-April**
Southwest Monsoon (SWM)	**May – September**
Second Inter-monsoon (SIM)	**October-November**
Northeast Monsoon (NEM)	**December-February**

Contribution for rainfall during Four Seasons



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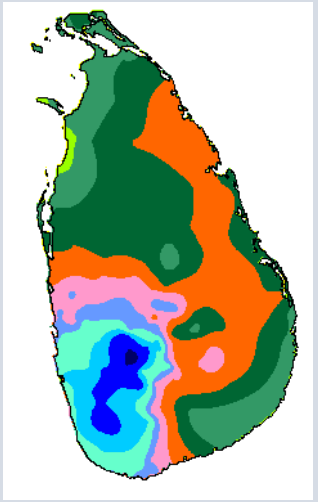

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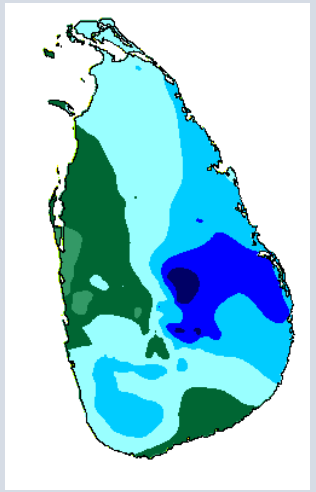

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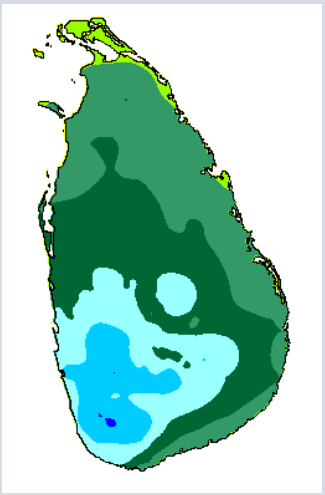

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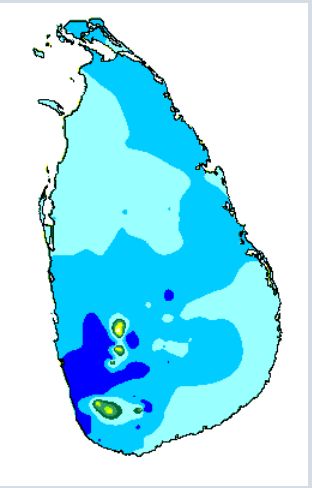
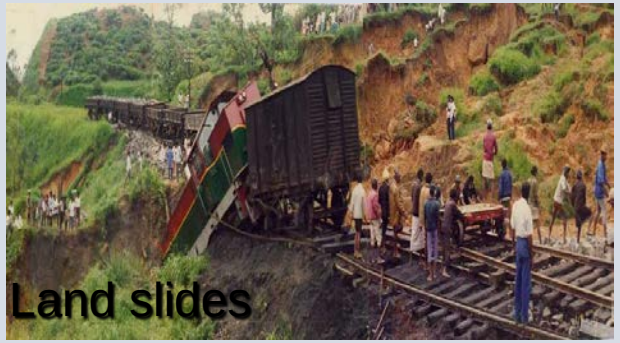
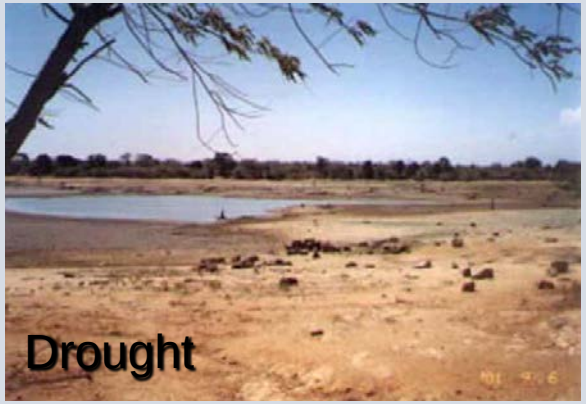


SEASON	*Southwest Monsoon*	*Northeast Monsoon*	*First Intermonsoon*	*Second Intermonsoon*
PERIOD	May-Sep	Dec-Feb	Mar-Apr	Oct-Nov
RAINFALL	546 mm	459 mm	260 mm	548 mm
	Varies between 100 to over 3000 mm	eastern slopes at approx. 1400 mm	excess of 250 mm	SW slopes of hills 750-1200 mm

Natural Disasters in Sri Lanka



Tsunami



Recently observed weather related hazards

- More Flood events than Droughts events

year	Hazard
2010	Flood
2011	Flood/Drought
2012	Flood/Drought
2014	Flood/Drought
2015	Flood

Early Warning Process – Sri Lanka

Separate agencies are responsible for early warning in the case of different disasters.

Disaster	Responsible for Early Warning
Cyclones and Weather related disasters	Department of Meteorology
Floods	Irrigation Department
Landslides	National Building Research Organization
Tsunami	Department of Meteorology and Geological Survey and Mines Bureau
Earthquakes	Geological Survey and Mines Bureau

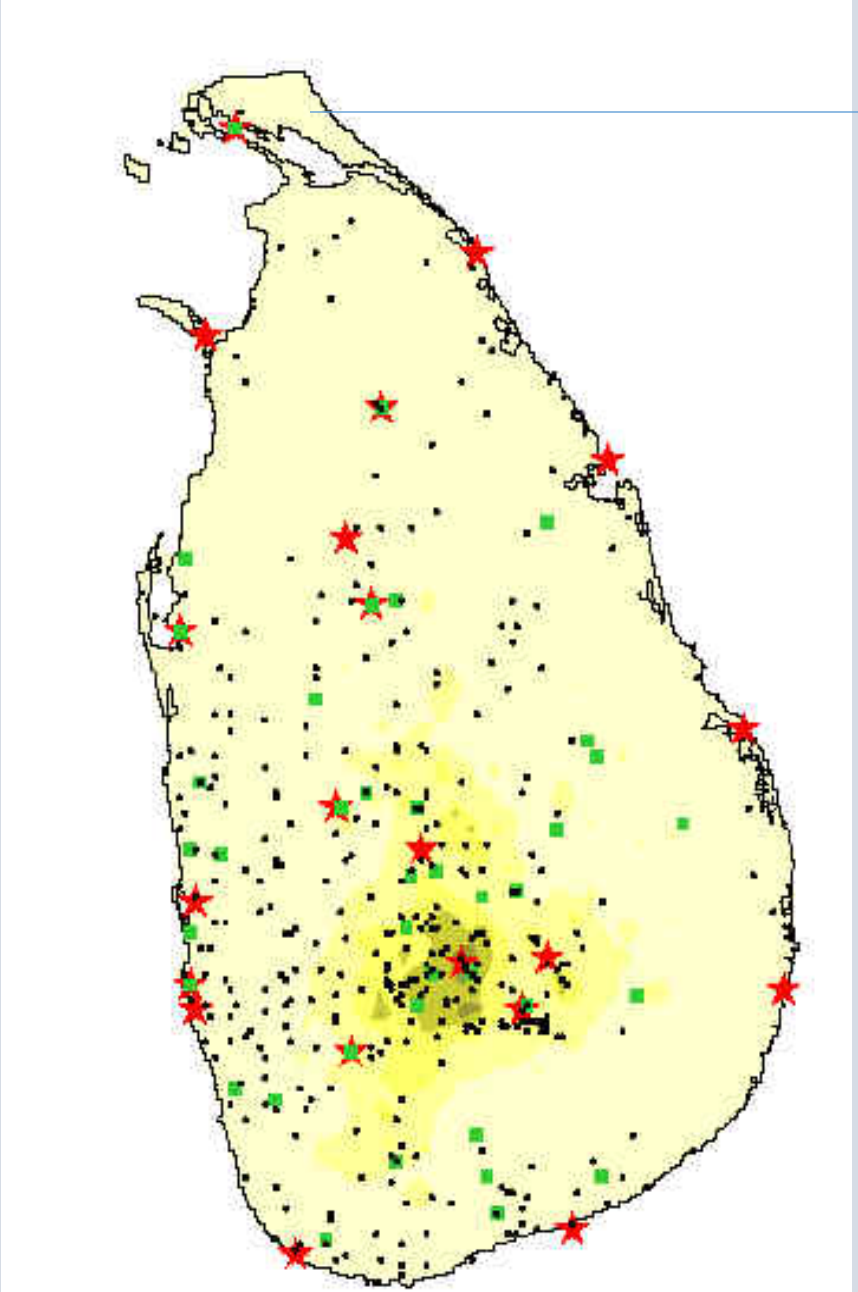
Our Objectives

- **To Provide a weather service to the general public, the agricultural and energy sectors, fishery, shipping and other interested parties.**
- **To provide climatological and agro-meteorological services**
- **To provide a weather services to national and international aviation in accordance with the technical regulations stipulated by WMO and ICAO.**
- **To encourage study and research in meteorology, climatology, climate change and allied subjects.**

Significant Historical Milestones in Meteorological Activities in Sri Lanka:

- Meteorological Activities in Sri Lanka started in mid 1860s with the establishment of a network of rain gauges
- Aviation Meteorological Activities started in 1946
- Establishment of the Department of Meteorology in 1948
- A member state of the WMO in 1951
- Establishment of an Agro-meteorology Division in 1973

Current Meteorological Observations network



Principal Meteorological Stations	23
Agro meteorological Stations	38
Rain gauge Stations	Around 520

1. **Data Format-Excel/Text/CSV**
2. **Some station's rainfall data available more than 100 years**

- Synoptic Data
  - 3 hourly data from local synoptic stations (21 stations)
  - 1 hourly data from Int'l & Domestic airports (3 stations)

There is a large gap in meteorological station network to the east of central hills.

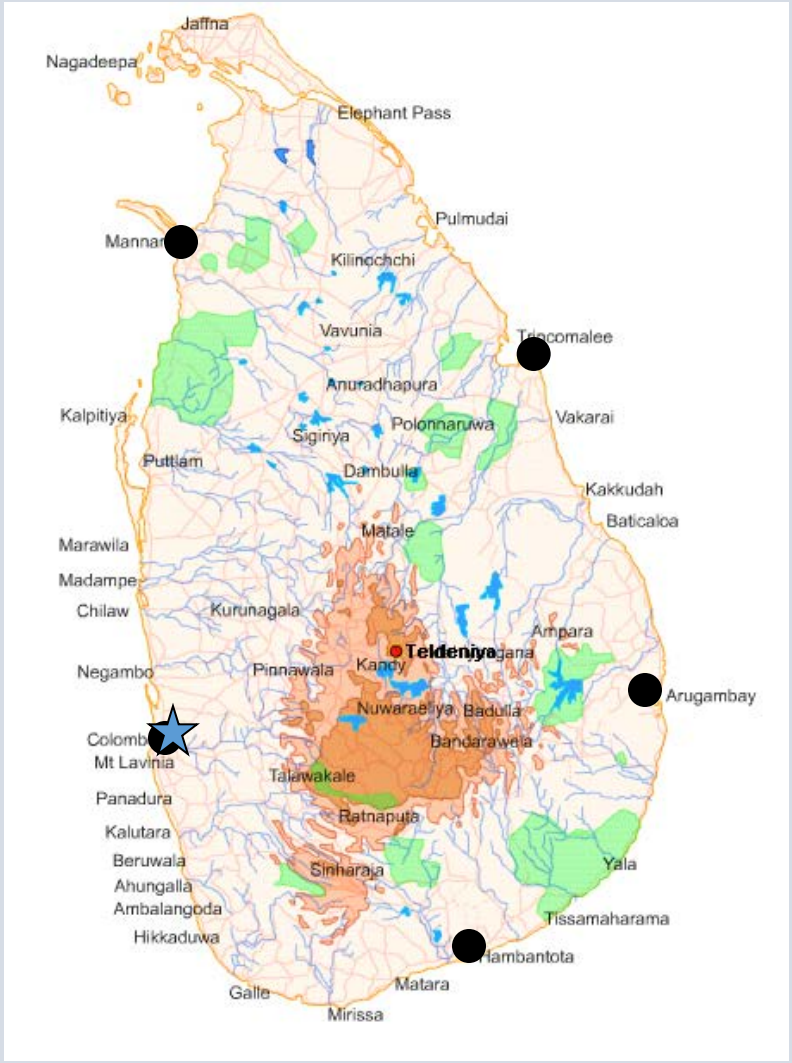
Data Availability-at main met stations

Station Name	Data Available From		Missing years Period above one year
Anuradhapura	1870		1941 - 50
Badulla	1968		1980, 1912,
Bandarawela	1991		------
Batticaloa	1869		------
Colombo	1869		------
Diyathalawa	1901		1931 -40
Galle	1873		1980, 1982 -1988, 1901 -1910, 1921 - 1930
Hambantota	1869		1941- -50,
Jaffna	1887		1909, 1912, 1913, 1991 - 2000,
Kankasanthurai	1951		------
Katugastota	1951		------
Katunayake	1961		------
Kurunegala	1885		1901, 1902,
Mahailluppallama	1952		------
Mannar	1870		1911 - 15, 1991, 1992,
Monaragala	2009		
Mulativu	1957		1963 - 1979,
NuwaraEliya	1869		1978, 1979, 1924, 1925,
Polonnaruwa	2009		------
Pottuvil	1983		------
Puttalam	1869		------
Ratmalana	1951		------
Ratnapura	1869		------
Trincomalee	1869		1911 - 1930,
Vauniya	1957		1991

Upper Air Observations – Pilot balloon/ Radiosonde

Pilot balloon observations ●

★ Radiosonde Observation



- Upper air Data
  - 6 hourly data from local pilot balloon stations (4 stations)

Automatic Weather Stations

Meteorological and Disaster Information Network donated by JICA it is consist of the Automatic Weather observation Station system (AWS)

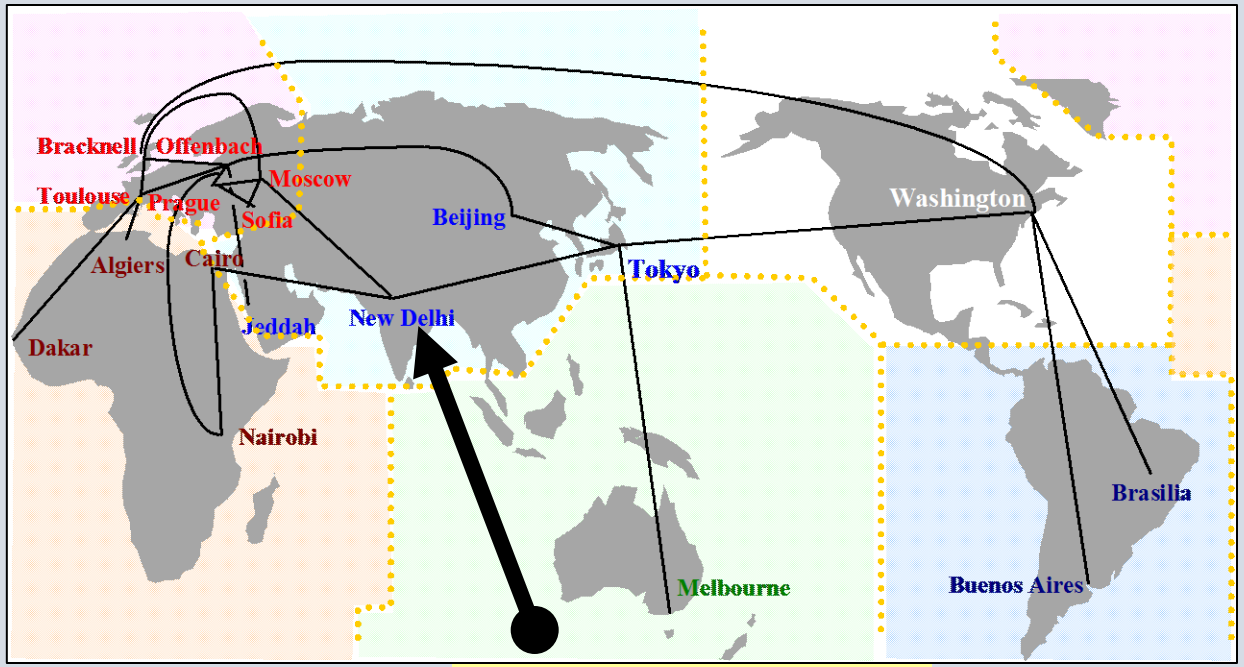
The AWS consists of 38 stations;

20 - Synoptic Meteorological Stations

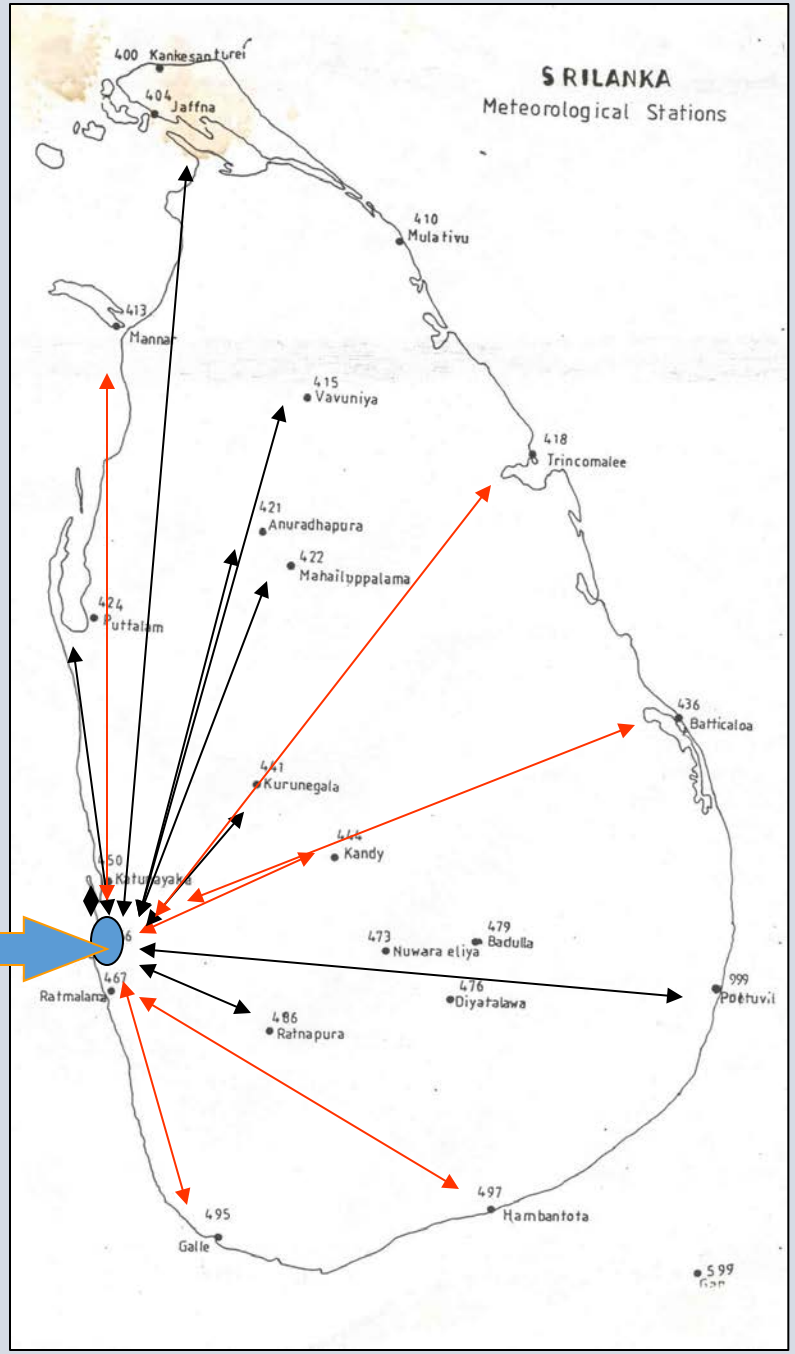
18 - Collaborator Stations

Data format-CSV

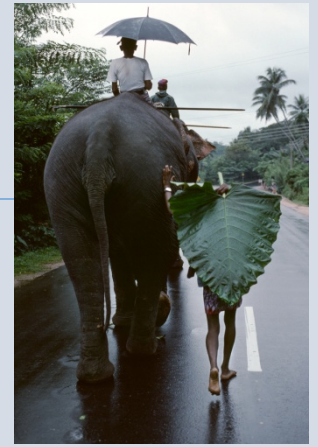
Global Telecommunication Network(GTS)



New Delhi



Meteorological Services of the Sri Lanka Meteorological Department



- Weather forecasts for general public
  (Short /Medium/long range forecast)

- Weather forecasts for fishery and shipping

- Aeronautical meteorological services
  International/Local

http://www.meteo.gov.lk

Agro Meteorological Services

•Agro-meteorological network was started in Sri Lanka in 1973

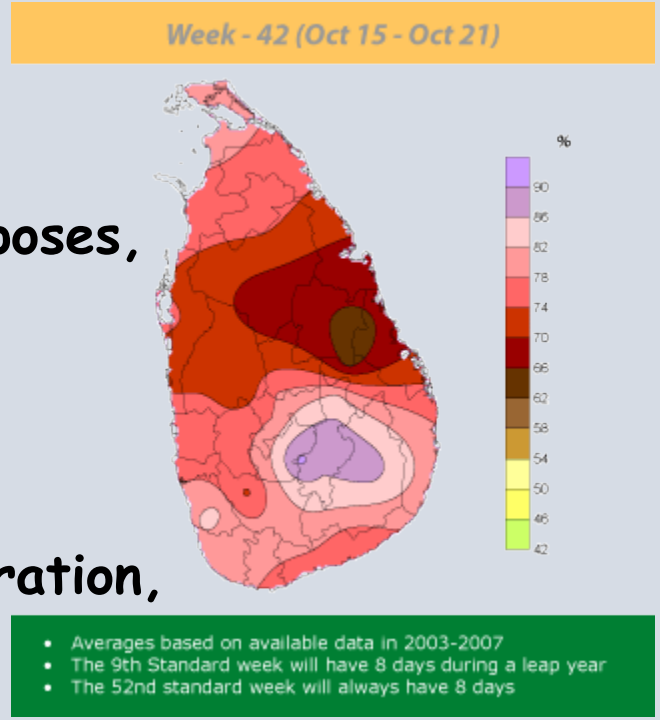
•DOM has up to Forty Agro-meteorological stations island wide, collaboration with the certain institutions.

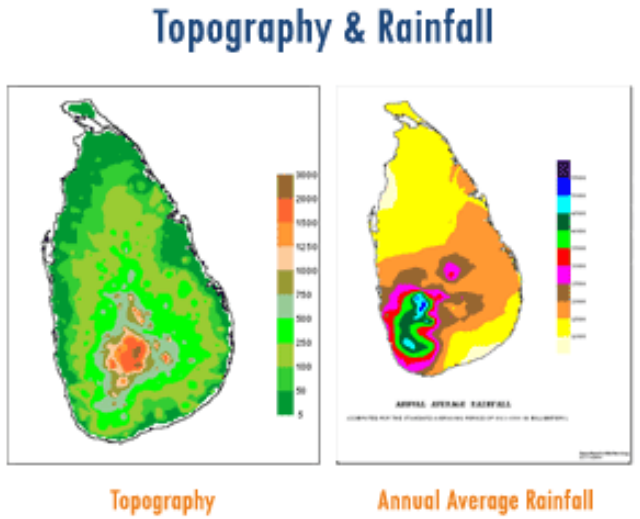
❑ Agro meteorological data

Data will provide for academic purposes, researched and other relevant project

❑ Average predictions

Weekly averages for Evaporation, Precipitation, Rela. Humidity, Sunshine duration, Max and Min Temperatures





Climatological Services

- ❑ **Climatological means**
- ❑ **Seasonal weather predictions**
- ❑ **El-Nino/La Nina outlook**

Center For Climate Change Studies(CCCS)

- DOM is the Focal Point of IPCC for Sri Lanka
- Conduct weather/climate related research activities
- Awareness Raising activities

Severe Weather Forecasts and Early Warning Services

Over 80% of the natural disasters in Sri Lanka occurred due to the weather based phenomena

SLMD responsible for forecast and warning of weather related natural disasters as well as Tsunami,

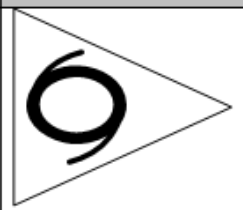
- **Tropical storms**
- **Heavy rain**
- **Thunderstorm/Lightning/Tornado**
- **Strong winds**
- **Tsunami**

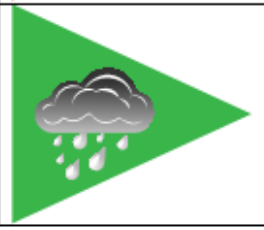
Following warnings /Alerts /Advisories can be issued

- Severe Weather Warning/Alert for Strong Winds
- Severe Weather Warning/Alert for Heavy Rain
- Severe Weather Warning/Alert for Strong Winds and Heavy Rain
- Severe Weather Warning/Alert for Thunder storm
- Severe Weather Warning/alert for Cyclones
- Very severe weather warning for cyclones

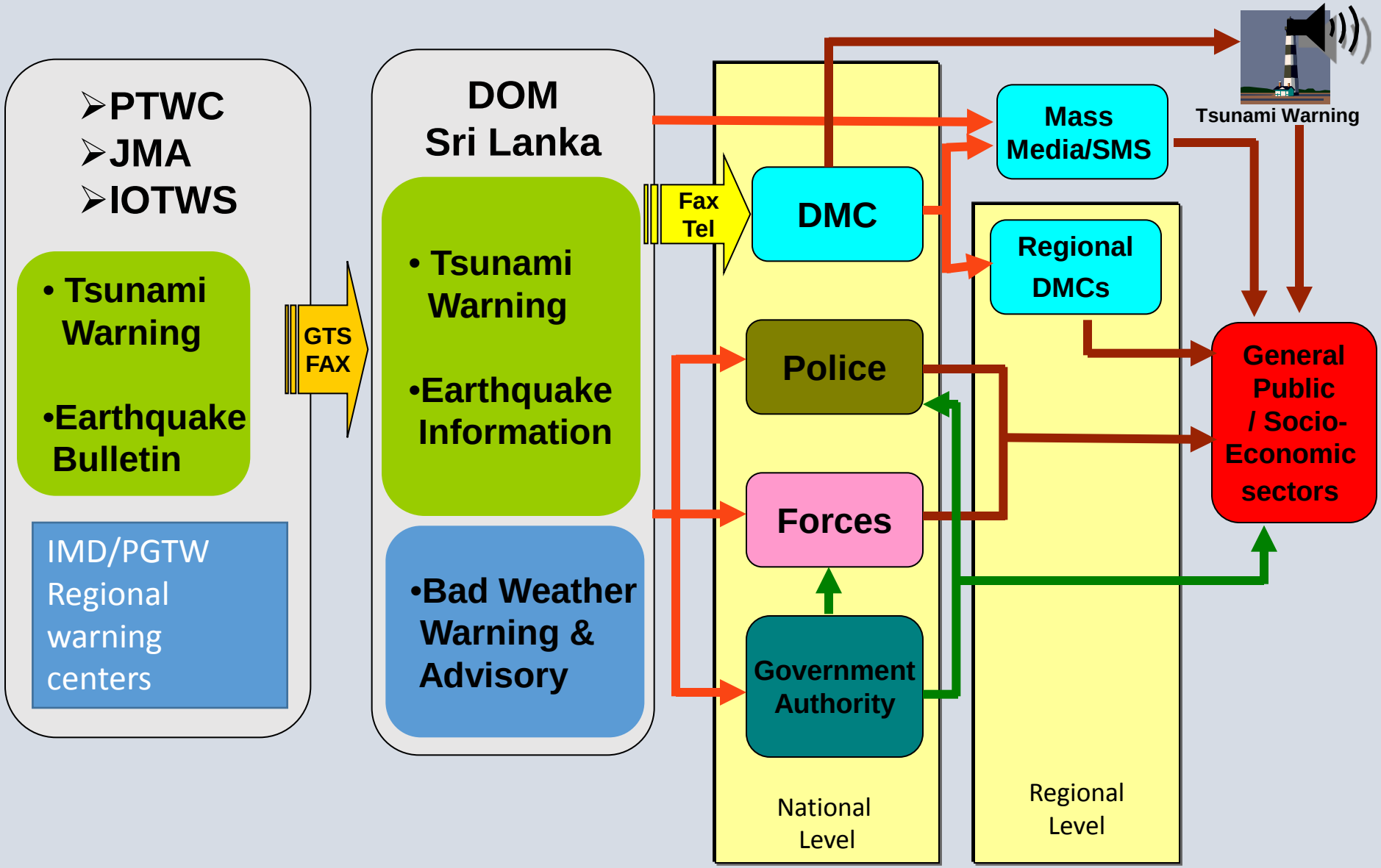
STANDARD OPERATING PROCEDURE FOR DISASTERS

ALERT LEVELS - CYCLONE

Sl. No	SIGN	ALERT STATUS	DESCRIPTION	ACTION REQUIRED
1		Information	Likely [1]formation of a cyclonic storm[2]	Information only and listen for regular weather updates
2		Alert	Cyclonic storm has formed and approaching[3]	Be vigilant and listen for regular weather updates. Act according to the relevant official instructions Possible evacuation in high risk areas
3		Warning	Cyclonic storm making land fall	Possible evacuation in high risk areas and listen for regular weather updates. Act according to the relevant official instructions
4		Threat is over	Cyclonic storm threat is over	Cyclonic storm threat is over however, associated threats such as rainfall need to be monitored. Act according to the official instructions

Sl. No	SIGN	ALERT STATUS	DESCRIPTION	ACTION REQUIRED
1		Information	Likelihood of Moderate Rainfall <100 mm	Effects of rainfall will vary from place to place according to local conditions. Act according to the relevant official instructions
2		Alert	Likelihood of Heavy Rainfall 100- 150 mm	Effects of rainfall will vary from place to place according to local conditions. Act according to the relevant official instructions
3		Warning	Likelihood of Very Heavy Rainfall > 150 mm	Effects of rainfall will vary from place to place according to local conditions. Act according to the relevant official instructions
4		Threat is over	Threat of heavy rainfall is over however light to moderate rainfall can be experienced[3]	Effects of rainfall will vary from place to place according to local conditions. Act according to the relevant official instructions

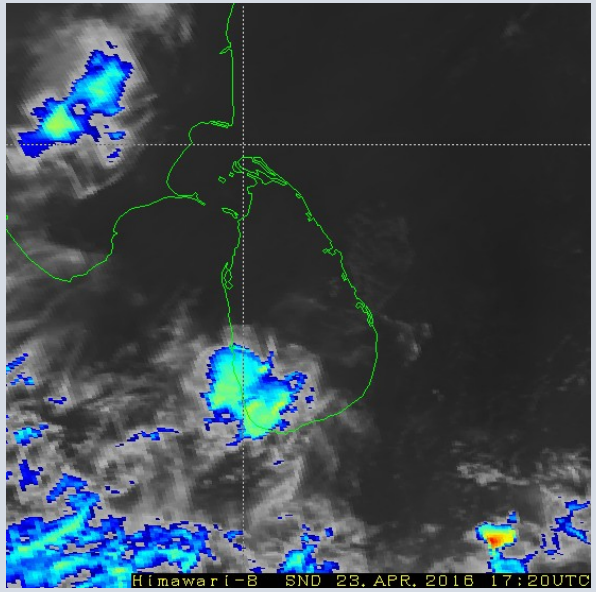
Early Warning Dissemination System in Sri Lanka



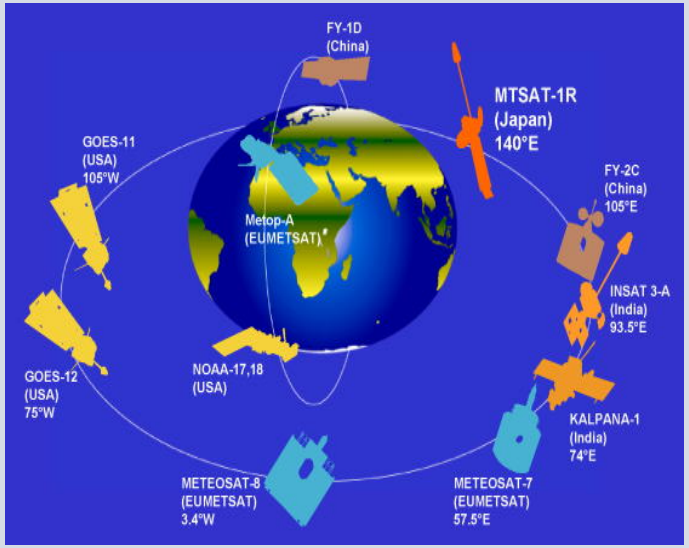
Government Departments and Statutory Bodies working with the Meteorological Department.

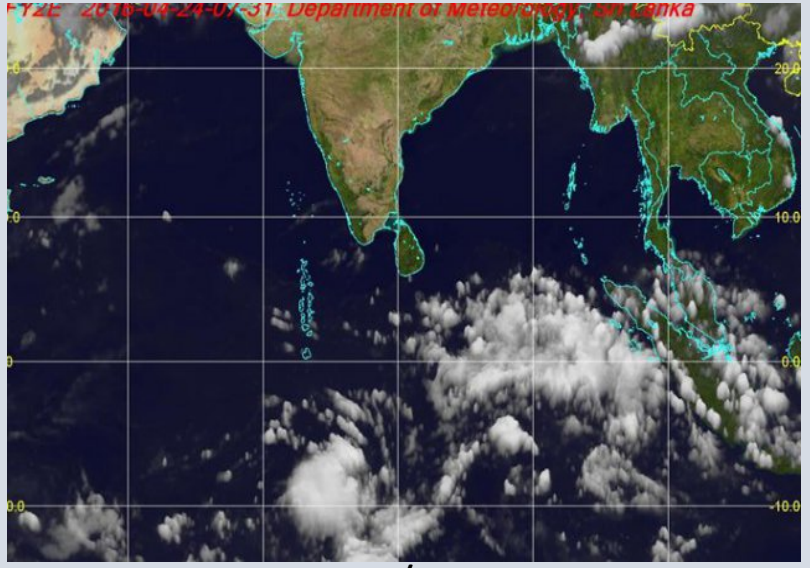
Agriculture	**Natural Resources Management Centre, Dept. of Agriculture, Tea Research Institute, Sri Lanka Tea Board, Rubber Research Institute, Agricultural Research and Training Institute, Coconut Research Institute, Sugar Cane Research Institute, Palmyrah Development Board, Sri Lanka Cashew Corporation**
Fisheries	**Ceylon Fisheries Corporation, Ceylon Fisheries Harbors Corporation, Ministry of Fisheries, National Aquatic Research Agency**
Oceanography	**National Aquatic Research Agency, Marine Pollution and Prevention Agency, Ministry of Shipping, Ministry of Defense, Navy, Indian Ocean Marine Affairs Cooperation Secretariat**
Aviation	**Civil Aviation Authority, Air Lanka, Air Force**
Water Resources	**National Water Supply and Drainage Board, Irrigation Department, Mahaweli Authority, Water Resources Secretariat**
Minerals	**Lanka Salt Ltd.**
Energy	**Ceylon Electricity Board, National Engineering Research and Development Centre, Intermediate Technology Development Group**
Environment	**Central Environmental Authority, Ministry of Environment, National Science Foundation, Inst. of Fundamental Studies, National Building Research Organization, Wildlife Conservation Dept., Forest Dept.**
Universities	**Depts. of Agriculture, Geography, Physics, Natural Resources and Geology in the Peradeniya, Jaffna, Colombo, Sabragamuwa, Ruhuna and Open Universities**

Satellite data & Products used in Forecasting

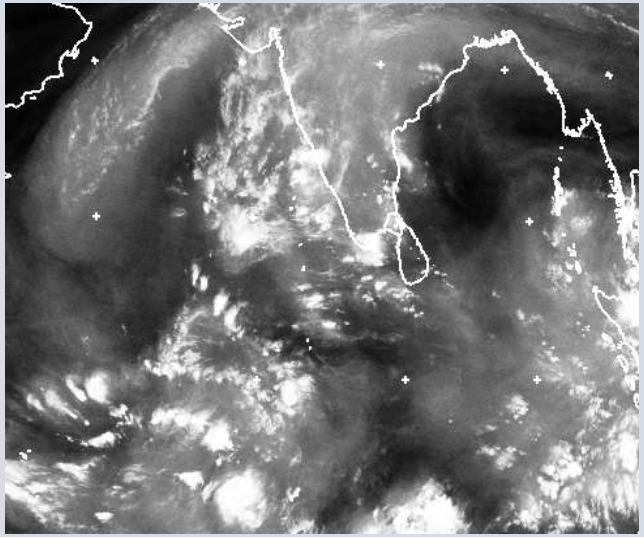


Himawavri

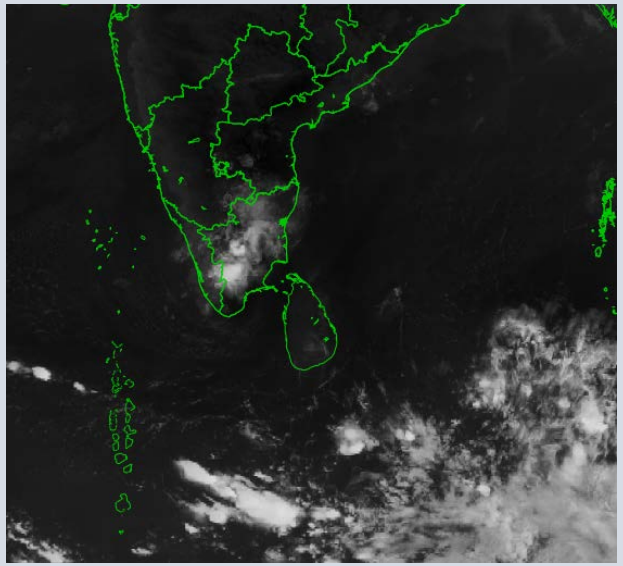




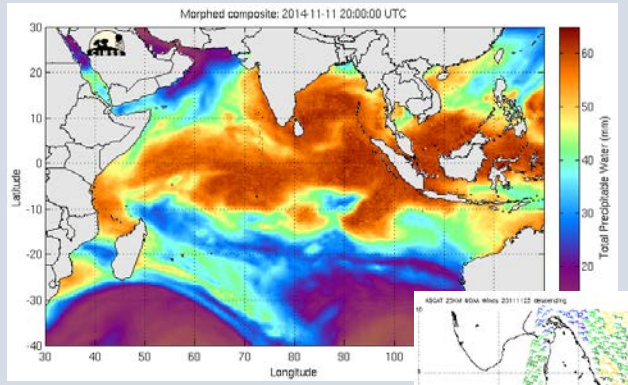
FY 2E/2C

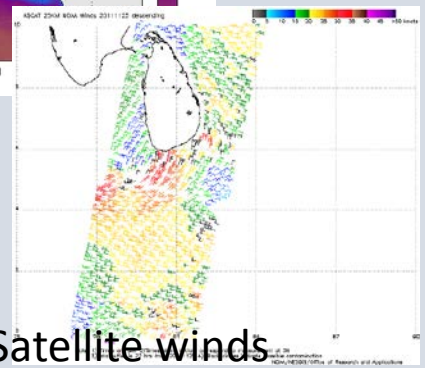


Dundee



INSAT 3D

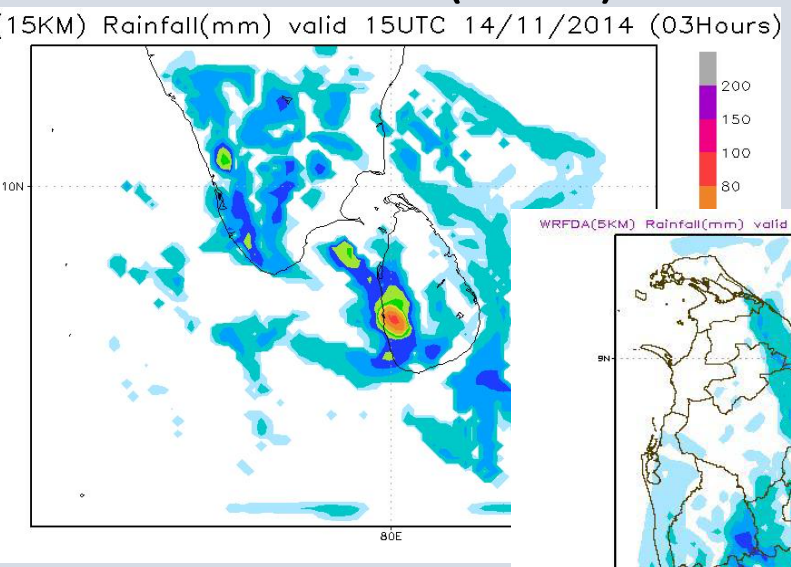




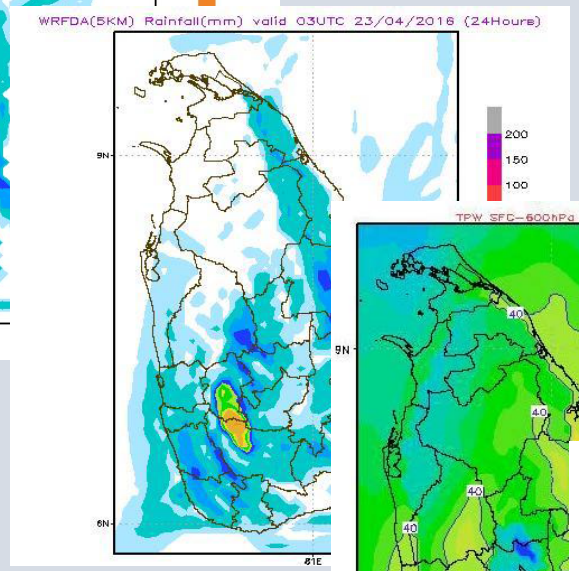
Scattrometer Satellite winds

We Run the WRF model

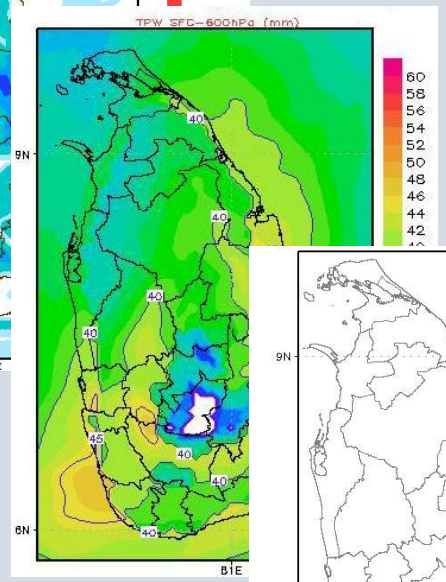
WRF (15km)



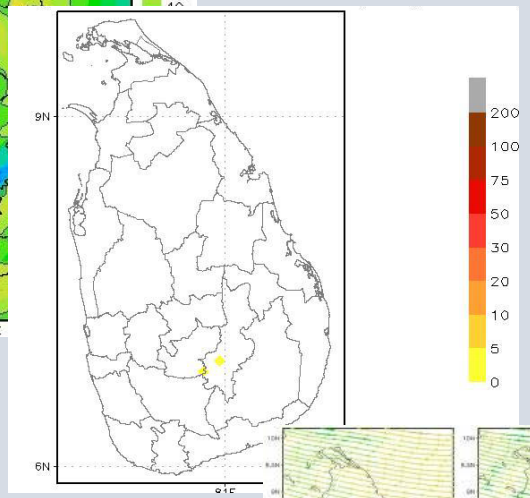
WRF Rainfall (5km)



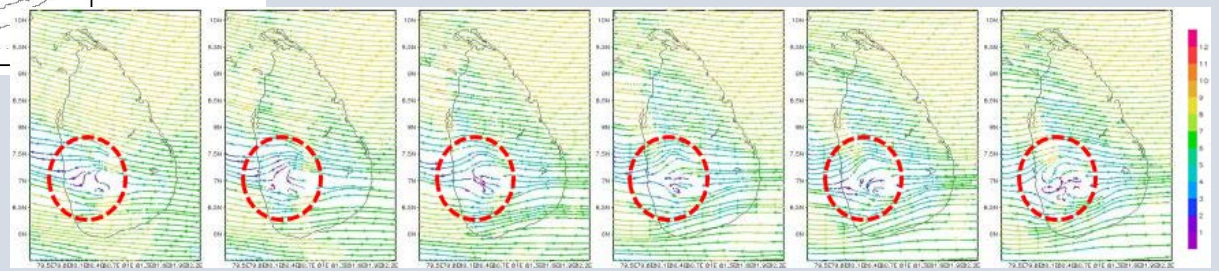
TPW(WRF5km



Lightning potential

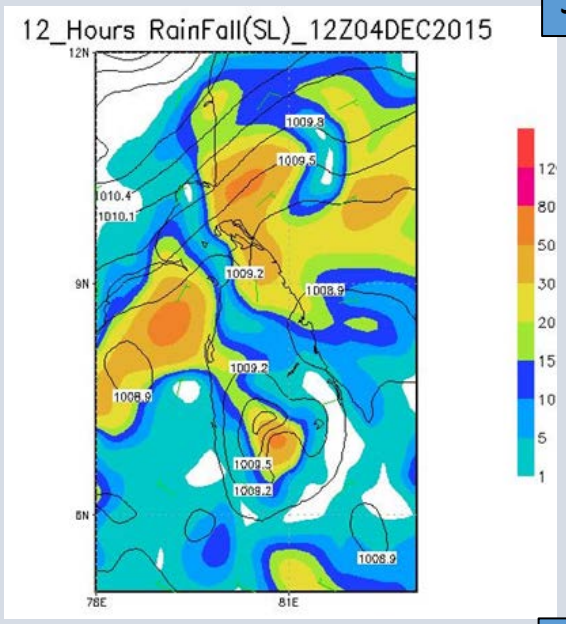


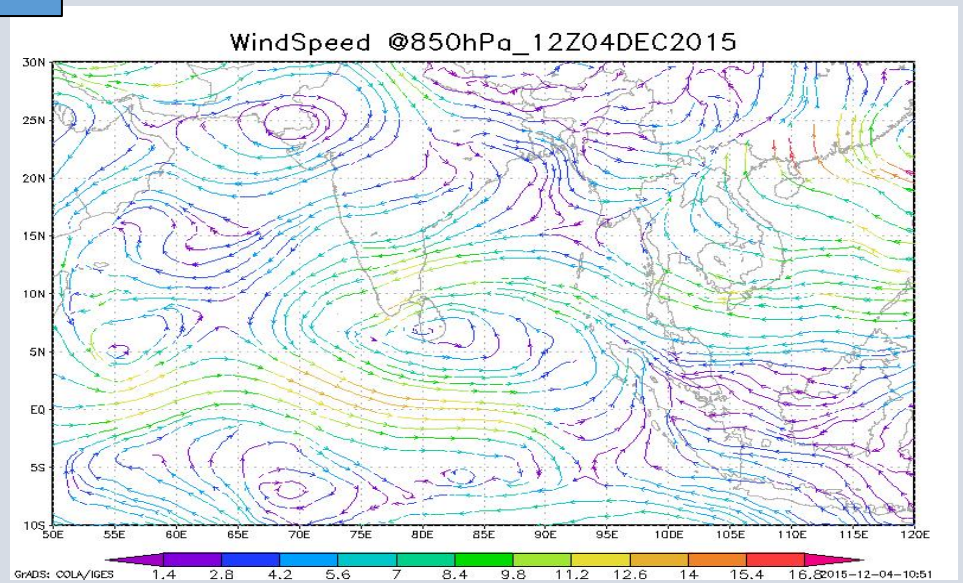
wind



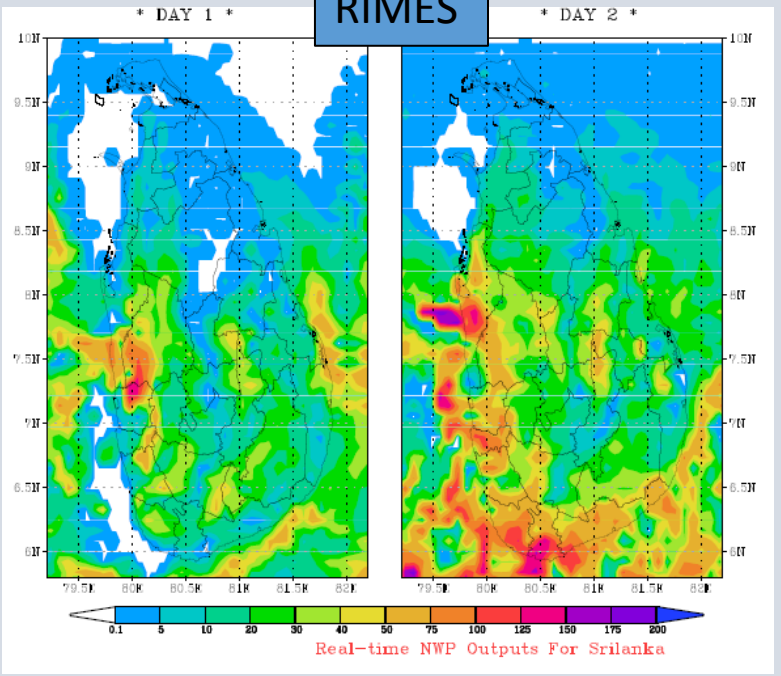
Use Other regional center's NWP model outputs in WX Forecasting/warning activities

JMA

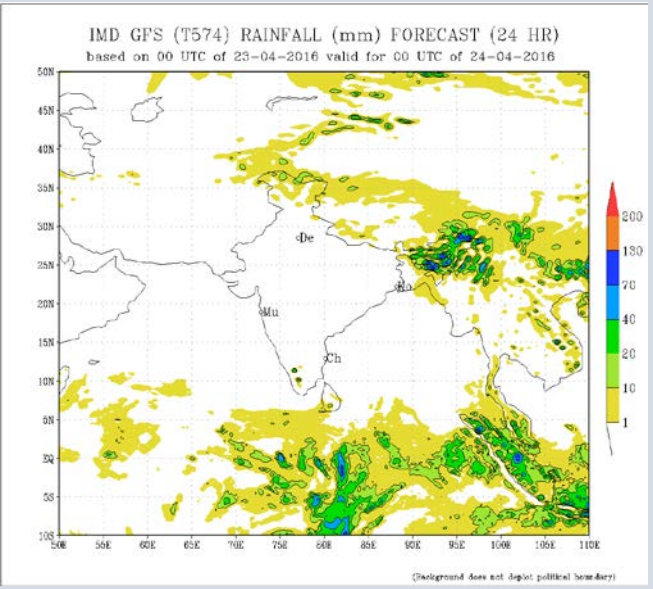


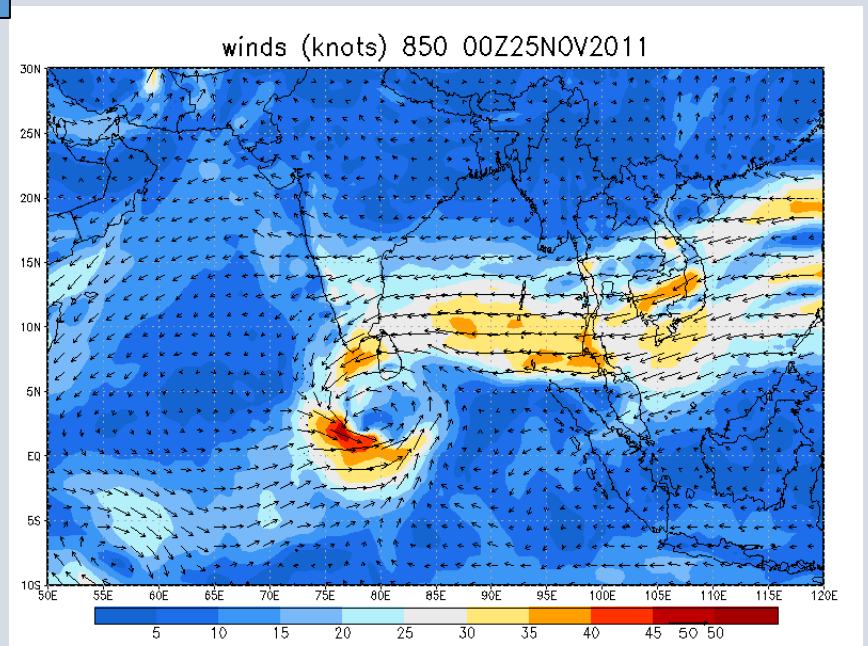


RIMES

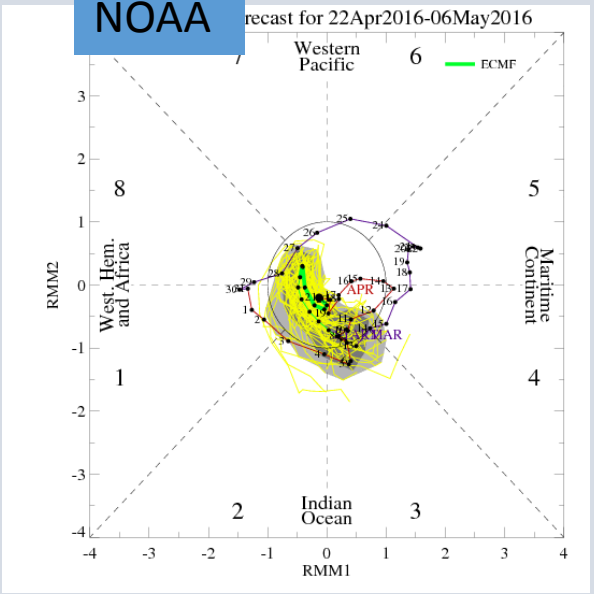


IMD



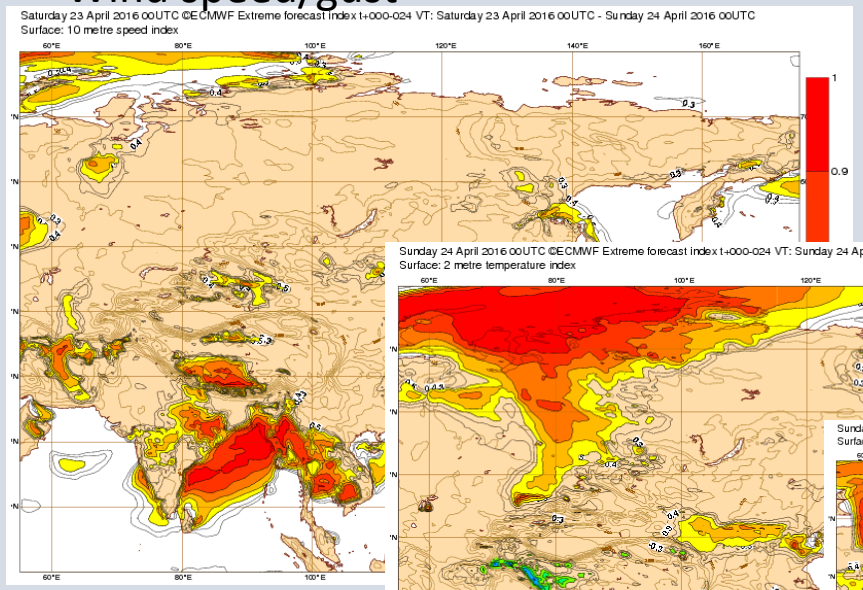


NOAA

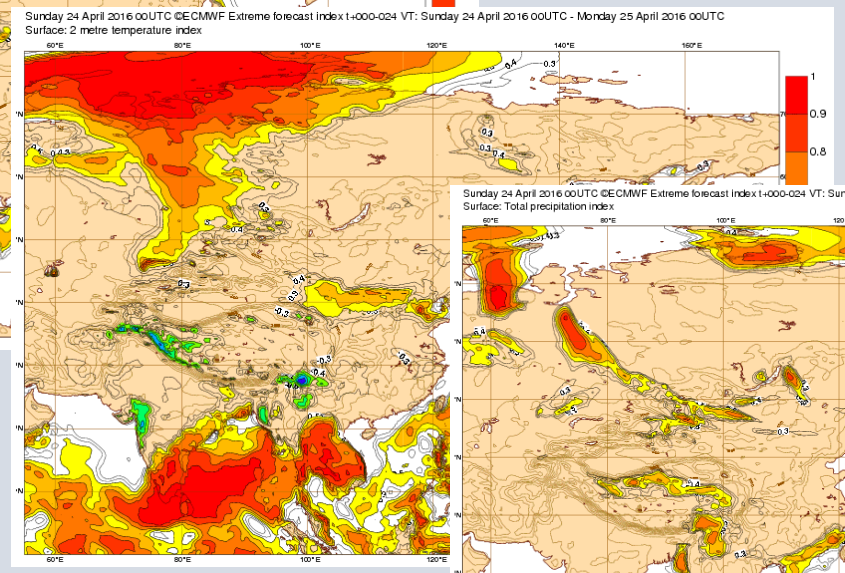


ECMWF Extreme Index/Meteogram

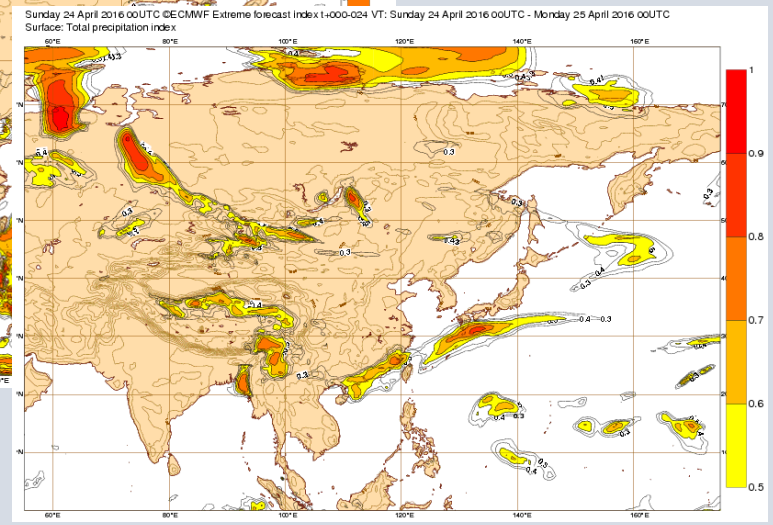
Wind speed/gust

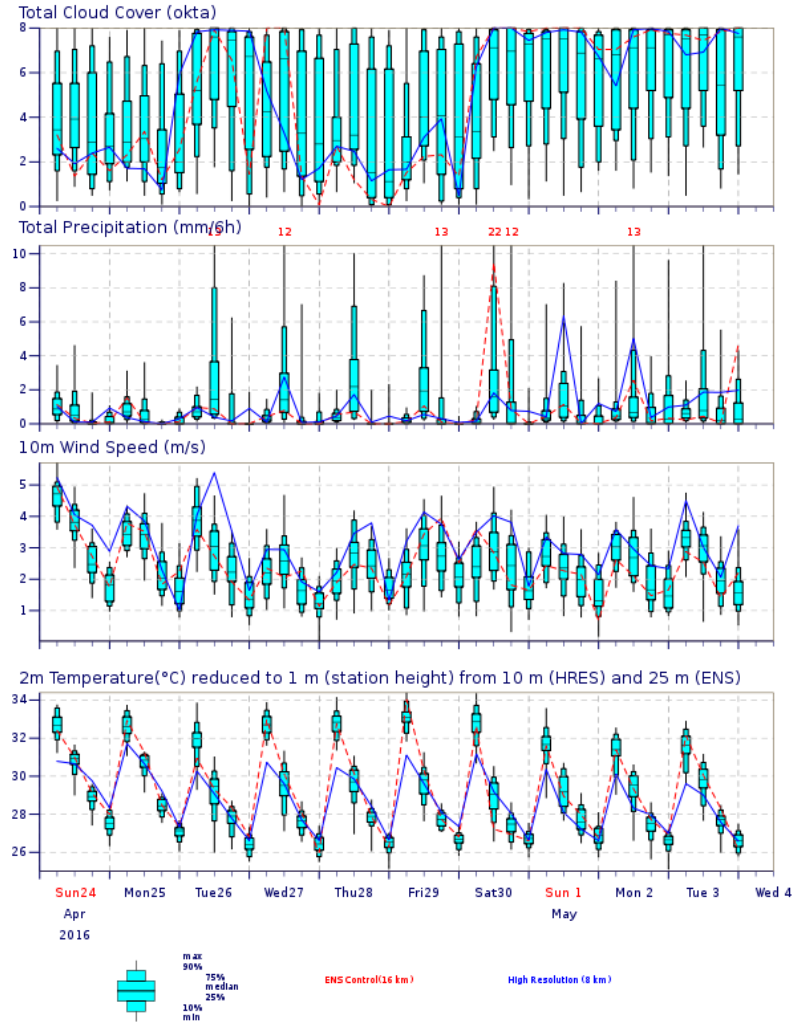


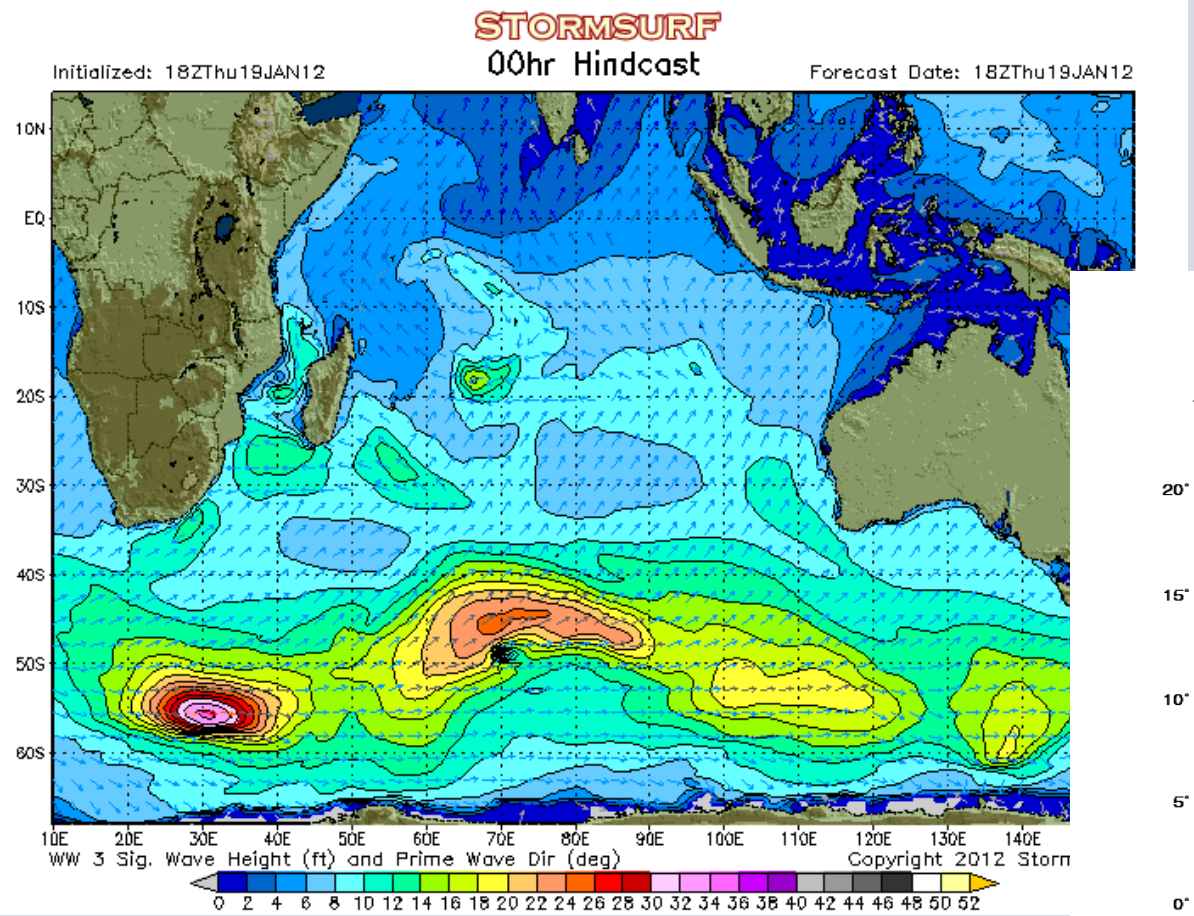
Temperature



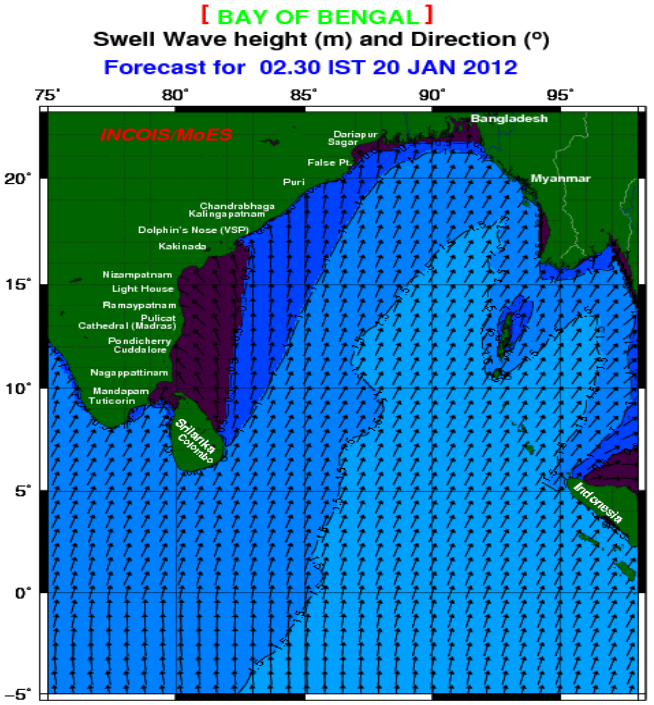
Precipitation







http://www.stormsurf.com/locals/indi.shtml



http://www.incois.gov.in

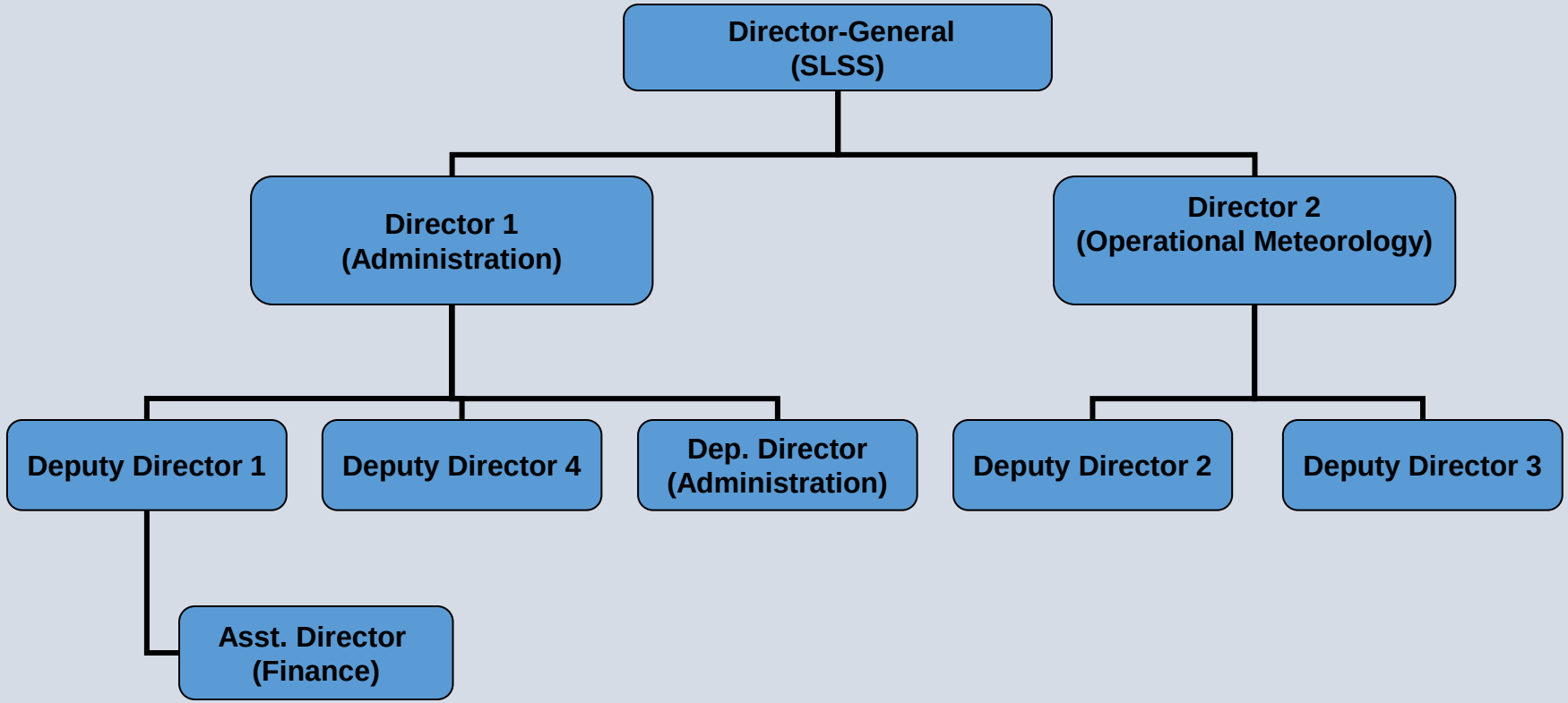
Organizational structure and human resources

Approved/Available Cadre and Vacancies

Total Cadre – 357

Scientific Service officers	30	28	02
Administrative Service	01	01	01
Engineering Service officer	03	03	-
Accountants Service officer	01	01	-
Technological Service officers	175	160	15
Other staff	117	95	12

Organizational Structure – Department of Meteorology




Thank You !