

**Progress Report of
Asia-Pacific Typhoon Collaborative Research Center (AP-TCRC)**

1. Introduction

- 1.1. The AP-TCRC is an official institution, established with the support of the ESCAP/WMO Typhoon Committee (hereafter the Committee). It aims to be a center of coordinated research and typhoon technology transfer mainly in Asia and the Pacific, and potentially over the globe. The AP-TCRC will organize
- (a) technical training on the new operational technologies and products, in collaboration with scientists from Members of the Committee;
 - (b) academic exchanges to encourage scientists from Members of the Committee to participate in the Pilot Project; and
 - (c) tropical cyclone international forums or other related international cooperation and related research collaborations with Members of the Committee in the tropical cyclone communities in the western North Pacific
- 1.2. The AP-TCRC aims to strengthen scientific and technical cooperation with the Committee and other related international organizations. It provides a sustainable platform for conducting collaborative research on advanced sciences and key techniques in typhoon monitoring, typhoon forecasting and modelling, and typhoon associated disaster prevention and mitigation.
- 1.3. The research scope of the AP-TCRC includes key techniques of typhoon numerical modelling and prediction, international tropical cyclone observation experiment and big data analytics, and scientific understanding of tropical cyclone development and variability on different time scales. Furthermore, the AP-TCRC devotes its efforts to organize technical trainings, academic journals and international forums in collaboration with the Committee.

2. Major AP-TCRC Activities in 2025

2.1. Typhoon Scientific Experiments

The AP-TCRC made substantive progress in typhoon scientific experiments through close collaboration with Hong Kong, China. During Super Typhoon Ragasa, the Center jointly conducted a dual-aircraft observation experiment with the Hong Kong Observatory (HKO) , including:

- (a) deployment of a modified King Air 350 aircraft; and
- (b) implementation of a forecast – observation integrated experiment framework.

2.2. Global Tropical Cyclone Data Center

The Global Tropical Cyclone Data Center was officially launched by the AP-TCRC. Major achievements include:

- (a) the development of the first international standard for typhoon data in the Asia-Pacific region; and
- (b) the compilation of the *Climate Atlas of Tropical Cyclones Landing in the Asia-Pacific Region*.

2.3. AI Models, High-Value Datasets, and Technical Standards

The AP-TCRC developed two typhoon-specific artificial intelligence models for intensity and precipitation forecasting, with a 15-minute refresh cycle. In parallel, two high-value datasets were produced, including high-timeliness satellite rainfall estimates and high-resolution historical wind fields. In addition, a draft international standard for objective identification of landfalling tropical cyclones in the Asia-Pacific region was formulated and is planned for submission in 2026.

2.4. Climate Change and Forecast Verification

The AP-TCRC continued to advance research on climate change impacts and forecast verification:

- (a) leading Typhoon Committee international cooperation projects involving China, the United States, Japan, the Republic of Korea, and Hong Kong, China, contributing to the *Fourth Assessment Report on the Impact of Climate Change on Tropical Cyclones in the Typhoon Committee Region*; and
- (b) leading the establishment of the Joint LC-TCFV, with the release of the 2022 and 2023 reports and the formulation of detailed criteria for global tropical cyclone forecast verification and assessment.

2.5. Cooperation with the World Meteorological Organization (WMO)

The AP-TCRC further enhanced its cooperation with the World Meteorological Organization (WMO). The Secretary-General of WMO visited the AP-TCRC and expressed high appreciation of its work. In accordance with the requirements of WMO WIPPS, the AP-TCRC undertakes relevant operational functions and jointly carries out preparatory work for the Joint LC-TCFV with the Tokyo Typhoon Center, Japan. During the year, the AP-TCRC released the 2022 and 2023 global tropical cyclone forecast test and assessment reports and finalized detailed indicator systems for global verification.

2.6. Shanghai Typhoon Collaborative Research Fund

The 2025 Shanghai Typhoon Collaborative Research Fund (STCRF), established by the AP-TCRC, was opened to scientists worldwide. The fund supports both long-term (one year, with possible extension) and short-term (two to three months) research. Supported research areas include tropical cyclone observation, understanding, modeling and prediction, marine meteorology, and related emerging technologies. Under this program, a total of 12 scientists have been funded, including 8 in 2025.

2.7. International Cooperation: Academic Conferences

The AP-TCRC actively participated in and organized international academic conferences:

(a) hosting the EXOTICCA 2025 Observation International Seminar, bringing together international scientists for a two-day discussion aimed at integrating observational resources and advanced technologies to address typhoon disaster challenges in the Asia-Pacific region;

(b) participating in the ESCAP/WMO Typhoon Committee Roving Seminar 2025 in Guangzhou, with attendance by young scientists from the AP-TCRC; and

(c) attending the 20th Typhoon Committee Integrated Workshop and High-Level Forum held in Macao, China, where Dr. Tang delivered a presentation on the Tropical Cyclone Strategic Plan.

The Scientific Experiment on EXOTICCA 2025 and Typhoon Observation International Seminar



EXOTICCA 2025 Observation International Seminar

2.8. International Cooperation: Bilateral Cooperation

The AP-TCRC strengthened bilateral cooperation with international partners through:

(a) the signing of a Memorandum of Understanding with Yokohama National University, Japan, in October;

(b) the signing of a Memorandum of Understanding with NIMS, Republic of Korea, in November;

(c) parallel discussions on meteorological data sharing and joint research with counterpart institutions in Pakistan and Cambodia; and

(d) the submission of a joint project proposal with Prince of Songkla University, Thailand.

2.9. International Cooperation: High-Impact Typhoon Case Collaborative Research Team

The AP-TCRC established a collaborative research team focusing on high-impact typhoon cases, with particular emphasis on:

(a) forecast techniques for Typhoon Yagi affecting Vietnam; and

(b) the development of AI-based typhoon intensity models for Vietnam.

3.0. International Cooperation: Academic Journal

The AP-TCRC continued to support the development of the academic journal *Tropical Cyclone Research and Review* (TCRR). In 2025, the journal received an impact factor of 4.1, ranking 33rd out of 110 journals in the JCR Meteorology & Atmospheric Sciences category (Q2), and achieved a CiteScore of 4.8.