2020 Progress Report (WGM)

LEI Xiaotu (**China**)

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Clarence FONG (**TCS**)

02, December 20120

WGM's activities since 14th IWS

UNESCAP/WMO
Typhoon Committee

14th IWS
(Guam, USA)

27-29 May
52nd TC Session
(F2F, HKO)

Video Conference
6 March

Workshop on Forecasting Tech. &
WGM projects progress (F2F) ->STI

10 June
(2nd VC, hosted by HKO)

Member report

WGM PS-IWS
1 Dec. (day 1)

Nov. 4-7

2020

2019

52nd TC Session
Feb. 25-28

Postpone

28, April
Special AWG (VC)

- Cancel the postpone
- 2nd VC

3rd WGM (VC)
27 Oct.

- Review progress
- Projects of 2021

WGM's activities since 14th IWS

➤ **3rd WGM meeting (VC)**

  ❑ **27 Oct. 2020** - *Shanghai, China*

  - Implementation status
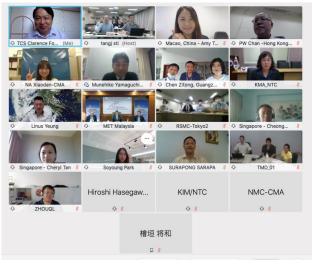 - Projects of 2021
  - Others (Chair reappoint…)

ESCAP/WMO Typhoon Committee
The 3rd Annual Meeting of TC Working Group on Meteorology

27 October 2020 13:30~17:30 (GMT+8)
Web Meeting hosted by STI, China

TENTATIVE AGENDA

Time	Activities	Presenters
13:30-13:45 (15 min)	• Opening Remarks • Introduction by Members • Group Photos	• WGM Chair and Vice Chairs, STI • Members
13:45-14:00 (15 min)	• Technical Presentation: The features of tropical cyclones in 2020	• RSMC Tokyo
14:00-16:30 (150 min)	• Presentation on POP/AOP/PPs (15x10 minutes each)	• Project Coordinators
16:30-17:00 (30 min)	• Discuss and Draft Priority Plans for 2021 (including new plans)	• Project Coordinators and Members
17:00-17:30 (30 min)	• Date and Place for 2021 WGM Annual Meeting • Other Business • Closing Remarks	

WGM's activities since 14th IWS

➢ **WGM parallel session at 15th IWS**

- ■ **01 December 2020** *(VC)*

    - Overview Member report (Met.)
    - Discussion on new projects
    - Others (overview focal points…)

15th IWS of the UNESCAP/WMO Typhoon Committee
1-2 December 2020
Viet Nam (Video Conference)

Tentative Agenda for Parallel Meeting of WGM
(Video Conference)

Day 1 (1 December 2020)	
Morning 9:30-12:30	Plenary Session
Lunch	
Afternoon 14:00-14:05	Item 1: Opening and Participant Introduction
14:05-16:25	Item 2: Member's Reports of 2020 (10 minutes for each presentation)
16:25-16:35	Item 3: Report of the 3rd Annual Meeting of WGM
16:35-16:45	Item 4: Discussion of New Project (PP2) in 2021
16:45-17:15	Item 5: Other business

Item 1: Opening and Participant Introduction
Item 2: Member's Reports of 2020

Time	Member
14:05-14:15	Cambodia
14:15-14:25	China
14:25-14:35	DPR Korea
14:35-14:45	Hong Kong, China
14:45-14:55	Japan
14:55-15:05	Lao PDR
15:05-15:15	Macao, China
15:15-15:25	Malaysia
15:25-15:35	Philippines
15:35-15:45	Rep of Korea
15:45-15:55	Singapore
15:55-16:05	Thailand
16:05-16:15	USA
16:15-16:25	Viet Nam

Item 3: Report of the 3rd Annual Meeting of WGM
Item 4: Discussion of New Project (PP2) in 2021
Item 5: Other business
    5.1 Overview the focal points of WGM
    5.2 Draft the summary report of WGM parallel meeting (prepare the conclusions & recommendations to be submitted to the 53rd TC Session)
    5.3 Discussion of Chair and Vice-chairs of WGM from 2021
    5.4 Date and place for the 4th Annual Meeting of WGM
    5.5 Group photo

Outline

I	Implementation status of projects in 2020
II	Proposed projects in 2021
III	Summary & Recommendation

Part I:

Implementation status of projects in 2020

(major progress)

2020 priority projects (15):

5 - POP

9 - AOP

1- PP

POP1
Seasonal prediction
(KMA)

POP2
Forum & CoDi Platform
(CMA & HKO)

POP3
TCRR
(CMA)

POP4
TOS
(KMA)

POP5
Verification
(CMA, HKO)

AOP1
EF
(JMA)

AOP2
TRAMS
(CMA)

AOP3
Radar network
(TMD,JMA)

AOP4
Nowcasting-RaINS
(MMD)

AOP5
SS Watch
(JMA)

AOP6
EXOTICCA-II
(CMA,HKO)

AOP7
Himawari 8/9
(JMA…)

AOP8
Available data
(CMA)

AOP9
Risk heavy rain (with AOP7 of WGH)
(JMA)

PP1
Workshop on tc forecasting tech.& WGM project progress review
(MMD)

2020 priority projects (5POPs):

	Project	Coordinator member	Remarks (key goals)
POP1	Development of typhoon seasonal prediction system	KMA (SeHwan Yang)	-products (fall & summer) - verification
POP2	Web-based typhoon forum & CoDi platform	CMA (Qian C.H, Lu X.Q.) HKO (Wong Wai-Kin))	- run routinely - encourage use online during TC season
POP3	Tropical Cyclone Research and Review (TCRR)	CMA (Wang Dongliang , Zhou Xiao)	- publish (quarterly) - influence
POP4	Transfer of the technology of the typhoon Operation System (TOS)	KMA (Kim Dongjin)	-training upon Member's request - follow-on technical assistance
POP5	Verification of tropical cyclone operational forecast	CMA (Chen G.M.) HKO (Wong W K)	-post-season verification - other basins - cooperation with (TLFDP)

2020 priority projects (9AOPs):

	Project	Coordinator	Key goals
AOP1	Enhanced use of ensemble forecast	Hisaki Eito (JMA)	-genesis guidance
AOP2	Improvement of South China Sea typhoon forecast	Chen Zitong (CMA)	-Ensemble forecasting
AOP3	Development of regional radar network	Asmadi abdul wahab (MMD) Patchara Petyirojchai(TMD) Hisaki Eito (JMA)	-update QC & QPE tech. - share more radar data
AOP4	Radar nowcasting based on RainNS/SWIRL	Fariza Yunus (MMD) Nursalleh K Chang (MMD) Wong Wai Kin (HKO)	- Nowcasting of radar-satellite blend
AOP5	Storm surge watch scheme	Hisaki Eito (JMA)	-add point upon request - verification
AOP6	Contribution for EXOTICCA-II	Lei Xiaotu (CMA) W.K. Wong (HKO)	-sharing data - demonstration research
AOP7	Enhancing utilization of Himawari 8/9 products	JMA (Kohei Matsuda) MMD, MSS, TMD, VNMHA	-RDCA
AOP8	Parallel analysis (available data used) in operational monitoring	CMA (Qian Chuanhai)	- More SDT fixes back to 5year
AOP9	Risk reduction against heavy rain (with AOP7 of WGH)	JMA (Hisaki Eito)	- Provide NWP products

2020 priority projects (1PP):

	Project (2018)	Coordinator	Key goals
PP1	Workshop on typhoon forecasting techniques and WGM project progress review	MMD (Alui Bahari) HKO (T.C. Lee)	-Training for younger forecaster - Review the progress (WGM meeting)

Perennial operating (or routine actions) projects (POPs)
Annual operating projects (AOPs)
Preliminary Projects (PPs)

Implementation status of projects in 2020

Monitoring:

AOP3 √	AOP4 √	AOP6 √
(Radar network)	(Radar nowcasting)	(EXOTICCA-II)
AOP7 √	AOP8 √	
(Utilization of Hiramari 8/9)	(Available data use)	

Forecasting:

POP1 √	AOP1 √	AOP2 √
(Seasonal prediction)	(Ensemble Forecast)	(TRAMS)
AOP5 √		
(Storm surge)		

Transfer:
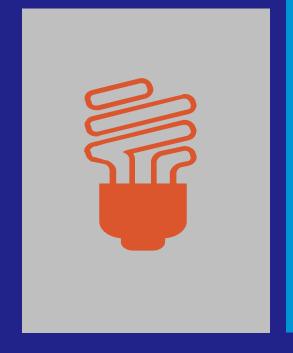
POP4 √	POP2 √	POP5 √
(TOS)	(Typhoon forum & CoDi)	(Verification)
POP3 √	AOP9 √	PP1 √
(TCRR)	(Rainfall -- WGH)	(Workshop & WGM meeting)

Major progress in 2020:

I. Monitoring (5)

- **New instrument & Experiment**

  AOP6 (EXOTICCA)

- **Data & analysis**

  AO3 (Radar network)
  AOP4 (RaINS)

  AOP7 (Utilization of Himawari 8/9)

  AOP8 (Available data use)

Footprints of EXOTICCA

Proposal
(TC 45th Session)

2013

2014

Endorse
(TC 46th Session)

-OC (Kick of) meeting
-Rocket dropsonde
-Aircraft

2015

2016

Joint Workshop
(TLFDP, UPDRAFT)

-2nd OC meeting
-10th Workshop
-(WGTMR)

2017

- EXOTICCA-II
(TC 51th Session)

-2nd Joint Workshop/WWRP

2019

2020..

2018

Joint Workshop
(TLFDP , UPDRAFT & EXOTICCA)

1) New instrument (AOP6: EXOTICCA-II)

Rocket dropsonde

Airship

Satelliet（FY-4、GF-4）

Satellite

Space based

Mobile radiosonde

UAV（mid-low）

UAV（high）

Aircraft（HKO）

Space-based

Tower &AW Station

Mobile system

Buoy

Wave glider

UMV

Ground based
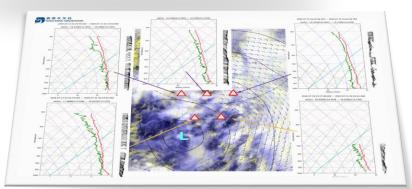
Ocean based
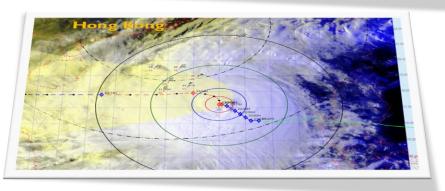
2)Field Campaign

➢ Aircraft & Dropsonde System (HKO)

Sinlaku(TD,01 UTC 31 July)

Higos (08 UTC 18 Aug)

Nangka (07-08 UTC 12 Oct 2020)
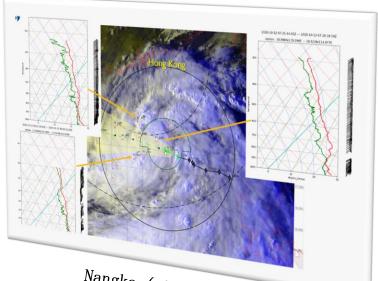
Saudel (09-10 UTC 22 Oct 2020)

15

2)Field Campaign
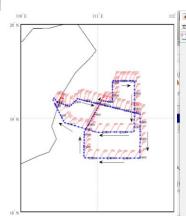
➤ Multi-platform (STI)
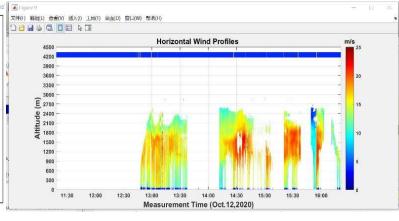
Nangka (11-13 Oct 2020)

UAV (mid-high)

Horizontal Wind Profiles

Altitude (m)

Measurement Time (Oct.12,2020)

m/s

UAV (low-)

Maximum wind 22m/s

windSpeed

弹簧刀低空无人机
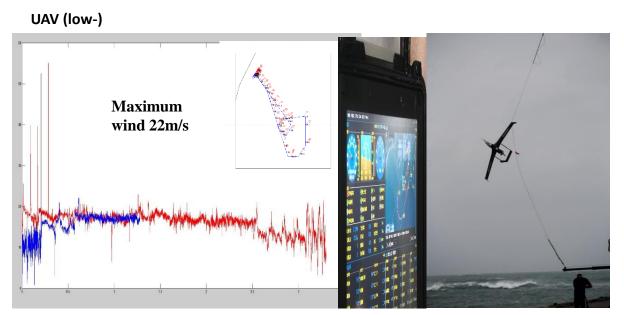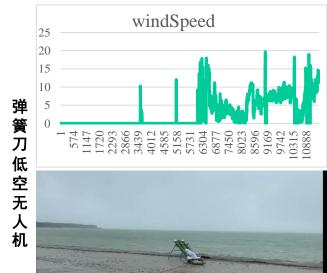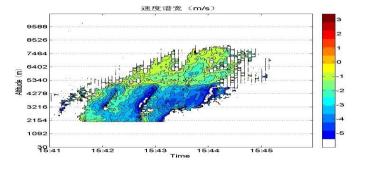
Sinlaku (2 Aug. 2020)

Major progress in 2020:

I. Monitoring (5)

- **New instrument & Experiment**

  AOP6 (EXOTICCA)

- **Data & analysis**

  AO3 (Radar network)
  AOP4 (RaINS)

  AOP7 (Utilization of Himawari 8/9)

  AOP8 (Available data use)

1) Radar network (AOP3)

> ***Users Guide on Introduction and Utilization of Quantitative Precipitation Estimation (QPE)* was drafted by Thailand, Malaysia and Japan.**

> **The guideline has been refined and prepared for the member interested in.**

13/03/2020 Ver.2.0α

Users Guide on Introduction and Utilization of Quantitative Precipitation Estimation (QPE)

Composed by the Thai Meteorological Department, the Malaysian Meteorological Department and the Japan Meteorological Agency in the framework of the Annual Operating Plan "Development of regional radar network" of the Working Group on Meteorology under the Typhoon Committee.

Our tools for QPE are effective when combined with radar composite. If some countries are planning to work on QPE of their own (apart from our radar composite project), it is not for sure how much this material can benefit.

1. What is QPE (Radar Data Analysis)?

QPE (Radar Data Analysis) is hourly precipitation estimation product which is calculated though calibration of radar data by rain gauge data and adjacent radar data.

The estimation process basically consists of three parts. Two analysis processes are conducted for each radar. Results of the 2nd analysis for each radar are composed to one imagery.

Step 1. 1st analysis process

In the 1st analysis process, radar data is calibrated with average of radar data and rain gauge data in common observation area of adjacent radars.

In this process, calibration factors of each radar site are calculated and precipitation is temporarily estimated by multiplying the calibration factor and radar precipitation data.

Step 2. 2nd estimation process

In the 2nd analysis process, result of 1st calibration is corrected with rain gauge data and weight according to distance between rain gauges and each grid to express more reasonable precipitation distribution. This means that calibration factor differs from grid by grid.

Step 3. Composite

Results of 2nd analysis for each radar data are composed into one precipitation distribution map. For grid which belong to observation range of multiple radars, the analysis result of the radar which observed most precipitation is used in composite map.

Radar Composite Imagery (Product of experimental radar data exchange)

2) Nowcasting (AOP4: RaINS)

Malaysia: RaINS is able to predict trajectory and intensity including growth and decay of thunderstorm cells. The 3-hour nowcast is updated every 10 minutes.

Observed Radar   **(RaINS)**

PABUK: COMPARISON OF NOWCAST with OBSERVED
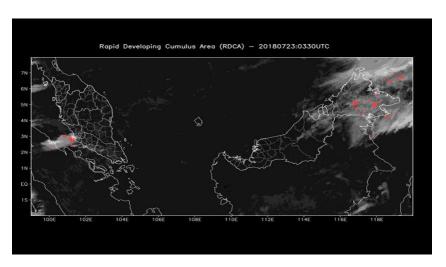
3) RDCA product (AOP7: Himawari 8/9)

JMA developed a technique to identify Rapidly Developing Cumulus Areas (RDCA) using Himawari-8/9 products.

➢ JMA provided online lecture as initial supports for development of RDCA by MSS, TMD and VNMHA. They have been considering what to use RDCA for and what data is available to use for verification.

➢ JMA and MMD continue the joint development for the RDCA global coefficient to improve RDCA algorithm for Malaysia region.
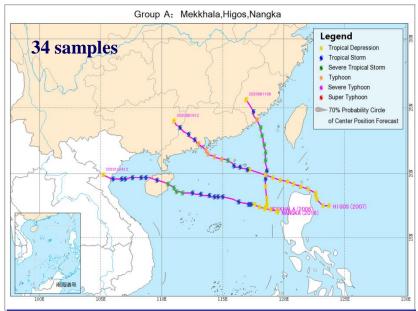
An example of RDCA product in Malaysia region with a new shell script in May 2019.

22

4) Parallel analysis of satellite data in monitoring (AOP8)

➢ **comparative analysis**

Group A：West of 120°E

Group B：East of 120°E

Group A: Mekkhala,Higos,Nangka

34 samples

Legend
- Tropical Depression
- Tropical Storm
- Severe Tropical Storm
- Typhoon
- Severe Typhoon
- Super Typhoon
- 70% Probability Circle of Center Position Forecast

Group B: Bavi，Maysak，Haishen

110 samples

Legend
- Tropical Depression
- Tropical Storm
- Severe Tropical Storm
- Typhoon
- Severe Typhoon
- Super Typhoon
- 70% Probability Circle of Center Position Forecast

TC name （Num.）	Start time	End time
MEKKHAL（2006）	06UTC, 10th Aug	06UTC, 11th Aug
HIGOS（2007）	00UTC,18th Aug	12UTC,19th Aug
NANGKA（2016）	00UTC,12th Oct	12UTC,14th Oct
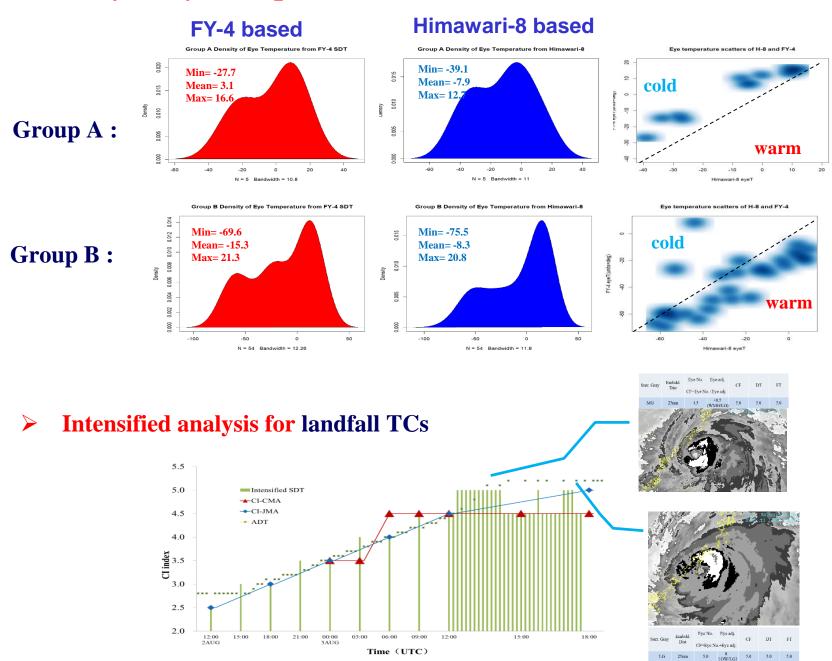
TC name (Num.）	Start time	End time
BAVI（2008）	00UTC, 22th Aug	12UTC, 27th Aug
MAYSAK（2009）	12UTC,28th Aug	06UTC,4th Sep
HAISHEN（2010）	12UTC,1st Sep	00UTC,8th Sep

➤ **Density of eye temperature from…**

FY-4 based　　**Himawari-8 based**

Group A :

Group A Density of Eye Temperature from FY-4 SDT

Min= -27.7
Mean= 3.1
Max= 16.6

N = 5 Bandwidth = 10.8

Group A Density of Eye Temperature from Himawari-8

Min= -39.1
Mean= -7.9
Max= 12.7

N = 5 Bandwidth = 11

Eye temperature scatters of H-8 and FY-4

cold

warm

Group B :

Group B Density of Eye Temperature from FY-4 SDT

Min= -69.6
Mean= -15.3
Max= 21.3

N = 54 Bandwidth = 12.26

Group B Density of Eye Temperature from Himawari-8

Min= -75.5
Mean= -8.3
Max= 20.8

N = 54 Bandwidth = 11.8

Eye temperature scatters of H-8 and FY-4

cold

warm

Himawari-8 eyeT

➤ **Intensified analysis for landfall TCs**

Intensified SDT
CI-CMA
CI-JMA
ADT

CI index

Time （UTC）

Major progress in 2020:

I. Monitoring (5)	• **New instrument & Experiment** AOP6 (EXOTICCA) • **Data & analysis** AO3 (Radar network) AOP4 (RaINS) AOP7 (Utilization of Himawari 8/9) AOP8 (Available data use)

Contribution:
- more and/or new data can be used in operational forecast;
- benefit to improve the knowledge and develop forecast techniques

Major progress in 2020:

II. Forecasting (4)
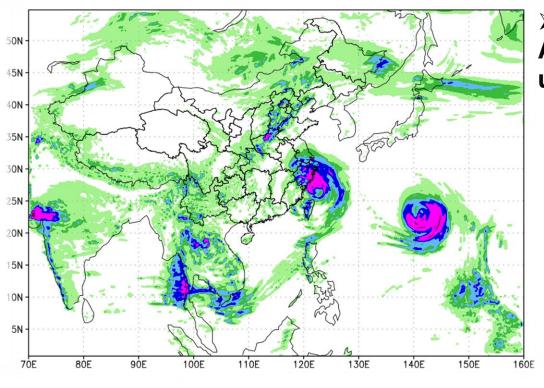
- **Upgrade techniques & products:**

  - Regional model **(AOP2）**

  - Storm Surge **(AOP5)**

  - Ensemble forecast **(AOP1)**

  - Seasonal Prediction **(POP1)**

1) Upgrade the regional model (AOP2)

TRAMS_V3.0
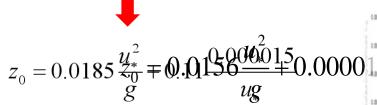
> **The TRAMS (Tropical Region Atmospheric model System) upgrade to V3.0**
> ✓ cloud Nudging +Landsf analysis
> ✓ 65 levels, top at 31 km
> ✓ X*Y=1001*601
> ✓ 4 forecasts per day
> - 00z, 12z→ T+168hrs
> - 06, 18z → T+72hrs
> ✓ Dt = 90 s
> ✓ Convection：SCALEAWARE NSAS
> ✓ MicroPhys： WSM6
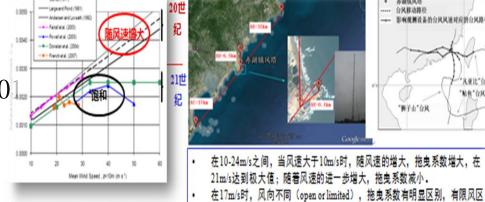
➢ **Surface roughness scheme**
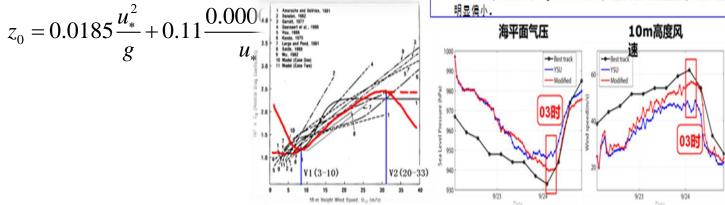
$$z_0 = 0.0156\frac{u_*^2}{g} + 0.00001 \quad （\text{ECMWF}，2010）$$

$$z_0 = 0.0185\frac{u_*^2}{g} + 0.0156\frac{0.00015}{ug} + 0.0000$$

（Modified based on field campaign）

$$z_0 = 0.0185\frac{u_*^2}{g} + 0.11\frac{0.000}{u_*}$$

- 在10-24m/s之间，当风速大于10m/s时，随风速的增大，拖曳系数增大，在21m/s达到极大值；随着风速的进一步增大，拖曳系数减小.
- 在17m/s时，风向不同（open or limited），拖曳系数有明显区别，有限风区明显偏小.

海平面气压　　　　10m高度风速
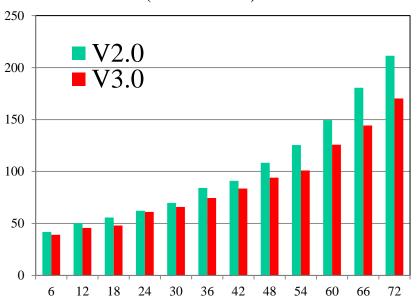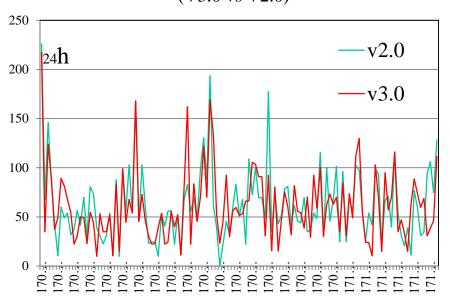
Performance of TRAMSv3.0

MEAN ERROR of TRACK FORECAST in 2017
(V3.0 vs V2.0)

ERROR of 24hr TRACK FORECAST in 2017
(V3.0 vs V2.0)

TC track forecast from V3.0 is better than V2.0, and it is more competitive as lead time growing.

HAISHEN
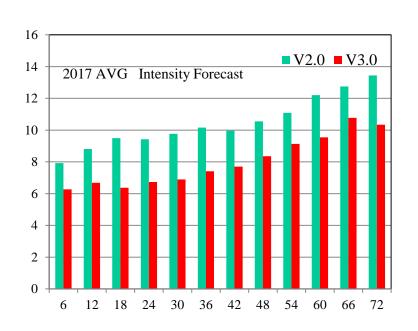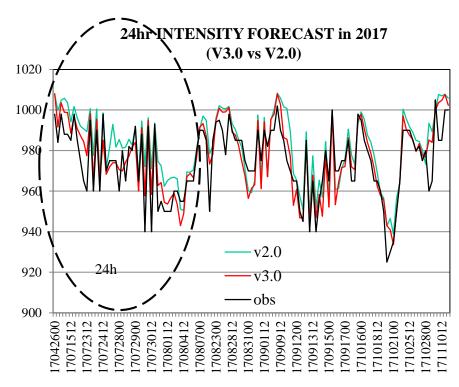
SAUDEL

Performance of TRAMSv3.0
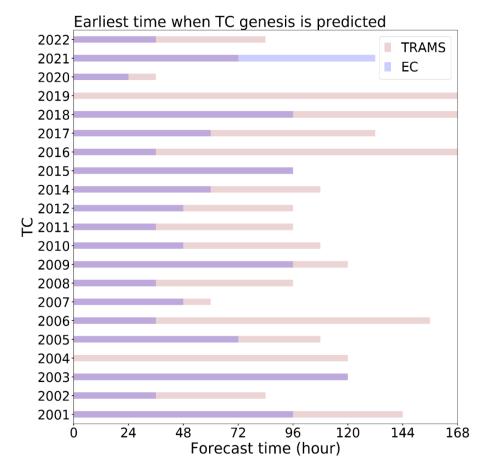
MEAN ERROR of INTENSITY FORECAST in 2017
(V3.0 vs V2.0)

24hr INTENSITY FORECAST in 2017
(V3.0 vs V2.0)

TC intensity forecast from V3.0 is also much better than that from V2.0, especially during the TC intensifying period.

Performance of TRAMSv3.0 (genesis)

Earliest time when TC genesis is predicted

The chart dedicated the earliest time when TC genesis is predict（in 2020）

TRAMS:

- 3 typhoons were 168h(7-day) predicted
- 9 typhoons were 5-day earlier predicted
- 19 typhoons were forecasted 3-day advanced.

EC:

- 2 typhoons were failed to predict
- 2 typhoons were 120h(5-day) predicted
- 7 TCs could be forecast 72h earlier
- 12 TCs 48h earlier
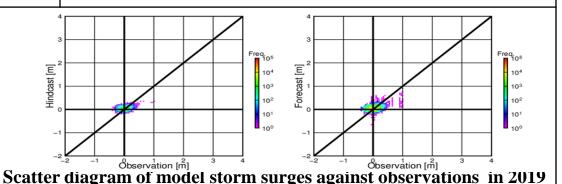
Both models have the ability to foretell the TC formation, but TRAMS has larger time scale and more accuracy.

2）Upgrade the Storm Surge model (AOP5)
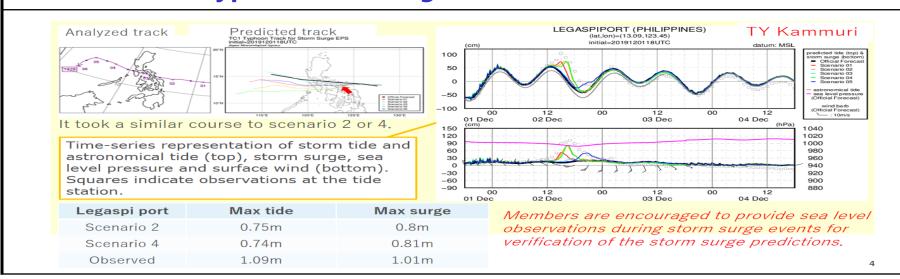
Verification of SS predictions	JMA is currently testing global ocean tide solutions (FES2014 and TPXO)

Annual verification results of the storm surge products are regularly published in Annual Report on Activities of the RSMC Tokyo since 2015.

Scatter diagram of model storm surges against observations in 2019

Verification on typical storm surge cases

It took a similar course to scenario 2 or 4.

Time-series representation of storm tide and astronomical tide (top), storm surge, sea level pressure and surface wind (bottom). Squares indicate observations at the tide station.

Legaspi port	Max tide	Max surge
Scenario 2	0.75m	0.8m
Scenario 4	0.74m	0.81m
Observed	1.09m	1.01m

Members are encouraged to provide sea level observations during storm surge events for verification of the storm surge predictions.

3) Ensemble forecast (AOP1)

> **TC activity prediction maps**

RSMC Tokyo

•provides two-day and five-day TC Activity Prediction Maps covering its area of responsibility based on ensembles from ECMWF, NCEP, UKMO and JMA, and a multi-center grand ensemble of these four.

•conducted parameter tuning with accumulated data and improved accuracy. Improved products have been operational since March 2020.

•added maps based on climatological normal for reference.

➢ **Reliability curves for TY genesis forecasts (Multi-center Ensemble)**

Multi-Center Grand Ensemble

Actual TC genesis of TS intensity against ratio of ensemble members predicting sustained TC-like vortex (equal weight on each center)

% of ensemble members predicting sustained vortex

Sample: Typhoons and EDA disturbances for Jan 2017 to Sep 2019
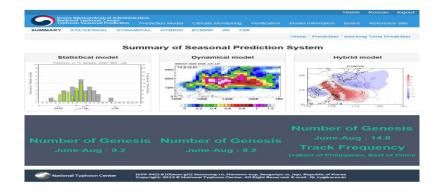
4）Seasonal prediction (POP1)

Four Types:

- Statistical Model based on multiple linear regression model
- Statistical - Dynamical ModelI based on CFS model
- Statistical - Dynamical ModelII based on Glosea5 model, **42 ensemble members**
- Dynamical Model based on Global seasonal forecasting system (Glosea5, 5 ensemble members)

http://gtaps.kma.go.kr/TSP/index.php (Annual update: late May)
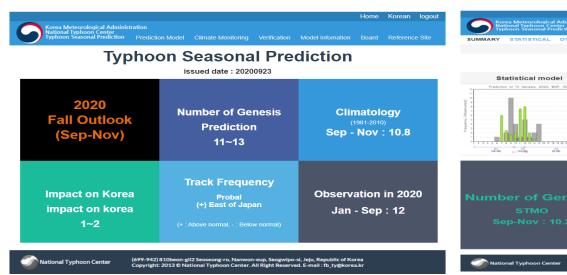
➢ **Summer Outlook**
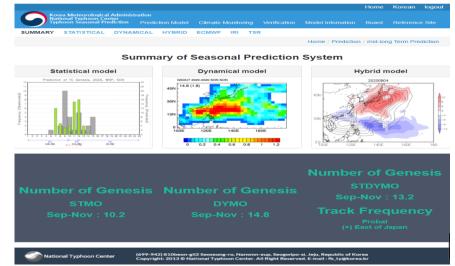
Below Normal	Near Normal	Above Normal
58.3%	41.7%	0.0%

Frequency : 9.2

Typhoons(WNP) : 9.2

Frequency 7.1

Frequency : 14.8
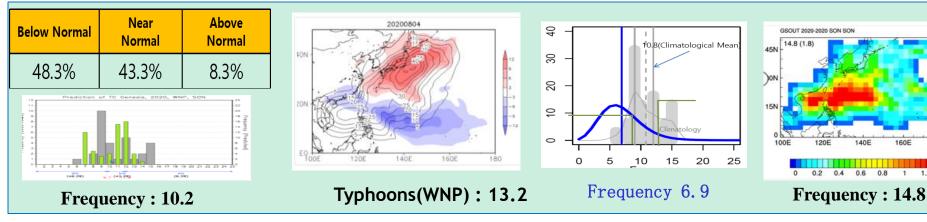
4）Seasonal prediction (POP1)

➤ Fall Outlook

http://gtaps.kma.go.kr/TSP/index.php (Annual update: late August)

Below Normal	Near Normal	Above Normal
48.3%	43.3%	8.3%

Frequency : 10.2

Typhoons(WNP) : 13.2

Frequency 6.9

Frequency : 14.8

Major progress in 2020:
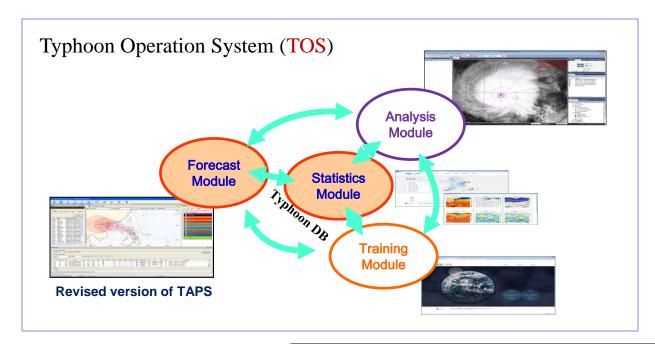
III. Transfer (6)

- **Tools**
    - **- Platform (POP4)**

- **Communication**
    - **- Information (POP2, AOP4)**
    - **- Knowledge (POP5, POP3, PP1)**

1）Tool(POP4: TAPS→TOS)

Typhoon Operation System (TOS)

Forecast Module
Statistics Module
Analysis Module
Training Module
Typhoon DB
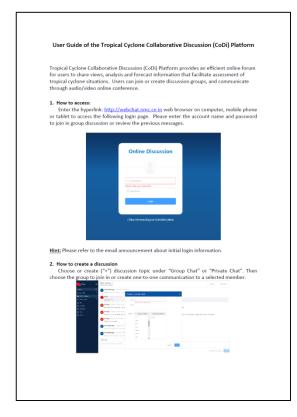
Revised version of TAPS
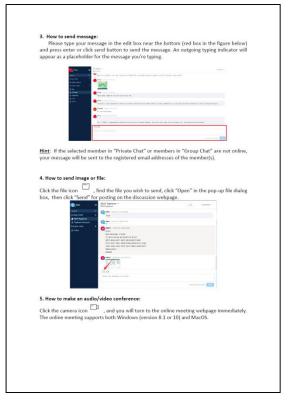
@ **Technology transfer (KMA)**
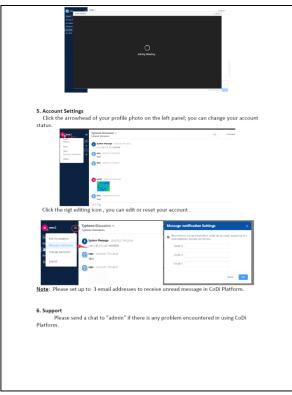
Year	Beneficiary	Transfer
2012-2013	NCHMF of Vietnam	
2014	DMH of Lao PDR	
2015	DMH, TMD	TAPS
2016	PAGASA	
2017	PAGASA, TMD	
2018	TMD, DMH	TOS
2019	SMG	

2）Communication(POP2: Web-based forum & CoDi platform)
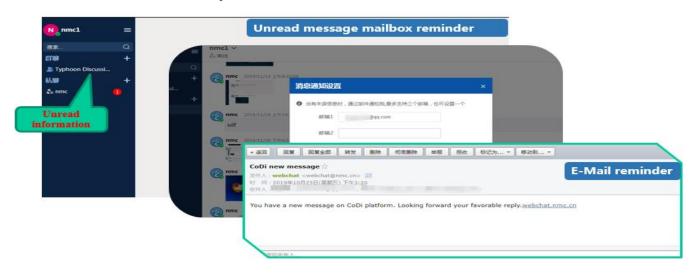
> **User manual** for Tropical Cyclone **C**ollaborative **Di**scussion (CoDi)
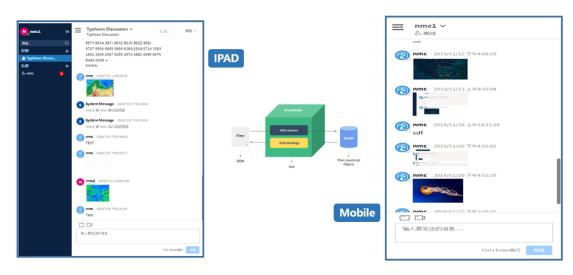
- ➢ **Instant reminder message to registered e-mail box**

  (If the user does not check the information within 10 minutes, the system will automatically send a reminder e-mail)

- ➢ **Suitability for mobile terminals**

☐ Real-time application

In 2019, based on CoDi China and Vietnam held several real-time online discussions in the case of Typhoon WIPHA for its positioning and intensity determination. This platform has helped both sides to communicate forecast and analysis reasons, and also facilitate the sharing of available data simultaneously.
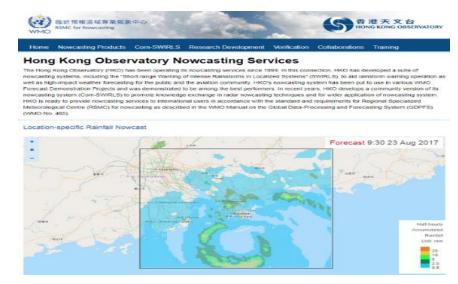
In 2020, CMA also tried to contact Vietnam colleagues in the case of HIGOS and SAUDEL.

for HIGOS

for SAUDEL

3）Communication(AOP4: Radar Nowcasting based on RaINS / SWIRLS)

- Collaboration of HKO and the MET Malaysia continued to develop the radar nowcasting techniques and blending system

- The first training attachment was organized by the MET Malaysia on 17-27 September 2019.

    - Forecasters from the Thailand Meteorological Department and the Guangxi Meteorological Observatory of the China Meteorological Administration joined the workshop to receive in-depth training of RaINS, as well as to apply their radar and NWP model data to conduct various forecast experiments on rainstorm cases
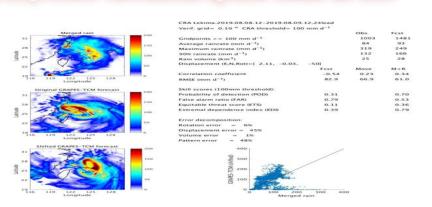
4) Communication (POP5: verification & application techniques)

verification techniques development	Verification (real time & post) 2020

precipitation verification system based on CRA
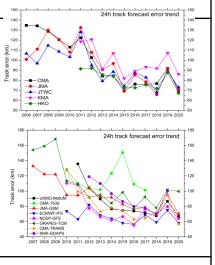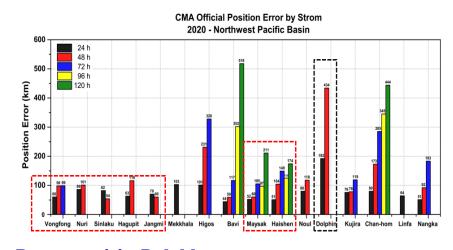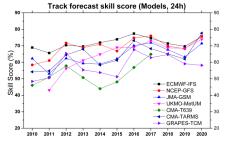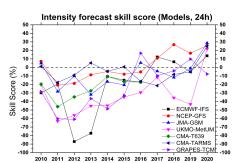
Performance analysis

Poor case(s): Dolphin ;
Good case(s): First 5 TCs, Maysak, Haishen

Verification (real time & post) 2020

Track Error
24h: *70~85km*
48h: *90~125km*
72h: *120~165km*
96h: *<270km*
120h: *<350km*

Skill
24h: *65-75%*
48h: *75-80%*
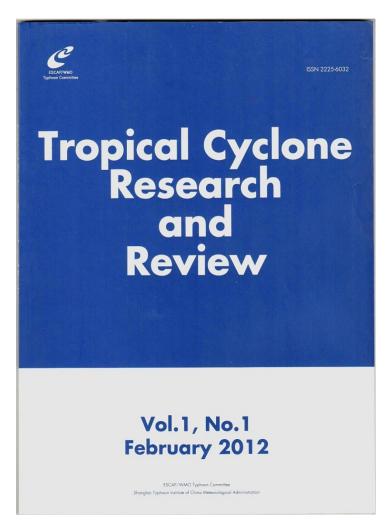
Track forecast skill: steady increase (from 50~60% to 70~80%)

Intensity forecast skill: rapid growth (from negative to 10~40%)

5）Communication(POP3: TCRR)

http://tcrr.typhoon.gov.cn

The Inaugural Issue

> **In cooperation with globally familiar publisher Elsevier**
>   (through KeAi Communications Co., Ltd.)

> **publication:**
> – 35 issues in total
> – 3rd and 4th issue of 2019 for WMO IWTC-9

> **Contributors**
> – from 16 countries and regions
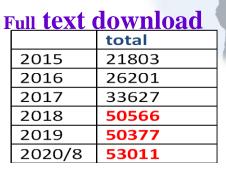> – International authors: 2/3
> – International peer-reviewers : 2/3

Full text download

	total
2015	21803
2016	26201
2017	33627
2018	**50566**
2019	**50377**
2020/8	**53011**

> **Influence:**
> 1. **Readers from 126 countries and regions**
>   **TCRR website: International~67%; China~ 33%**
> 2. **Full text download capacity in the first eight months**
>   **exceeded 53000 times**
> 3. **Latest virtual impact factor is 0.35**
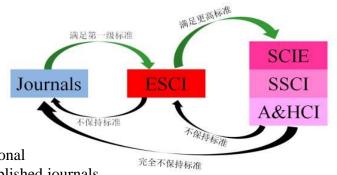
Impact factor	Representative journal
4~4.673	Climate Dynamics
3~4	Journal of Geophysical Research
2~3	Ocean Modelling
1~2	Weather and Forecasting
0.333~1	Journal of Tropical Meteorology

➢ Included by four databases

◆ **ESCI (Emerging Sources Citation Index)**

A new index in the Web of Science™ Core Collection
Owned by the Clarivate Analytics, like SCI
Includes high-quality, peer-reviewed publications representing both regional
importance and emerging scientific fields not well-covered in more established journals

◆ ScienceDirect

• Operated by the Anglo-Dutch publisher Elsevier
• Provides subscription-based access to a large database of scientific research
• Hosts over 12 million pieces of content from 3,500 academic journals and 34,000 e-books

◆ DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

• Launched in 2003 at Lund University, Sweden
• A community-curated online directory that indexes and
  provides access to high quality, open access, peer-reviewed journals

◆ CNKI 中国知网 www.cnki.net
中国知识基础设施工程

• The most comprehensive system of China academic knowledge resources
• Supported by Education Ministry, Science and Technology Ministry, Propaganda Ministry and
  General Administration of Press and Publications of China

- **Visiting editors from 2013 to 2018**

	Visiting editor
2013	2+1 (ROK)
2014	2 (Thailand & Philippines)
2015	2 (USA & Viet Nam)
2016	2 (USA & Thailand)
2017	2 (Thailand & Viet Nam)
2018	2 (Thailand & Viet Nam)
2019	2 (Indian & USA)
Total	14+1

- **2 visiting editors in 2019**
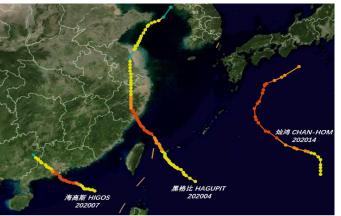
Prof. Shishir Dube
(Indian Institute of Technology)

- **No visiting editors in 2020**

Prof. Kimberly Wood
(The Mississippi State University of USA)
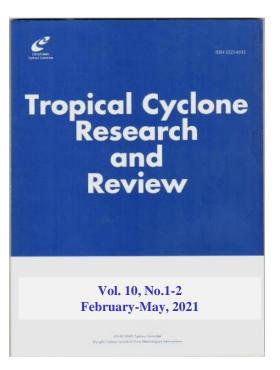
Call paper for 7+N TC events

TC Members	tropical cyclones
CMA, STI/CMA	Hagupit (2004), Bavi (2008)
RSMC-Tokyo	Dolphin(2012), Chan-Hom(2014)
KMA	Maysak (2009), Haishen(2010)
HKO	Higos (2007)
Viet Nam	......

Tropical Cyclone Research and Review

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February-May, 2021
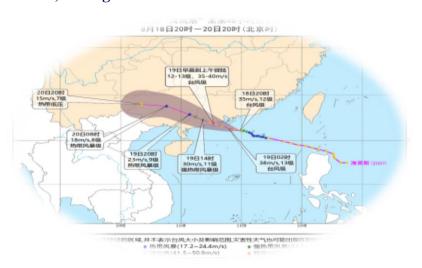
Regional Cooperation (joint workshop & train & fellowship)

CMA Video Conference System for TC discussion among CMA, HKO and SMG for TC **HIGOS** at 1300 UTC, 18 August 2020

Real Time Communication

0900UTC, 13 October 2020

observation data sharing by **WECHAT** between CMA and HKO during TC **NANGKA** in 2020

HKO

SMG

Regional Cooperation (joint workshop & train & fellowship)

Real Time Communication

- ## CMA -- JMA   ADVANCE NOTICES from JMA TC_Communication

at 0730UTC, 31 July 2020, from CMA to JMA

Case 1: there is an active monsoon depression over the South China Sea, but with a very poor structure, and very difficult to fix the center of this system. so this afternoon, we CMA will follow your step to upgrade the system to TD at 0600UTC today. How do you consider the development of this TD? we simply hope that the TD keeps the current intensity of TD till tomorrow morning(0000UTC, August 1), then we can consider whether or not to upgrade it to a TS. Anyway, we have to respect science, respect observations and operational regulations.

at 0923UTC, 31 July 2020, from JMA to CMA

Thank you very much for sending us your query. We also consider that the accuracy of the center position of this system is poor. The sustained wind gradually become stronger and we expect this system will be upgraded to TS within the next 24 hours. We will decide the intensity of the system using observation data and whether we need to upgrade it to TS.

Case 2:

TD

TD

Himawari infrared image at 0300UTC, 10 Oct. 2020

CMA leaves a message at the TC_Communication at 0215UTC, 10 Oct. 2020 as follows:
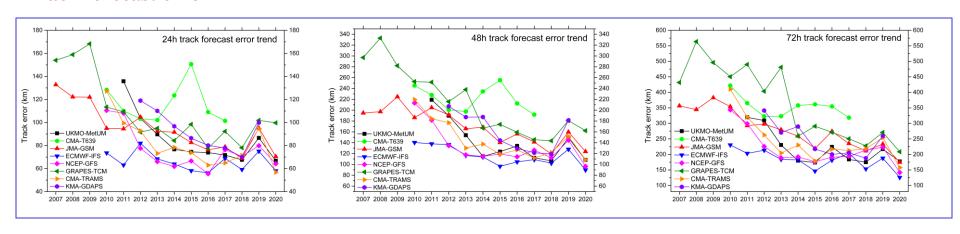
Dear colleagues in Tokyo Typhoon center, How do you think about the development of the two TDs, one over the eastern part of the South China Sea, the another one around 26N,147E? which one will have the chance to be given name earlier than another one? regarding the TD over the South China Sea, we CMA will upgrade it to TS, very likely at 0600UTC. We need your guidance information ASAP at your convenience.

JMA answers: Tropical cyclone TC0006(EDA11) at 19.27N, 118.63E is likely to be upgraded to Tropical Storm Mekkhala (T2006) at 03 UTC 10/08/2020.
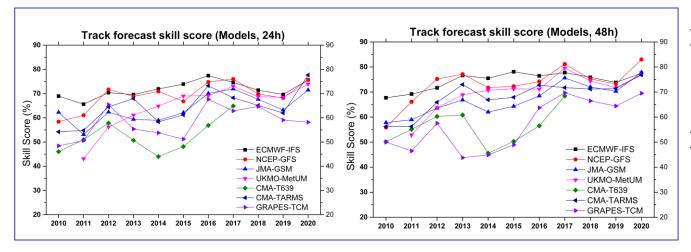
*Contribution (Progress forecast capability: Models)

-- TC forecast verification for 2020

Track forecast error

Skill score
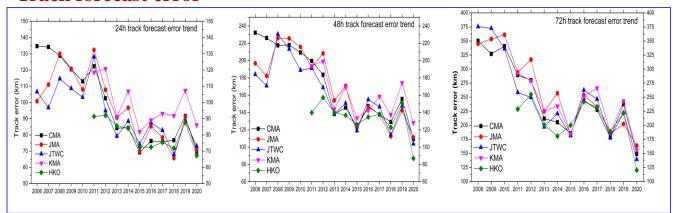
- ➤ **Model forecast error for track has been steadily decreased.**

- ➤ **Model forecast skill for track has been increased. (from 50~60% to 70~80%)**

*Contribution (Progress forecast capability: Official)
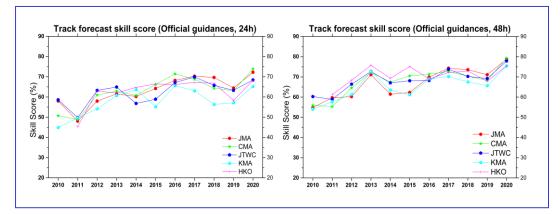
-- TC forecast verification for 2020

➢ **Ability of officially forecast for track has been steadily improving in 2020.**

Track forecast error

Skill score

Track Error
24h: 70~85km
48h: 90~125km
72h: 120~165km
96h: <270km
120h: <350km
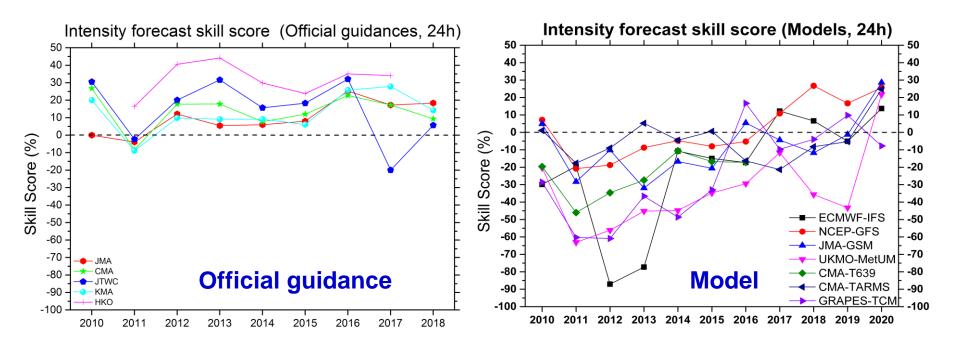
Skill
24h: 65-75%
48h: 75-80%

intensity forecast skill score (<u>increasing</u>)

Intensity forecast skill: rapid growth (from negative to 10~40%)

Part II:

Proposed projects in 2021

2021 priority projects (16):

5 - POP

POP1 Seasonal prediction (KMA)

POP2 Forum & CoDi Platform (CMA & HKO)

POP3 TCRR (CMA)

POP4 TOS (KMA)

POP5 Verification (CMA, HKO)

9 - AOP

AOP1 EF (JMA)

AOP2 TRAMS (CMA)

AOP3 Radar network (TMD, JMA)

AOP4 Nowcasting-RaINS (MMD)

AOP5 SS Watch (JMA)

AOP6 EXOTICCA-II (CMA, HKO)

AOP7 Himawari 8/9 (JMA…)

AOP8 Available data (CMA)

AOP9 Risk heavy rain (with AOP7 of WGH) (JMA)

2- PP

PP1 Workshop on tc forecasting tech.& WGM project progress review (MMD)

PP2 Workshop on tc forecasting tech.& WGM project progress review (KMA)

PP1:

Workshop on typhoon forecasting tech.& WGM project progress review
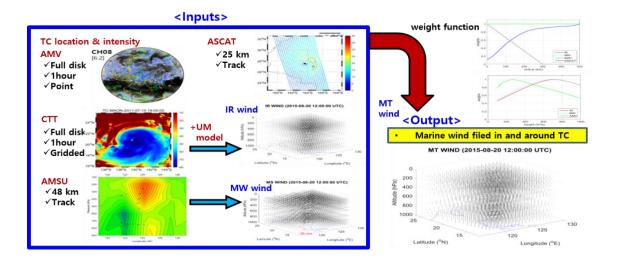
- ✓ Malaysia, Oct., 3days
- ✓ conjunction with training course (cooperation with TRCG)
- ✓ Participants: forecast and scientists from Malaysia, focal points and coordinators of WGM project

Postpone (from 2020 to 2021)

PP2:
GEO-KOMPSAT-2A Utilization for Tropical Cyclone
Coordinator: Mr. Jun Park (KMA)

✓ Introduce GK2A upper level products related typhoon forecast and share the technique using GK2A data

✓ Submit progress reports. Upon the receipt of the reports, holding follow-up technical meeting(s) to identify a way forward

2021 Budget for proposal plans (5POPs, 9AOPs, 2 PP)

Project	Objective	Organizer	Funding Requested
POP3	Tropical Cyclone Research and Review	CMA	US$9,000 (TBC)
POP4	Transfer of the Technology of the Typhoon Operation System (TOS)	KMA	US$6,000
AOP3	Development of regional radar network	TMD, MMD, JMA	US$8,000
AOP4	Radar nowcasting based on RaiNS/SWIRL	Met Malaysia	US$5,000
AOP7	Enhancing Utilization of Himawari 8/9 Products	JMA	US$9,000
AOP8	Parallel analysis of satellite data in operational tropical cyclone monitoring	CMA	US$7,000
PP1	Workshop on typhoon forecasting techniques and WGM project progress review	Met Malaysia (in cooperation with WGM and TRCG)	US$12,000(cross-cutting project)
Total Funding Requested			**US$56,000**

Part III:

Summary & Recommendation

Summary

➤ **Members Report** (Mete. component)

  ❑ Members made significant progress in tropical cyclone <u>monitoring & forecast technical</u> during 2020

➤ **Action plans** (5POPs + 9AOPs + 1PP)

  ❑ WGM has <u>successfully completed</u> the tasks in 2020

  ❑ WGM has draft the plans for 2021

Recommendation

1. To endorse the proposed WGM plans of 2021 and the budget at the 53nd Session

    ❑ Proposed plans (5POPs + 9AOPs + 2PP)

2. To endorse the nomination from CMA to appoint Dr Tang Jie (Deputy director of STI) as the new chairperson of WGM

    ❑ To endorse the nomination from Malaysia to appoint Mr. Jailan Simon as vice-chairperson of WGM

    ❑ To reappoint Dr. Vicente B. Malano (Philippines) as the vice-chairperson of WGM

3. To encourage coordinators of WGs projects to submit the outcome (research paper) to TCRR

Thank you for your attention!

Footprint: ESCAP/WMO TC Collaborative Research Center
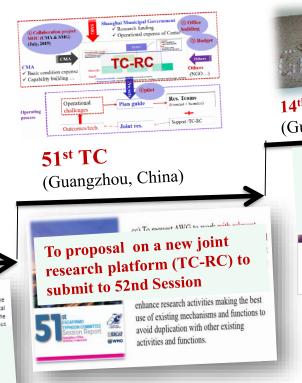
13th IWS
(Chiangmai, Thailand)
2018, Nov.9

As requested by AWG:
to draft the proposal for discuss
in TC51

10. Other business
1. Dr. TC Lee informed the meeting that Hong Kong, China has been conducting operational tropical cyclone reconnaissance flights within Hong Kong Flight Information Region (FIR). The resulting meteorological data has been shared with WMO Members and numerical prediction centres. To further benefit the meteorological community, especially in the Typhoon Committee region, it is considered advantageous

forecast errors cases. The proposed centre will also benefit future cross cutting projects of Typhoon Committee. Dr. TC Lee remarked the need to synergize this initiative with the existing research groups / centers established by individual Typhoon Committee Members in order to avoid overlapping of efforts. As requested by AWG, China will draft the proposal for discussion in TC51.
3. Ms. Yohko Igarashi, RSMC Tokyo, JMA mentioned about the overlapping of some Typhoon Committee tropical cylcones names with those which have been retired or used in other Region. AWG noted this issue and suggested WMO TCP to bring up this issue for discussion during the coming WMO TCM meeting in Honolulu, Hawaii.

51st TC
(Guangzhou, China)

To proposal on a new joint
research platform (TC-RC) to
submit to 52nd Session

cc) To request AWG to work with relevant

enhance research activities making the best use of existing mechanisms and functions to avoid duplication with other existing activities and functions.

14th IWS
(Guam, USA)

Revised
according
AWG and
Members

VIDEO CONFERENCE
REPORT OF THE FIFTY-SECOND SESSION OF TYPHOON COMMITTEE

52

Video Conference
6 March

15th IWS
2020, Dec.1-2

Recommendation to discuss
for endorse during TC-53

Thank you for your attention!