China-ASEAN Meteorological Cooperation Forum
Nanning, China, 17 to 19 September 2025

The Activities of the AI Applications in Typhoon Committee

Yihong DUAN

ESCAP/WMO Typhoon Committee Secretariat

Acknowledgements:
Dr. Yu-heng He from Hongkong Observatory
Dr. Clarence Fong and Dr. Jinping Liu from Typhoon Committee Secretariat

Contents

- ✓ Introduction to the Typhoon Committee
- ✓ Activities of the AI Applications
- ✓ Future Plan 2025+

Introduction to the Typhoon Committee

ESCAP/WMO Typhoon Committee

Typhoon Committee is a intergovernmental body established in 1968, under the auspices of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and World Meteorological Organization (WMO);

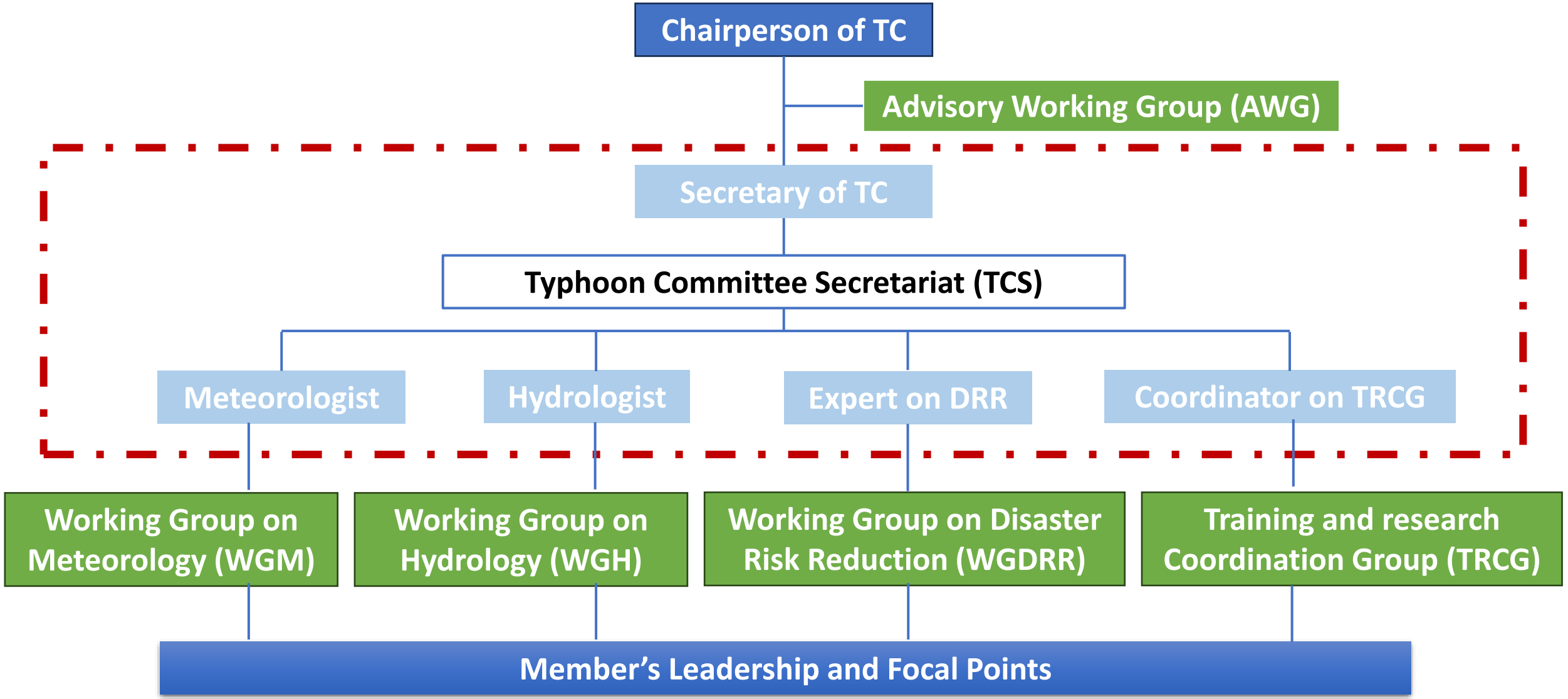
Currently evolved into a collaboration of 14 Members from Asia Pacific area

Introduction to the Typhoon Committee

The Typhoon Committee has been repeatedly recognized as an outstanding regional body who has integrated the actions and plans of the meteorological, hydrological, and disaster risk reduction (DRR) components to produce meaningful results.

- **Vision:** The Typhoon Committee is the world's preeminent inter-governmental, regional organization for improving the quality of life of the Members' populations through integrated cooperation to mitigate impacts and risks of typhoon-related disaster risks and to enhance beneficial typhoon-related effects.
- **Mission:** To integrate and enhance regional (Meteorological, Hydrological, and Disaster Risk Reduction) activities of Members within international frameworks to reduce the loss of lives and minimize social, economic, and environmental impacts by typhoon-related disasters.

Structure of Typhoon Committee



ESCAP/WMO Typhoon Committee

• The Typhoon Committee's Activities

- Session (Annual)
- Integrated Workshop (Annual)
- Working Group Meetings (Annual)
- Roving Seminar (Annual)
- Workshops/Trainings/Seminars:(Irregular)

Introduction to the Typhoon Committee

2nd Five Year Strategic Plan 2012-2016

3rd Five Year Strategic Plan 2017-2021

4th Five Year Strategic plan 2022 -2026

The Five-Year Strategic Plan is the guiding document for the work of the Typhoon Committee. We update the Strategic Plan every five years, and the latest plan covers the period from 2022 to 2026.

Introduction to the Typhoon Committee

ESCAP/WMO Typhoon Committee

1. Enhance capacity to monitor the impacts of tropical cyclone related disasters and strengthen tropical cyclone related disaster risk reduction (DRR) activities in various sectors.
2. Enhance capacity in tropical cyclone forecast and disaster risk prediction using multi-hazard impact-based forecast warnings, understandable information designed in collaboration with users, and cutting –edge information technology, leveraged from the latest advances in big data analytics, artificial intelligence, machine learning, and social science to support early warning systems, decision making and disaster response.
3. Improve flood mitigation measures and integrated water resource management to reduce the impacts of flooding caused by tropical cyclones.
4. Strengthen capacity development activities in meteorology, hydrology, DRR and civil protection sections, to enhance nationally to locally coordinated mechanisms for tropical cyclone early warning information to reach the last mile and combine public awareness with the appropriate response to protect life and property from tropical cyclones.
5. Promote visibility and enhance Typhoon Committee's Regional and International collaboration mechanisms to build partnerships, enhance capacity development, share best practices, and encourage capacity development, share best practices, and encourage active participation of international organizations in the disaster risk reduction programmes.
6. Advance collaborative scientific research amongst operational tropical cyclone centers and research communities, particularly in relation to climate change, and include support for translating research outcomes to services by developing relevant experiments, research projects, conducting fields surveys, and publishing and promoting research findings.
7. Enhance the resilience of vulnerable communities to tropical cyclone impacts, especially communities along the coast and inland areas with high risk floods and flash floods, such as hillside or mountainous regions and low lying floodplains along rivers.

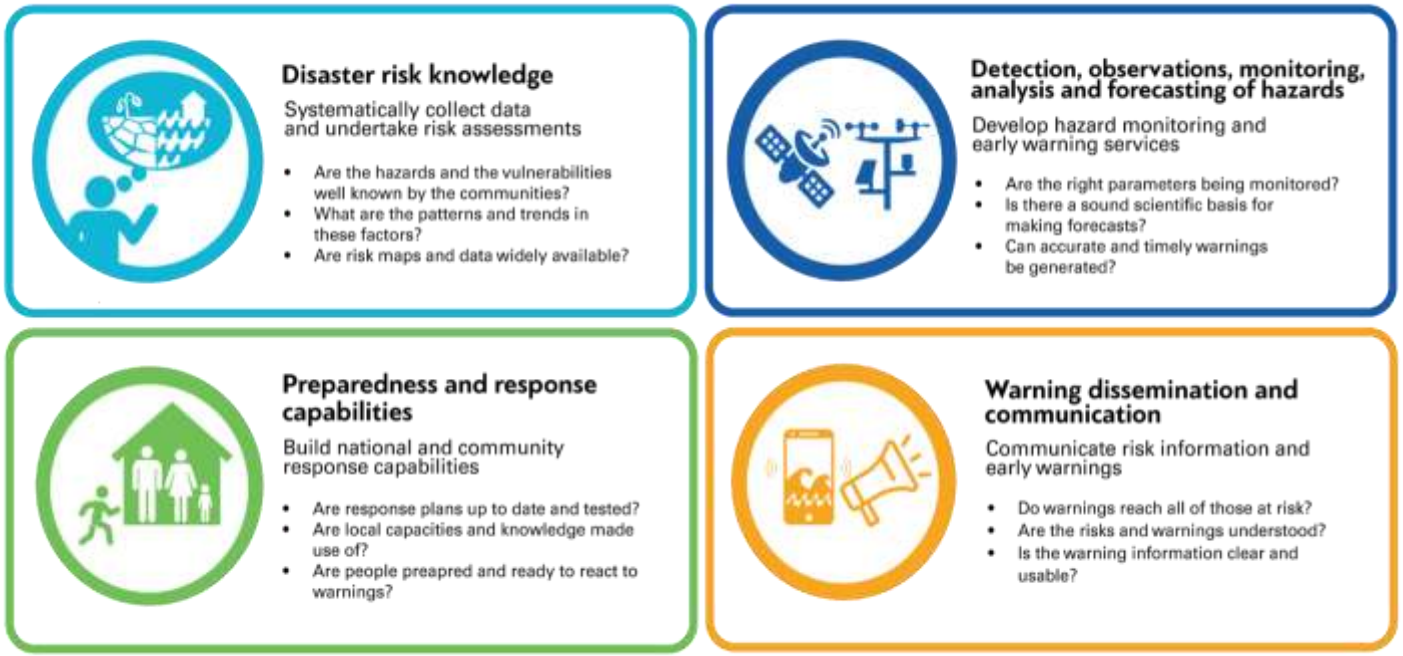
Key Results Areas (KRAs) for TC Strategic Plan 2022-2026

Contents

- ✓ Introduction to the Typhoon Committee
- ✓ Key Activities of the Typhoon Committee on AI Applications
- ✓ Future Plan 2025+

Key Activities of AI Applications

To address the challenge of **insufficient multi-hazard early warning systems**, the United Nations is spearheading the Early Warnings for All (EW4All) initiative to ensure everyone on the planet is protected by early warning systems by the end of 2027. EW4All is **co-led by WMO and UNDRR**, with the support of other agencies.



4 Pillars of EWS

ESCAP/WMO Typhoon Committee

- At its 56th Session held in Kuala Lumpur, Malaysia in 2024, the Typhoon Committee decided to establish a project on Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and Forecasting, with the aim of enhancing typhoon forecasting capabilities.
- A kick-start workshop for the Project was held at the Hong Kong Observatory, Hong Kong, China, on 21-22 May 2024.

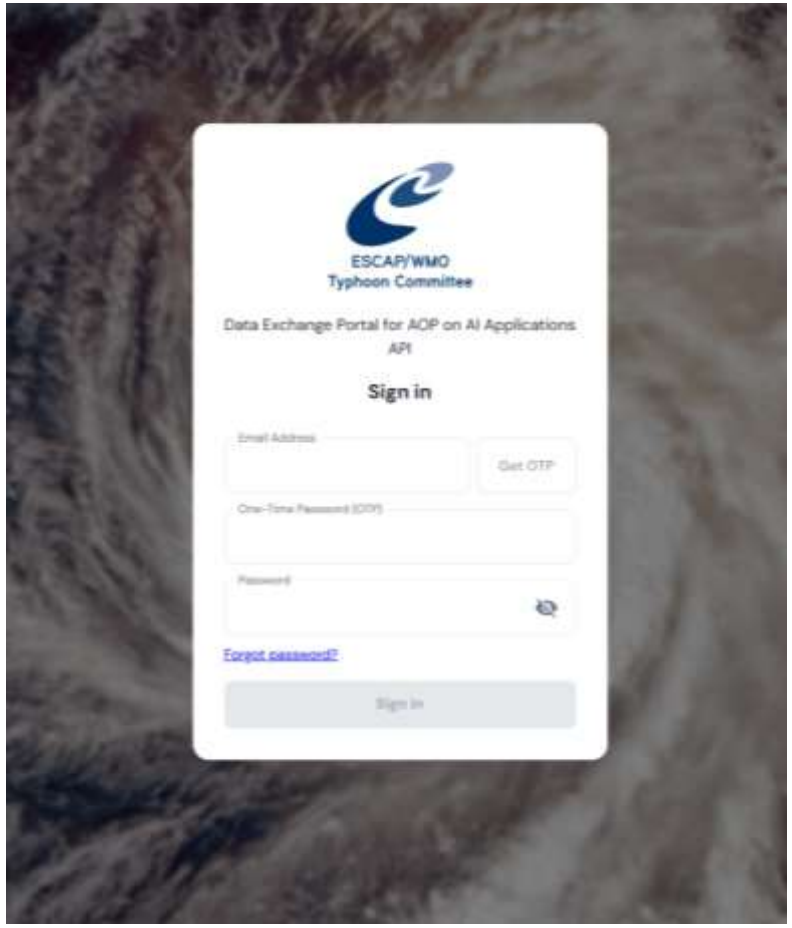
The first face to face Meeting of the ET-AITC

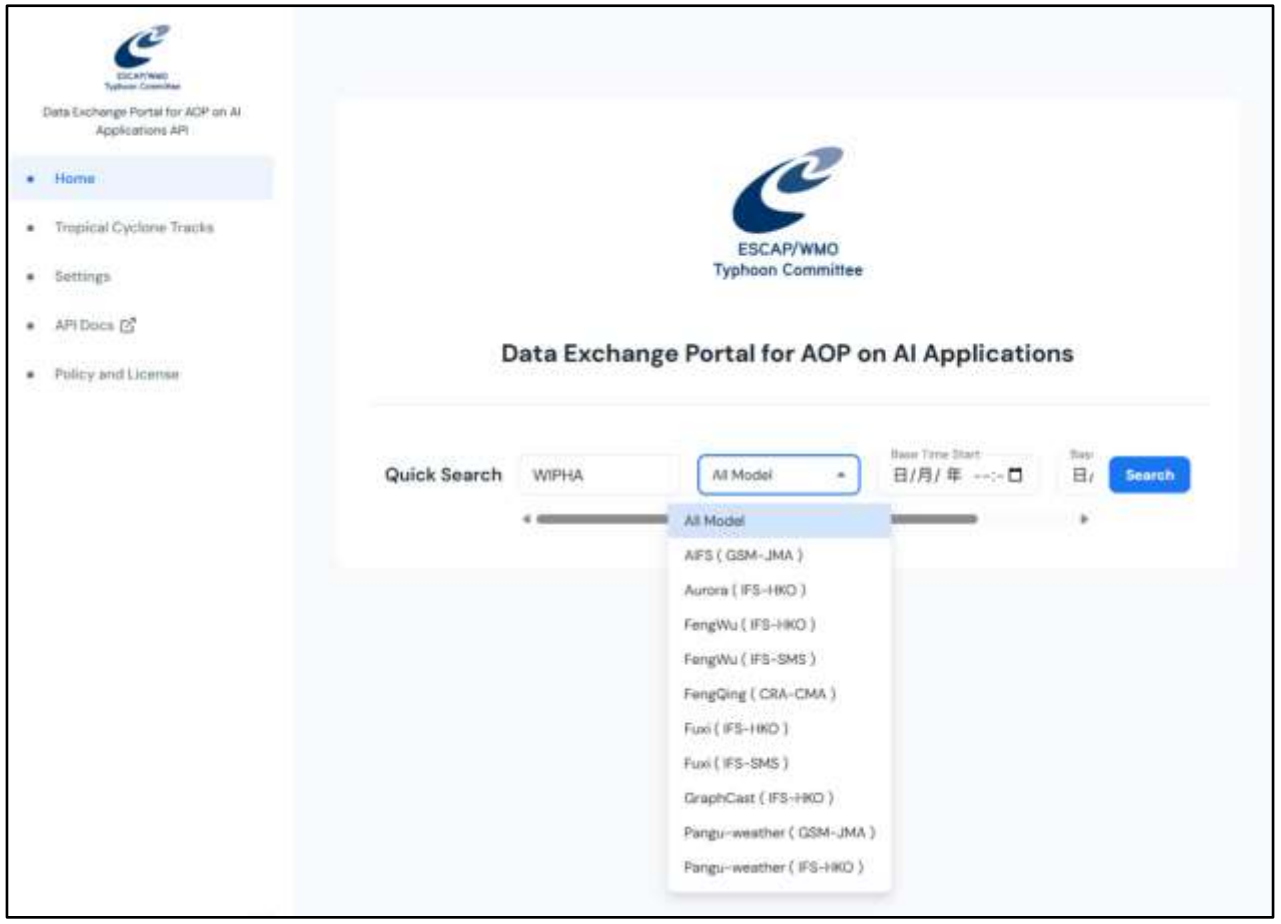
- Established the Expert Team on AI Applications in Tropical Cyclone Analysis and Forecasting (ET-AITC)
- ET-AITC is composed of 12 experts from 11 members. This expert group is Co-chaired by experts from Hong Kong, China and Japan.

The first face-to-face meeting of was held in Tokyo, Japan from June 24 to 26, 2025.

Data Exchange Portal on AI Applications

ESCAP/WMO
Typhoon Committee

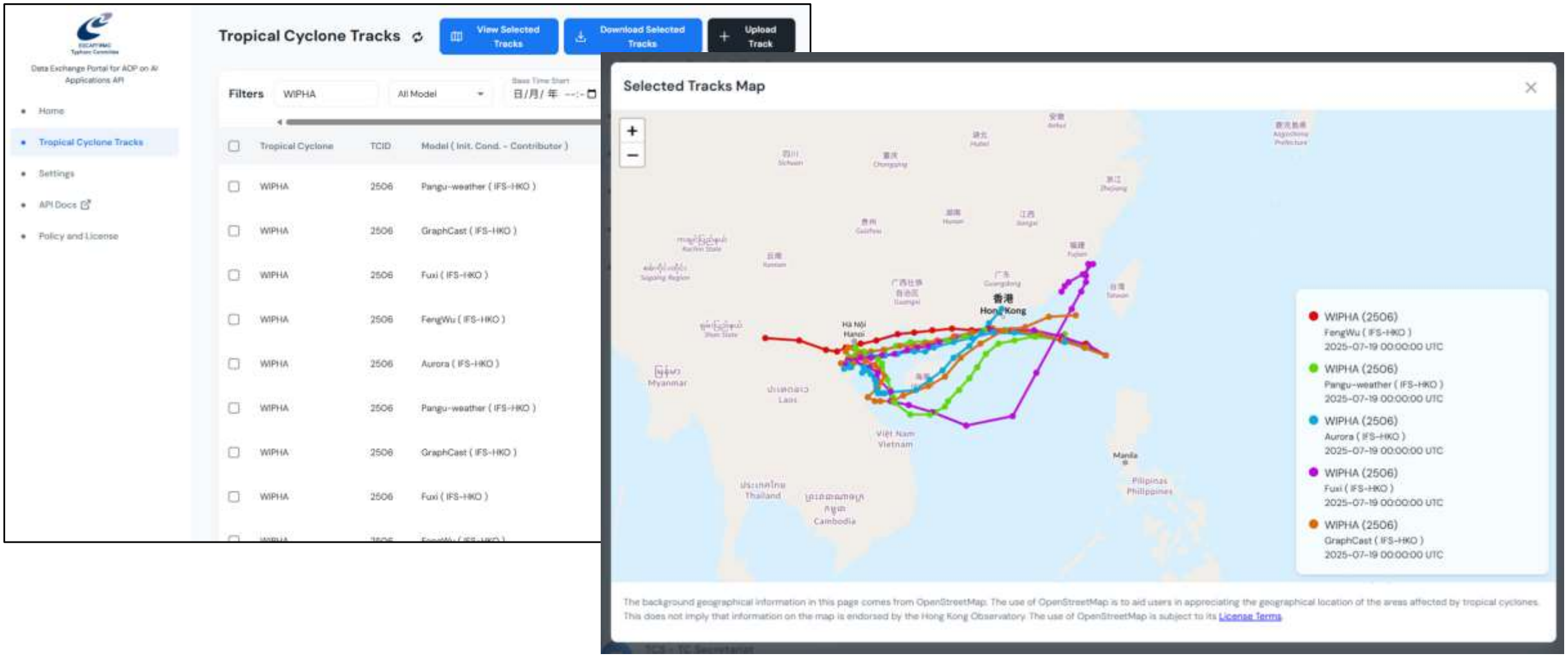




Established a platform for exchanging and sharing tropical cyclone track prediction data AI based.

Data Exchange Portal on AI Applications

ESCAP/WMO Typhoon Committee



TC Members can share this platform to obtain typhoon path forecasts made by other members using AI technology.

AI Application in Hydrological Component

ESCAP/WMO Typhoon Committee

WGH AOP2: Improvement of Hydrological Data Quality Control System by Using AI technology

The objectives of WGH AOP on **Improvement of Hydrological Data Quality Control System by Using AI Technology** was proposed as development of an advance hydrological data quality control system by using technology of big data and Artificial Intelligent (AI) so as to enhance TC Member's capacity on managing and monitoring hydrological data (Rainfall, Water Level, Discharge, tide, etc.) and reduce the uncertainty of input data for flood forecasting.

WGH AOP3: Improvement of Flood Forecasting modelling by Using AI technology

The objectives of WGH AOP on **Improvement of Flood Forecasting modelling by Using AI technology** was proposed as development of an advance hydrological flood forecasting system by using technology of big data and Artificial Intelligent (AI) so as to enhance TC Member's capacity on flood forecasting and water-related early warning .

Development of Operational Platform for Hydrological Data Analysis and Quality Control

ESCAP/WMO Typhoon Committee

Data Anomaly Detection

Accurate identification and effective correction of anomalies in hydrological data

Data Interpolation

Using hydrological data compilation rule and big data algorithms to train AI models.

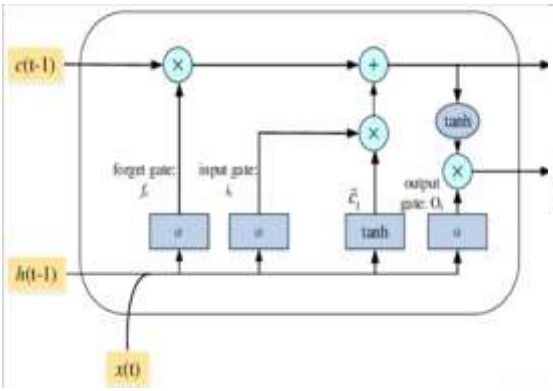
Data Transformation

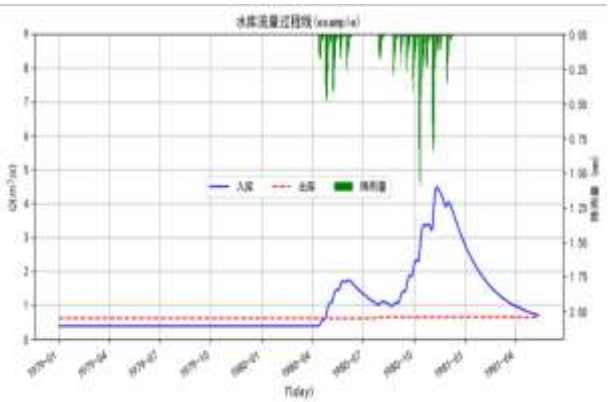
Rainfall data (discrete) is converted into a simulated flow series using a P~R model, and its rationality is verified based on the principle of water balance.

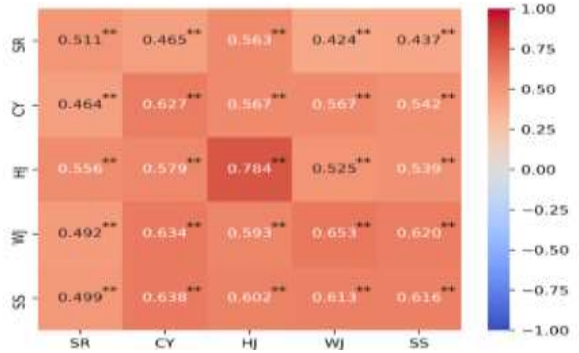
Data Inference

Dynamic Time Warping (DTW) is used to analyze and evaluate the trends of hydrological data, taking into account data lag or lead effects.

#Station	Entry Time (YYYYMMDDHHmm)	TM (ELm)	Lag Time (sec)
1	201905251610	51.8	0
1	201905251620	51.7	0
1	201905251630	***	0
1	201905251640	51.8	0
1	201905251700	51.7	0
1	201905251710		inf
1	201905251720	51.6	0
1	201905251730	51.6	0








Hydrological Data Analysis & Quality Control
2025-08-16 Saturday Fuzhou: Cloudy 25°C/33°C
Expand Navigation
• Digital Cockpit
• Data Gatekeeping
• Real-Time Information ...
• Hydrological Informatio...
• Equipment Information ...
• Data Validation
• Data Reasoning
• Data Assessment
• Data Graph
Select a category
郑州
西安
成都
重庆
武汉
合肥
南京
上海
杭州
南昌
长沙
贵阳
福州
台北
南宁
香港

Typhoon Committee Roving Seminar 2024

- The Typhoon Committee Roving Seminar 2024 was successfully held in hybrid mode on 17 – 19 December 2024 in Bangkok, Thailand. It was organized Typhoon Committee and hosted by TMD. The theme of this Roving Seminar was on **Artificial Intelligence for Enhanced Tropical Cyclone Prediction and Emergency Response**

Contents

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Conclusions and Future Plan for 2025+

- The AI application for tropical cyclone initiative will be a **Research-to-Operation** project in future:
  - ✓Data exchange of tropical cyclone forecast tracks (both real-time and non-real-time) from several data-driven models.
  - ✓Data or products provided by contributing Members.
  - ✓Verification and inter-comparison.
- Promoting application of data-driven models in tropical cyclone forecasting under WIPPS Pilot Project.
- Facilitating the cross-sectoral integration of AI applications across WGM, WGH, and DRR to foster a unified and collaborative AI strategy within the Typhoon Committee.
- Enhancing the cooperation with the AI research and developing communities.
- Organize the second AI Application Workshop in 2026. (Shanghai, April 2026)

ASEAN countries

Brunei

Indonesia

Myanmar

Cambodia

Philippines

Vietnam

Laos PDR

Malaysia

Singapore

Thailand

TC members

Thank you for your attention

Email: duanyh@typhooncommittee.org

Table 1 The list of WGM POP/AOP/PPs in 2025			
Item	Projects	Driver	Since
POP1	Improve the Algorithm of Typhoon Summer Prediction	ROK	2021
POP2	Tropical Cyclone Research and Review	China	2013
POP3	Verification of Tropical Cyclone Operational Forecast	China	2015
AOP1	Enhanced Use of Ensemble Forecast	Japan	2011
AOP2	Improve the Performances and Impacts of South China Sea Typhoon Model	China	2012
AOP3	Development of Regional Radar Network	Japan	2011
AOP4	Radar Nowcasting Based on RaINS/SWIRL	Malaysia	2019
AOP5	Storm Surge Watch Scheme	Japan	2012
AOP6	Contribution for the Experiment on Typhoon Intensity Change in Coastal Area (EXOTICCA-II)	China	2014

Table 2 The list of WGM POP/AOP/PPs in 2025			
Item	Projects	Driver	Since
AOP7	Enhancing Utilization of Himawari 8/9 Products	Japan	2018
AOP8	Parallel Analysis of Satellite Data in Operational Tropical Cyclone Monitoring	China	2018
AOP9	Enhancement of Disaster Risk Reduction Against Heavy Rain in Collaboration of AOP7 of WGH	Japan	2019
AOP10	GK2A Utilization for Tropical Cyclone	ROK	2021
AOP11	4th Assessement Report on Impacts of Climate Change on Tropical Cyclones in Typhoon Committee Region	China	2023
AOP12	Tropical Cyclone Monitoring using Drifting Buoys	ROK	2023
AOP13	Promoting Technical Exchange of AI Applications in Tropical Cyclone Analysis and Forecasting	Hong Kong, China	2024
PP1	Utilization of FengYun Satellite for High-Frequency Observation of Tropical Cyclone	China	2025

Table 3 The list of WGH AOPs in 2025 and beyond

Item	Projects	Driver	Duration
AOP1	Knowledge Sharing on Storm Surge Inundation Mapping	USA	2020~2026
AOP2	Improvement of Hydrological Data Quality Control System by Using AI technology	ROK	2023~2027
AOP3	Improvement of Flood Forecasting modelling by Using AI technology	ROK	2023~2027
AOP4	Review and enhancement on specifications for hydrological information and forecasting in TC Members	China	2025~2027
AOP5	Application Study on New Generation of Integrated Micro-siphon Rain Gauge in TC Members	China	2025~2027
AOP6	Flood Risk Mapping with Ground/Satellite Observation Data	Japan	2024~2027
AOP7	Flood resilience enhancement through Platform on Water Resilience and Disasters	Japan	2023~2027
AOP8	Training Course on Hydrological Monitoring and Flood Management for Developing Countries	China	2023~2028
AOP9	Synergized Standard Operating Procedures for Coastal Multi-Hazard Early Warning System (SSOP)-Phase III	USA	2025~2027

Table 3 The list of DRR AOPs in 2025 and beyond			
Item	Projects	Driver	Duration
AOP1	Capacity Building/Knowledge Sharing in DRR	Members	2020~2026
AOP2	Installation of Early Warning System related to typhoon disasters	ROK	2023~2027
AOP3	WGDRR Annual Meeting	ROK	2023~2027
AOP4	Benefit Evaluation of Typhoon Project	China	2018~2025
AOP5	Sharing Information related to DRR		2018~2025
AOP6	Making video related to DRR	Hongkong China	2019~2026

Membership of Typhoon Committee

Cambodia

China

DPRK

Hong Kong, China

Japan

Laos PDR,

Macao, China

Malaysia

ROK

Philippines

Singapore

Thailand

USA

Vietnam