



REGIONAL WORKSHOP ON IMPACT-BASED
FORECASTS IN RAI (ASIA)

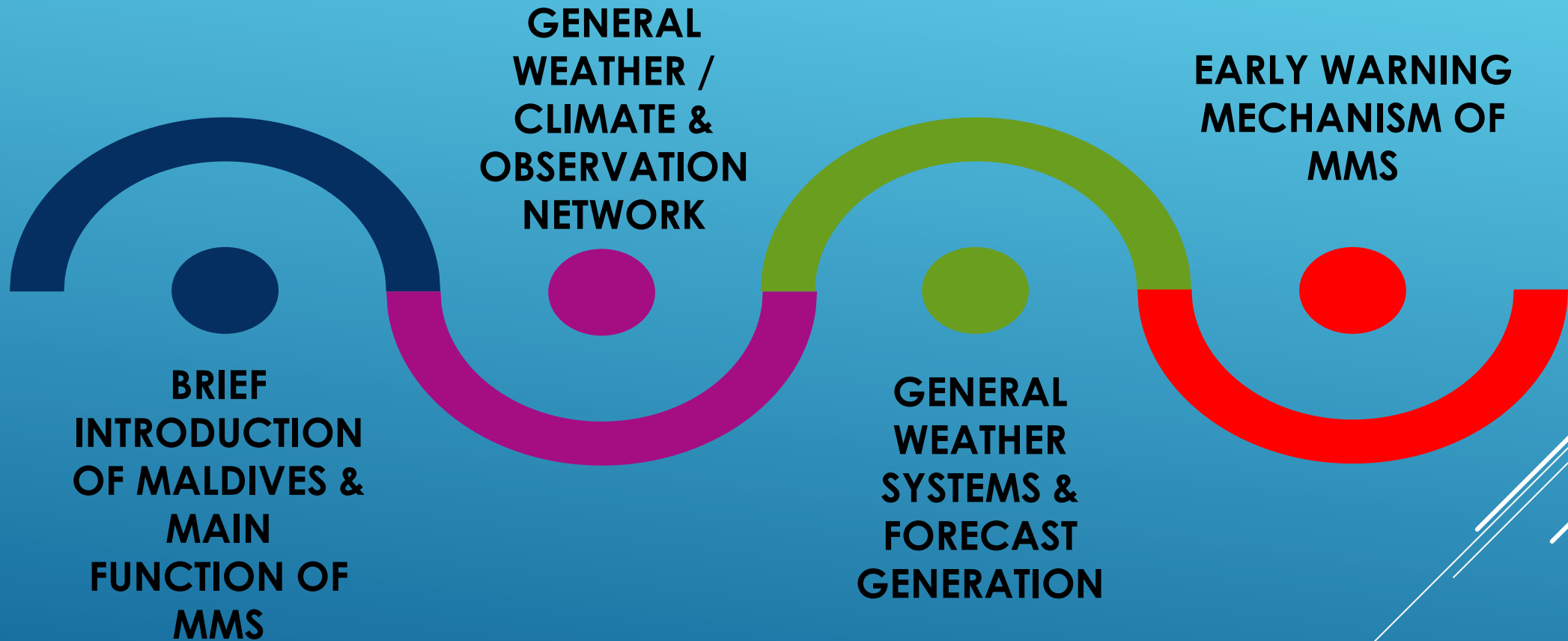
**WEATHER FORECASTING & EARLY
WARNING MECHANISM IN MALDIVES**

07TH NOVEMBER 2017

Maldives Meteorological Service

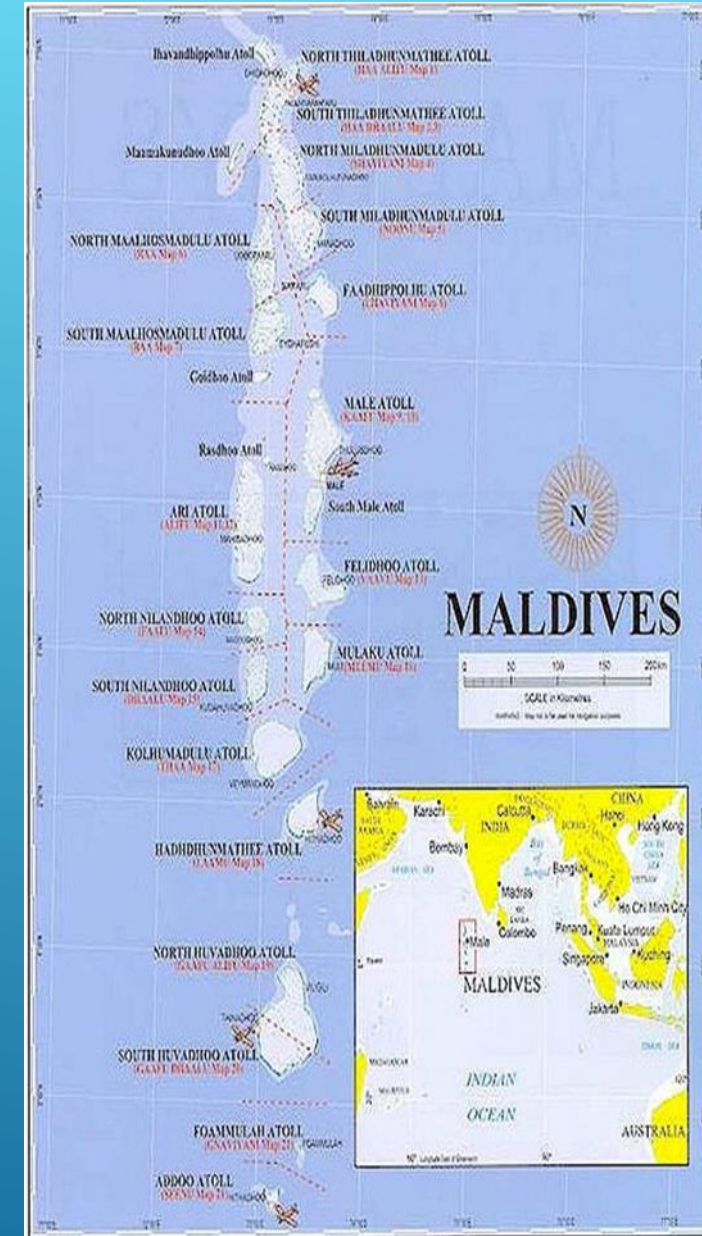
Hussain Waheed
(Assistant Meteorologist)

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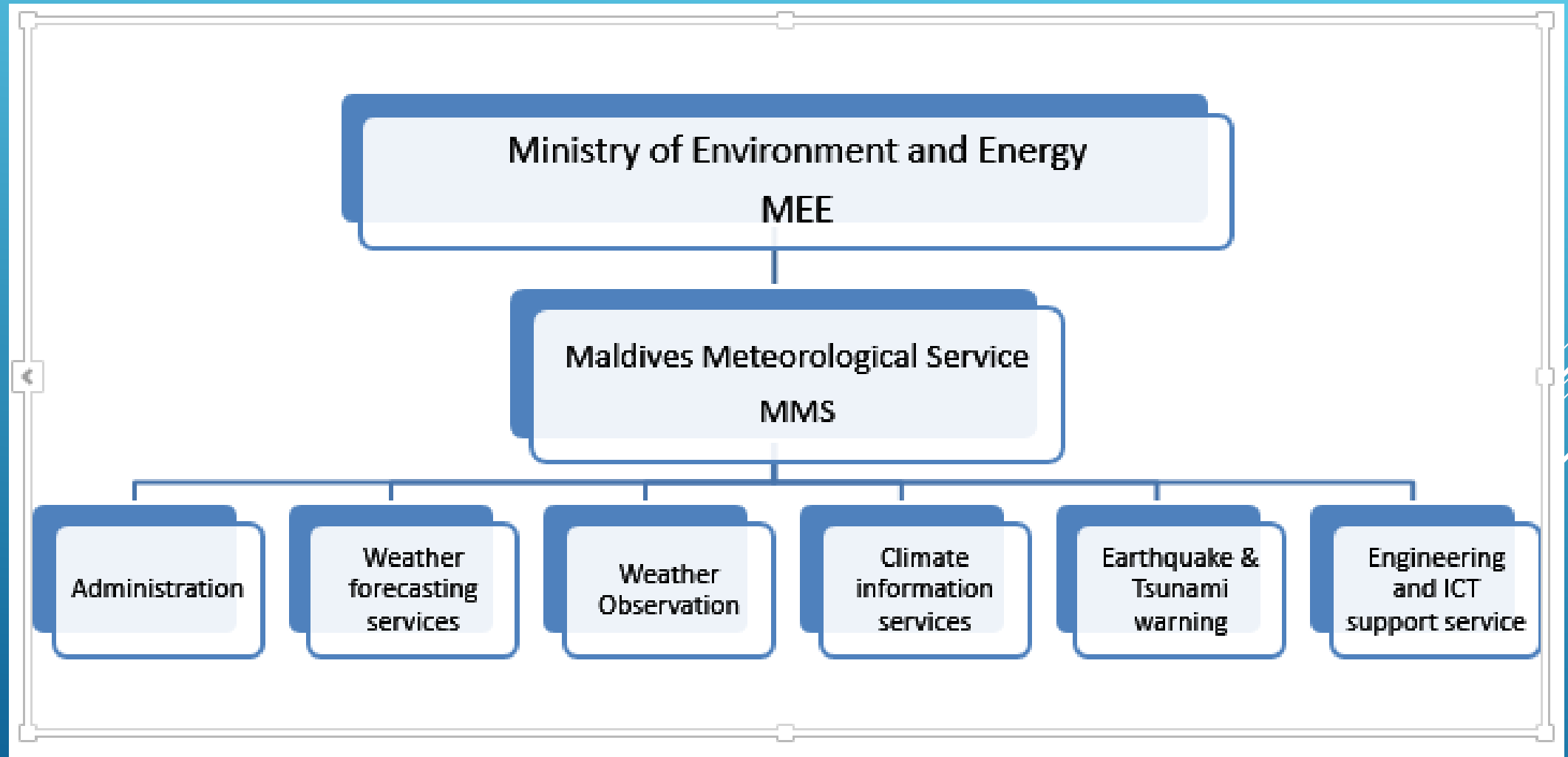


The Maldives

- ✓ Area: 90,000 sq km
- ✓ Population: 350,000
- ✓ Total number of islands: 1,200
- ✓ Number of inhabited islands: 200
- ✓ All these islands on average are 1 meter above msl.
- ✓ No rivers or mountains (some islands have ponds & wetlands)
- ✓ Vulnerable for climate change & Sea level rise



MAIN FUNCTION OF MMS



OBJECTIVES

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graph TD; A[OBJECTIVES] --> B[PREPARE AND DISSEMINATE WEATHER FORECAST]; A --> C[PUBLIC WEATHER BROADCASTING]; A --> D[MONITOR AND ISSUE WEATHER/EARTHQUAKE WARNINGS]; B --> B1[GENERAL PUBLIC]; B --> B2[AVIATION SECTOR]; B --> B3[TOURISM SECTOR]; B --> B4[FISHING & SHIPPING COMMUNITY]; C --> C1[TV]; C --> C2[RADIO];
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PREPARE AND
DISSEMINATE WEATHER
FORECAST

GENERAL PUBLIC

AVIATION SECTOR

TOURISM SECTOR

FISHING & SHIPPING
COMMUNITY

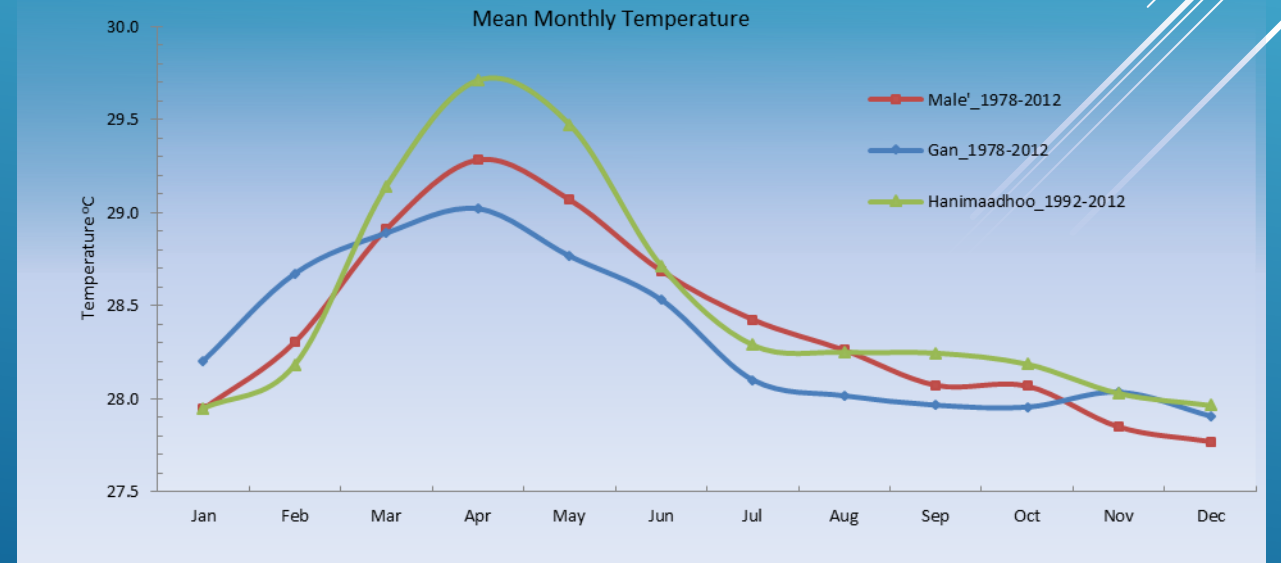
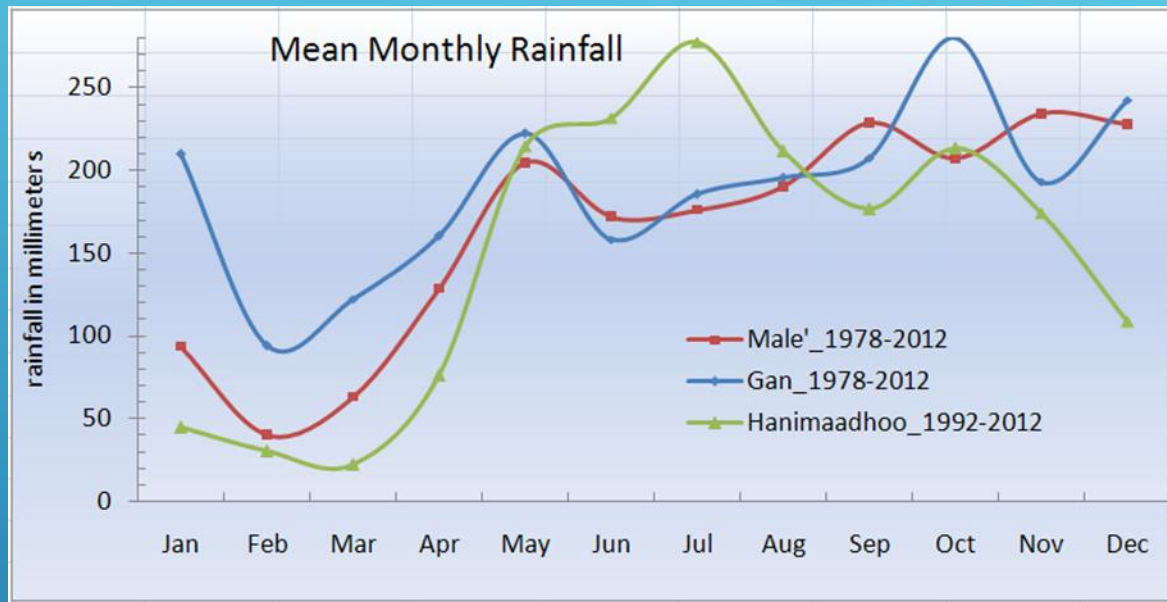
PUBLIC WEATHER
BROADCASTING

TV

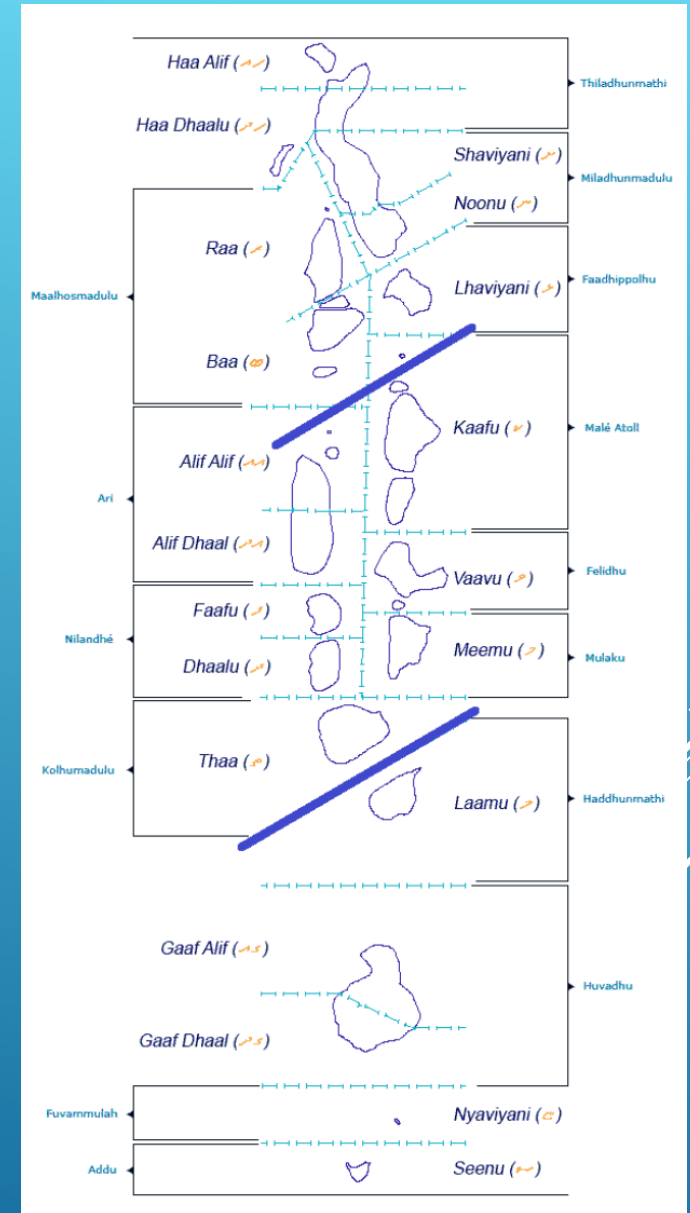
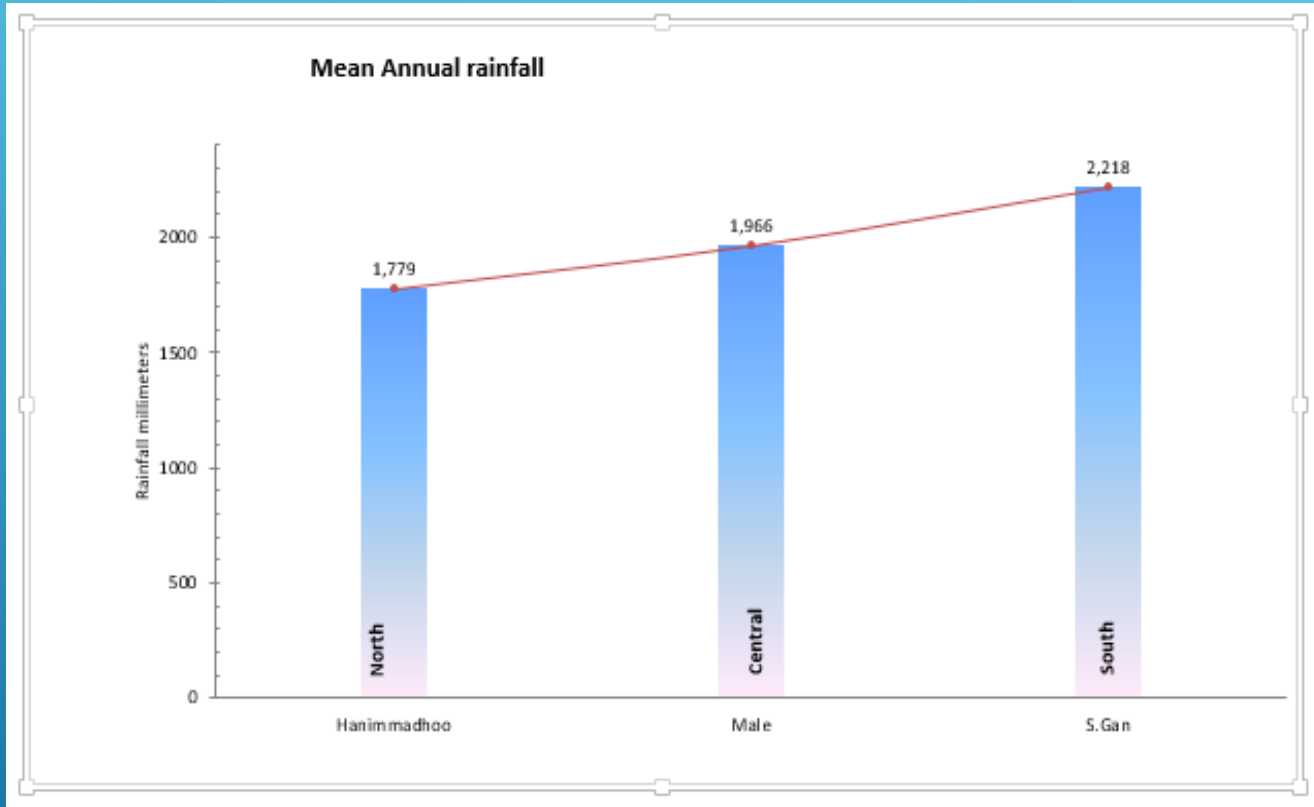
RADIO

MONITOR AND ISSUE
WEATHER/EARTHQUAKE
WARNINGS

GENERAL CLIMATE OF MALDIVES

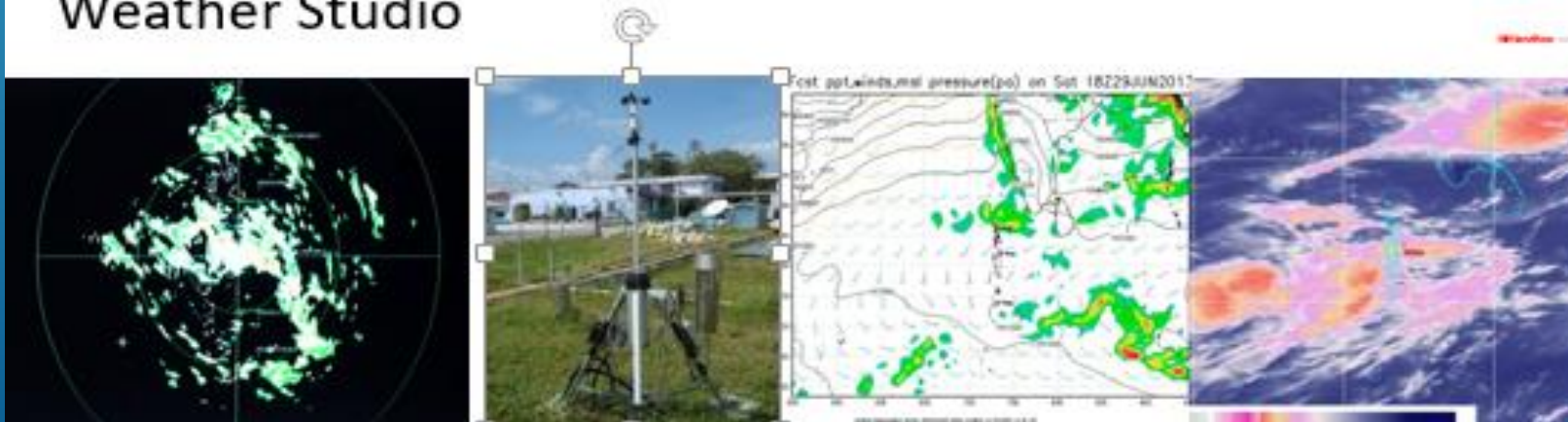
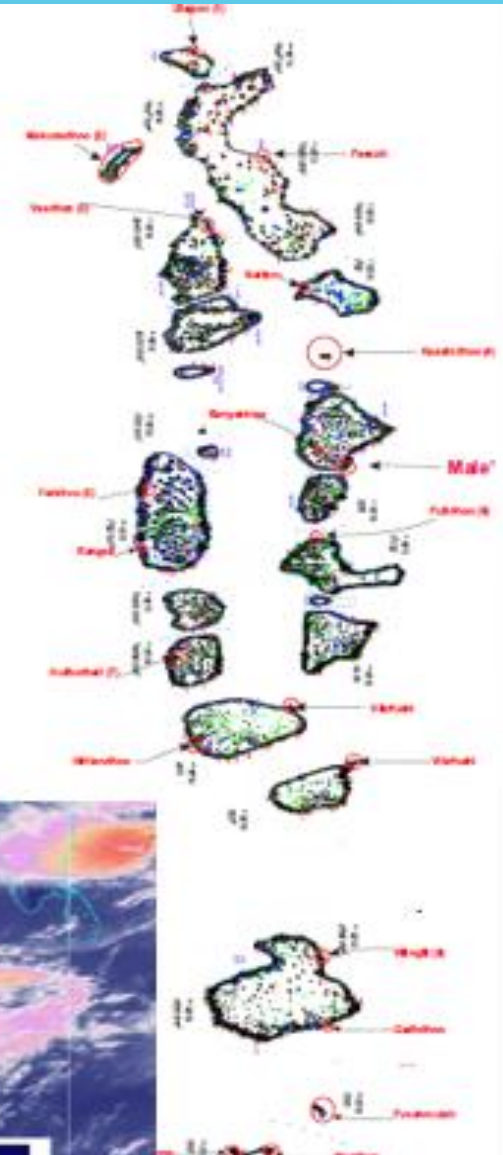


GENERAL CLIMATE OF MALDIVES



MMS Capacity

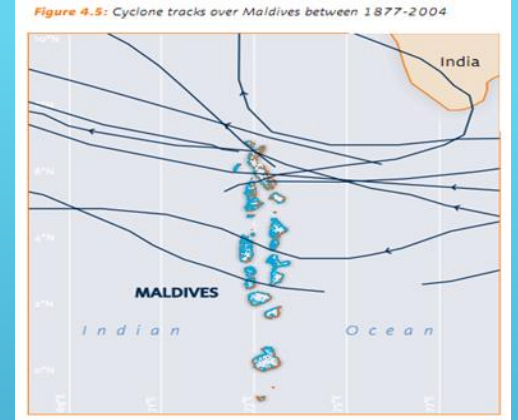
Manned observatories	:	5
Automatic Weather Station	:	20
Upper air observation	:	1
Weather RADAR	:	1
Seismometer	:	2
Tide gauge	:	3
Satellite picture receiving system (CMACast)	:	1
Numerical Weather Prediction Models (WRF)	:	1
Weather Studio	:	1



MAJOR WEATHER SYSTEMS

- ITCZ (Inter Tropical Convergence Zone)
- Monsoons (SW & NE)
- Low pressure systems (Tropical Cyclones)

Cyclones



Strong winds & Rough Seas



Thunderstorms



Tornado / Water Spout



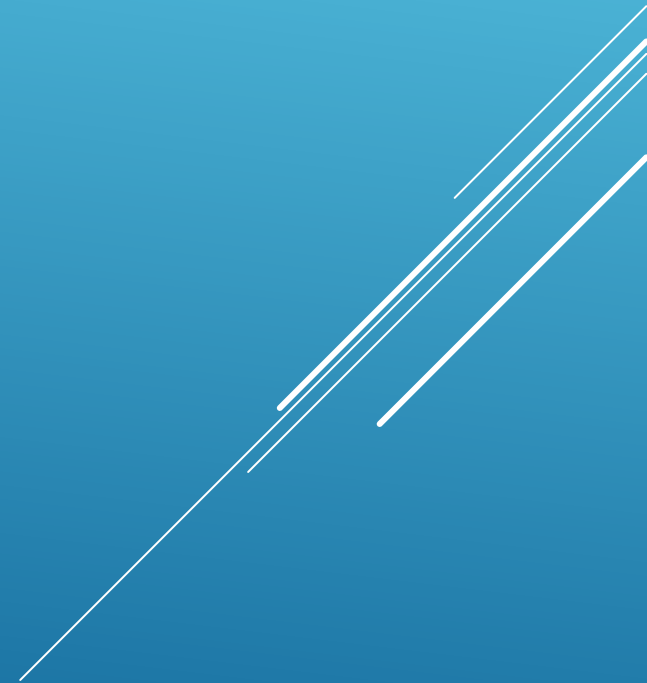
Swell & Tidal Waves



Flash Flood



WEATHER FORECASTING PRODUCTS AND IT'S GENERATION



WEATHER FORECASTING PRODUCTS

- **Satellite Products**

- Satellite Pictures
- Satellite Winds
- Satellite Water Vapour

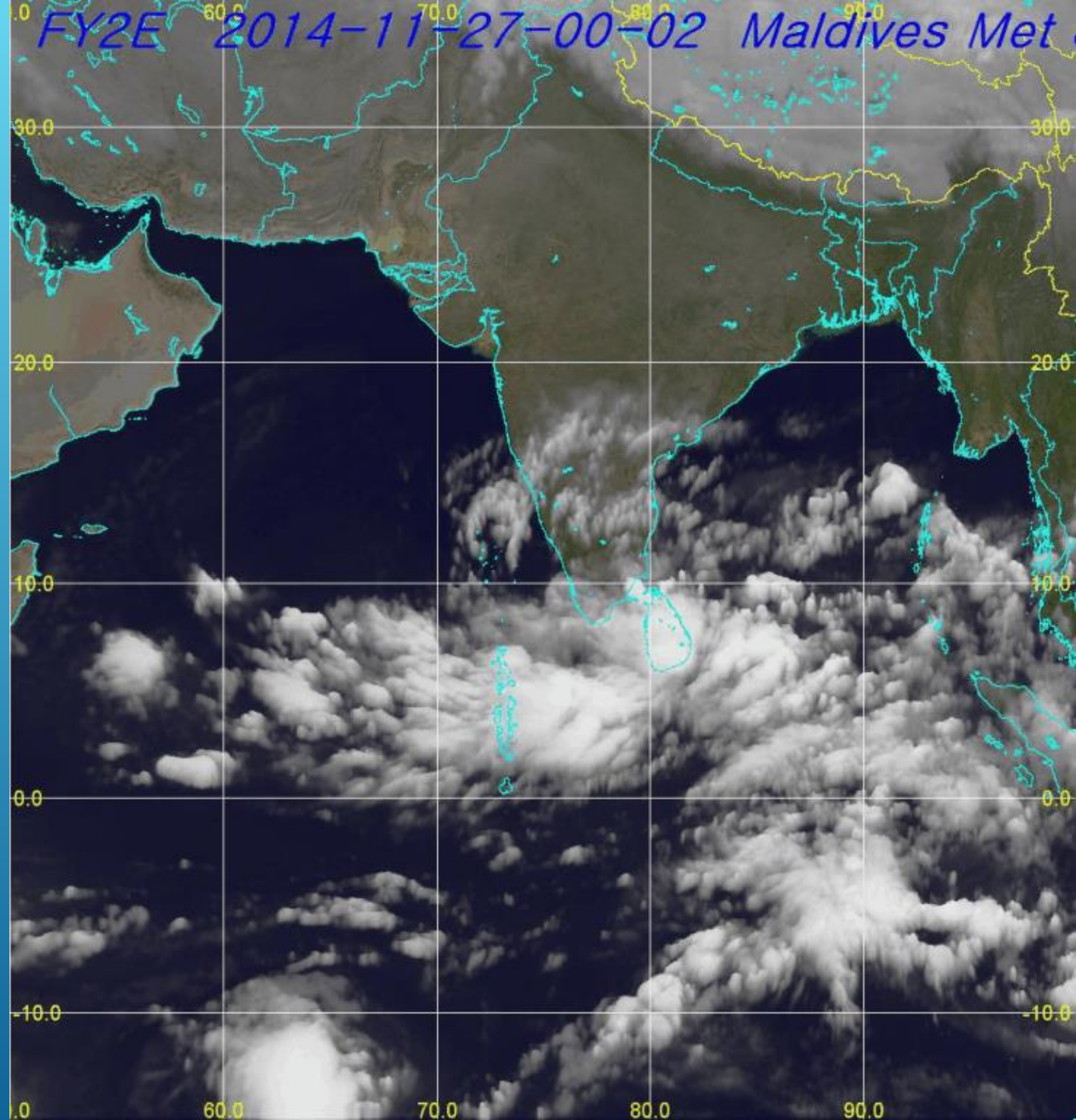
- **Numerical Weather Prediction Models**

- Precipitation
- Temperature
- Winds(various levels)
- Convergence
- Wave

- **Weather Radar**

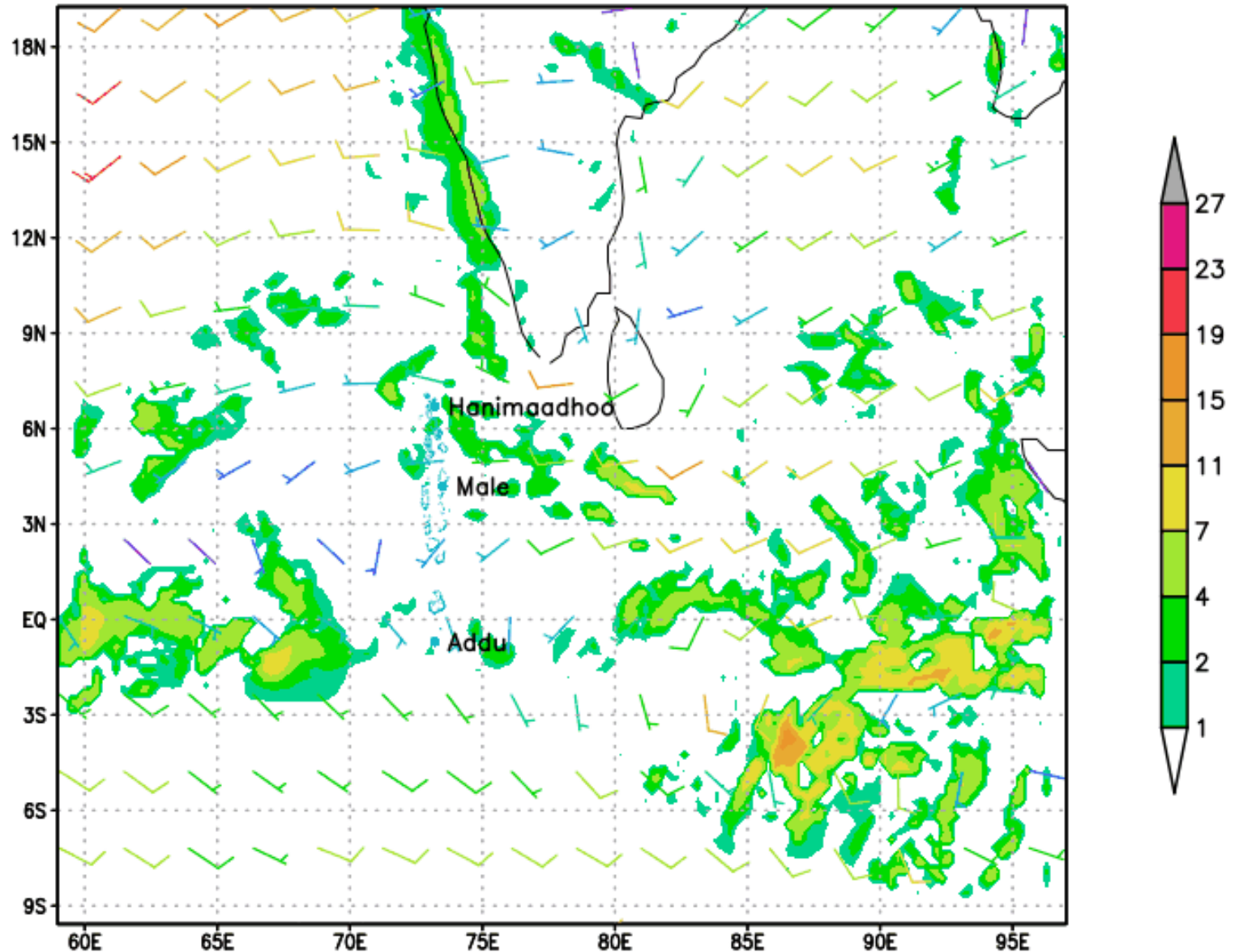
- Doppler Weather Radar

SATELLITE PICTURES



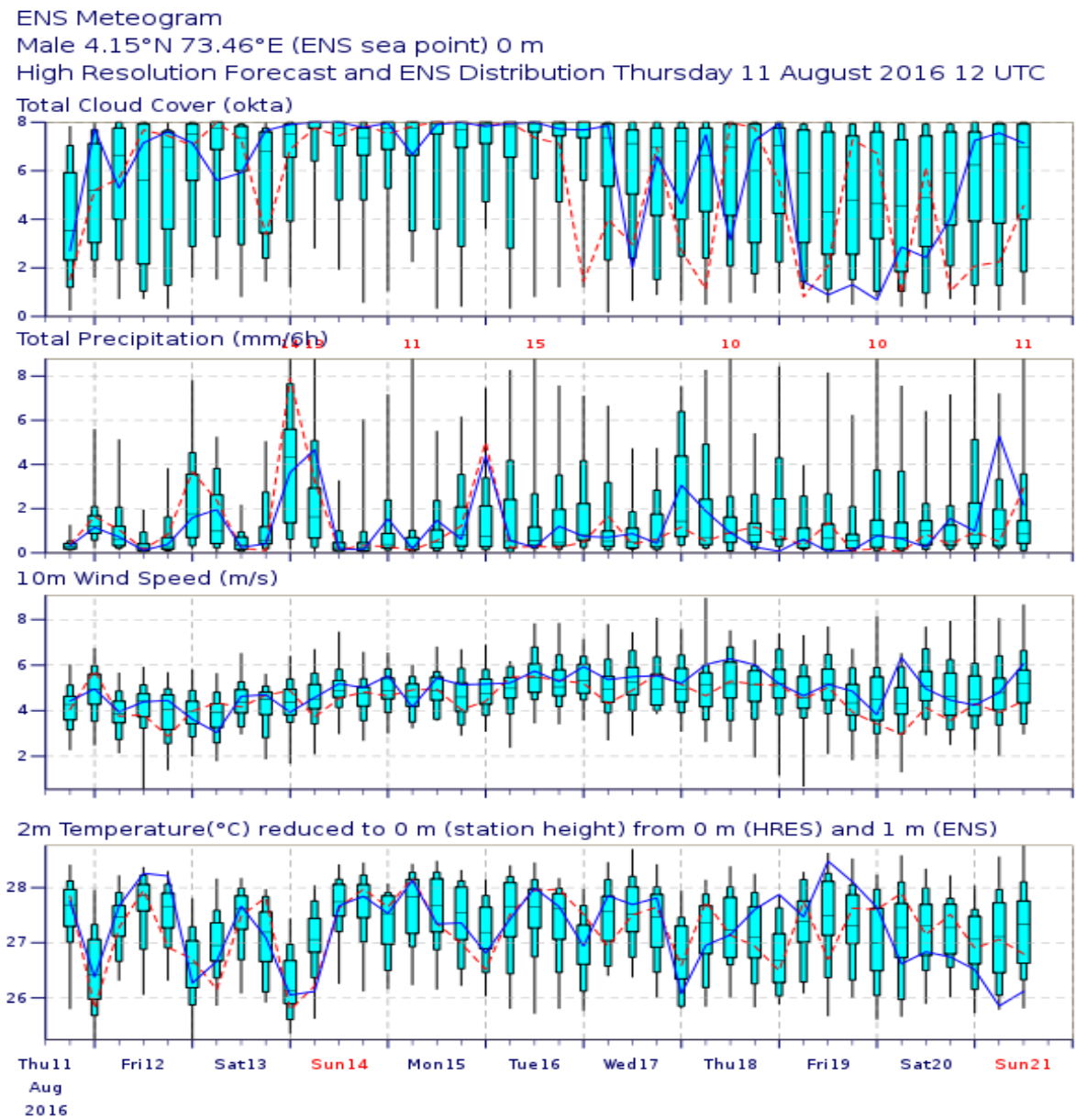
PRECIPITATION MODEL

Forecasted Rainfall and winds on Thu 15Z11AUG2016



MMMS model run on MMS Climate Server on 11082016 12UTC

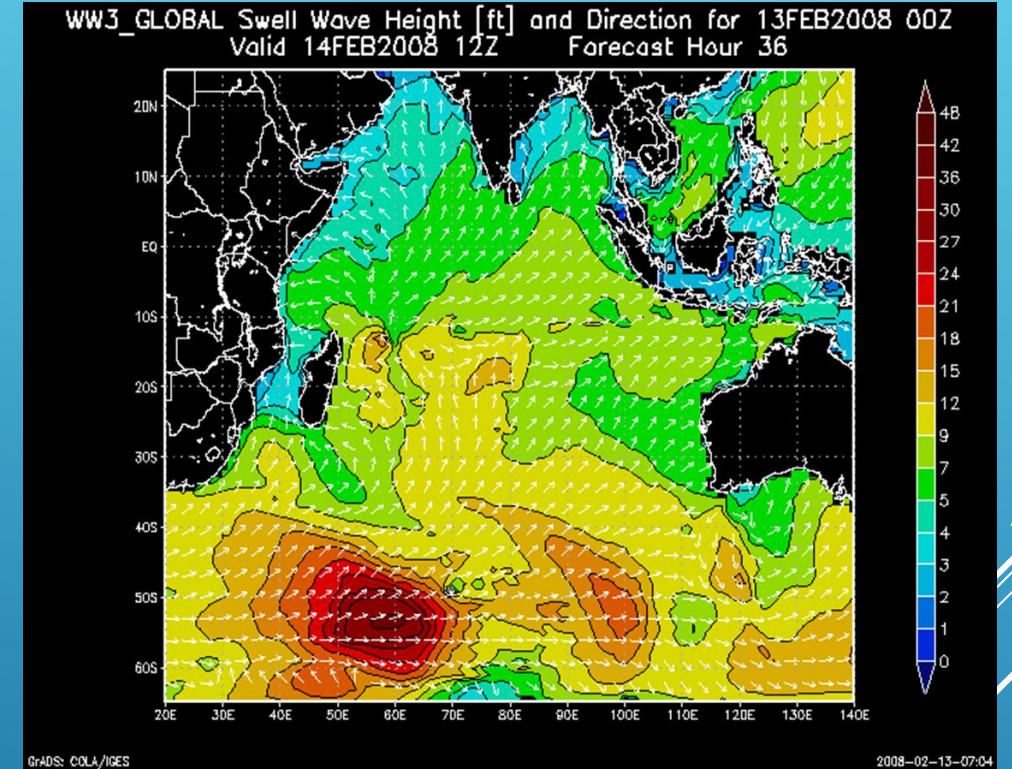
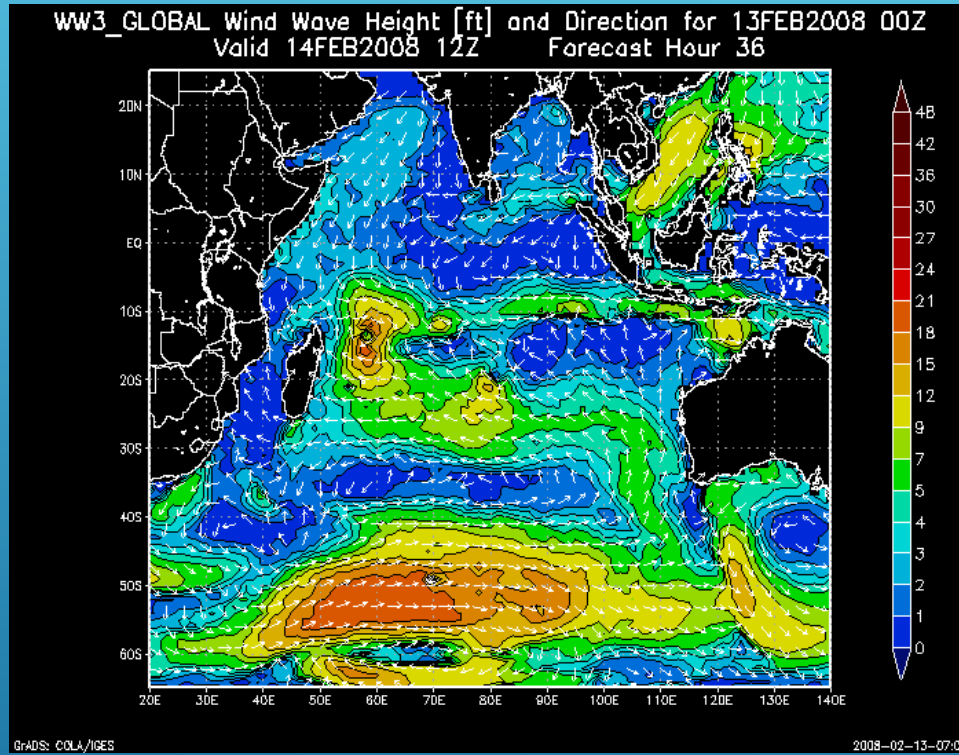
ECMWF MODEL



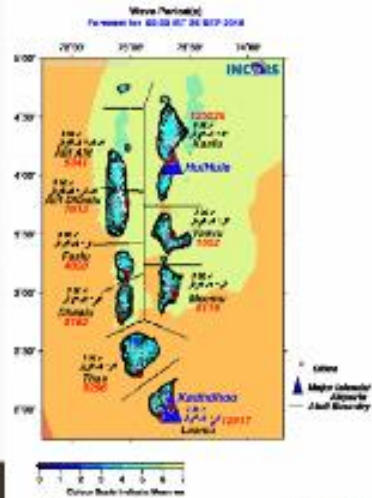
ENS Control(16 km)

High Resolution (8 km)

WIND WAVE & SWELL PREDICTION MODEL



RIMES & INCOIS Products for Maldives



Integrated Ocean Information and Forecast System
Maldives

Forecast Products

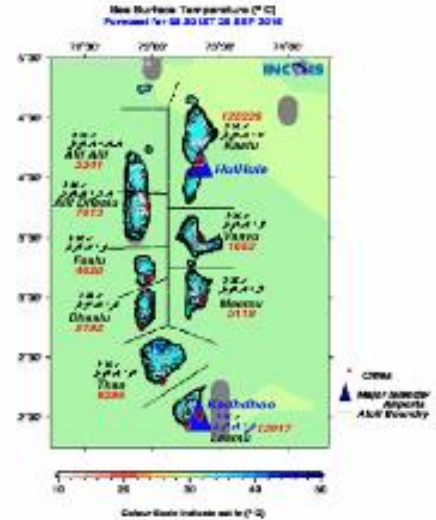
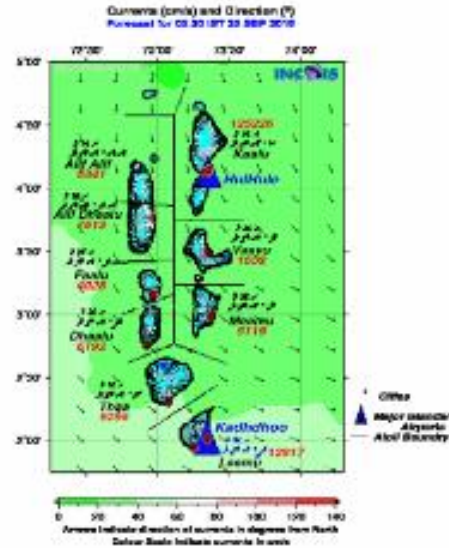
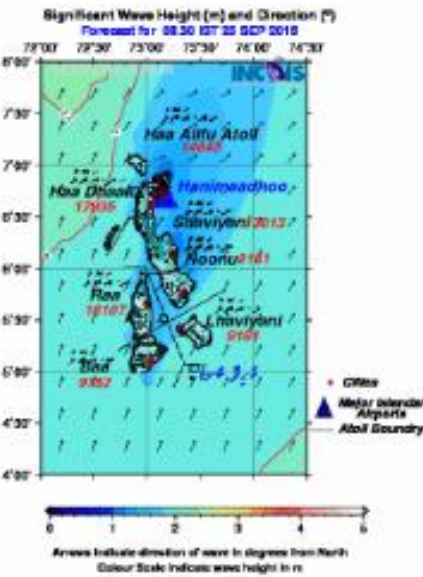
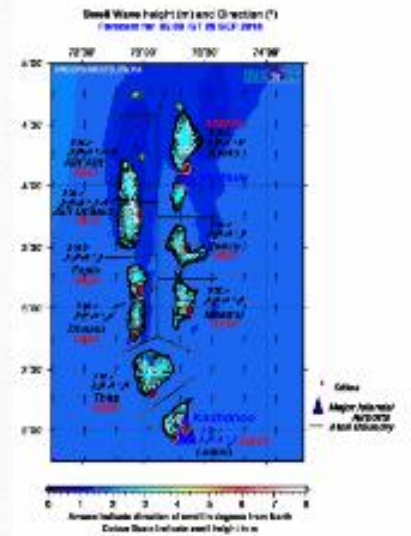
- Wave
- Current
- SST
- Sea Level Pressure
- Sea Level Height
- Sea Level Gradient
- Sea Level Slope
- Sea Level Curvature
- Sea Level Tilt
- Sea Level Curl
- Sea Level Divergence
- Sea Level Convergence
- Sea Level Vorticity
- Sea Level Vorticity Curl
- Sea Level Vorticity Divergence
- Sea Level Vorticity Convergence
- Sea Level Vorticity Curl Divergence
- Sea Level Vorticity Convergence Divergence
- Sea Level Vorticity Curl Convergence Divergence
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- Sea Level Vorticity Divergence Curl Convergence
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- Sea Level Vorticity Convergence Divergence Curl Convergence

Indian Ocean Forecast System (INDOFS)

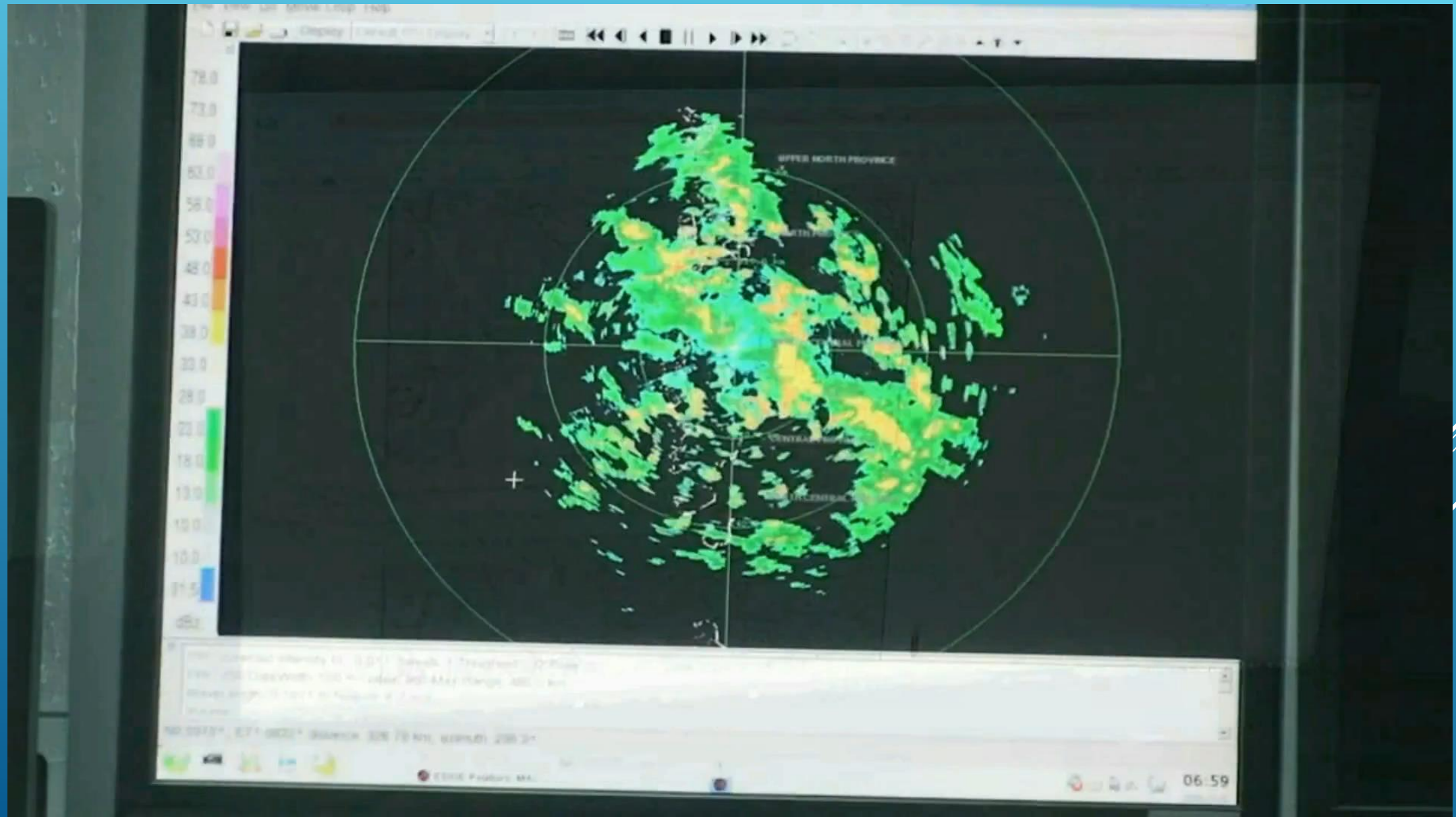
The Maldives, a string of islands of 864 km, is a high-latitude in the Indian Ocean comprising 32 administrative areas and made up of hundreds of islands. It is located in the Indian Ocean between 4°N and 10°S. The area covers 900,000 km² and has a population of 260,000. The Maldives is a low-lying island country in the Indian Ocean. It is a member of the Indian Ocean Rim Association (IORA), the Indian Ocean Rim for Southeast Asia (IOR-SEA), the Indian Ocean Rim for East Africa (IOR-EA), the Indian Ocean Rim for the Pacific (IOR-PAC), the Indian Ocean Rim for the Caribbean (IOR-CAR), the Indian Ocean Rim for the Americas (IOR-AM), the Indian Ocean Rim for the Middle East (IOR-ME), and the Indian Ocean Rim for the South Pacific (IOR-SP).

In order to better assess, identify, and forecast the risks associated with integrated sea level rise, the Maldives Government has established the Integrated Ocean Information and Forecast System (INDOFS). The system is designed to provide real-time information on the state of the ocean and atmosphere, and to provide decision support for the Maldivian Government and the Maldivian people. The system is designed to provide real-time information on the state of the ocean and atmosphere, and to provide decision support for the Maldivian Government and the Maldivian people. The system is designed to provide real-time information on the state of the ocean and atmosphere, and to provide decision support for the Maldivian Government and the Maldivian people.

INDOFS Maldives



DOPPLER WEATHER RADAR



WEATHER FORECASTING AND DISSEMINATION

Weather Forecast – Maldives

(Valid: 25 Oct / 10:00 am to 26 Oct / 10:00 am)

Scattered rain with a few heavy showers and thunderstorms will be experienced in central and northern atolls. Isolated showers are expected in southern atolls.

Surface winds will vary between south / south-west 13 – 23 miles per hour in central atolls and 7 – 17 miles per hour elsewhere. Winds may gust 40 miles per hour during showers.

Seas would be moderate becoming rough during showers.

Weather Forecast – Maldives

(Valid: 05 March/ 08:00 pm to 06 March / 08:00 pm)

Scattered showers with a few thunderstorms will be experienced in southern atolls. Generally fine weather is expected elsewhere.

Surface winds will vary between North east / easterly at 8 – 18 miles per hour in southern atolls and 3 – 13 miles per hour elsewhere.

Seas are expected to be moderate in central atolls and slight elsewhere.

Dhivehi Forecast

English Forecast

Marine Forecast

Daily Rainfall Report

Aviation Products

- SYNOP/PILOT-TEMP
- Flight Folder
- T4Charts
- METAR/SPECI
- SIGMET
- SIG WEATHER
- TAFS

PREPARE & DISSEMINATE WEATHER FORECAST

- General public. (10 am & 8 pm)



- Tourism sector (on request)



- Aviation sector (every hour)



- Fishing & shipping (10 am & 8 pm)



STANDARD OPERATING PROCEDURE (SOP)

ALERT WHITE

01

MEAN WIND SPEED
23 – 29 MPH
RAINFALL > 50 MM
MODERATE/HEAVY
THUNDERSTORMS
TIDAL/SWELL WAVES

Weather Information,
but no immediate
threat.

ALERT YELLOW

02

MEAN WIND
SPEED 30 – 40 MPH
HEAVY/TORRENTIAL
RAINFALL > 2 HRS
STRONG TORNADO
SEVERE
THUNDERSTORMS
SIGNIFICANT
TIDAL/SWELL WAVES

Action Concern authorities and
people living in the area to
be on alert & be ready to
take action. Travel by sea
not advisable.

ALERT RED

03

MEAN WIND SPEED > 40 MPH
FLASH FLOOD EXPECTED
VIOLENT TORNADO
TROPICAL CYCLONE
DESTRUCTIVE TIDAL/SWELL
WAVES OR STORM SURGE

Evacuation of population
from threatened areas to
safer places. Prohibition of
sea transportation.

STANDARD OPERATING PROCEDURE (SOP)

ALERT GREEN

04

CANCELLATION

Condition has improved.

ALERT YELLOW MESSAGE

02

ALERT YELLOW ADVISORY:

TORRENTIAL RAIN EXPECTED.

AREA: SOUTHERN ATOLLS.

PERIOD:

06/0630 – 06/0900 HRS.

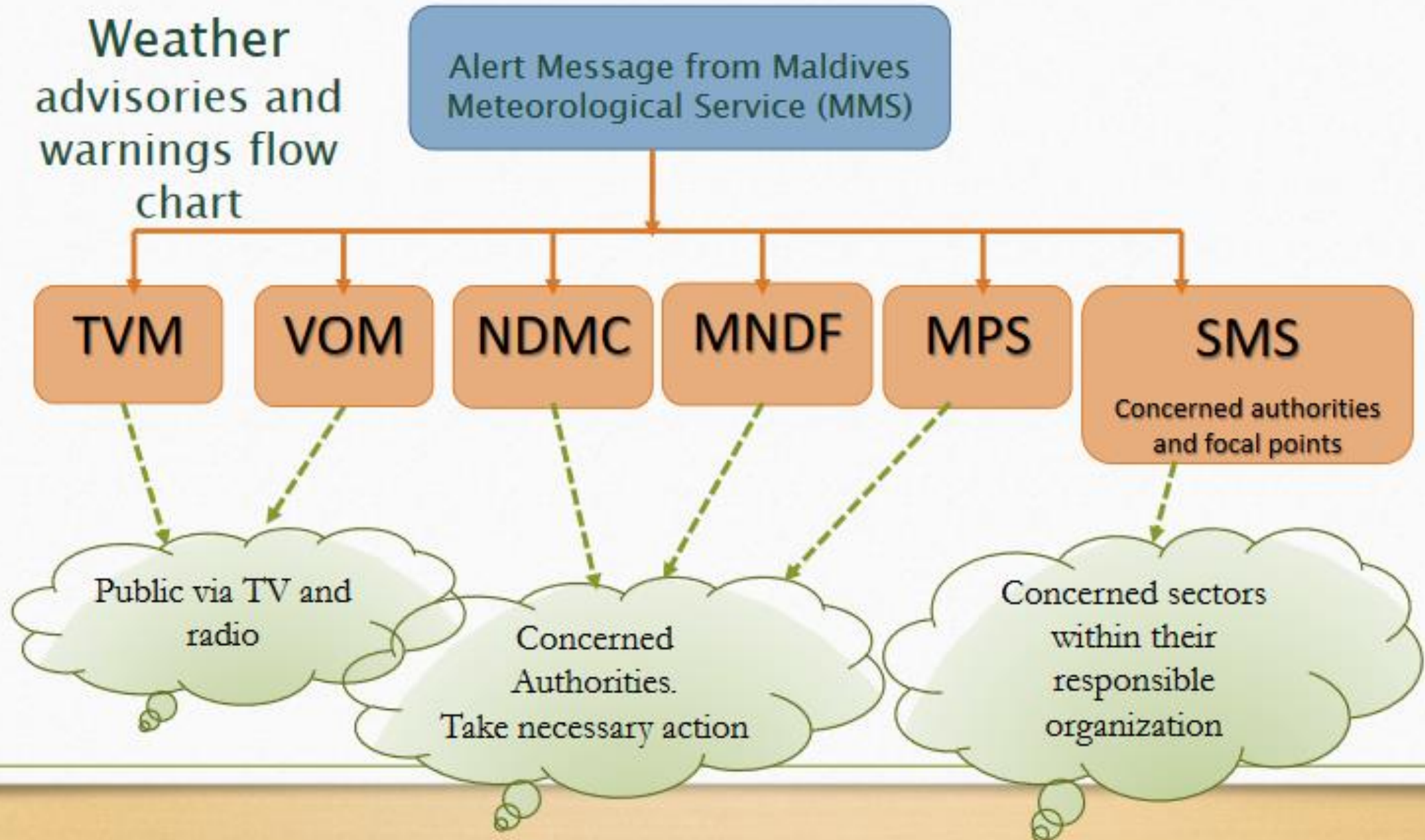
ISSUED:

0600 HRS 06 NOVEMBER 2017.

-METSERVICE-

EARLY WARNING MECHANISM

Weather advisories and warnings flow chart



- ❖ Phone: 3323084
- ❖ Mobile: 7967171
- ❖ Tweeter: @MetMaldives
- ❖ Facebook: MetMaldives
- ❖ Dial weather: 3317171
- ❖ Website: meteorology.gov.mv
- ❖ Mail: nmc@meteorology.gov.mv



THANK YOU