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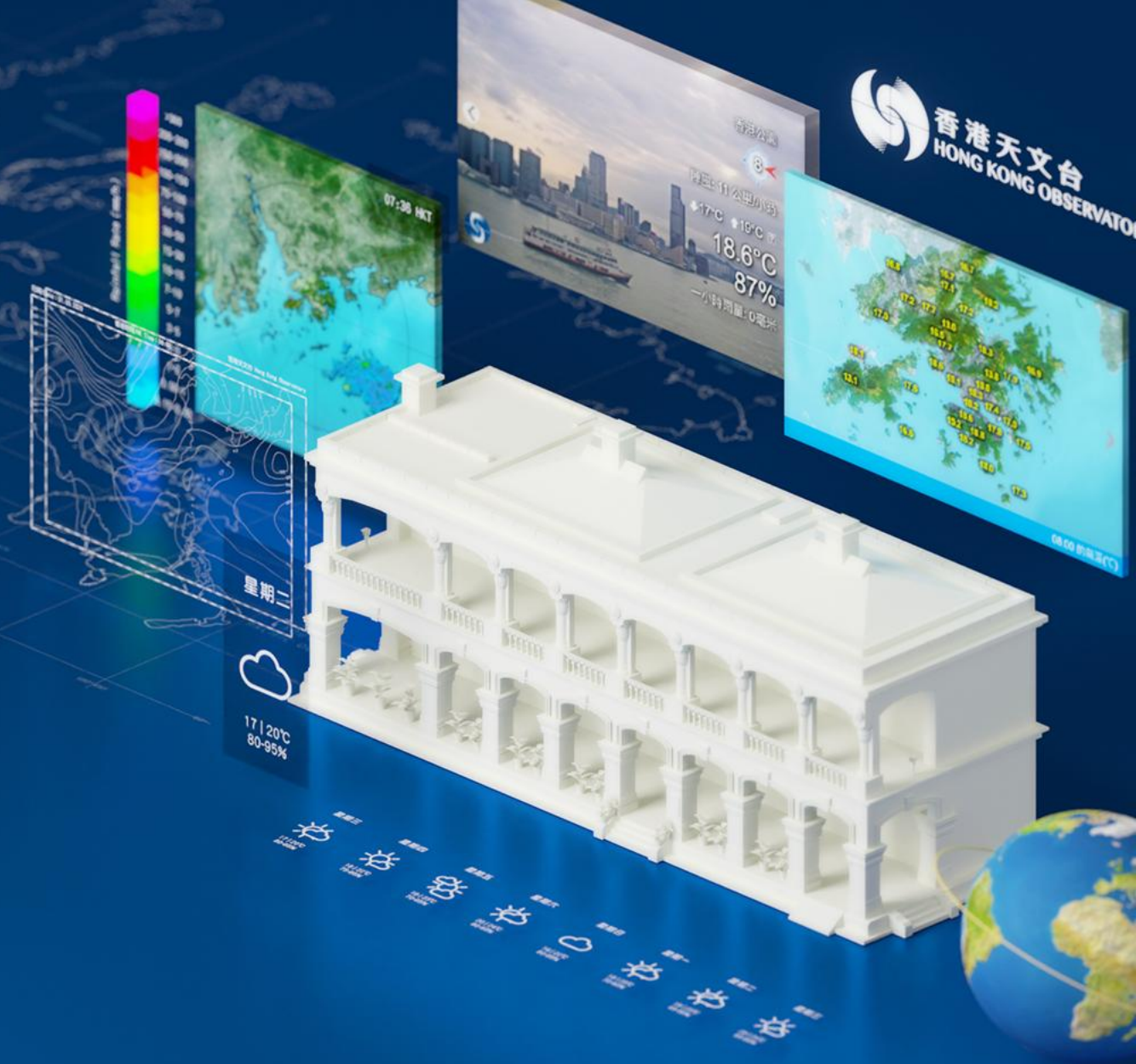
RSMC NOWCASTING PRODUCTS

WMO Severe Weather Forecasting Programme (SWFP)
Regional Sub-programme for Southeast Asia (SWFP-SeA)
Training Desk and Study Visit for Cambodia
(Ha Noi, 19 - 23 May 2025)

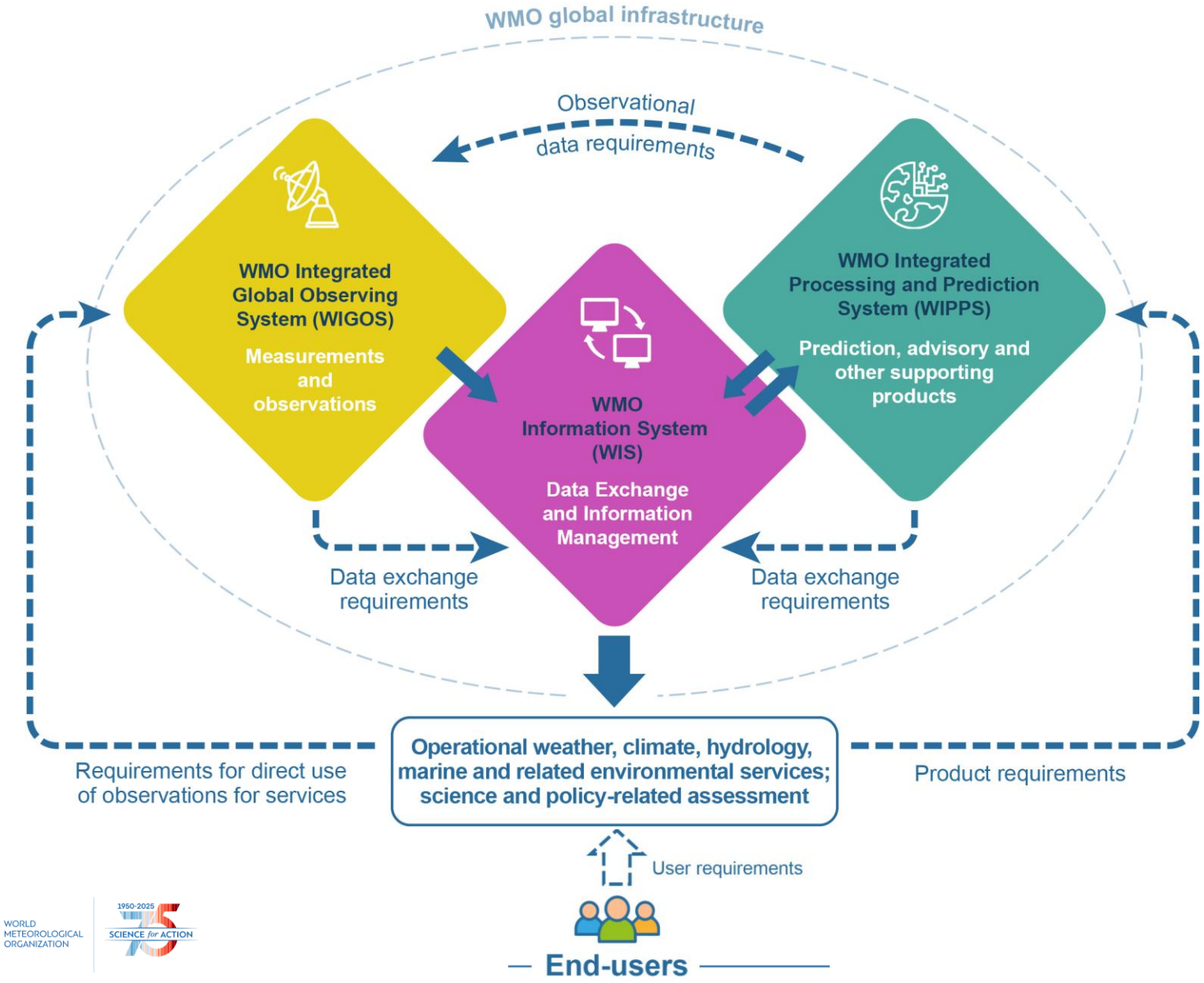
Wai-Kin Wong

Senior Scientific Officer, Forecast Development Division

E-mail: wkwong@hko.gov.hk

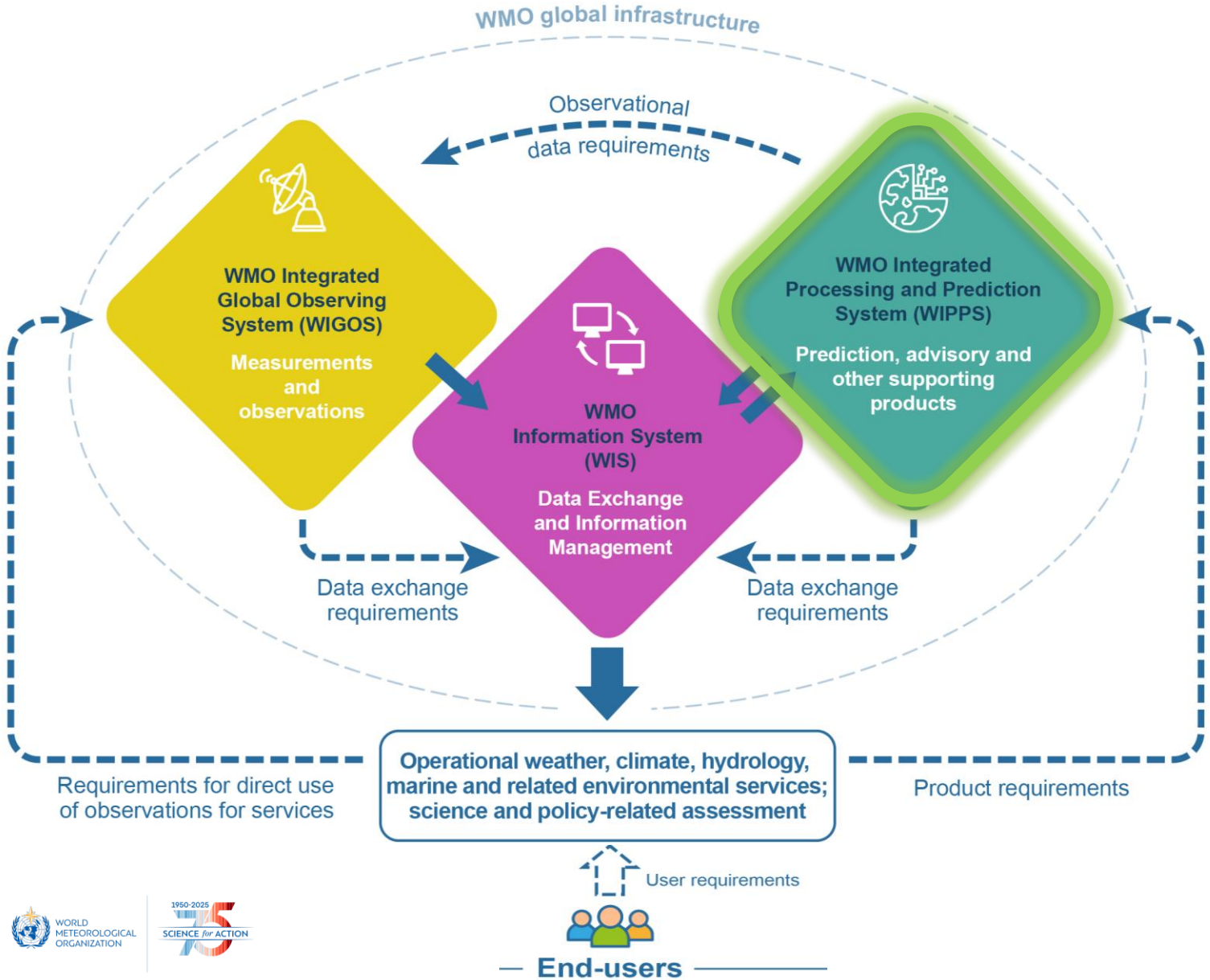


WMO Operational Infrastructure



- **WIGOS**
  - WMO Integrated Global Observing System
- **WIPPS**
  - WMO Integrated Processing and Prediction System
- **WIS**
  - WMO Information System (Data exchange)

WMO Integrated Processing and Prediction System in WMO Global Infrastructure



WIPPS is a worldwide network of modelling centres operated by WMO Members.

Its purpose is to make operationally available defined products and services for applications related to weather, climate, water and environment among WMO Members and relevant operational organizations (***WMO Strategic Plan - Output 2.3***)

Its role is to process observation and generate analysis and prediction products based on science and technology to meet users' needs.

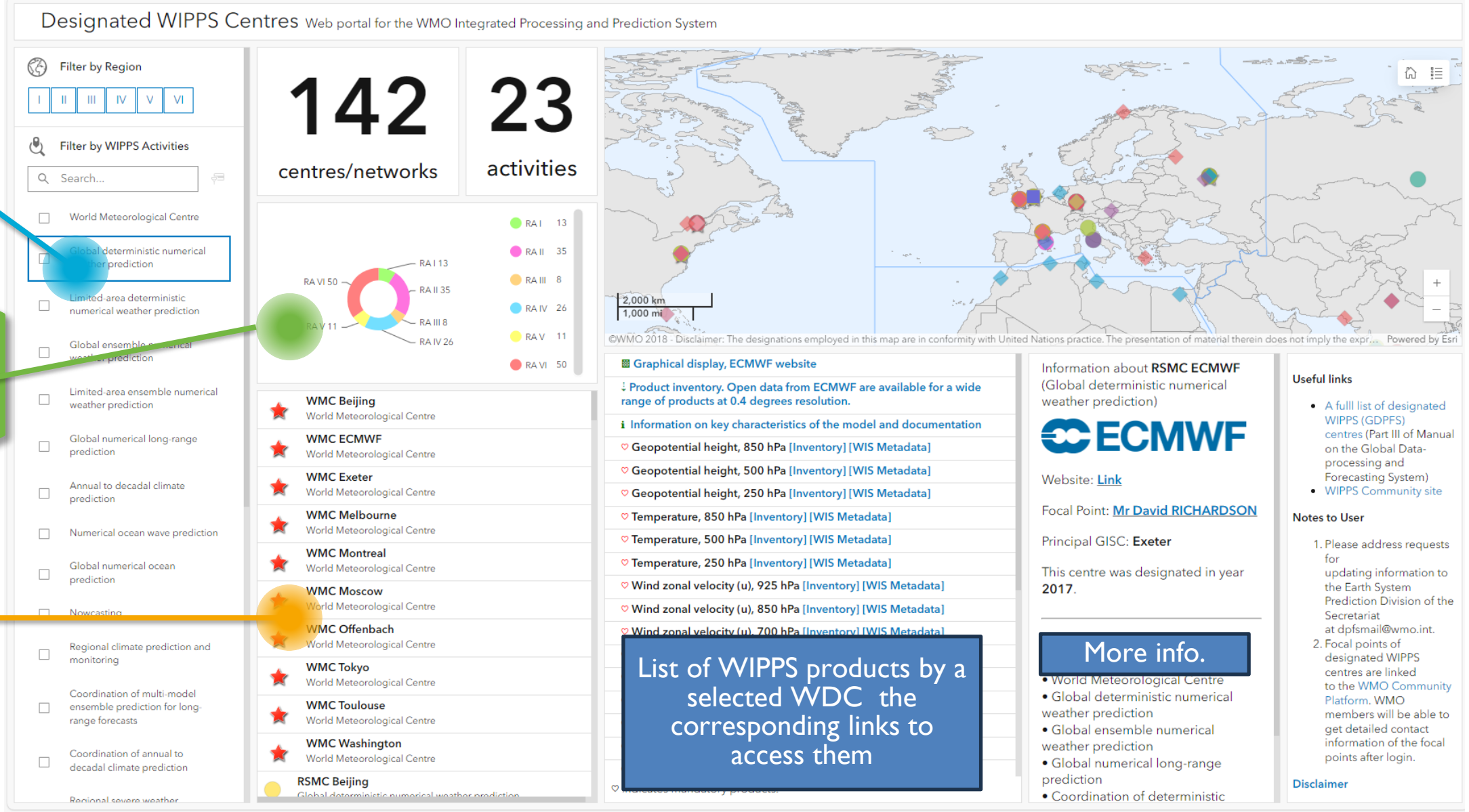
WIPPS Web Portal

- WIPPS Web Portal: [WIPPS Web Portal | World Meteorological Organization (wmo.int)]

WIPPS activities at a glance

Geo-statistics

List of designated centres



WORLD METEOROLOGICAL ORGANIZATION

WMO 臨近預報區域專業氣象中心 RSMC for Nowcasting

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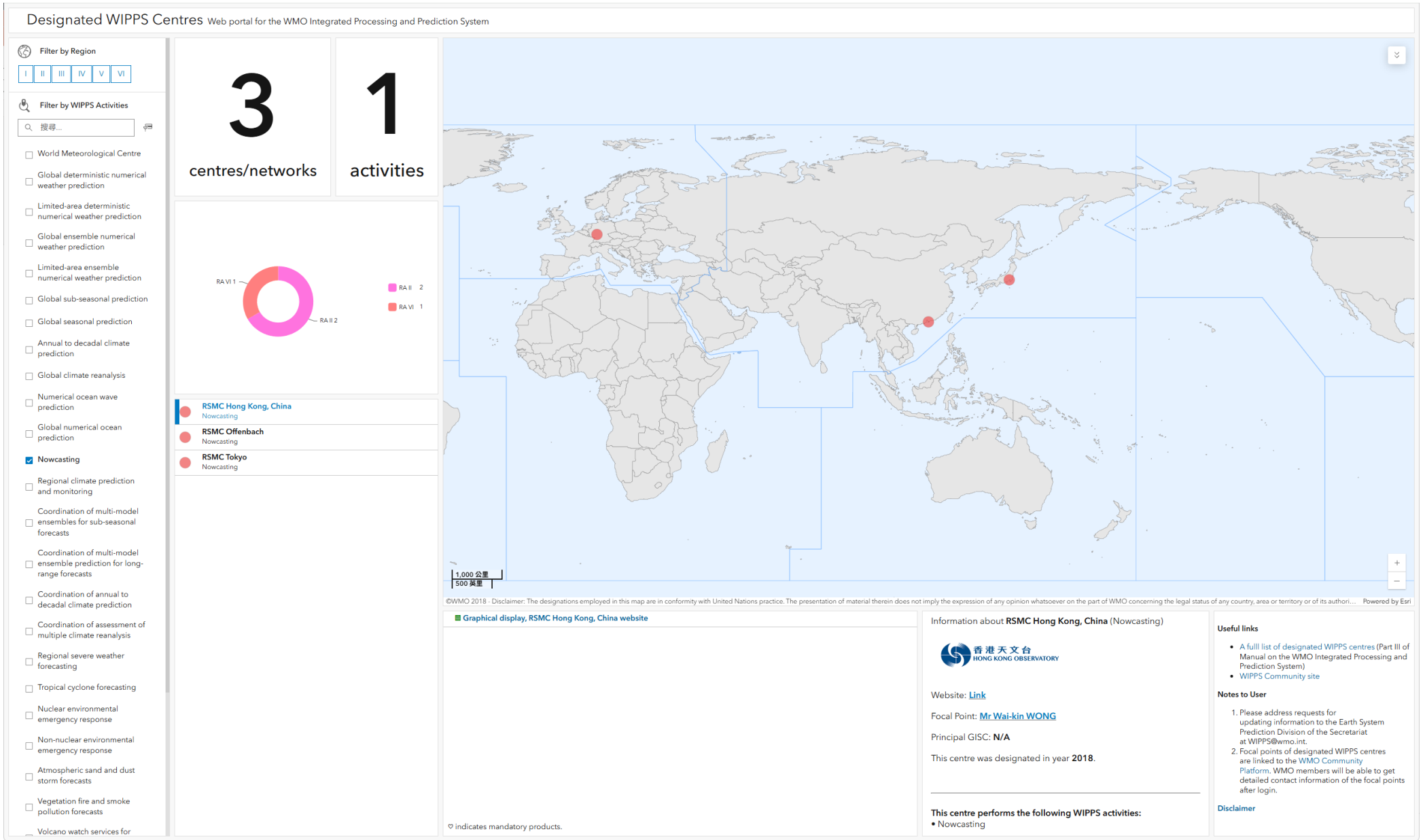
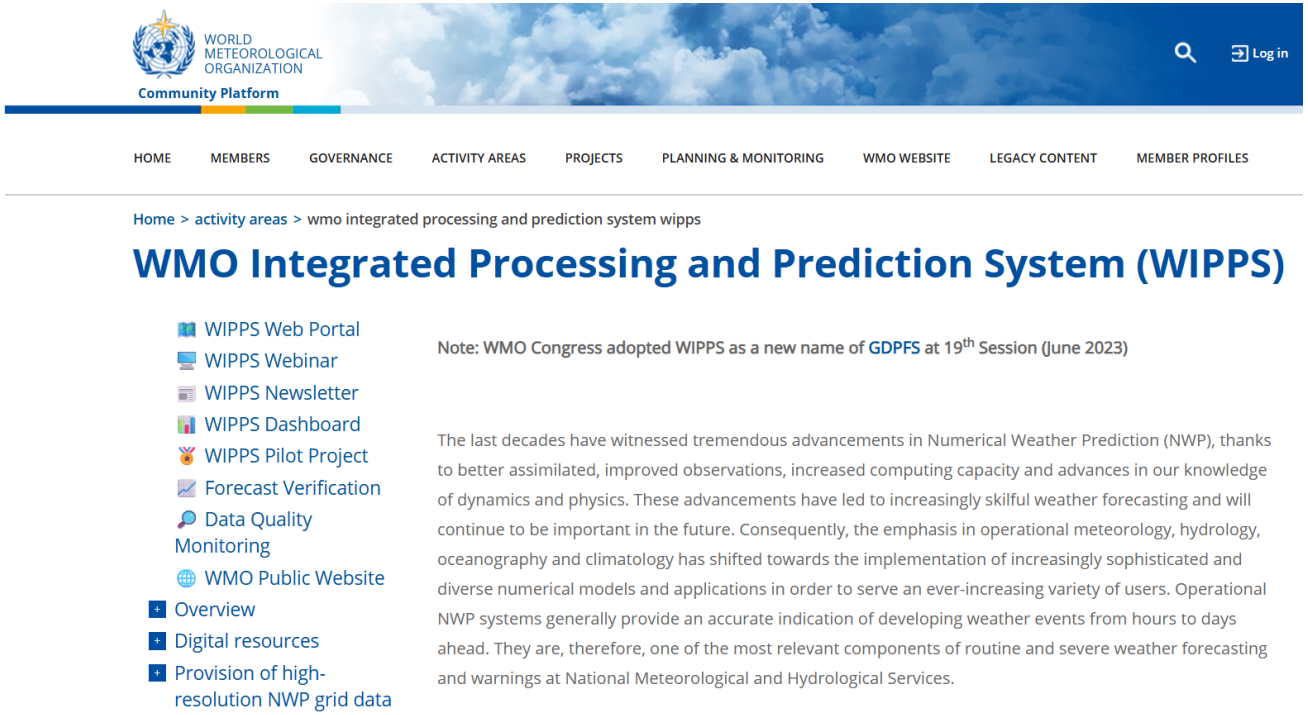
WIPPS Web Portal | World Meteorological Organization (wmo.int)

Nowcasting ➡



WMO WIPPS Homepage

- https://community.wmo.int/en/activity-areas/wmo-integrated-processing-and-prediction-system-wipps



RELATED NEWS

WIPPS Webinar
WIPPS Pilot Project
WIPPS Newsletter
New Web Portal Eases Access of Forecast Products

RELATED PUBLICATIONS

Manual on WIPPS (WMO-No. 485)
Guide on WIPPS (WMO-No. 305)
Guidelines on High-resolution Numerical Weather Prediction (WMO-No. 1311)
Seamless prediction of the Earth system: from minutes to months
Guidelines on Ensemble Prediction Systems and Forecasting (WMO-No. 1091)
Guidelines on Ensemble Prediction System Postprocessing (WMO-No. 1254)
Guidelines for Nowcasting Techniques (WMO-No. 1198)
Guidance on Operational Practices for Objective Seasonal Forecasting (WMO-No. 1...
Guidance on Verification of Operational Seasonal Climate Forecasts (WMO-No. 12...
Guidelines for Satellite-based Nowcasting in Africa (WMO-No. 1309)
Forecast Verification for the African Severe Weather Forecasting (WMO-No. 1132)
WMO Global Annual to Decadal Climate Update
WMO Global Seasonal Climate Updates
BAMS paper on "WMO-Accredited Infrastructure to Support Operational Climate Pre...

RELATED DOCUMENTS

Long-range Forecasts (1 month to 2 years)

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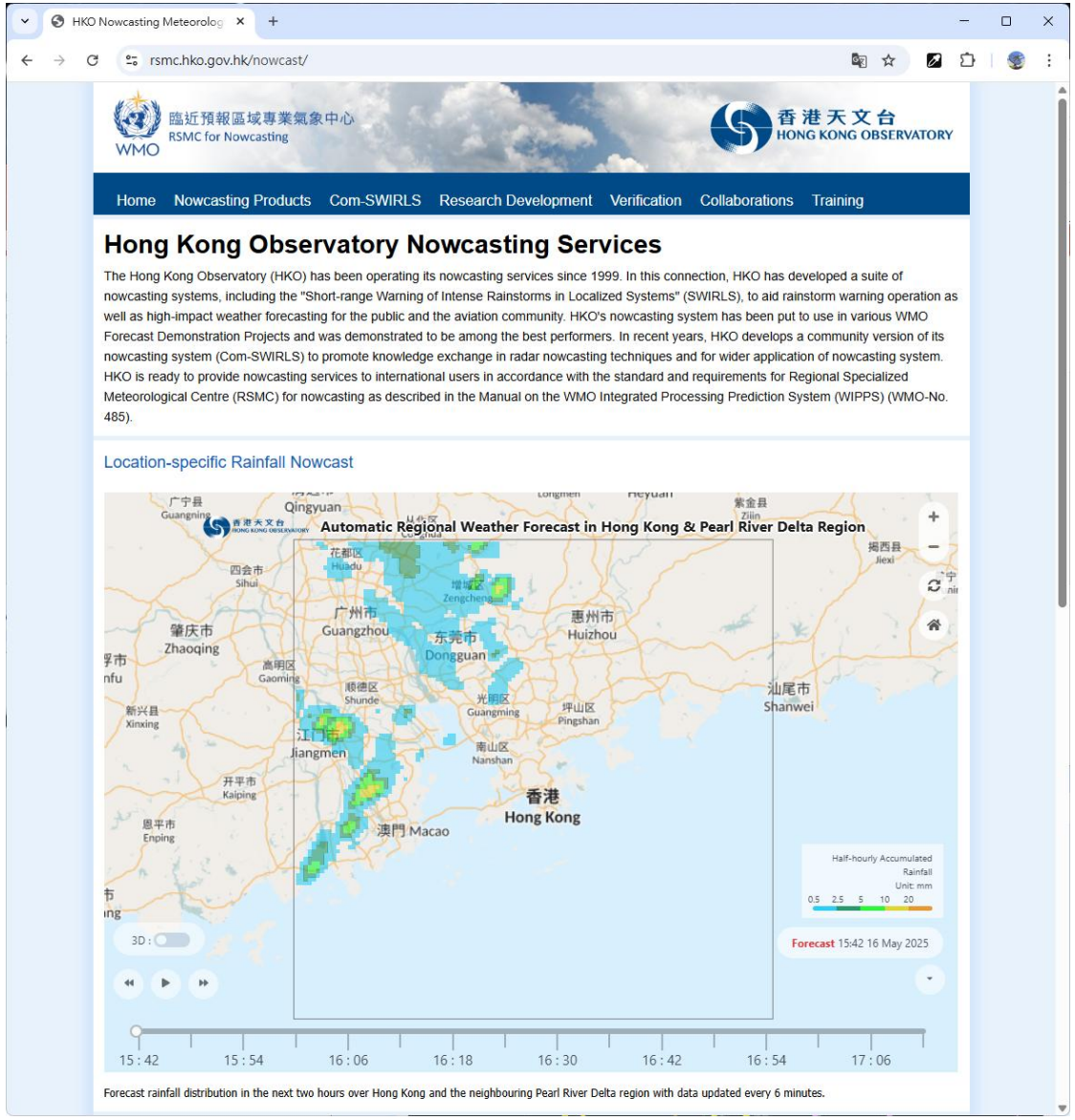
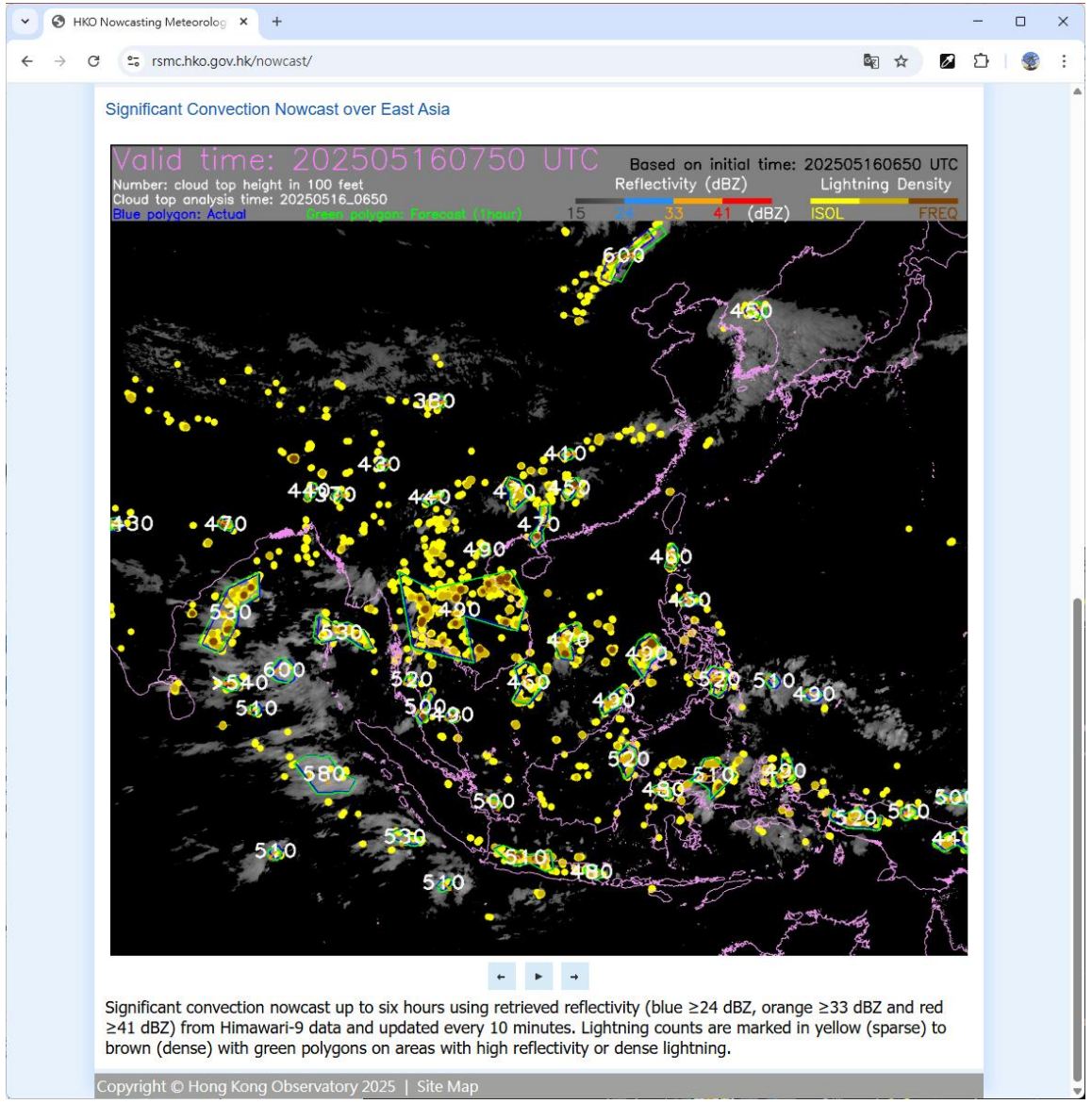
RSMC Hong Kong for Nowcasting

https://rsmc.hko.gov.hk/





HKO SWIRLS Nowcasting System

Data Products and Services for Local to Regional Supports

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SWIRLS: Short-range Warning of Intense Rainstorms in Localized Systems

Observations

Satellites

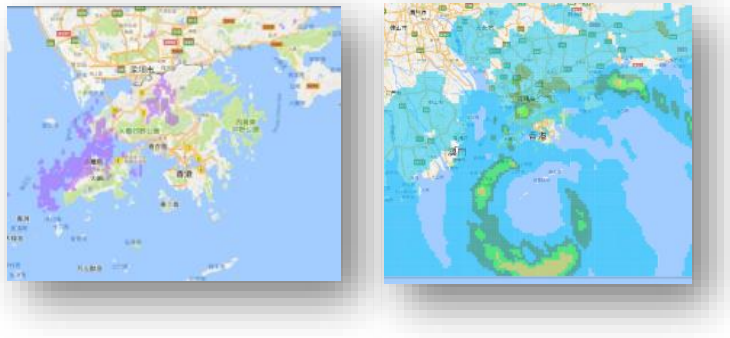
Radars

Rain Gauges

Lightning Detectors

SWIRLS

GPU computing servers



Nowcast rainfall, lightning, hail & gust

Products and Services

Weather Forecasters

Nowcast alert to public via HKO's mobile app and website

Government & Utilities

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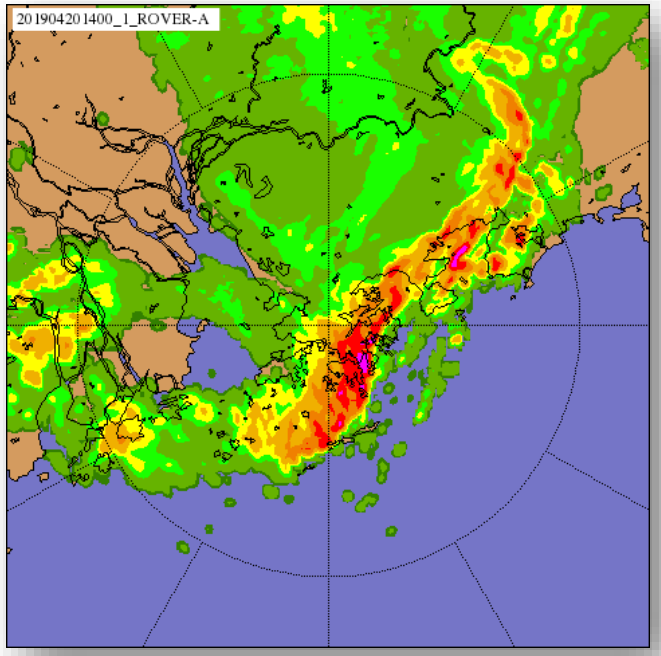
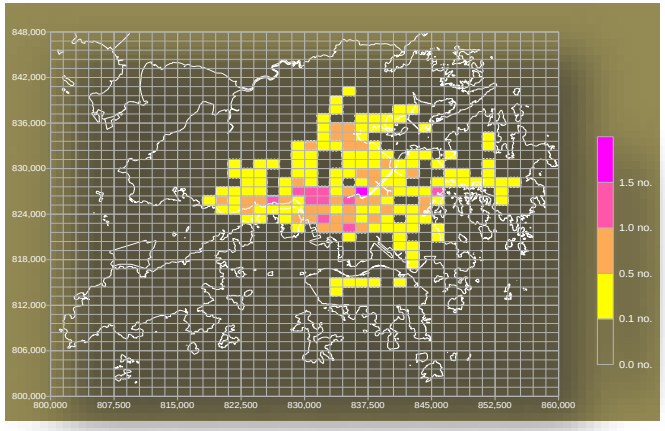
SWIRLS support to government departments

Rainfall Nowcast

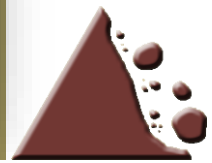


Flood risk monitoring and clearance

Drainage system operation



Landslip warning



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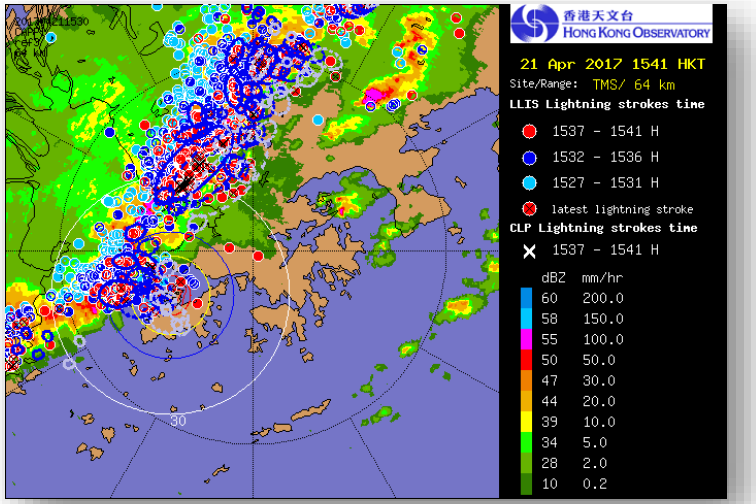
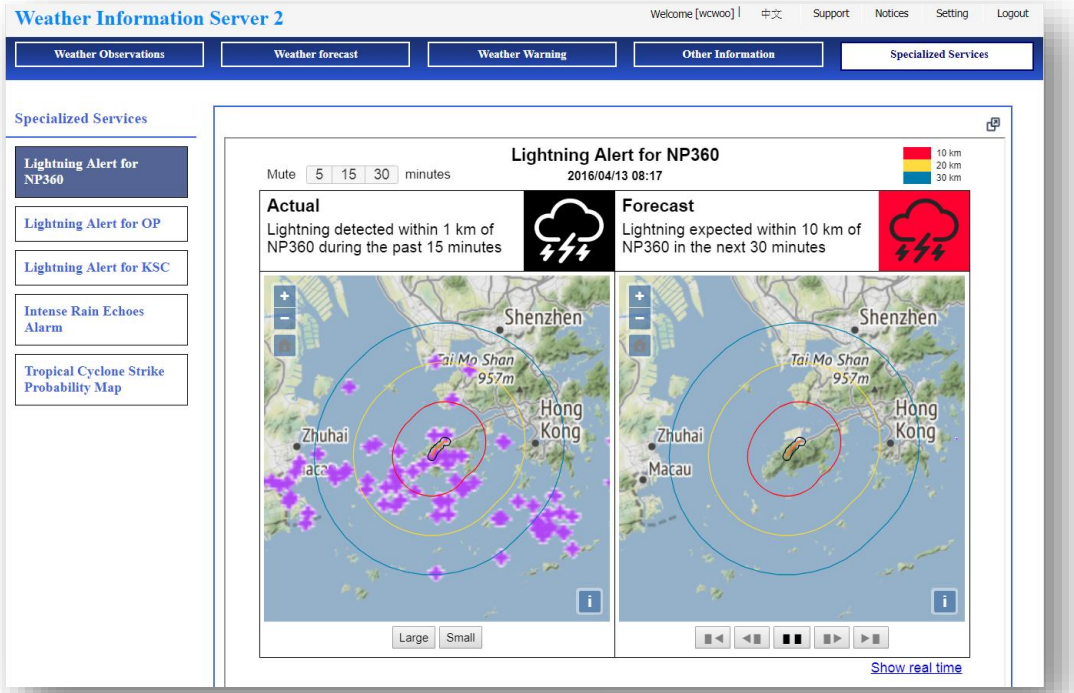
SWIRLS support to public utilities

Lightning Nowcast





Minimizes risk of lightning strikes for ground operation

Supports decisions on mobilization and smooth operation of power

Timely suspension of services before thunderstorms and early resumption after

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WMO

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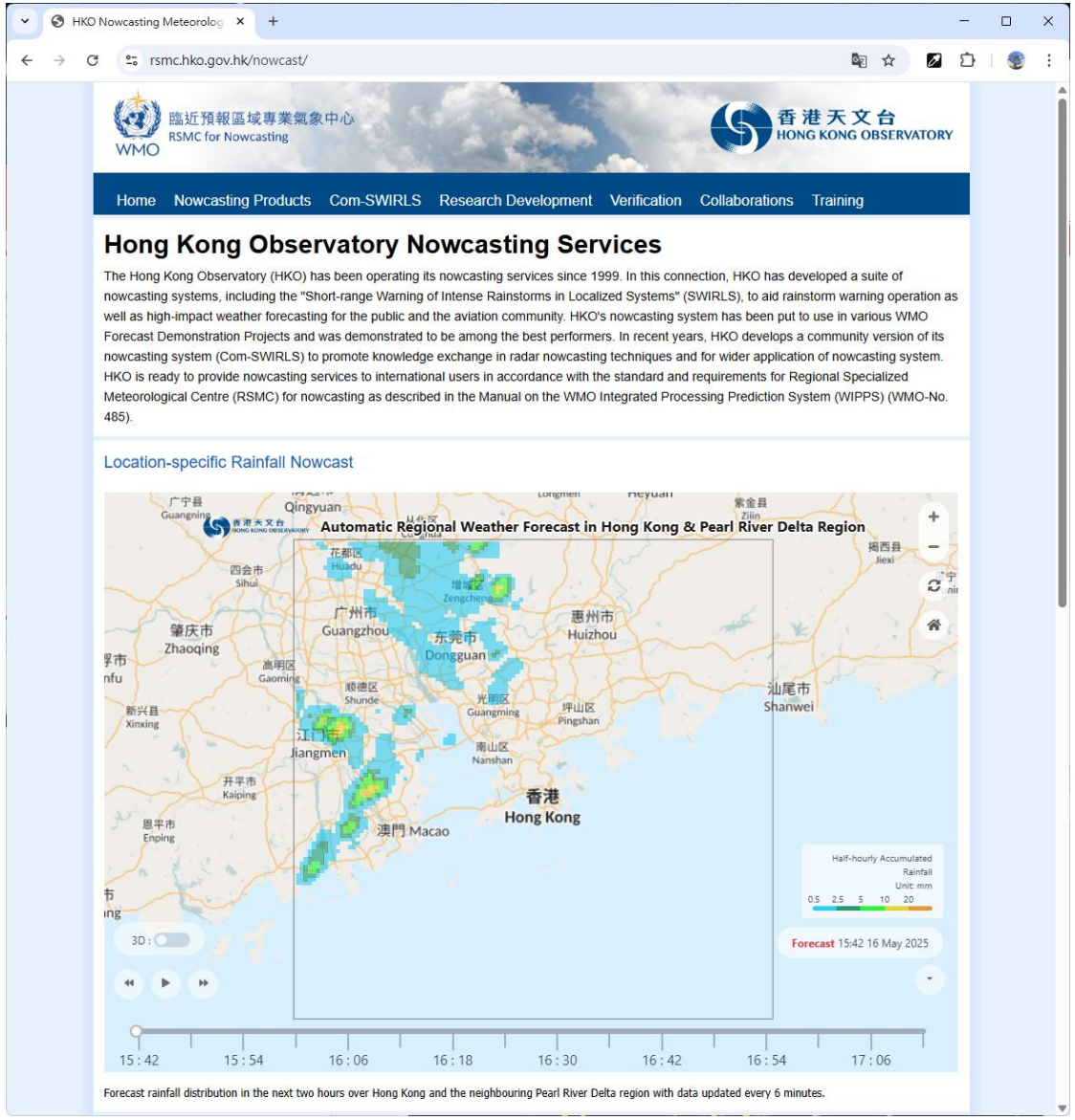
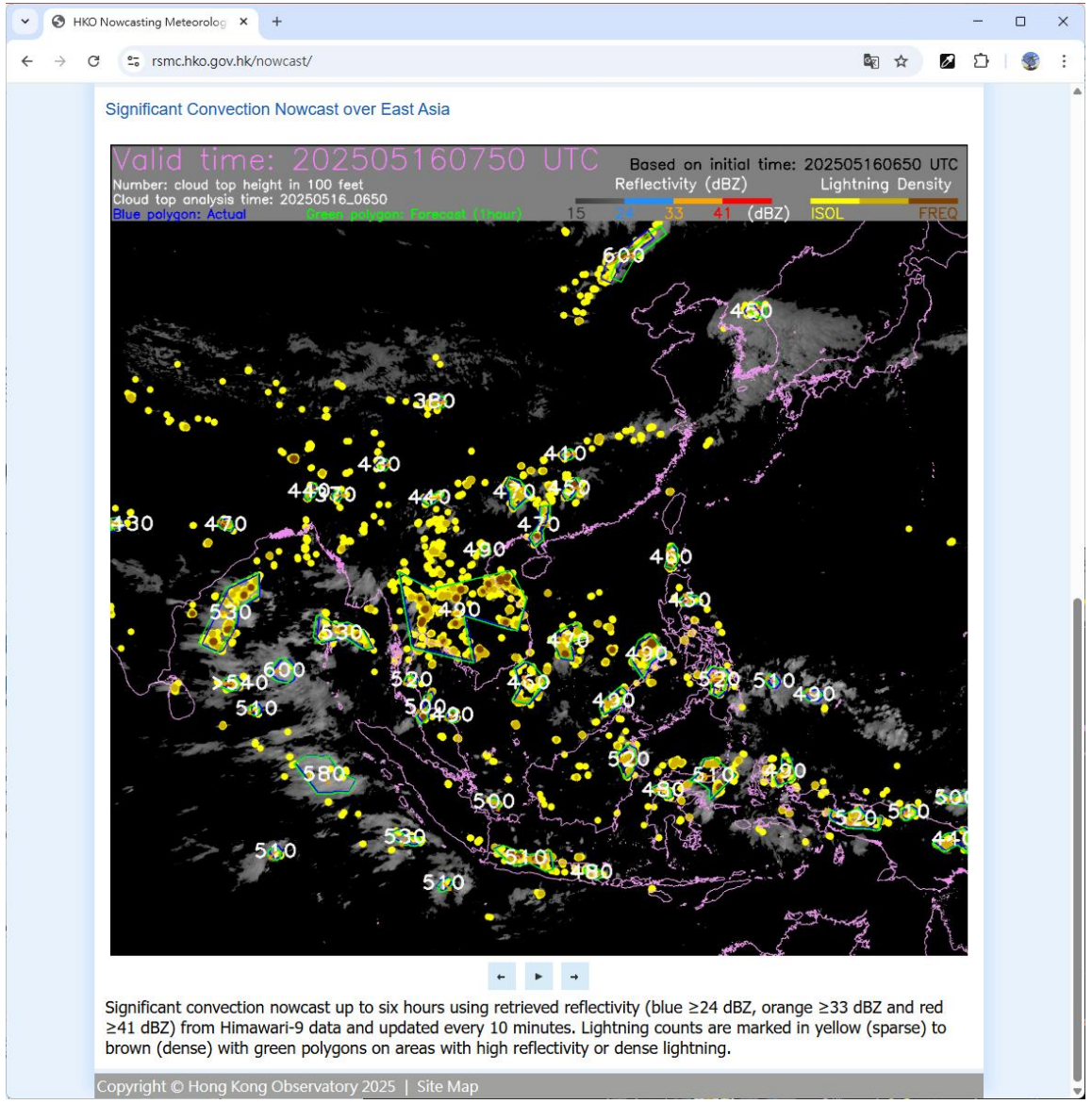
RSMC Hong Kong for Nowcasting

https://rsmc.hko.gov.hk/





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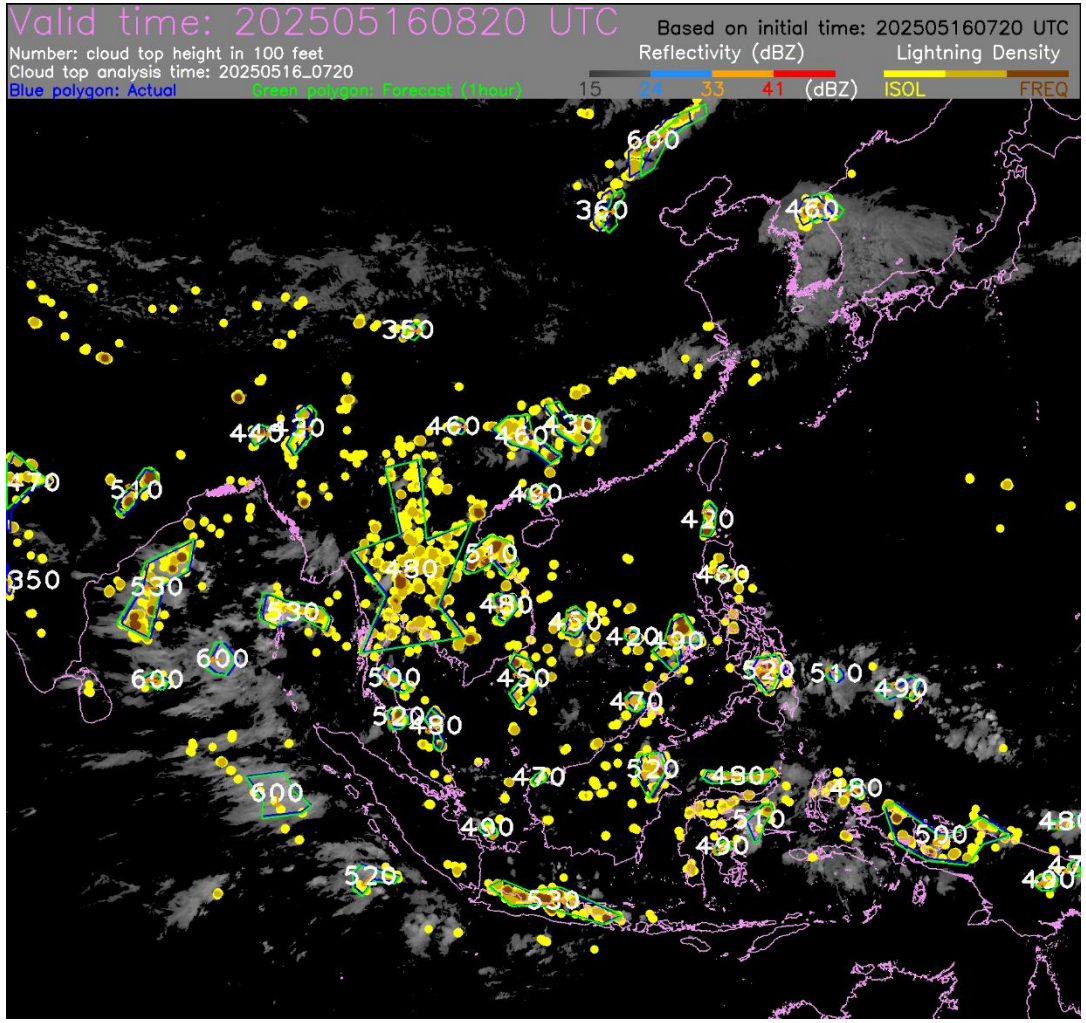
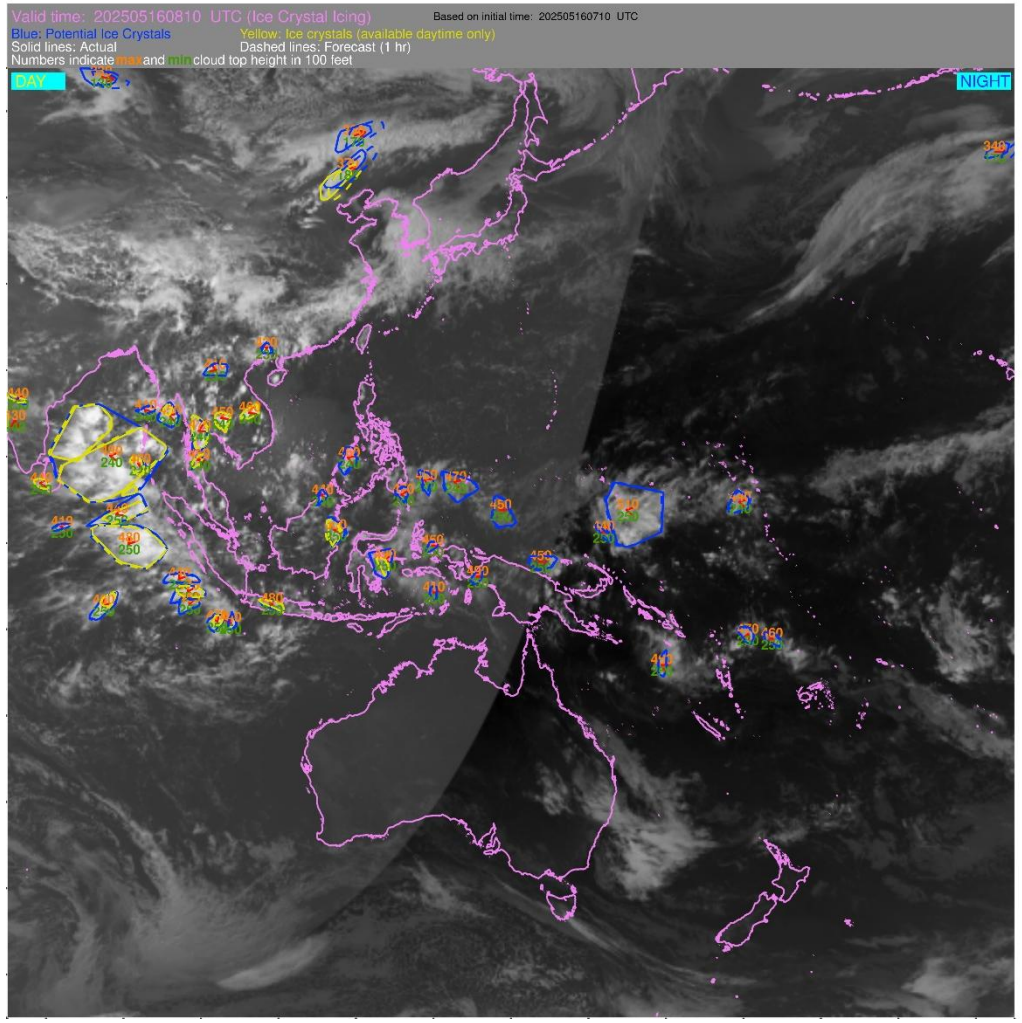
Real-time Satellite Nowcast Products

Significant Convection (SigConv)



In-cloud Icing (Ice Crystal Icing)



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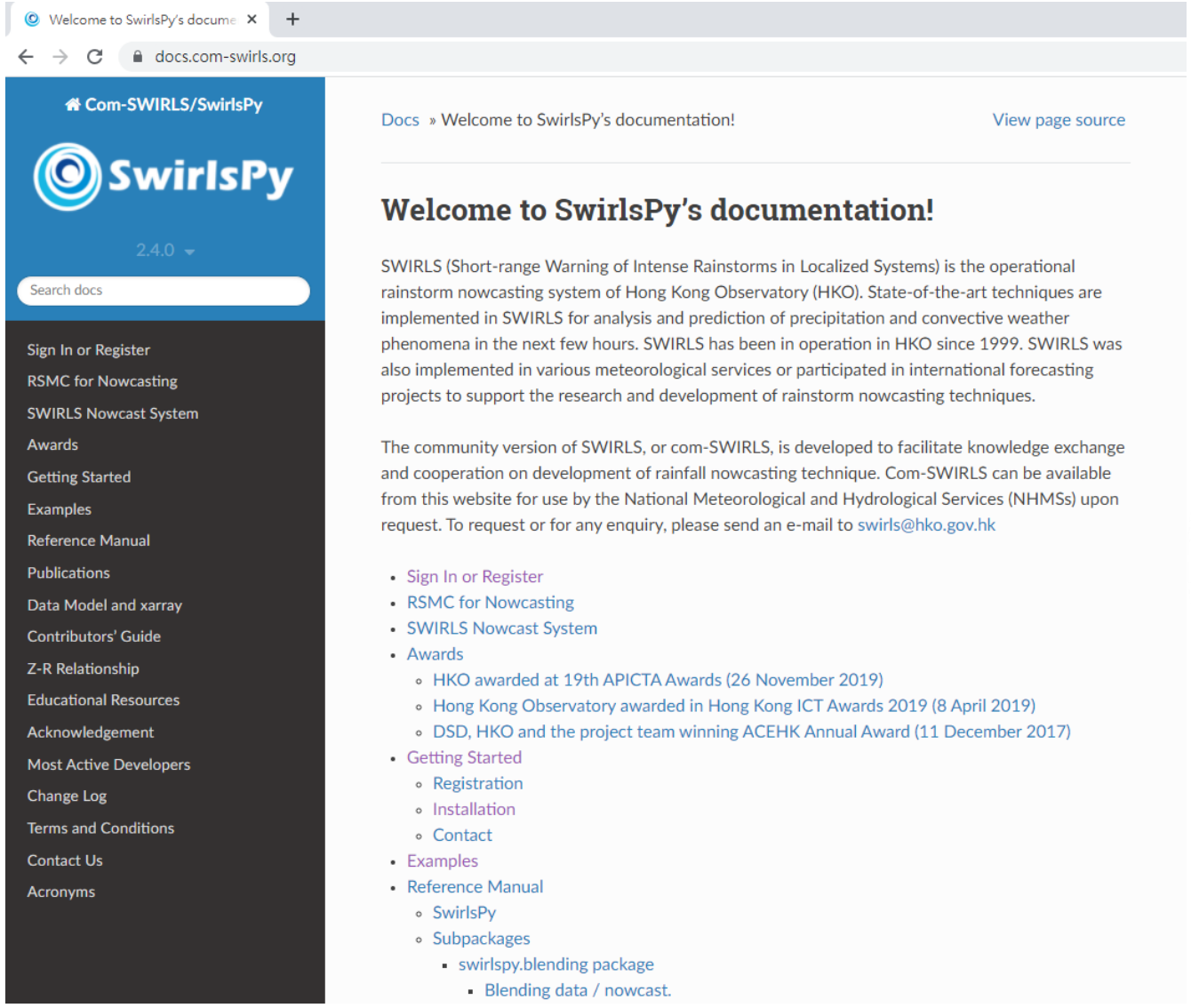
Technology Transfer for Capacity Building on Nowcasting

International / Regional Workshops

SWFP Training Programme

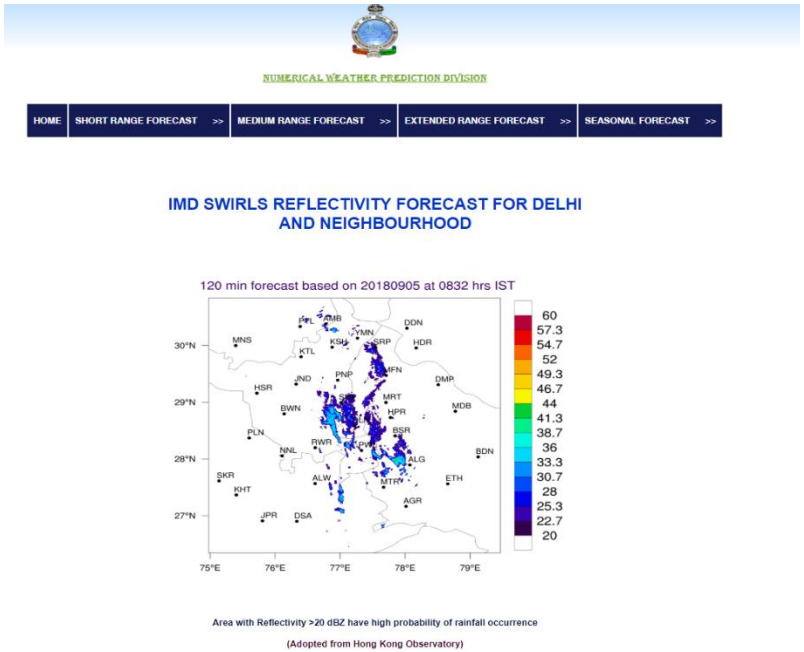
WMO VCP Workshops

Com-SWIRLS Collaborative Platform

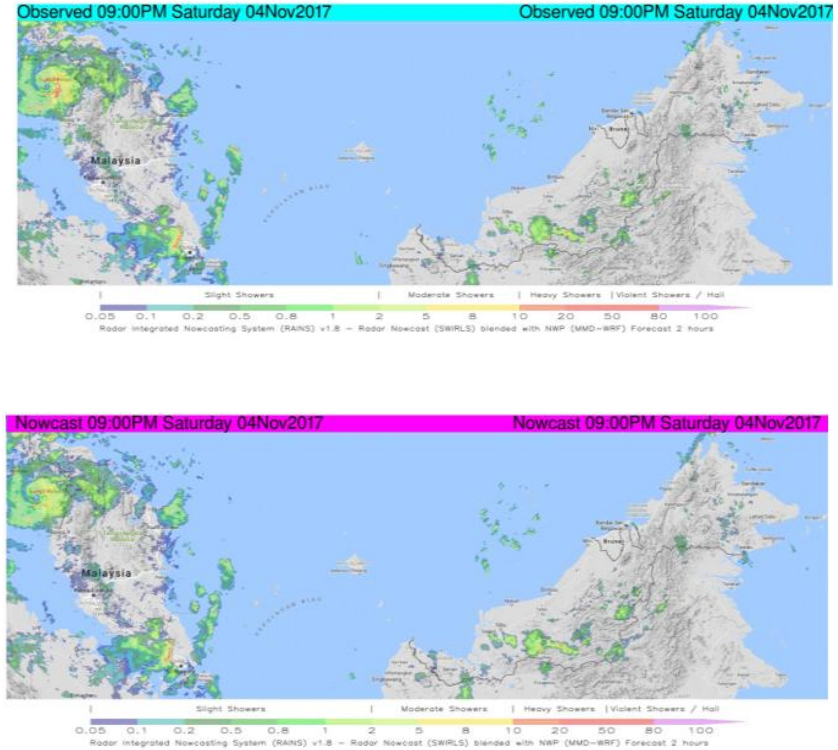


Users of Com-SWIRLS in R&D and operational applications

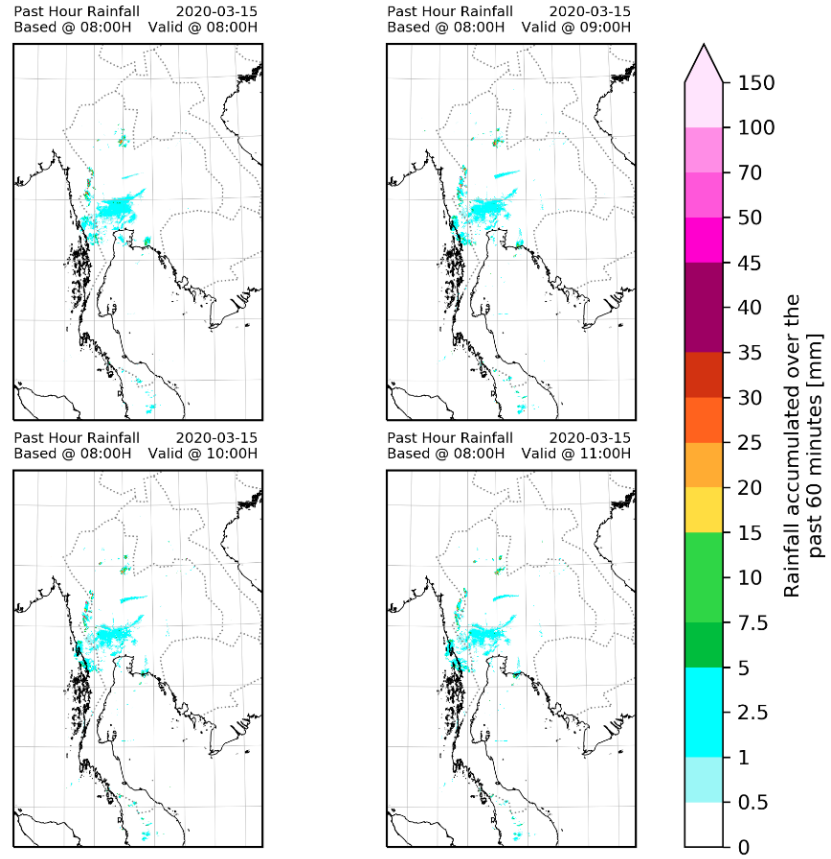
India

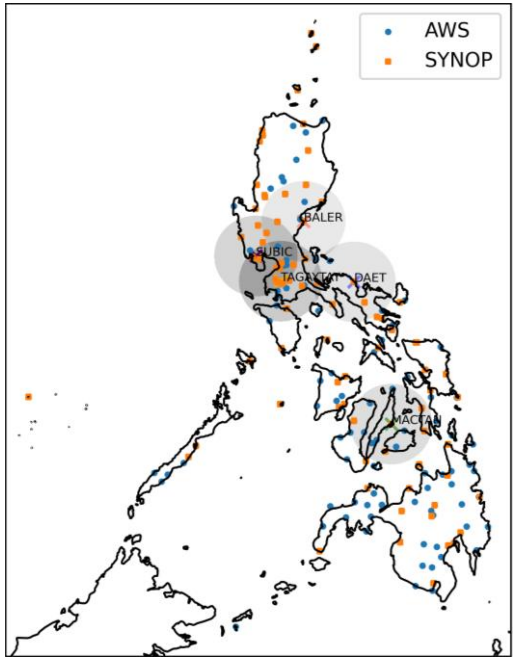


Malaysia



Thailand





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ESCAP/WMO Typhoon Committee

ESCAP Economic and Social Commission for Asia and the Pacific

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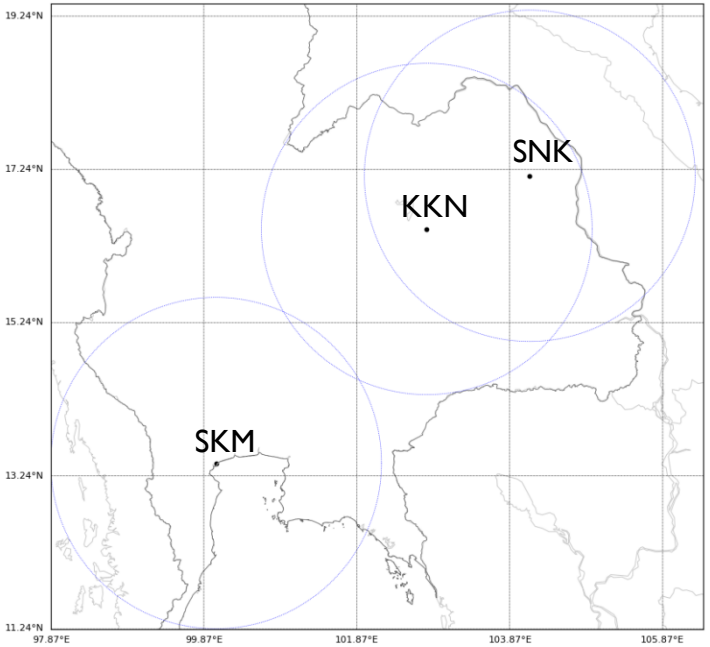
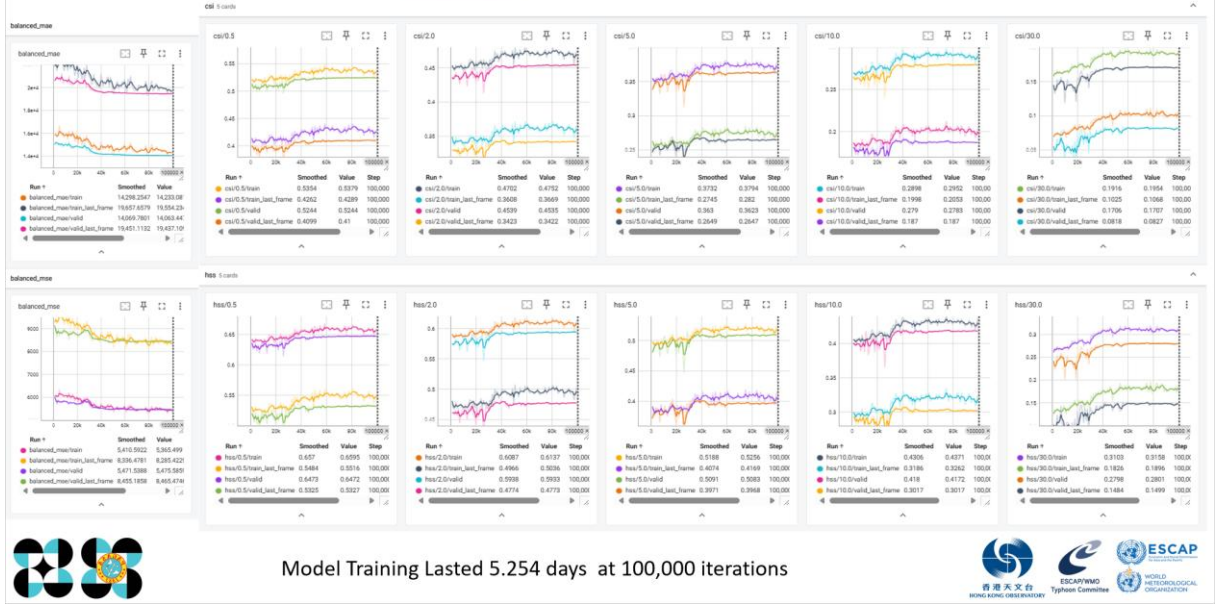
Collaboration with PAGASA and TMD in knowledge transfer and implementing Com-SWIRLS and deep learning nowcast models



Model Training: TrajGRU with Pretraining, Individual Radars



Model Training Lasted 5.254 days at 100,000 iterations

กรมอุตุนิยมวิทยา Thai Meteorological Department

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Xingjian Shi, Zhihan Gao, Leonard Lausen, Hao Wang, Dit-Yan Yeung, Wai-kin Wong, and Wang-chun Woo, 2017: Deep learning for precipitation nowcasting: A benchmark and a new model

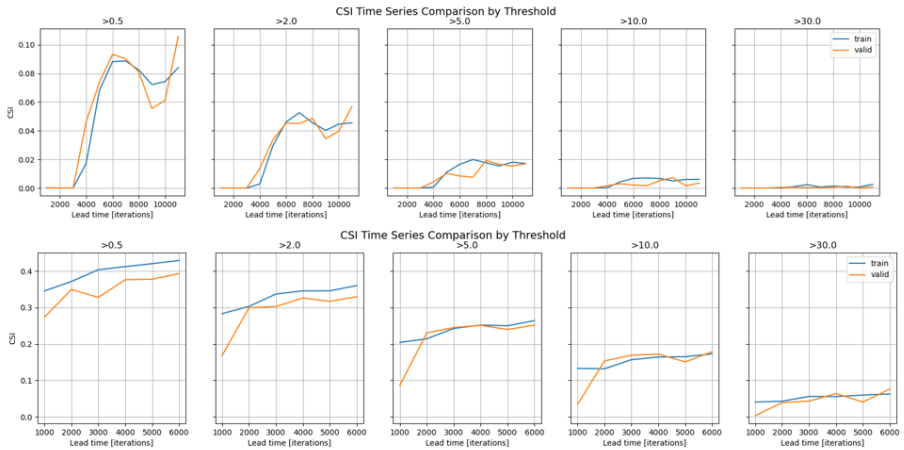
TrajGRU Model

Worked for TrajGRU Model: Result (TH only VS TH + HKO7 – KKN site)

(After revising mask file and frequency sequence time)

TH only

TH + HKO7



Under development

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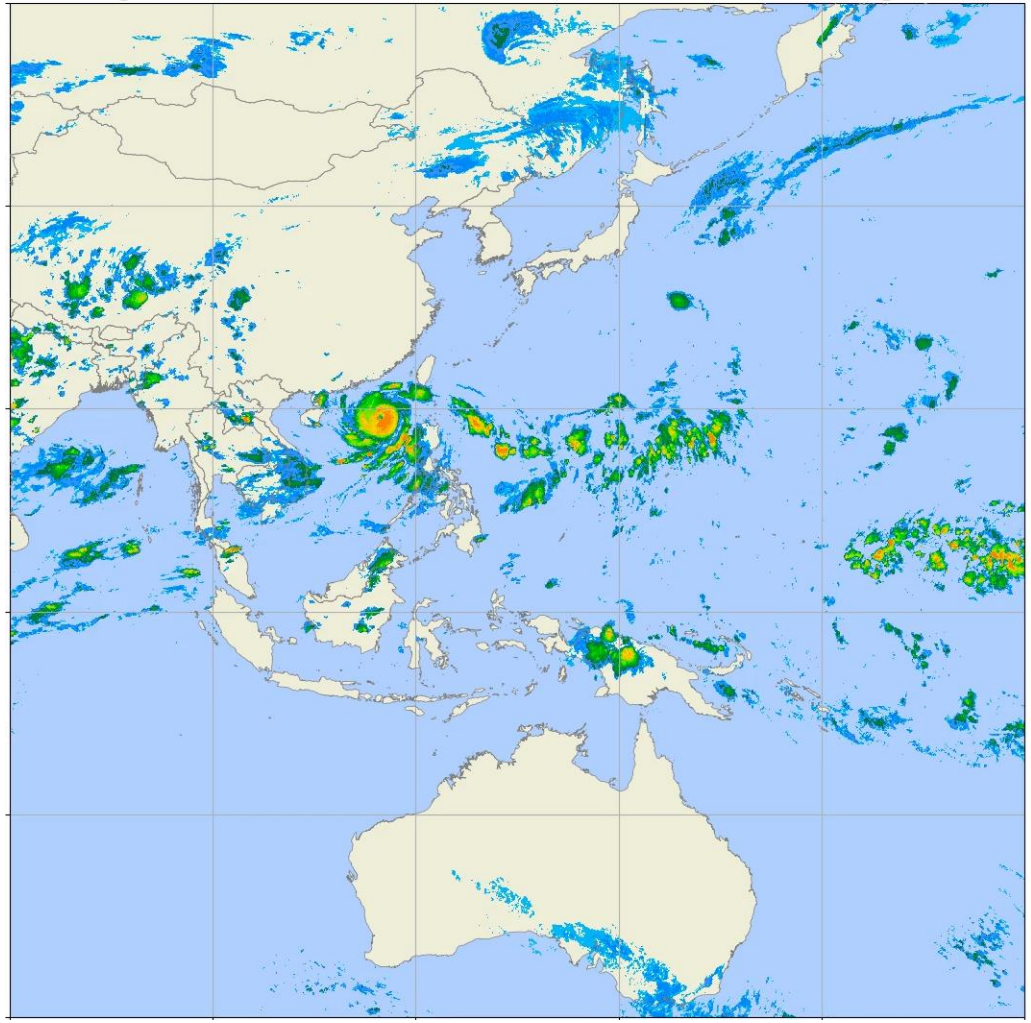
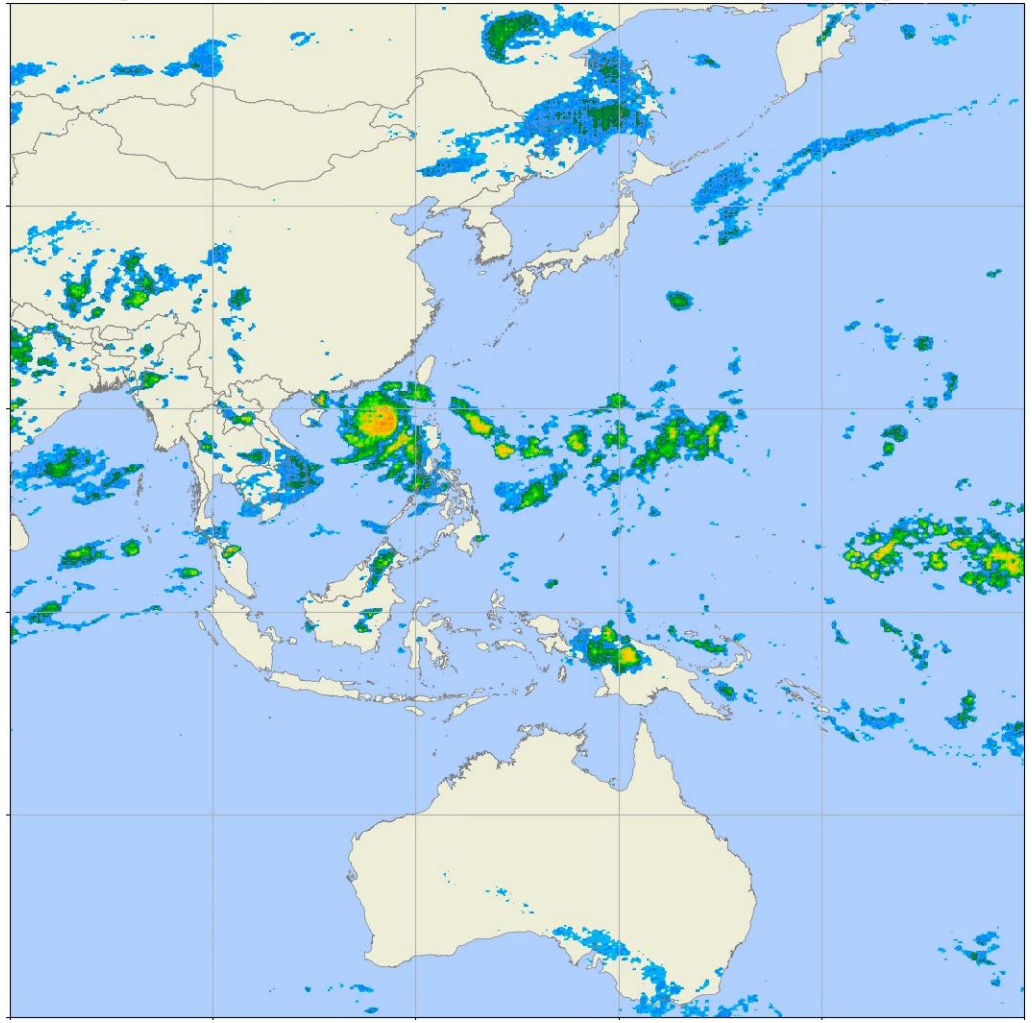
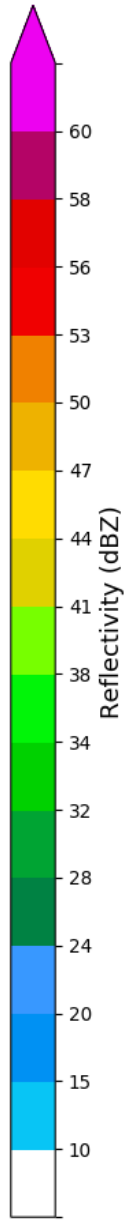
Use of AI/ML in nowcasting – (1) Precipitation or Significant Convection

Actual Observations



ResConvLSTM-GAN





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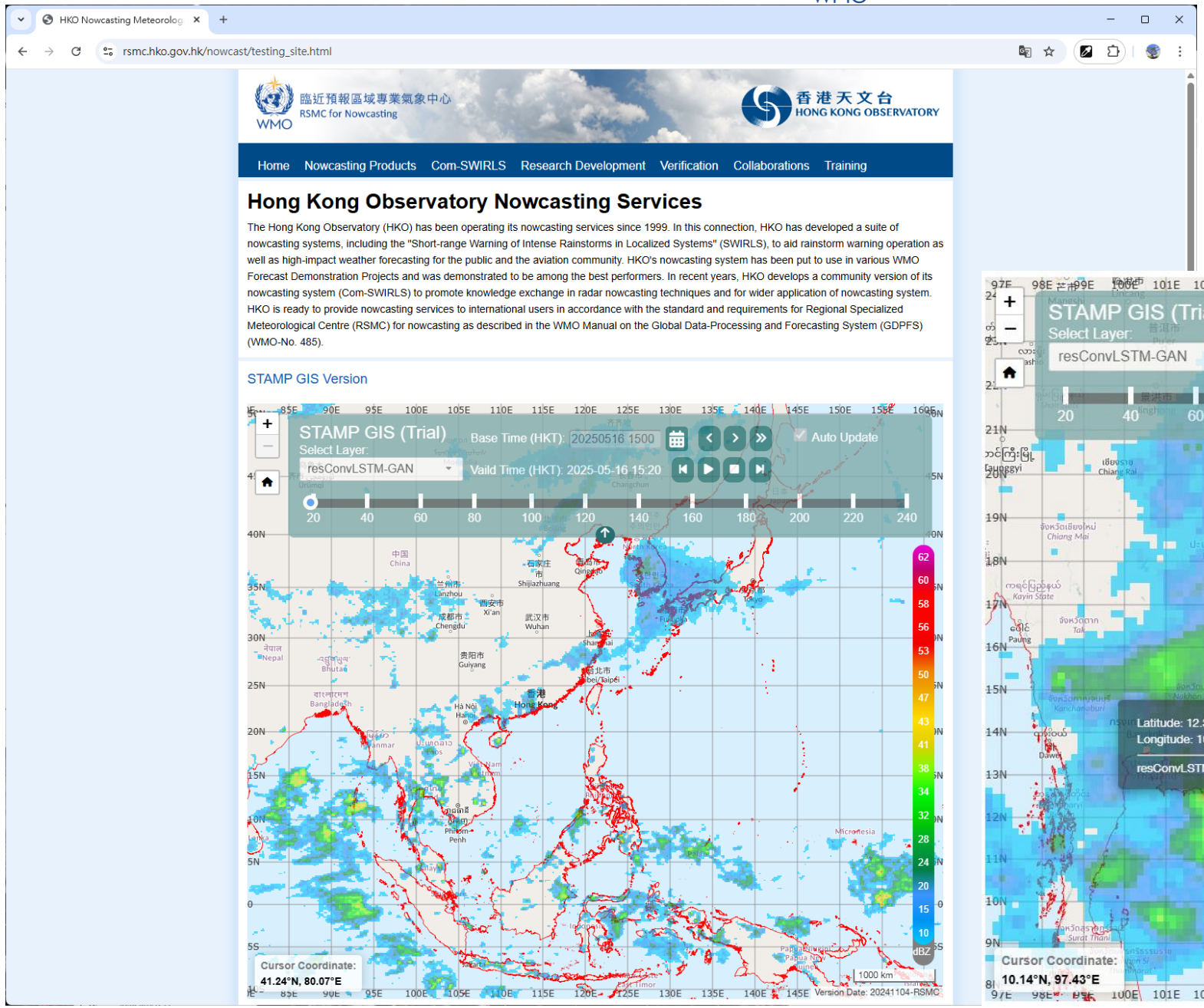
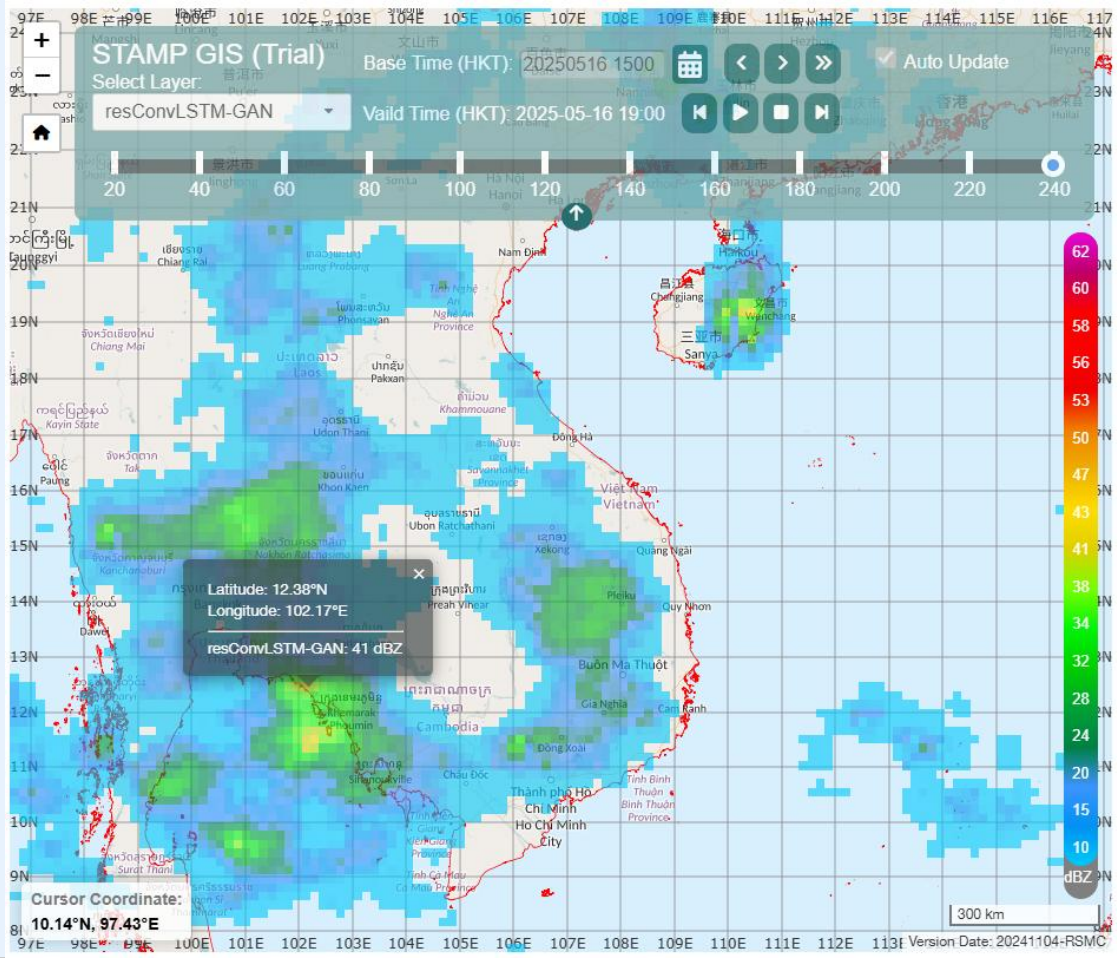
A new web-GIS tool showing AI/ML nowcast product and interactive visualization





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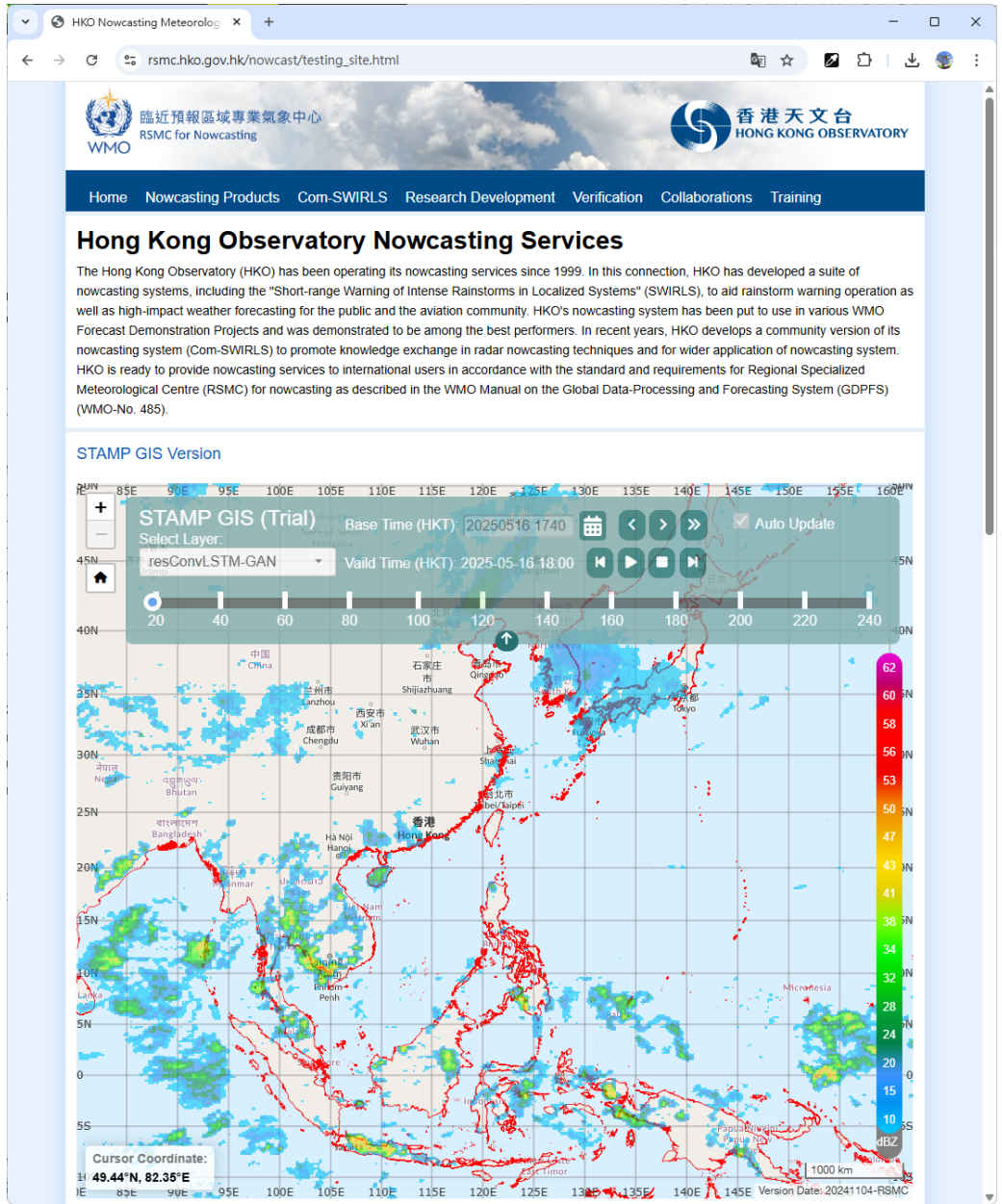

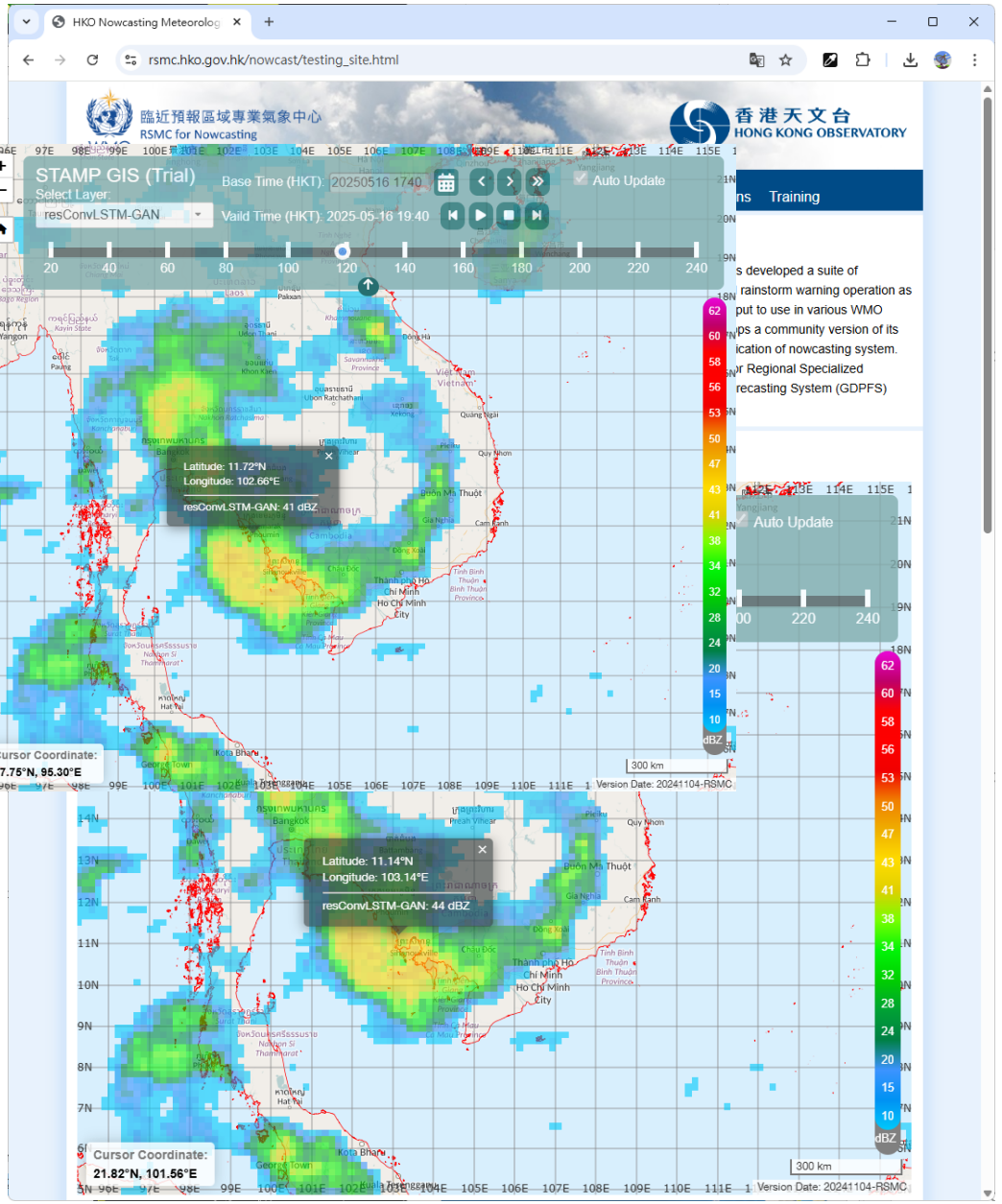

Under development

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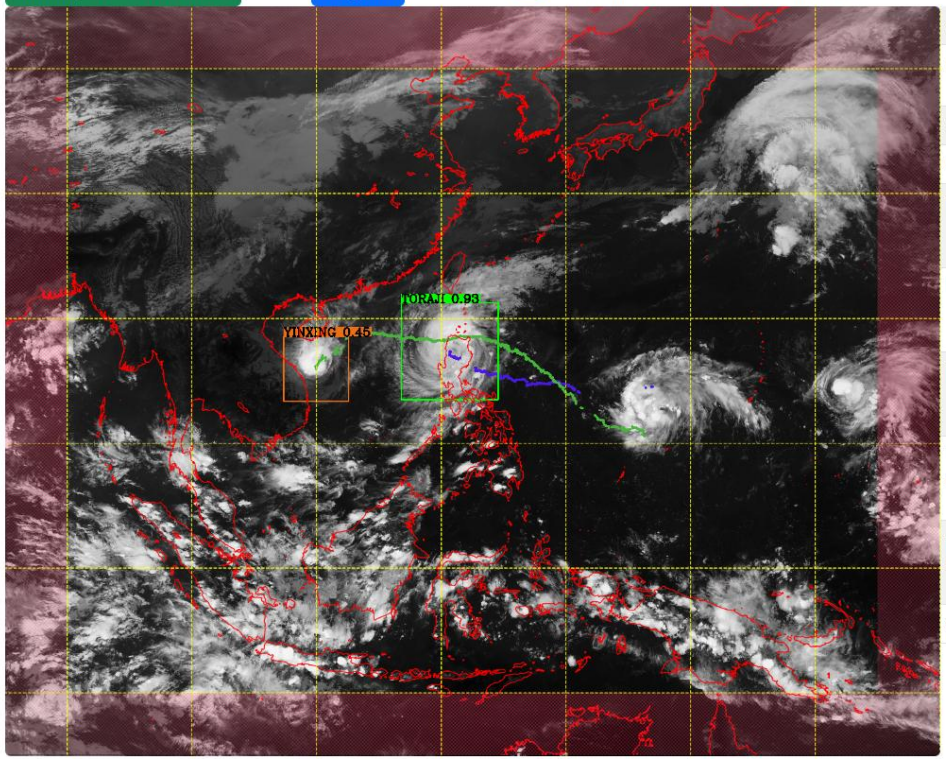
Use of AI/ML in nowcasting – (2) Automatic Tropical Cyclone Position Fix, Intensity Estimation and Genesis

AI-STORMVIS

— One-Stop SatFix, track and intensity estimation.

Real-Time | Satellite + Objective Intensity | Past TC Verification | Optical Flow Motion | User Guide | Docs

Cur image: 2024.11.11/07:50Z | ImageTab | Toggle BBoxes | Lat: 29.92, Lon: 86.74



#	2436 TORAJI	2435 YINXING
Pos	17.42°N 120.64°E	16.02°N 109.92°E
CI	4.0 (60 knots)	2.9 (39 knots)
Rad	3.9°	2.6°
T-1 mvt	28.3 km/h 15 kt N (357)	23.8 km/h 12 kt SSW (193)
T-3 mvt	21.6 km/h 11 kt NW (322)	30.4 km/h 16 kt SSW (210)
T-6 mvt	47.4 km/h 25 kt NW (305)	41.6 km/h 22 kt SW (228)
T-12 mvt	32.8 km/h 17 kt WNW (301)	-
T-24 mvt	27.4 km/h 14 kt WNW (293)	19.8 km/h 10 kt SW (226)
Since	11.08/06:10Z	11.03/09:20Z

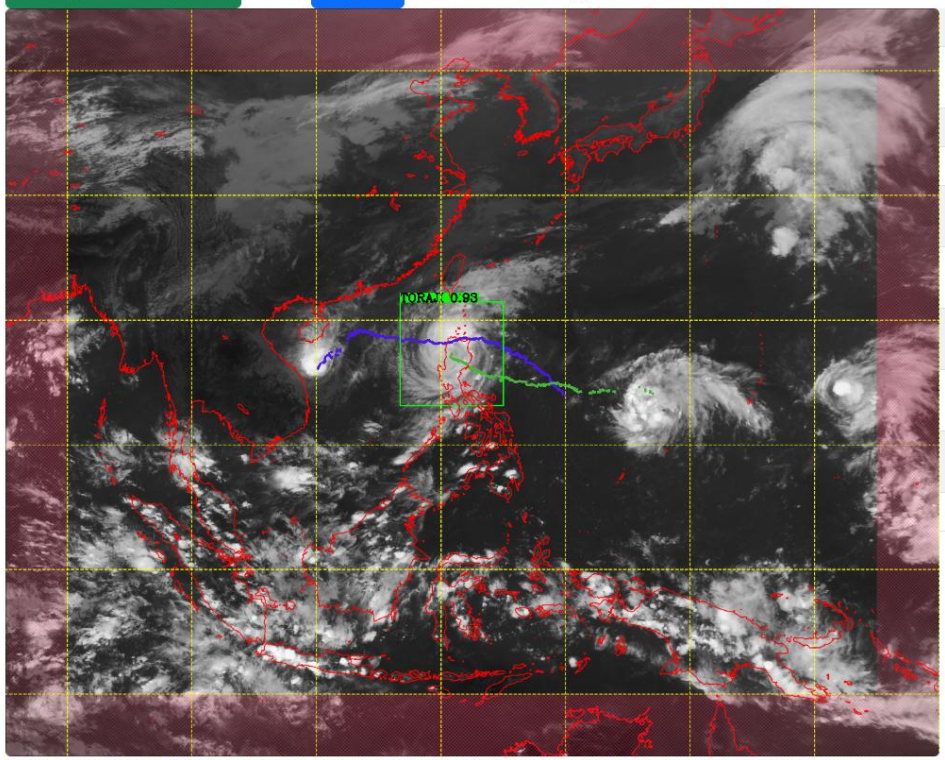
Note: Outputs in the red-shaded region may not be accurate as TCs could be recognised even without full image.

AI-STORMVIS (FY4B Version)

— One-Stop SatFix, track and intensity estimation.

Real-Time | Satellite + Objective Intensity | Past TC Verification | Optical Flow Motion | User Guide | Docs | Log

Cur image: 2024.11.11/07:45Z | ImageTab | Toggle BBoxes



#	2436 TORAJI
Pos	17.34°N 120.82°E
CI	3.9 (59 knots)
Rad	4.2°
T-1 mvt	42.9 km/h 23 kt N (351)
T-3 mvt	31.7 km/h 17 kt NW (312)
T-6 mvt	35.2 km/h 19 kt NW (309)
T-12 mvt	33.0 km/h 17 kt WNW (301)
T-24 mvt	35.7 km/h 19 kt WNW (289)
Since	11.08/06:00Z

Note: Outputs in the red-shaded region may not be accurate as TCs could be recognised even without full image.

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Thank you very much

Q&A