



# 中国-东盟 气象人工智能模型应用联合创新行动倡议

China-ASEAN Joint Innovation Action Initiative on Meteorological AI Model Applications

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Department of International Cooperation

China Meteorological Administration

2025-09-17 Nanning

# 山水相连，陆海相望

## Joined by mountains, neighbors by sea

Chinese President Xi Jinping proposed “**China is ready to open a dialogue with ASEAN on climate response**” during the **ASEAN-China Special Summit to Commemorate the 30<sup>th</sup> Anniversary of ASEAN-China Dialogue Relations** in Beijing via video link on November 22, 2021.



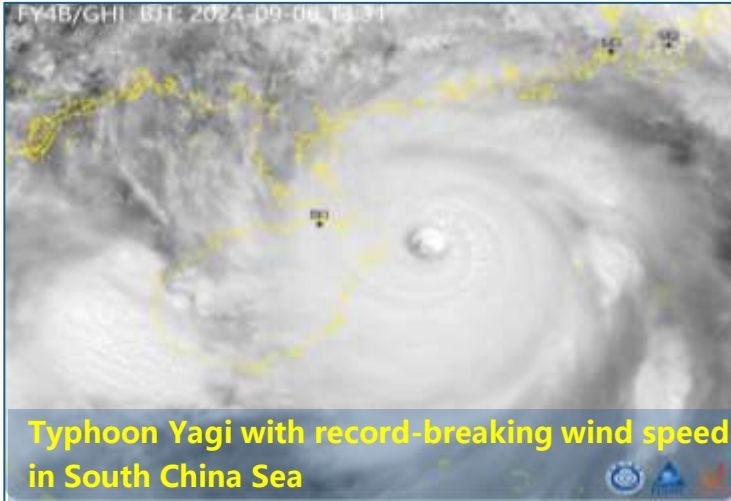


# 气候变化，极端天气肆虐

## Climate Changes, Weather Rages

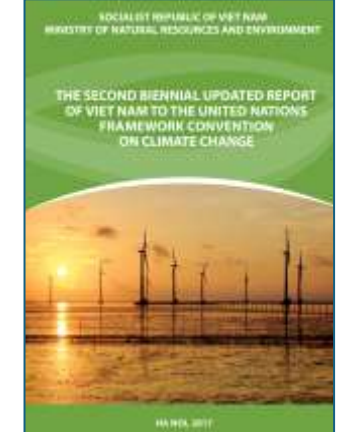
# 共迎挑战，共担责任

## A Shared Challenge, A Common Duty





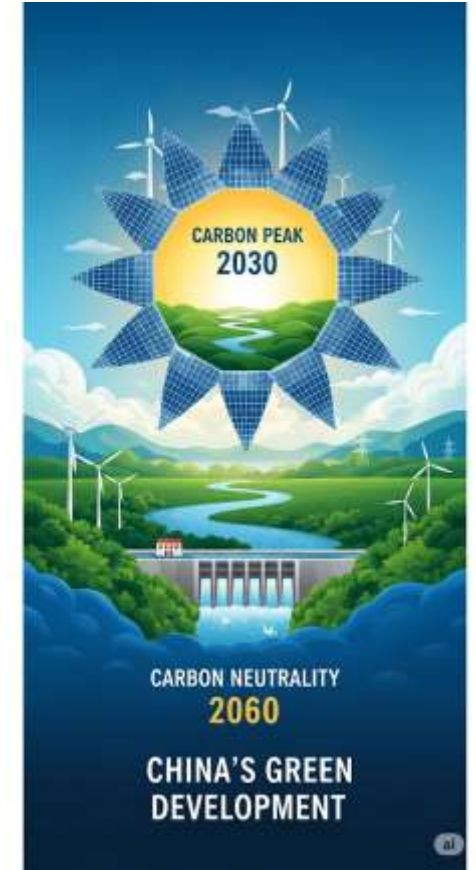
# 愿景相合，行动并进 Shared Vision, Collective Action





# 愿景相合，行动并进 Shared Vision, Collective Action

China's "Ecological Civilization" → Guiding Principle for National Development





**愿景相牵，两年再携手。**

**Our shared vision brings us together every two years.**



# 同心协力，合作有成

## Together in Substantive Cooperation

Since 2023

On-site Exchange

Co-development

Technical Exchange

Capacity Building

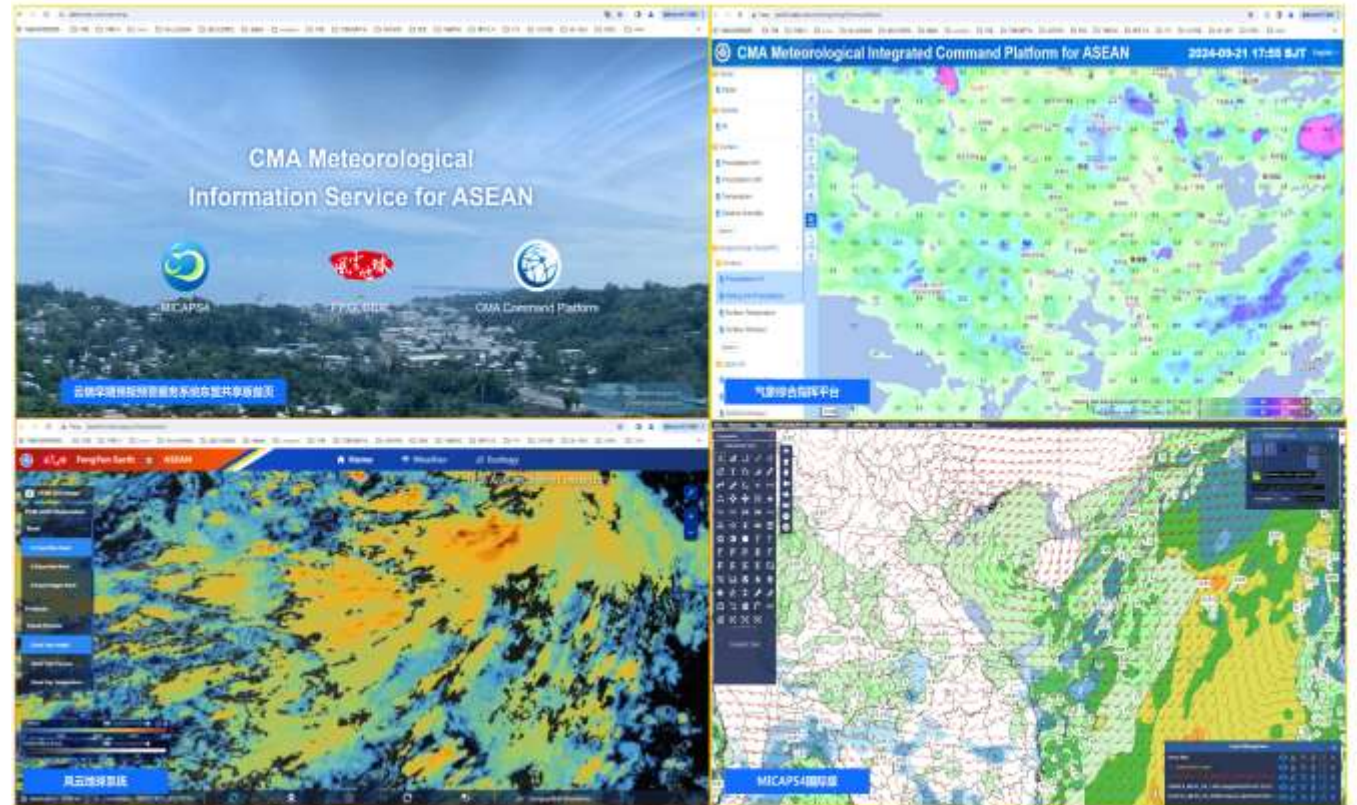
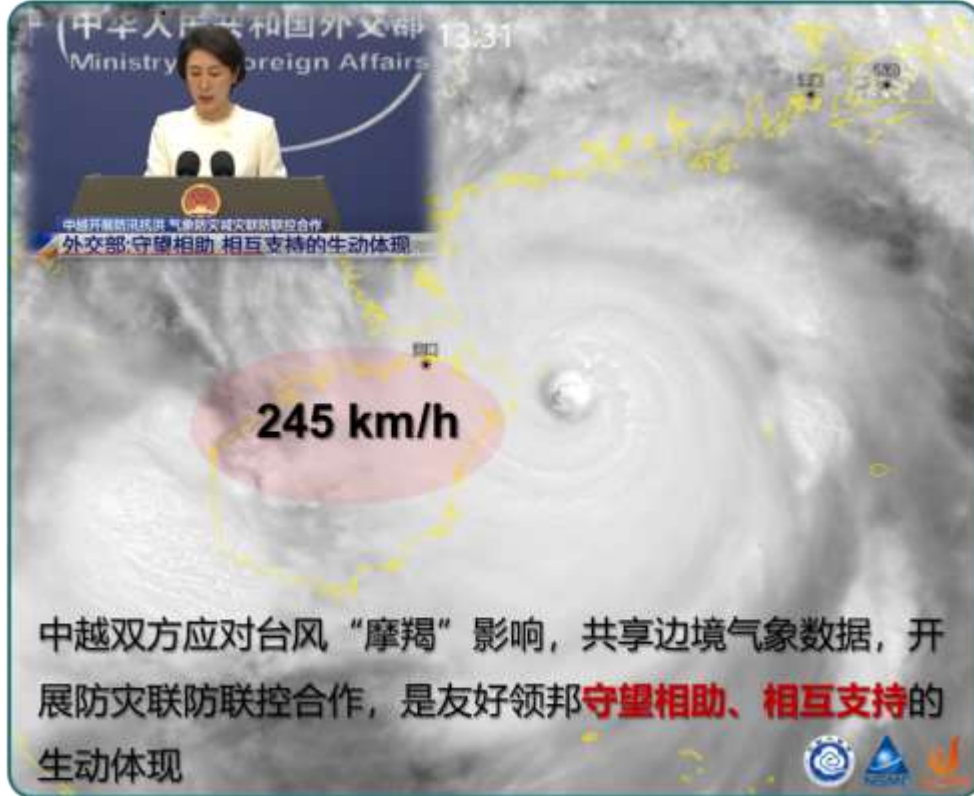




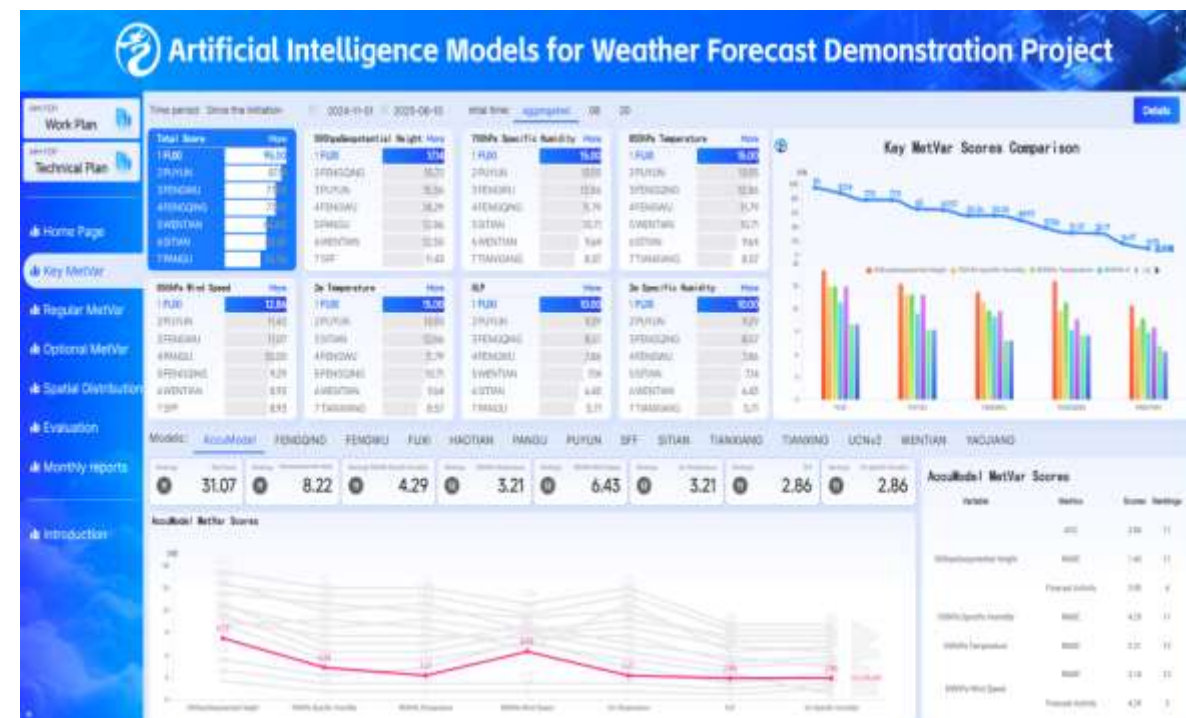
# 同心协力，合作有成

## Together in Substantive Cooperation

### On-line Data Exchange



## AI has been a Game Changer for Meteorology



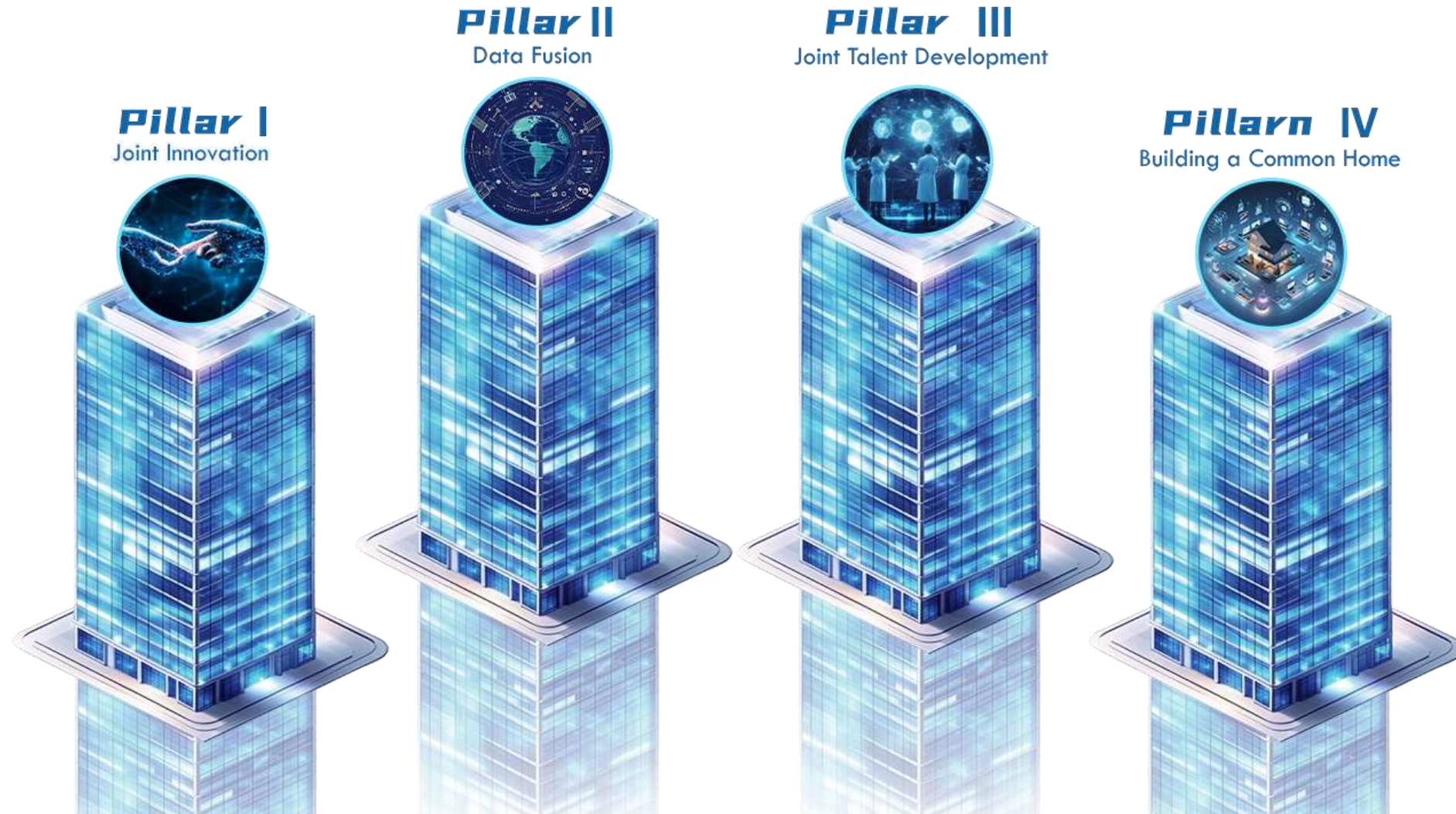
**Why AI ? Harnessing the Power of Computing and Data Fusion**



# We Propose Activities for **the next 2 Years**

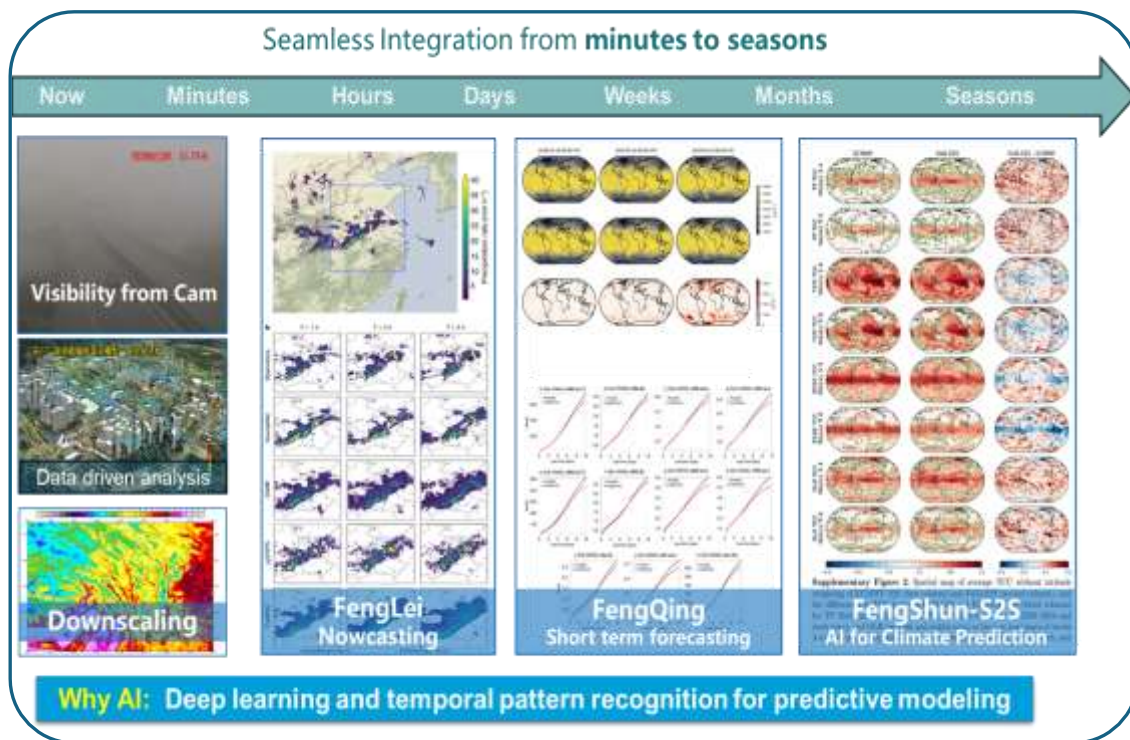
## 气象人工智能模型应用联合创新行动倡议

### China-ASEAN Joint Innovation Action Initiative on Meteorological AI Model Applications



## 支柱一：联合创新-共享算法基础

### Pillar I: Joint Innovation-Sharing Foundational Algorithms



#### Key Activities:

- Joint fine-tuning or improvement of "Feng" series **AI weather forecast models**.
- Co-development of novel AI applications, e.g., **LLM-based digital assistant**.
- Foster a regional professional community through **training and exchanges**.

**Objective:** Establish a regional cooperative innovation initiative for AI-powered meteorological solutions.

# 支柱一：联合创新-共享算法基础

## Pillar I: Joint Innovation-Sharing Foundational Algorithms

### Base LLM

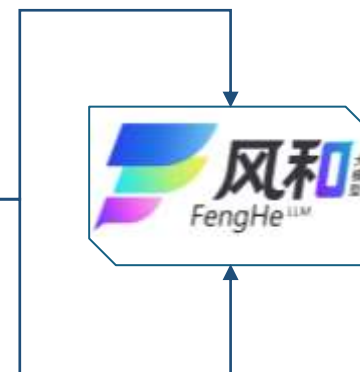


### Met-related corpus

- **NMC+NCC Documents(Past 10 Years):**  
Training materials, decision-making documents, meteorological papers, regulations (10,000+ files).
- **Disaster Reduction Department:**  
Nationwide meteorological service case from provincial, municipal, and county levels (1TB+).
- **Processed Data:**  
Cleaned raw documents, generating 800,000+ professional text entries
- **WMO IPCC Documents:**  
Report, Bulletin, guideline, manual
- **Journals and News:**  
SCI Paper; Internet News

### Knowledge

### Distilled Model



### Supervised Fine Tuning

### Reasoning



### Integrated into DRR System



### Chatbot for DRR Decision Maker

Translate Forecast to Impact and Risk for Decision Maker  
AI Generated draft for local knowledge in developing countries

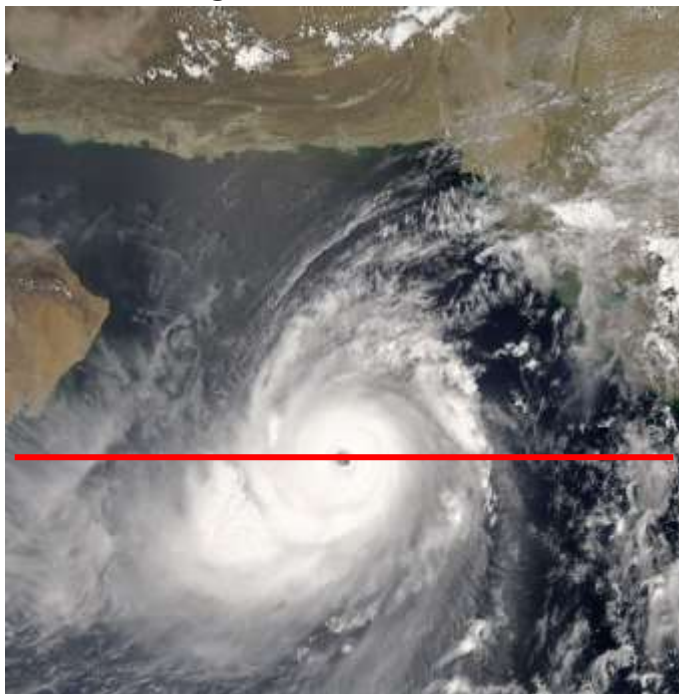
## 支柱二：融通数据-丰富高分数据

### Pillar II: Data Fusion- Higher resolution Data

High Resolution Reanalysis dataset to be released next month for AI training

|         | Resolution         | Layers | NRT latency | Assimilation Method | Since |
|---------|--------------------|--------|-------------|---------------------|-------|
| ERA 5   | 0.25°/1 Hour       | 37     | 5 Days      | 4DVar+EDA           | 1940  |
| CRA 1.5 | <b>0.1°/1 Hour</b> | 47     | 2 Hours     | Hybrid-4DEnVar      | 1979  |

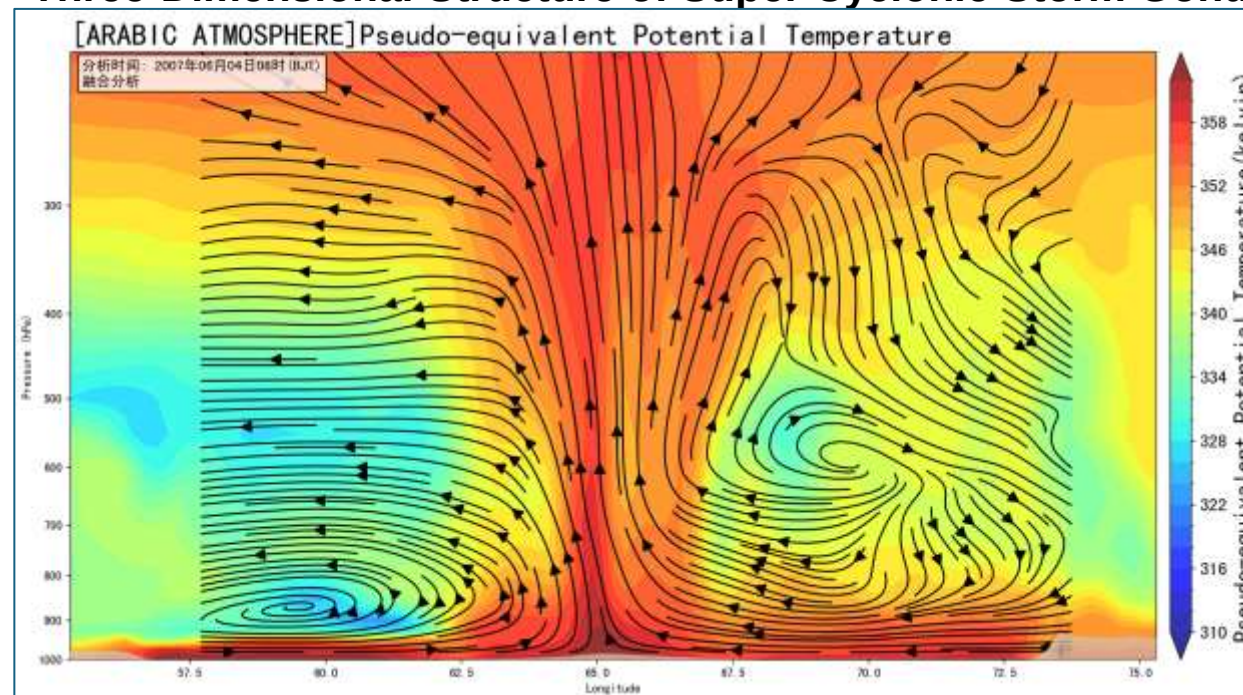
Satellite Image at 09 UTC on June 4, 2007



Super Cyclone GONU



Three-Dimensional Structure of Super Cyclonic Storm GONU



Cross section of Cyclone GONU @ 0900UTC on June 4, 2007



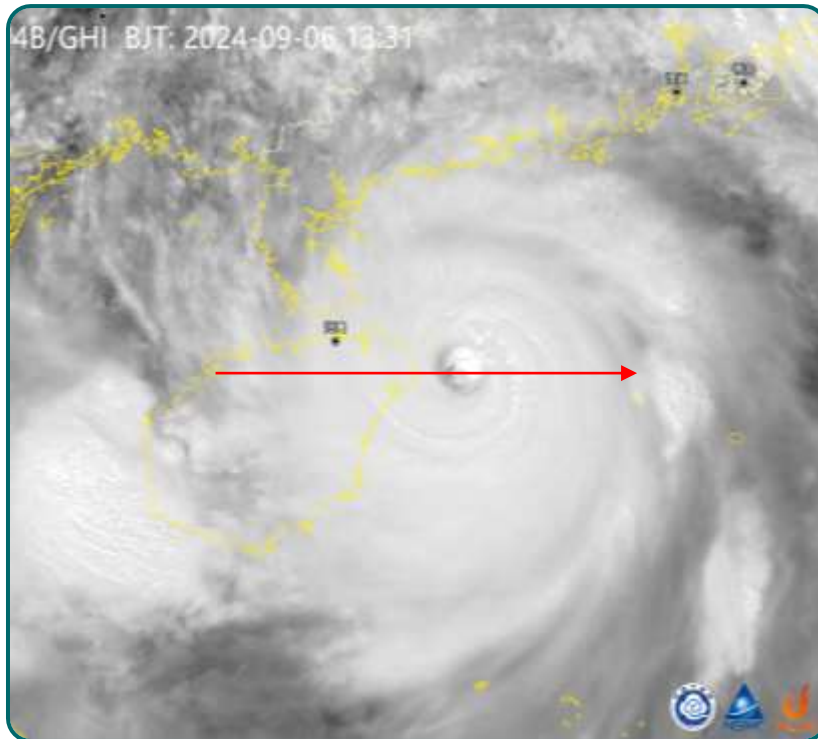
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### Pillar II: Data Fusion- Higher resolution Data

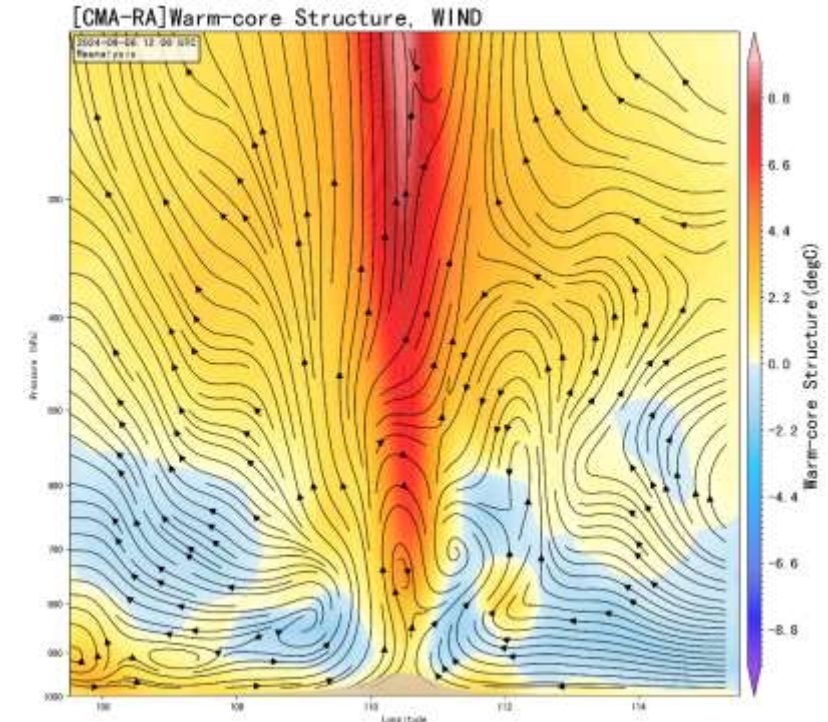
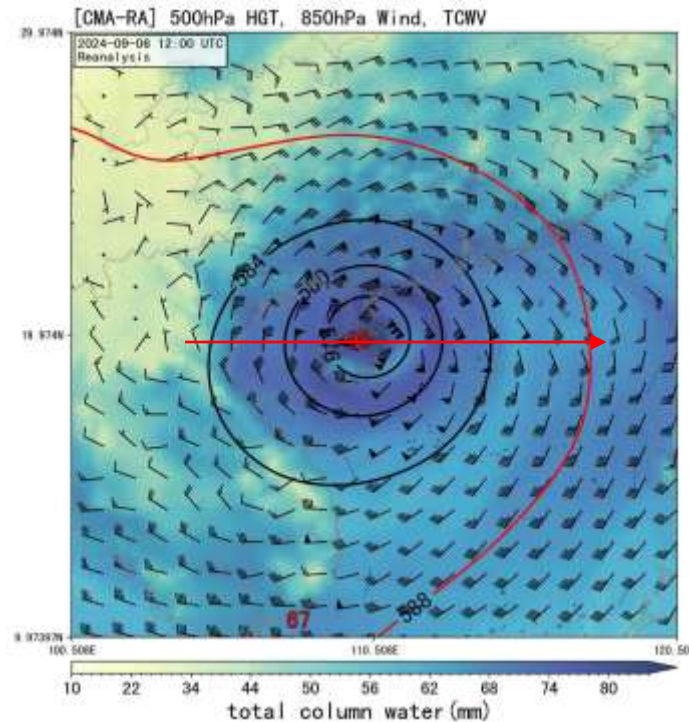
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Satellite Image at 05 UTC on Sept 6, 2024



Three-Dimensional Structure of Super Typhoon Yagi





# Data-driven AI needs high quality data

To enhance model accuracy and adaptability, greater support is needed for high-resolution data collection and diverse training datasets. Strengthening these efforts will unlock AI's full potential in meteorological services. So that is why we propose collaborations on **Africa-Asia-Australia Monsoon Scientific Experiment**.



2025-2026, CMA will launch 2 Geostationary Satellites positioning over Pacific Ocean



## 支柱三：携手育才，共绘未来

### Pillar III: Joint Talent Development – Cultivating Shared Excellence

#### Key Activities:

- 3 month- 6 month- 1 year for co-development **Visting Scholar Program.**
- For Utilizing novel AI Models **Shorting Training via WMO, TC.**
- Foster a regional professional community **Degree scholarships.**

| Level                                                      | Key Content Modules                                                                                                                                                                                                                          |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AI for Meteorology: Fundamentals & Overview                | - AI & ML Basics - Meteorological Data Science Fundamentals - AI Use Cases in Meteorology - Intro to Python for Met-AI - Simple Weather Case Study                                                                                           |
| Meteorological AI: Model Development & Practice            | - Deep Learning Fundamentals (CNNs, RNNs) - Met-AI Modeling Practice (Image Recog., Time Series) - Model Evaluation & Optimization - Intro to Physics-Informed AI (PINN) Concepts - Project Work with Real Met-Datasets                      |
| Advanced Met-AI: Research & Deployment                     | - Advanced DL Architectures (GANs, Transformers, GNNs) - Multi-Source Heterogeneous Met-Data Fusion - Explainable AI (XAI) in Meteorology - Physics-Informed AI (PI-AI) Advanced - HPC & Cloud for Met-AI - Project Development & Deployment |
| Met-AI Innovation & Frontier Topics (Optional/Specialized) | - AI-Driven Early Warning Systems - Climate Change Scenario Modeling with AI - AI-NWP Integration - AI for Met Services & Decision Support - Ethics, Regulations & Sustainability - Frontier Paper Reviews & Discussions                     |



## 支柱四：共筑家园

### Pillar IV: Building a Common Home

#### A Liaison Secretariat

It is proposed that, with the consent of ASEAN partners, the Guangxi Meteorological Service, the host of the biennial China-ASEAN Meteorological Cooperation Forum, serve as a non-decision-making, voluntary-service secretariat focused on liaison and coordination to facilitate daily communication





## CMA & WMO Launched MAZU @ WAIC



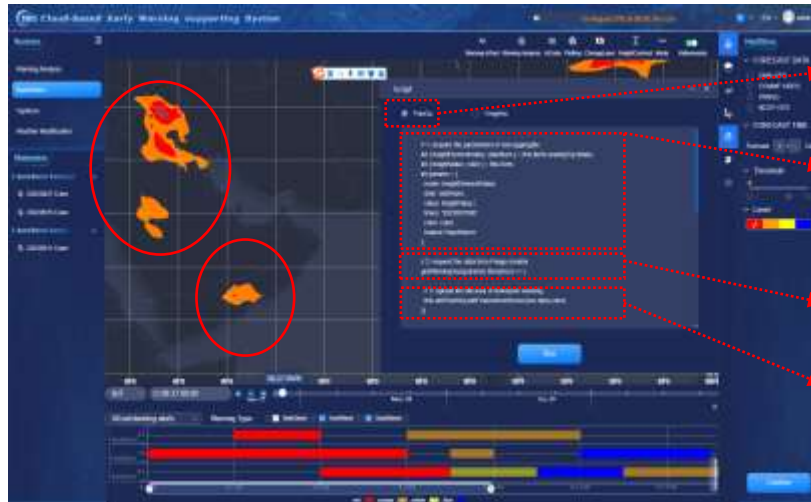
World Artificial Intelligence Conference

2025, July 26

# Integrations

## MAZU-Cloud: Integrating the AI Models in one platforms

- With just 30 lines of code, the system can deploy AI models such as Fengshun, Fenglei, Fengqin, Fuxi, Pangu, and AIFS, as well as your own AI models, enabling multi-model integrated forecasting and application.

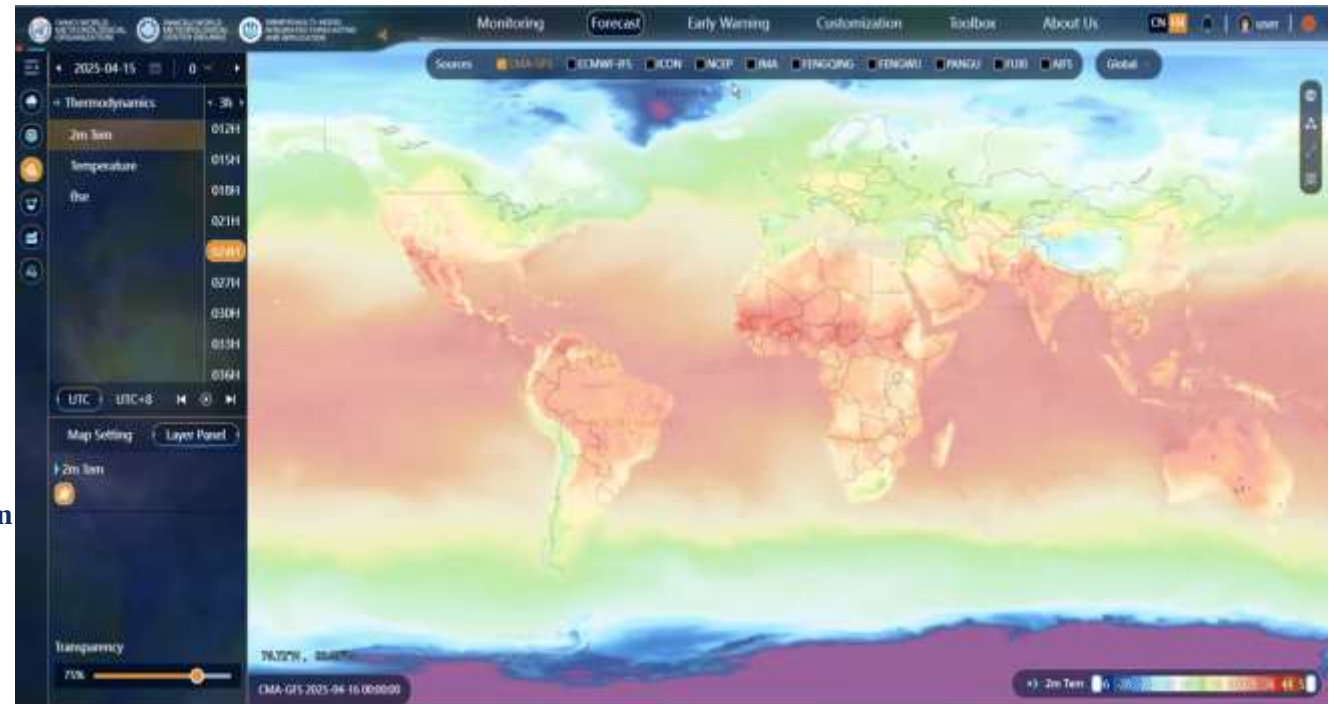


**Invoke AI large model**

**Choose warning algorithm: Sandstorm**

**Invoke resources in the Cloud**

**Computed result: MSLP Distribution**



# 城市多灾种早期预警智能体 三端合一

AI Agent for Urban Multi-Hazard Early Warning: “MAZU-Urban”



China's Solution to Early Warnings for All : MAZU



**M**ulti-hazard  
**A**lert  
**Z**ero-gap  
**U**niversal

AI Agent for Urban Multi-Hazard Early Warning

All-in-one Terminal



Smart Tablet

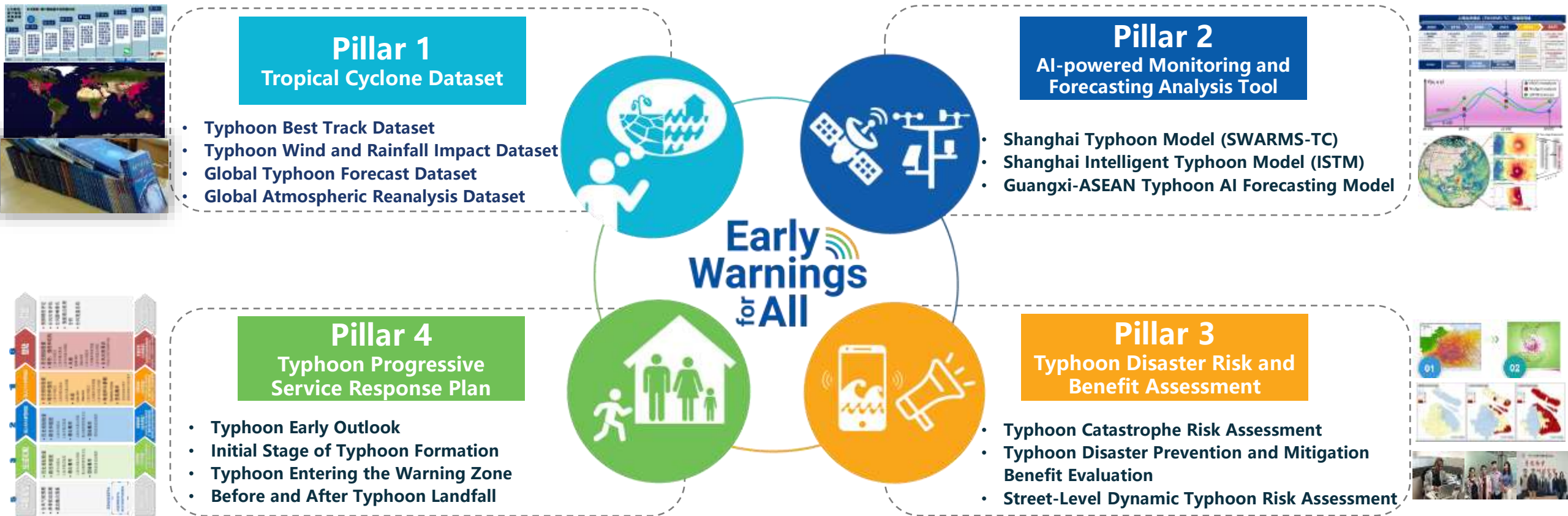


Smart Phone



# 启动台风多灾种早期预警智能体 “MAZU-TC” 建设工作

Launch of the Construction Work for Typhoon Multi-Hazard Early Warning Intelligent Agent "MAZU-TC"



We propose:

The development of MAZU-TC is by no means a task that any single country or institution can accomplish alone. It requires global collaboration.

**We sincerely urge: Please join us with your nation.** Whether it is data, computing power, or top scientific talent—every contribution is crucial.



# 为何“妈祖”？ Why MAZU?



Lin Moniang, born on 23<sup>rd</sup> March, 960 A.D.

She was honored as **MAZU** in China



Rescue Survivors during Severe Weather



From Ancient Wisdom to Modern Technology



Intangible Cultural Heritage of Humanity  
for Safety and Peace



# 线上线下，携手共解难题！

Online or On-site we work together to solve the problems!





# 第4届中国—东盟气象合作论坛

## THE 4<sup>TH</sup> CHINA-ASEAN METEOROLOGICAL COOPERATION FORUM

### 数智赋能气象合作 早期预警普惠民生

DIGITAL INTELLIGENCE EMPOWERS METEOROLOGICAL COOPERATION EARLY WARNINGS BENEFIT PEOPLE'S LIVELIHOODS

主办单位：广西壮族自治区气象局  
Hosted by: Meteorological Service of Guangxi Zhuang Autonomous Region

中国气象局国际合作与培训中心  
China Meteorological Administration International Cooperation and Training Centre

中国气象学会  
Chinese Meteorological Society

协办单位：广西壮族自治区生态环境厅  
Co-Organized by: Department of Ecology and Environment of Guangxi Zhuang Autonomous Region

广西壮族自治区商务厅  
Department of Commerce of Guangxi Zhuang Autonomous Region

广西壮族自治区大数据发展局  
Big Data Development Bureau of Guangxi Zhuang Autonomous Region

2025年9月17-19日  
September 17-19, 2025

中国·南宁  
Nanning, China

