



Overview of existing Weather Forecasting and Warning infrastructures in Myanmar

by

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Officer (DMH)

26. February. 2018

Nay Pyi Taw

Outline

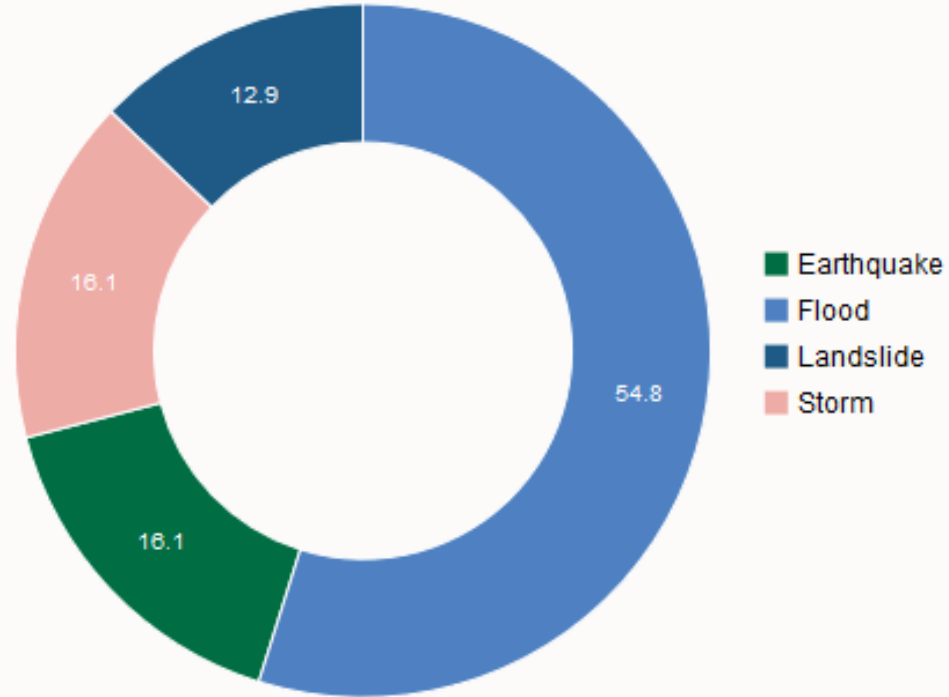
- Introduction
- Myanmar & its disasters
- Meteorological Hazard Calendar
- Natural Disaster (Vulnerable) Area in Myanmar
- National capacity for weather forecasting
- Forecast, Warnings and Bulletins in DMH
- Organizational structure and human resources
 - 24/7 working
- Early Warning Dissemination
- Brief overview of products and services provided, and the form provided from DMH
- Conclusion

Introduction

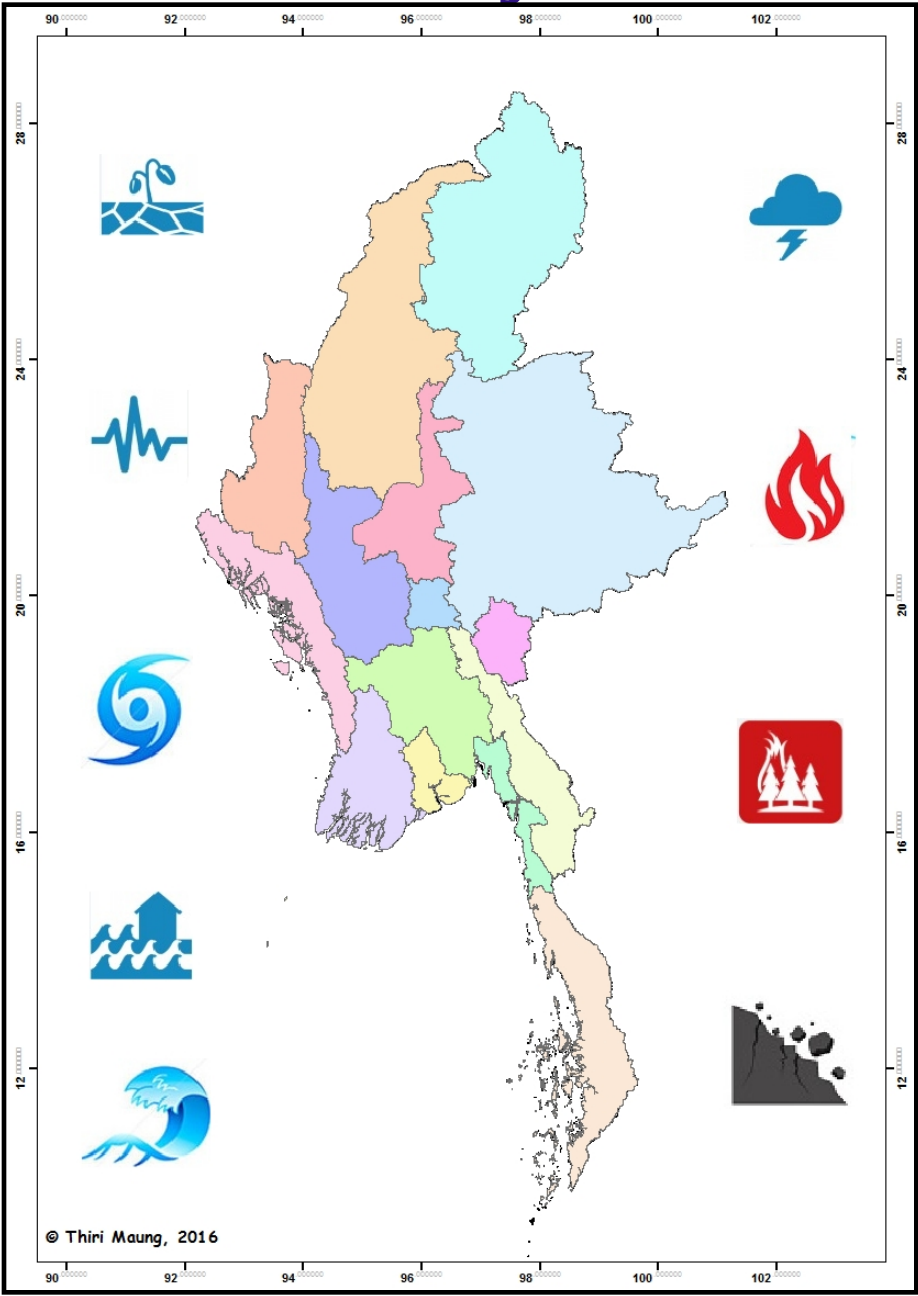
- DMH is servicing Meteorological, Hydrological and Seismological phenomena to provide important news and warnings for disaster prevention/mitigation and development of socio-economic activities in the region.
- Many Asia-Pacific countries have been improved their early warning systems for typhoons and cyclones – notably Myanmar, India, Bangladesh, Philippines and Viet Nam (CRED & UNISDR, 2016)
- Early Warning System Information is the main responsibility of DMH to issue timely and effectiveness prevention of the disaster risk reduction.

Myanmar and its Disasters

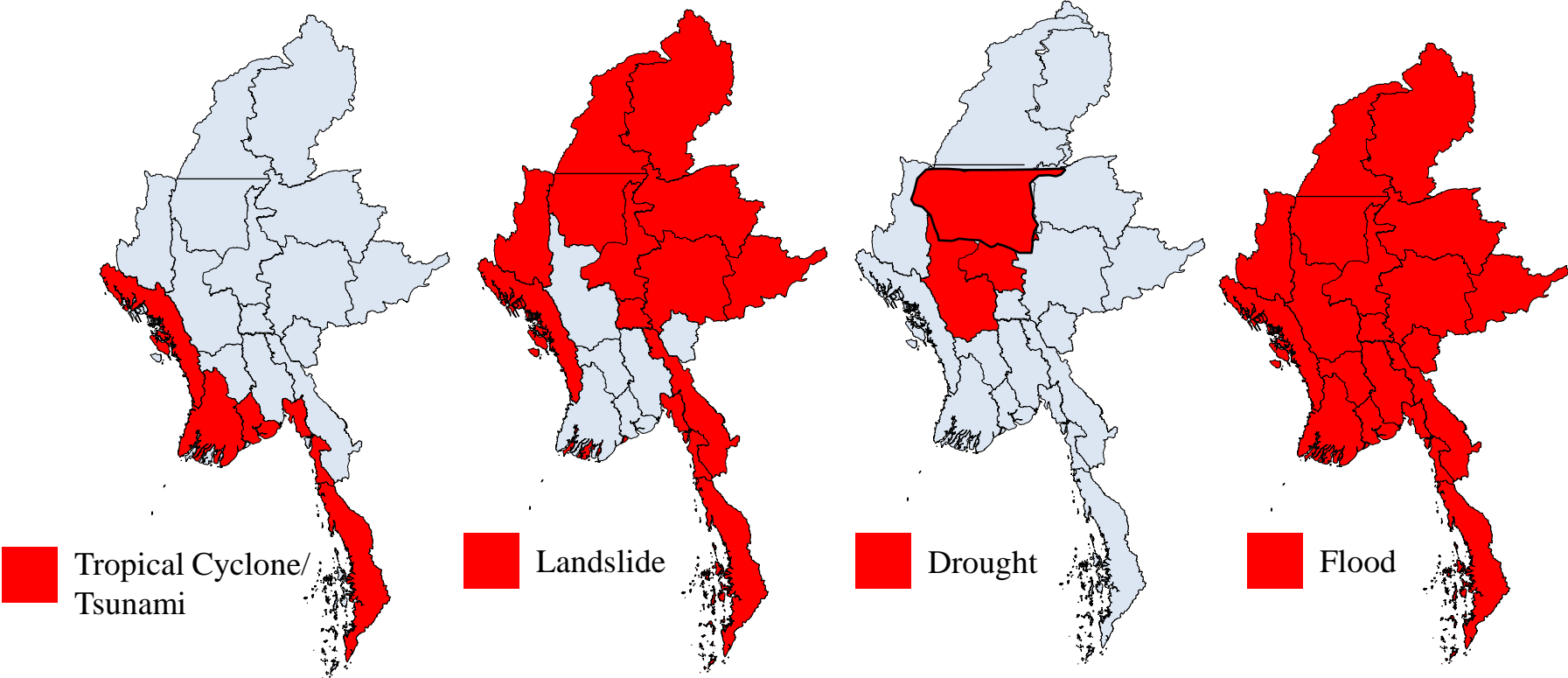
Disaster Frequency between (1990 – 2014)



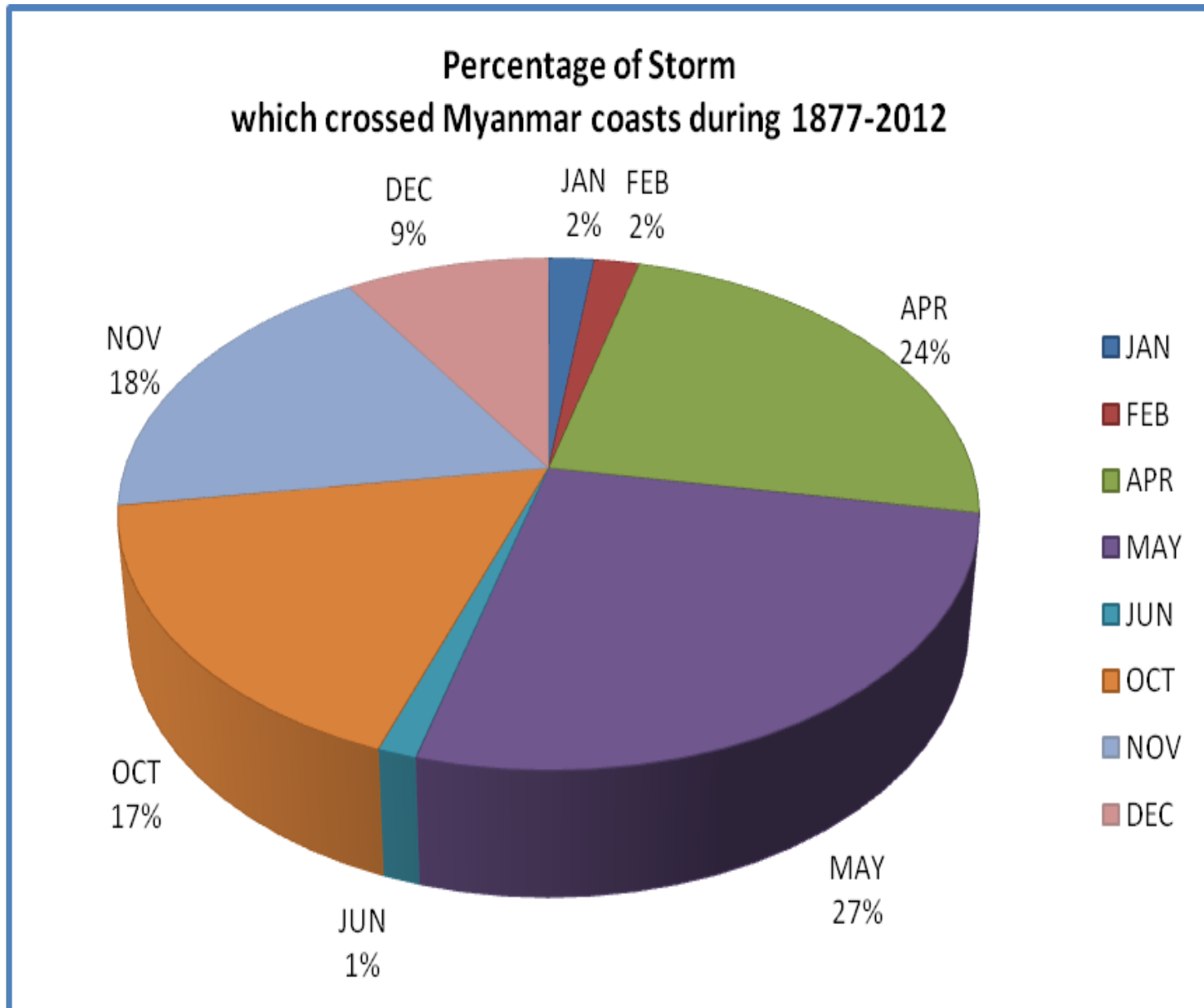
Ref:
<http://www.preventionweb.net/countries/mmr/data/>



Natural Disaster (Vulnerable) Area in Myanmar

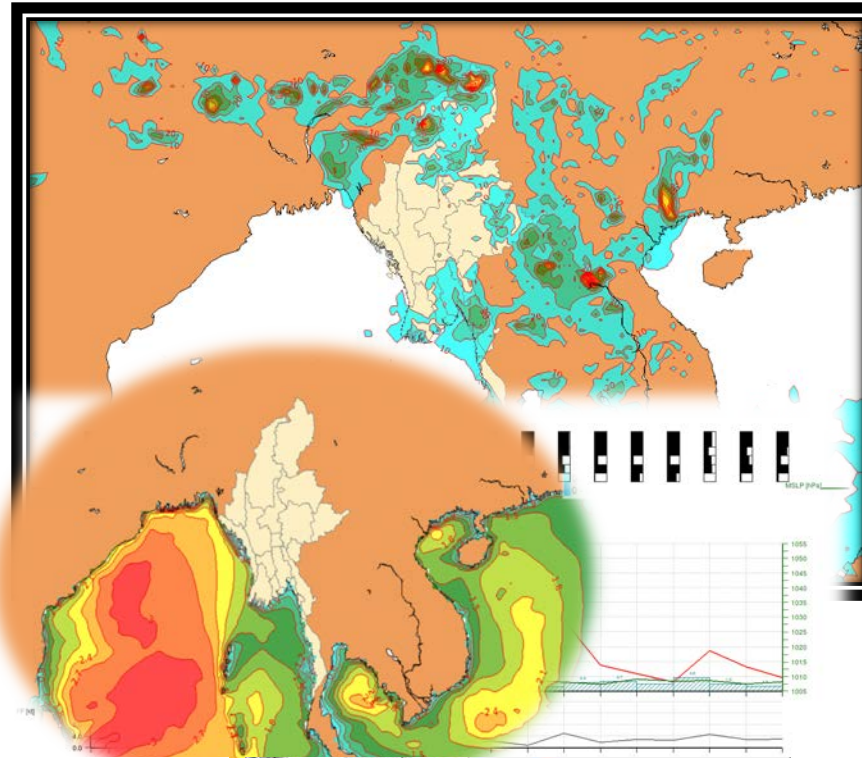


Frequency of Cyclones (%) which crossed Myanmar coasts (1877-2012)

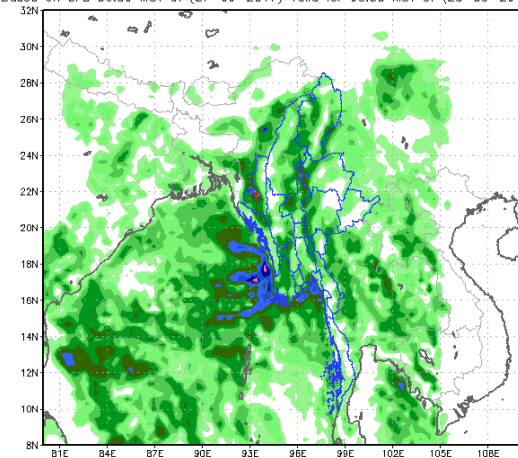


National Capacity for weather Forecasting

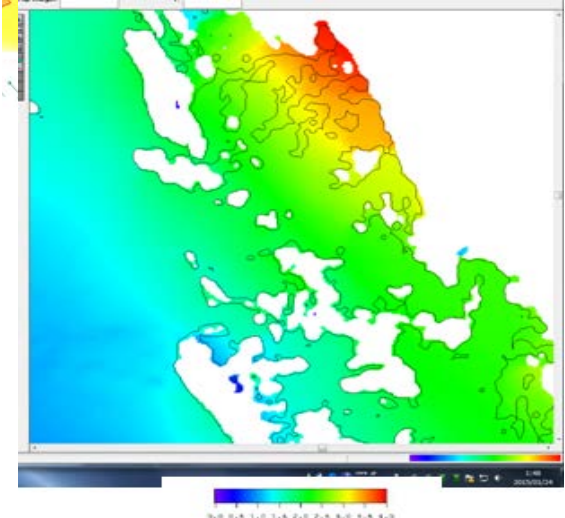
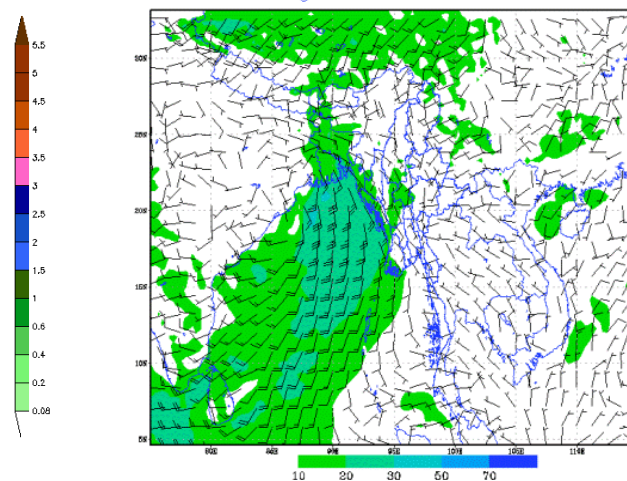
- WRF Regional model (30km resolution)
- WRF-Adas Realtime Modeling System (WARMS) (9km resolution)
- DIANA tools(Norway, Met. NO.) (25 km Resolution)
- Storm Surge Model (30Second resolution with 3 domain, small 900m, medium 3600m and large 14,000m)
- Data Visualization software using Grid Analysis and Display System (GrADS)



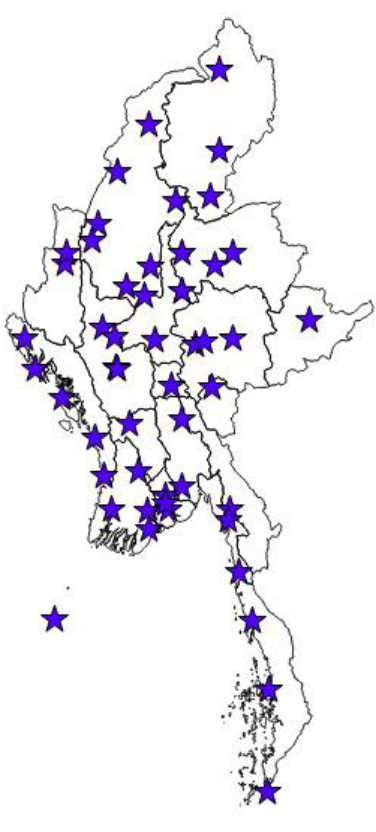
DMH MYANMAR WRF(30 km) RAINFALL (inches) FORECAST(24 hrs)
Based on GFS 06:30 MST of (27-09-2017) Valid for 06:30 MST of (28-09-2017)



DMH MYANMAR (WRF model)Forecast 3 Hourly Surface Wind(in mph)
Forecast Length in Hours : 2015092000+3 Hours.



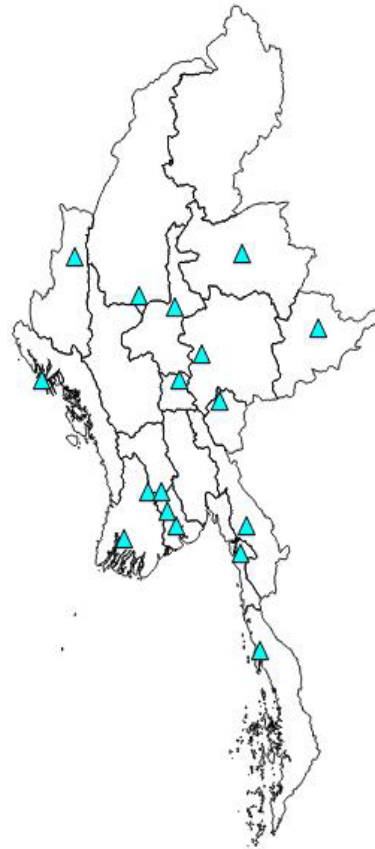
Meteorological Observation Network



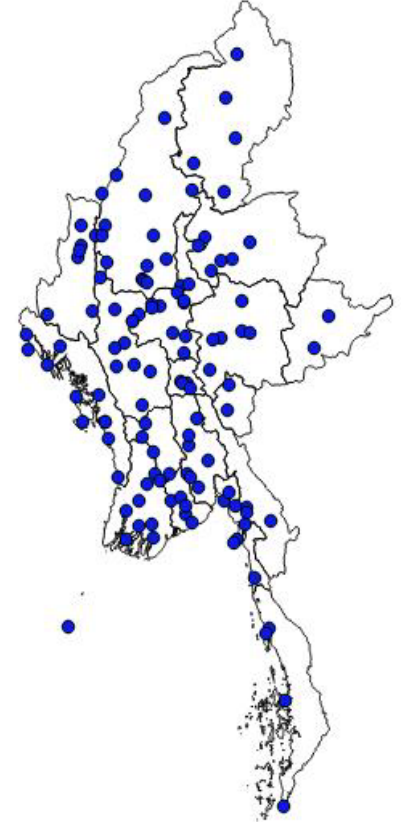
51 WMO
GTS Stations



8 Aviation
Stations



17 Agro-Met
Stations



121 Reporting
Stations

Automatic Weather Systems(AWS)

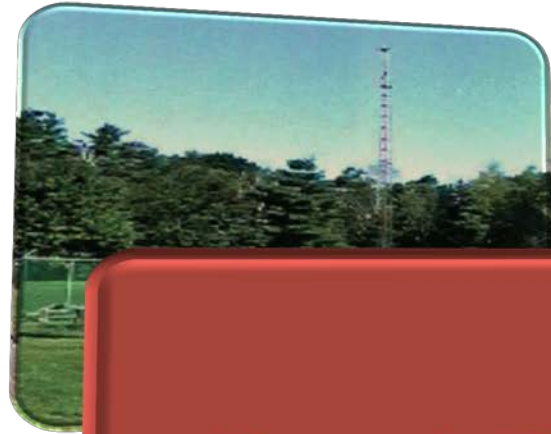
The screenshot shows the 'Weather Monitor' interface for station DMH - NPT - MDRU1. The top navigation bar includes 'AWS Panel', 'AWS Single', 'AWS Graph' (highlighted), 'AWS Table', and 'Export'. Below this, there are filters for 'Select Stations', 'Select Data', 'Start Date' (08/02/2017), 'UTC Time' (00:00), 'End Date' (08/05/2017), and 'UTC Time' (23:59), along with 'Filter' and 'Reset' buttons. A grid of 20 station selection options is displayed, each with a checkbox and a colored square:

<input type="checkbox"/> Select All	<input type="checkbox"/> HPAAN, Hpaan	<input type="checkbox"/> MAGWA, Magway	<input type="checkbox"/> PATHE, Pathein
<input type="checkbox"/> BAGOO, Bago	<input type="checkbox"/> KALAY, Kalaymyo	<input type="checkbox"/> MANDA, Mandalay	<input type="checkbox"/> PUTAO, Putao
<input type="checkbox"/> BHAMO, Bhamo	<input type="checkbox"/> KAWTH, Kawthaung	<input type="checkbox"/> MAWLA, Mawlamyine	<input type="checkbox"/> SITTW, Sittwe
<input type="checkbox"/> DAWEI, Dawei	<input type="checkbox"/> KENGT, Kengtong	<input type="checkbox"/> MEIKH, Meikhtila	<input type="checkbox"/> TAUNG, Taungoo
<input type="checkbox"/> GWAAA, Gwa	<input type="checkbox"/> KYAUK, Kyauk Phyu	<input type="checkbox"/> MONYW, Monywa	<input type="checkbox"/> TAUJI, Taunggyi
<input type="checkbox"/> HAKHA, Hakha	<input type="checkbox"/> LAPUT, Laputta	<input type="checkbox"/> MYITK, Myitkyina	<input type="checkbox"/> THAND, Thandwe
<input type="checkbox"/> HKAMT, Hkamty	<input type="checkbox"/> LASHI, Lashio	<input type="checkbox"/> NANSA, Nansam	<input type="checkbox"/> YANGO, Yangon
<input type="checkbox"/> HMAWB, Hmawbi	<input type="checkbox"/> LOIKA, Loikaw	<input type="checkbox"/> NAYPY, Nay Pyi Taw	

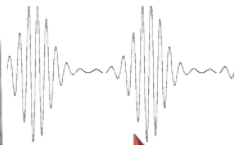
- Have been installed (50) AWS
 - (30) by JICA
 - (20) by Korea
- Still in processing (90) AWS by World Bank

GTS Data Transmitting System

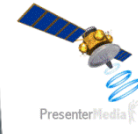
SSB
Phone



Observatory



Main Center
• Nay Pyi Taw



Bangkok
&
New Delhi

Data dissemination Methods





OBSERVATIONS RECORDED AT 09:30 HOURS M.S.T ON 28.9.2017


REGION/ STATE	Temperature °C					Rainfall (mm)					REGION/ STATE	Temperature °C					Rainfall (mm)				
	At 09:30 hours	Maximum	Minimum	Prev 24 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours		Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours	Since 06:00 hours		
KACHIN																					
Pulao	24	32	22	30	4183	4183	Maungdaw	26	34	24	2	4121									
Myittha	28	33	23	0	2612	2320	Kyaikaw	28	34	24	2	4058									
Bhamo	28	35	26	1	1570	1842	Sitaw	26	33	25	63	4372	4749								
Maungbaw	24	30	22	43	3236		Kyaikaba	-	34	24	98	5270	4754								
SHAN																					
Thabeik	26	33	19	2	1181	1276	Gwa	27	30	25	19	5880	4509								
Lashio	25	32	22	1	1003	1259	Arin	26	32	24	22	4311									
Taunggyi	20	25	18	Tr	1188	1471	Taunggye	-	33	24	53	5329									
Kanglung	24	30	20	0	1093	1233	Myittha U	28	34	25	9	3684	3634								
Namsam	24	29	20	3	1204		Maneung	27	32	23	26	4440	4829								
Phuung	21	25	17	0	2104	2114	BAGO														
Hatto	24	28	17	0	876	1010	Pyay	27	31	24	52	1178	1203								
CHEN																					
Mindat	20	28	18	7	1424	1471	Zaung Tu	27	28	25	14	2850									
Hakha	18	23	16	5	1703	1625	Maung	29	25	24	17	3305	3097								
Patheingyi	27	30	22	6	3429		Shwegyin	30	30	23	8	2334	2066								
U-SAGAING																					
Hkamti	27	34	24	5	4055	4036	Thamawady	29	31	24	17	1815	2233								
YANGON																					
Hsinliin	27	30	24	2	2030	2233	Hinewadi	30	30	25	6	2302	2607								
Katha	28	34	24	32	1283	1153	Mingaladon	30	30	26	8	2408	2621								
Mawlaik	28	34	22	9	1924	1745	Kaba-Aye	30	30	22	3	2727	2783								
Kataywa	26	31	23	35	1220	1641	C-Yangon	29	29	25	5	2758									
Kalay	27	30	23	48	1865	1708	Khayan	30	30	24	9	2981									
L-SAGAING																					
Kanbau	26	33	26	20	904		Hinthada	27	32	24	4	1830	2360								
Shwebo	27	33	26	5	888	829	Maubin	29	30	21	11	2005	2478								
Mataywa	28	35	26	Tr	603	653	Phayapon	30	30	26	3	2709									
Sagaing	26	34	20	12	790	790	Patheingyi	28	28	21	11	2162	2874								
MANDALAY																					
Pyin Oath	26	28	20	9	1394		KAYAH														
Mandala	29	34	26	3	807	817	Lokaw	24	28	20	0	809	1048								
Maikha	33	32	24	0	983	813	KAYI														
Maekok	23	28	20	12	2587	2691	Hpa-an	28	30	26	18	3335	4284								
Myingyan	27	32	25	24	729	656	MON														
Nyaung-U	28	32	25	6	563	619	Thalon	28	30	26	14	4705	5525								
Yamethin	27	31	24	0	628	644	Mawlaikya	30	30	24	1	3182	4970								
Kyaikse	28	35	25	4	713		Yay	28	32	23	0	4695	5315								
Kyaikbatay	0.19																				
NAYPYITAW																					
Tatkon	31	31	24	1	674		Kyaukhada	29	30	25	1	4349	5087								
Yezin	30	31	25	1	1275	1189	Tharayay	28	28	24	17	3591	3507								
Pyinmana	27	32	25	0	1095	1029	DAWEI														
Ita	28	31	24	Tr	1076		Dawei	29	32	23	Tr	4403	5445								
MAOWAY																					
Chaik	28	31	25	1	537	813	Kaithong	28	31	24	0	4013	3943								
Maibu	28	35	24	5	992	787	Co Co Island	29	30	24	20	2084	2337								
Magway	28	30	20	17	372	805	Goon Island	29	29	21	20	2084	2337								
Aungmye	27	32	25	5	1175		Complet	By : H.E.K.													
Pakokki	27	32	25	3	511	606	Check By : H.E.M.T.K.														
Taungtha	28	32	23	8	1056																


Availability of systematically observed Meteorological data


Name


 1-12--13.txt


 2-12-13.txt


 3-12-13.txt


 4-12-13.txt


 5-12-13.txt


 6-12-13.txt


 7-12-13.txt


 8-12-13.txt


 9-12-13.txt


 10-12-13.txt


 11-12-13.txt


 12-12-13.txt


 13-12-13.txt


 14-12-13.txt


 15-12-13.txt


 16-12-13.txt


 17-12-13.txt

 18-12-13.txt

 19-12-13.txt

 20-12-13.txt

 21-12-13.txt

 22-12-13.txt

```
AAXX 01004
48001 NIL=
48004 NIL=
48008 21556 80000 10260 20256 40046 70296 8497/ 333 20250
56459 58001=
48010 21456 80000 10265 20253 40053 70295 8477/ 333 20260
56539 58012=
48018 22556 80000 10265 20246 40025 8597/ 333 20215 56569
59007=
48019 22456 80000 10250 20247 40048 8577/ 333 20254 56459
58002=
48020 NIL=
48025 32140 80000 10276 20268 40046 85841 333 20272 56799
59003=
48035 21240 80000 10224 20220 40056 75166 8692/ 333 20212
56999 58009=
48037 32457 83602 10273 20256 40032 8587/ 333 20268 56449
59001=
```

➤ GTS data availability since May, 2012

➤ Currently Text format

Main page

About Website

FTP Data Service

Weather News Radio

Colleague Link

Webboard

Suggestion



Tsunami Warning

Storming Tracking

Earthquake Reporting

ECMF Maps



Radar Monitoring

Satellite Monitoring

Route Map

Synoptic Data

Radar Data

Warning News

Metar Data

Note Data



Surface Data

08/05/2017

- 00. UTC
- 03. UTC
- 06. UTC
- 09. UTC
- 12. UTC
- 15. UTC
- 18. UTC
- 21. UTC

Country : --- select ---

Browse All Data Reset

Upper Wind Data

08/05/2017

- 00. UTC
- 06. UTC
- 12. UTC
- 18. UTC

Country : --- select ---

Browse All Data Reset

Weather Around The World

Country: THAILAND

City: (48455)

UPDATE: 2017-08-05 /16.00

30.3 °C

Himawari cast and SATAID Satellite



*Himawari cast Direct
Receiving from Antenna*

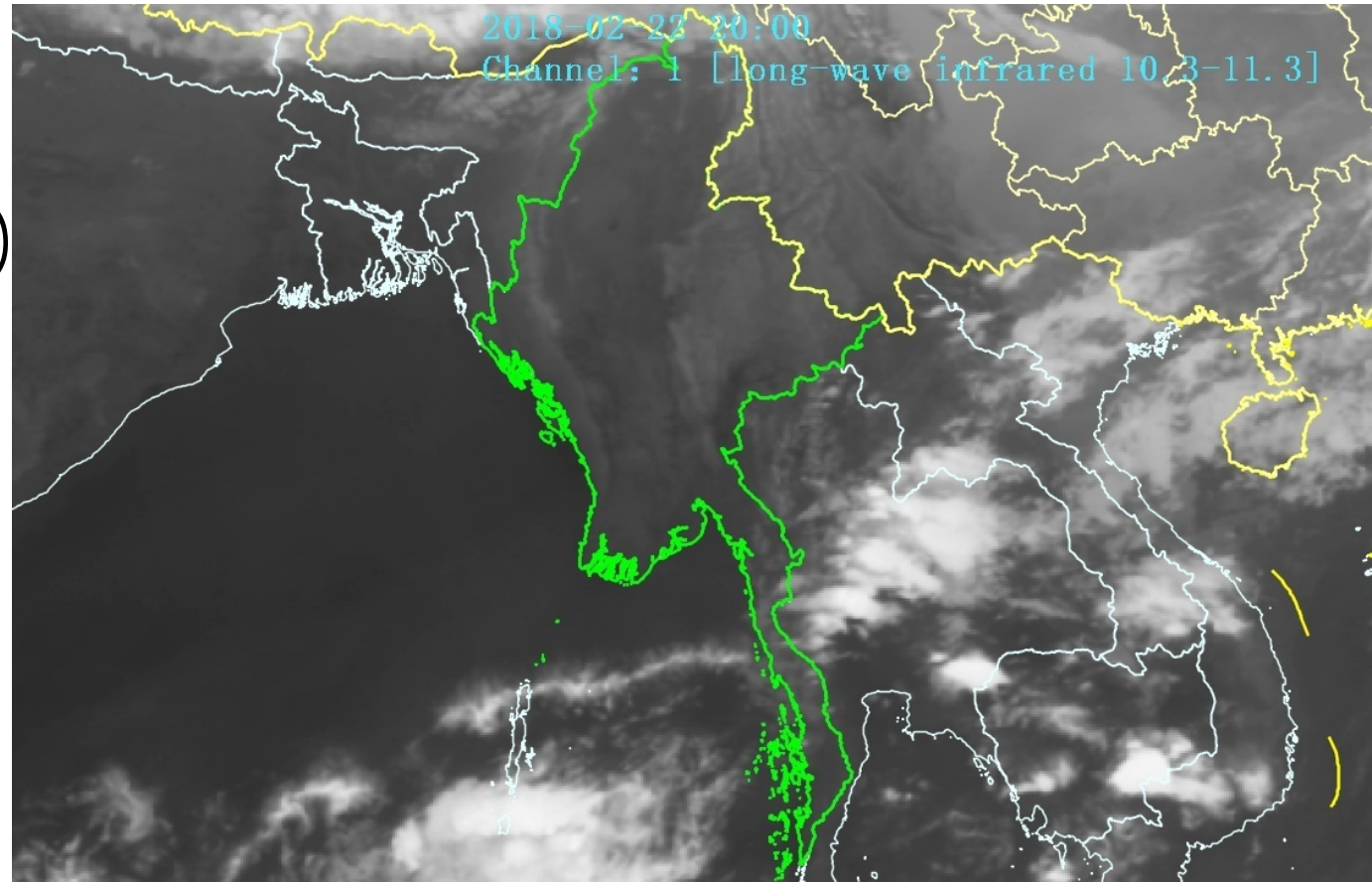
MTSAT Data Processing System in DMH, Nay Pyi Taw

✓ Installation of MTSAT and SATAID are started from 2010 December, donated by JICA .
Upgraded Himawari 8 (MTSAT) on November, 2015.

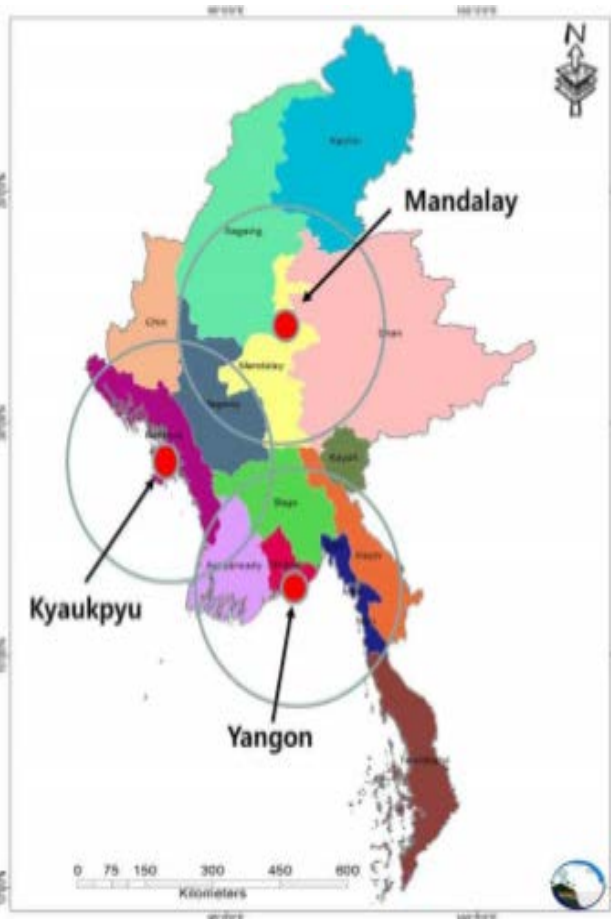
✓ Upgrade- Every 10 minutes observations (Himawari-8 , 14th December, 2015)

Meteorological Information Comprehensive Analysis Process System (MICAPS)

➤ MICAPS
collaboration with
WMO/VCP (China)
in 2005



Radar Network



Perspective View



Kyauk Phyu



Yangon

Wireless LAN



Yangon
International
Airport



Mandalay

Internet Link



VSAT

Internet Link



DMH Multi-Hazard Early
Warning Center, Nay Pyi Taw

Radar Products

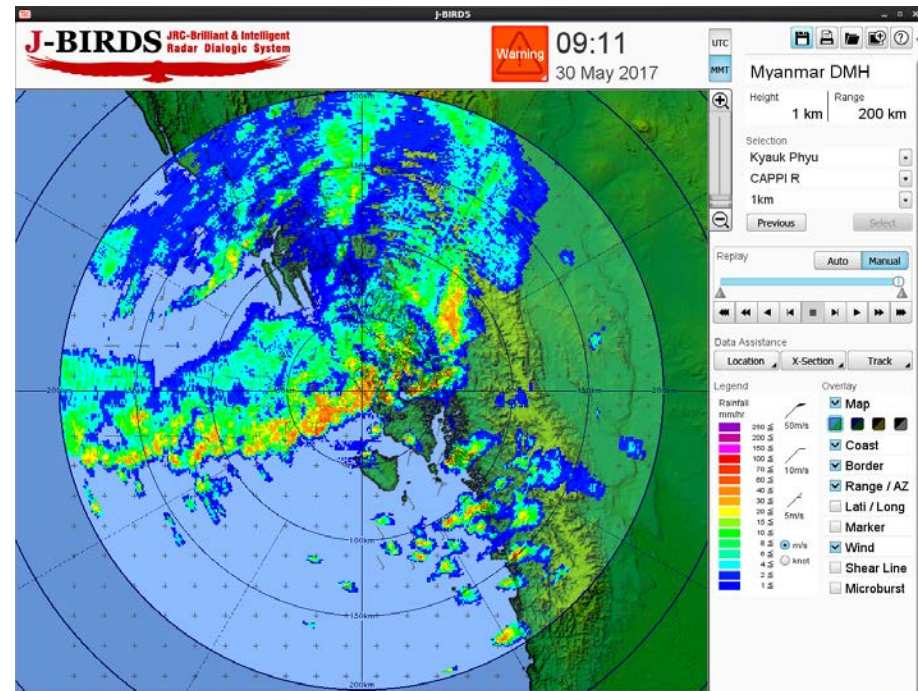
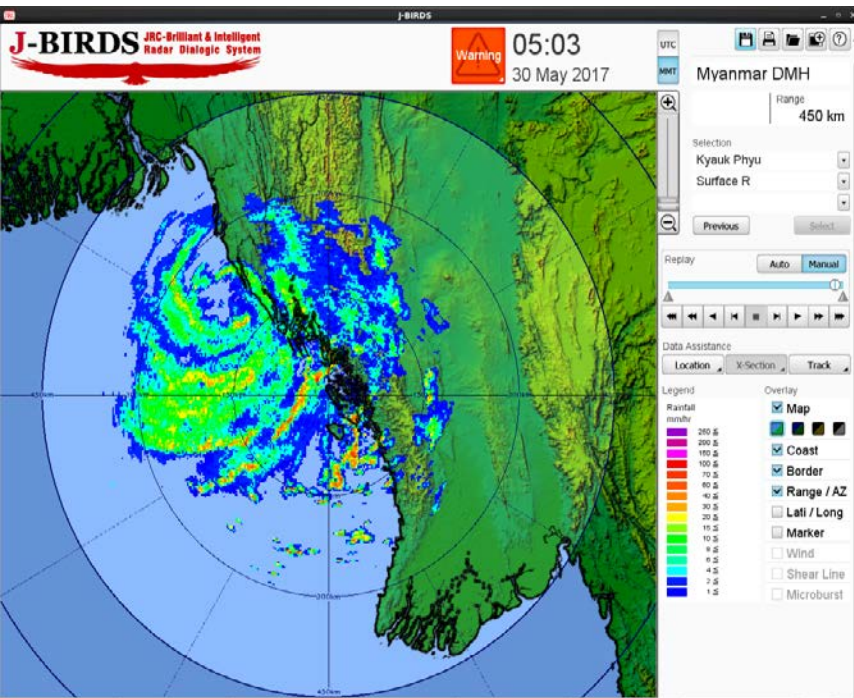


Fig. Radar Images (Kyauk phyu) Cyclonic Storm “MORA”25-30 May 2017

Forecasts, Warnings and Bulletins in DMH

Meteorological Forecasts, Warnings, Bulletins

Daily, (10) days, Monthly and Seasonal Weather Forecast

Aviation Weather Forecast

Sea Route Forecast

Squall Wind Weather Forecast

Special Weather Forecast

Cyclone/Surge Forecast

Untimely Rainfall Forecast

Fog Warning

Port Warning

New Records

Agro-meteorological Bulletin

Significant Weather Warning

Hydrological Forecasts, Warnings, Bulletins

Daily, (10) days, Monthly and Seasonal Water Level Forecast

Significant Water Level Bulletin

Flood Warning and Bulletin

Minimum Alert Water Level and Bulletin

Minimum Alert Water Level Bulletin (for Low Flow Season)

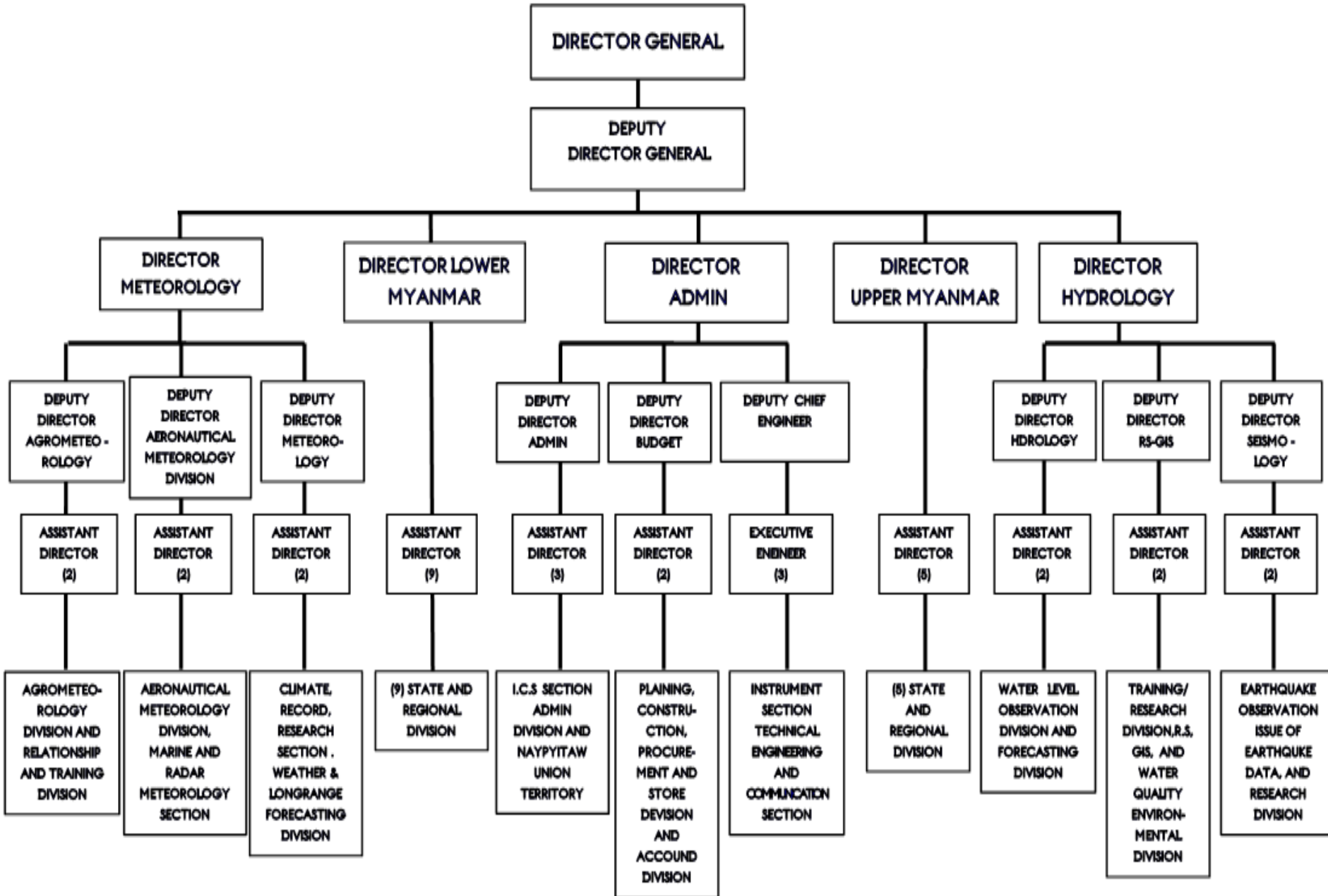
Seismological Services

Tsunami Warning

Earthquake News

Types of Forecast/Warning	Responsibility Section/Division	Time
Daily Weather	Forecasting	7:00Am/12:00 noon/2:00pm/4:00pm/7:00pm
10 day weather	LRF	Every month of 8/18/28
Monthly Weather	LRF	Every month of (28)
Seasonal Weather	LRF	April 28/June 28/August 28
Aviation Weather	Aviation Met	Every 6 Hourly
Special weather	Forecasting	As per request and weather conditions
Coastal Weather	Forecasting	10:30 Am/ 1:30pm
New Records	Forecasting	If new record occur..
Agromet Bulletin	Agromet	Every 10 day
Cyclone/surge	Forecast/warning	24-36 Hr ahead
Heavy rainfall	Forecast/warning	Vigorous monsoon/cyclone/....
Untimely Rainfall	Forecasting	Weather disturbance....
Fog Warning	Aviation Met	If necessary
Port Warning	Forecasting	Squally wx is expected

Organizational structure and human resources



24/7 Working group for Weather Forecasting

- (3) groups in main Office (Nay Pyi Taw)
 - Group Leader/Forecaster (1) Person
 - Assistance forecasters (2), senior and Junior Observers (3) persons
- (3) groups in Yangon (Kaba-Aye)
 - Group Leader/Forecaster (2) Persons
 - Assistance forecasters (4), senior and Junior Observers (3) persons
- (3) groups in Yangon (Mingladone) for **Aviation**
 - Group Leader/Forecaster (1) Person
 - Assistance forecasters (2), senior Observers (2) persons

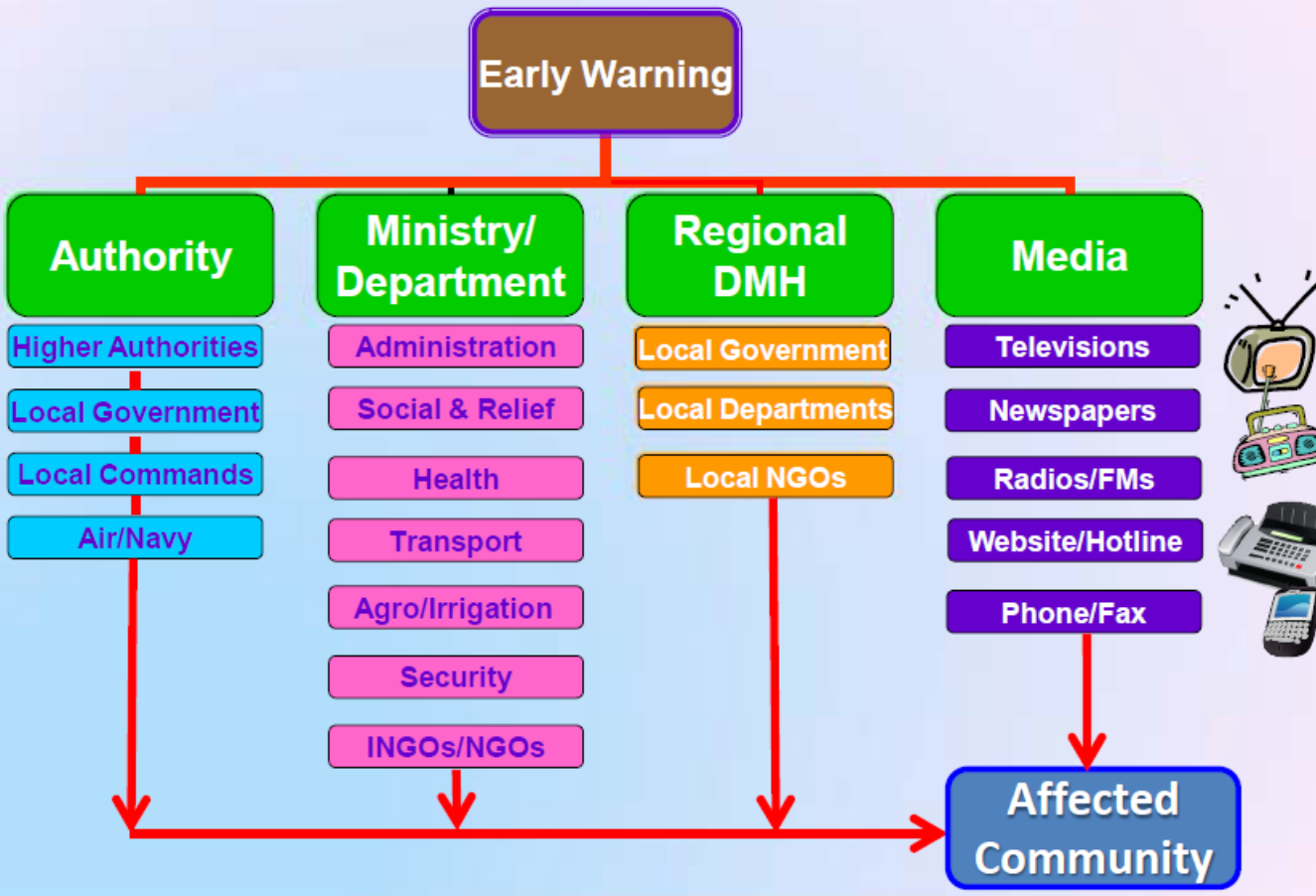
Weather Discussion



Operation for Daily Weather FC



Early Warning Dissemination



SSB



ANSWERING MACHINE



<https://www.facebook.com/dmhmoezalanaypyitaw/?fref=ts>
www.moezala.gov.mm

PHONE



FAX



Brief overview of products and
Services provided, and the form
Provided from DMH

Myanmar Daily Weather Report

(Issued at 2:00 pm Sunday 25th February, 2018)

SUMMARY OF OBSERVATIONS RECORDED AT 09:30 hrs M.S.T: During the past (24) hours, rain have been isolated in Yangon and Taninthayi Regions, Kayin and Mon States, weather has been partly cloudy in Upper Sagaing Region, Kachin, Shan, Chin and Kayah States and generally fair in the remaining Regions and States. Night temperatures were (2°C) below February average temperature in Northern Shan State, (3°C) above February average temperature in Mon State, (2°C) above February average temperatures in Sagaing, Ayeyarwady Regions and Kayin State and about February average temperatures in the remaining Regions and States. The significant night temperatures were (4°C) each in Heho and Hakha, (5°C) in Namsam, (6°C) each in Thipaw, Pinlaung and Mongyang. The noteworthy amount of rainfall recorded was Khayan (0.39) inch.

BAY INFERENCE: Weather is partly cloudy over the Andaman Sea and South Bay and generally fair elsewhere over the Bay of Bengal.

FORECAST VALID UNTIL MORNING OF THE 26th FEBRUARY, 2018: Rain will be likelihood of isolated in Upper Sagaing and Taninthayi Regions, Kachin, Kayin and Mon States. Degree of certainly is (60%). Weather will be generally fair in Naypyitaw, Mandalay and Magway Regions, Chin and Rakhine States and partly cloudy in the remaining Regions and States.

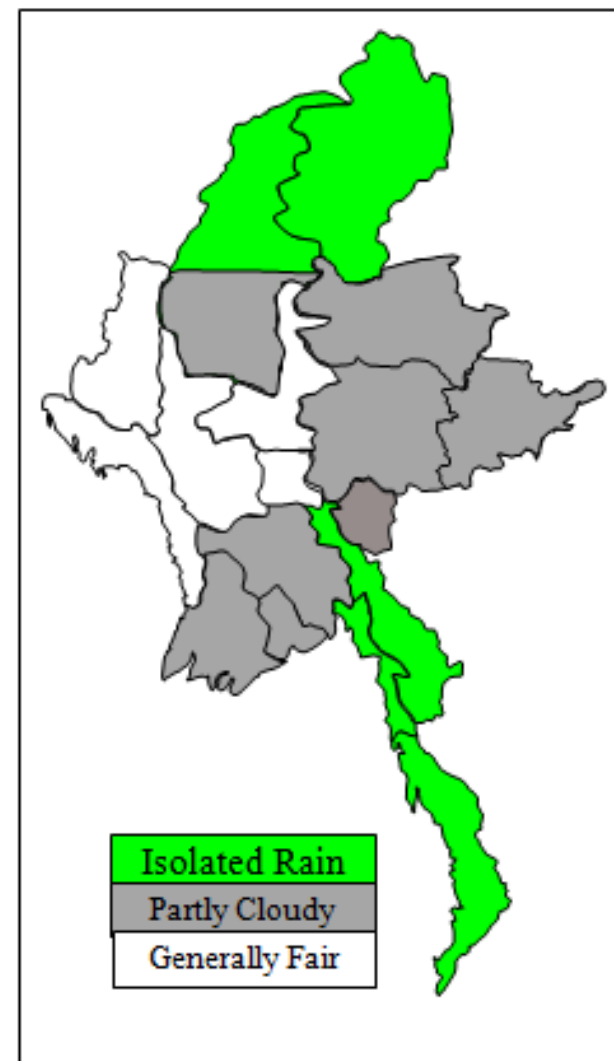
STATE OF THE SEA: Seas will be slight to moderate in Myanmar waters. Wave height will be about (2 - 5) feet in off and along Myanmar Coasts.

OUTLOOK FOR SUBSEQUENT TWO DAYS: Likelihood of light rain in Sagaing and Taninthayi Regions, Kachin, Eastern Shan, Kayah, Kayin and Mon States.

FORECAST FOR NAYPYITAW AND NEIGHBOURING AREA FOR 26th FEBRUARY, 2018: Generally fair weather.

FORECAST FOR YANGON AND NEIGHBOURING AREA FOR 26th FEBRUARY, 2018: Partly cloudy.

FORECAST FOR MANDALAY AND NEIGHBOURING AREA FOR 26th FEBRUARY, 2018: Generally fair weather.



Storm Warning No.13, 2015

30th July, 2015 14:00 MST Today

Cyclonic Storm

According to the observations at (13:30) hrs MST today, the Cyclonic Storm "Komen" over Northeast Bay of Bengal is centered at about (150) miles Southeast of Kolkata (India), (50) miles Southwest of Chittagong (Bangladesh), (105) miles Northwest of Maungdaw (Myanmar) and (160) miles Northwest of Sittwe (Myanmar).

The present stage of the Cyclonic Storm is coded orange stage. Although it is moving towards Southern coasts of Bangladesh, Chin and Rakhine States, Magway Region (Myanmar) are dangerous affected due to the banding features of the Cyclonic Storm.

Position of the Cyclonic Storm, Center pressure and wind speed

The Cyclonic Storm is located at Latitude (22.0) degree North and Longitude (91.0) degree East, Centre pressure of Cyclonic Storm is (986) hPa and maximum wind speed near the center is (50) miles per hour at (13:30) hrs MST today.

Forecast for next (12) hour

It is expected to cross Southern coasts of Bangladesh near Chittagong during next (12) hours commencing morning today. It is forecast to move West-Northwest wards and weaken gradually.

It will be under maximum wind speed with (60-90) mph in Maungdaw district, (50-70) mph in Sittwe district during the Cyclonic Storm is crossing the coasts of Bangladesh.

Frequent squalls with rough to very rough seas will be experienced off and along Myanmar Coasts. Surface wind speed in squalls may reach (50 - 60) m.p.h.

During the Cyclonic Storm is crossing the Southern coasts of Bangladesh, probable maximum storm surge is about (8 - 10) feet at Maungdaw district, about (6-8) feet at Sittwe district.

General caution

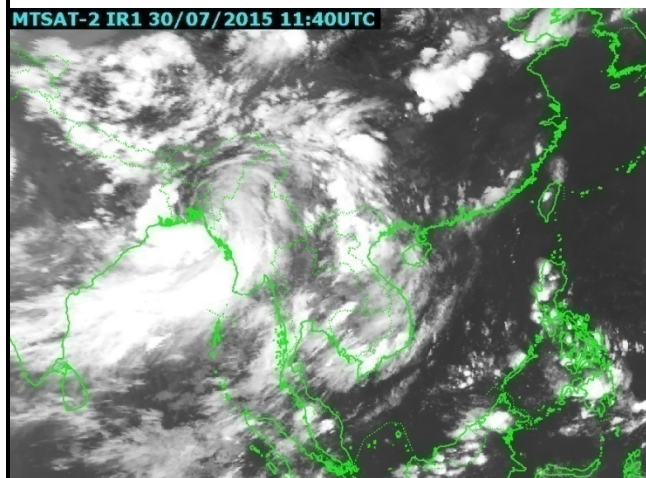
Under the influence of the Cyclonic Storm, rain or thundershowers will be widespread in Lower Sagaing, Magway, Bago, Yangon and Ayeyarwady Regions, Chin and Rakhine States with regionally heavy falls, strong wind, flash flood and land slide.

Rain or thundershowers will be widespread in Upper Sagaing, Mandalay and Taninthayi Regions, Shan, Kayin and Mon States with likelihood of isolated heavy falls, strong wind, flash flood and land slide.

Advisory

Trawlers, vessels and ships off and along Myanmar Coasts are advised especially to avert in condition of the Cyclonic Storm.

MTSAT-2 IR1 30/07/2015 11:40UTC



Untimely rainfall warning

Issued at (14:00) hours M.S.T on 24-12-2017

According to the observations at (13:30) hrs MST today, typhoon "Tembin" over South China Sea is forecasted to cross Vietnam coasts on (26.12.2017) and move to westwards as waves. Under the influence of these waves, rain or thundershowers are likely to be fairly widespread in Taninthayi Region, Shan, Kayah, Kayin and Mon States and isolated in Bago, Yangon and Ayeyarwady Regions during (26.12.2017 - 28.12.2017). It is advised that people should be aware of untimely rain and thundershowers with strong winds during this time.

Significant Weather Warning

Issued at (14:00) hours M.S.T on 5- 5-2017

According to the observations at (13:30) hrs MST today, due to the influence of Easterly and Westerly waves, rain or thundershowers will be fairly widespread in Upper Sagaing and Taninthayi Regions, Kachin, Chin, Kayah, Kayin and Mon States, scattered in Naypyitaw, Lower Sagaing, Mandalay and Yangon Regions, Shan State and isolated in the remaining Regions and States within during next (72) hrs commencing evening today with strong wind, hail, lightning and thunderstorm. Surface wind speed in strong wind may reach (30 - 35) mph.

Due to the significant weather phenomena, public is advised to be awareness on this condition.

Early Warning For Weather Events During The Pre Monsoon Period

Issued on 2- 5- 2017

- During the Pre Monsoon Period of May, isolated rain or thundershowers are likely in the afternoon or evening accompanied with strong wind, hails, thunder and lightning, due to the convective cloud and at the upper air due to the convergence of cold air from the west and unstable of warm air in the whole country. Surface wind speed in strong wind may reach (35)mph to (40)mph.
- Public is advised to take necessary awareness with the weather events during the Summer Period of April.

CONCLUSION

- DMH take precautionary measures and minimize the effects of natural disasters.
 - DMH improves Daily and seasonal weather forecasting capacity to further strengthen early warning and climate services for sector specific planning and sustainable development and
 - Nowcasting forecast are essential need to implement
- DMH issues and disseminates timely for weather forecasting news and warning news
- Working for efficient operation, planning and development activities in natural protection, industry, health, social welfare and all sectors of national economy.
- Cooperation and collaborations with local and international organizations for the meeting, workshops and trainings for not only infrastructures but also modernize techniques sharing knowledge to reduce of natural disaster in Myanmar.

THANK YOU...

Welcome Question?