

# 國立陽明交通大學應用數學系

## 學術演講公告

主講人：陳柏孚博士（國立臺灣大學 氣候天氣災害研究中心）

講題：Meteorological AI Applications From Typhoon Analysis to  
Pangu-weather From Regression to Modeling the System

時間：112 年 12 月 5 日(星期二) 下午 2:00 –3:00

地點：(光復校區) 科學一館 223 室

### Abstract

This presentation introduces the AI-meteorological applications developed in NTU in recent years.

The first part showcases the usefulness of deep learning (DL) for reconstructing homogenized and trustworthy global tropical cyclone (TC) wind profile datasets since 1981 and thus facilitating an examination of climate trends of TC structure/energy extremes. Understanding past TC trends and variability is critical for projecting future TC impacts on human society considering the changing climate. By training with uniquely labeled data integrating best tracks and numerical model analysis, our model converts multichannel satellite imagery to a 0-750-km wind profile of axisymmetric surface winds. The model performance is verified to be sufficient for climate studies by comparing it to independent satellite-radar surface winds. Based on the new homogenized dataset, the major TC proportion has increased by ~13% in the past four decades. Moreover, the proportion of extremely high-energy TCs has increased by ~25%, along with an increasing trend ( $>$  one standard deviation of the 40-y variability) of the mean total energy of high-energy TCs. Although the warming ocean favors TC intensification, the TC track migration to higher latitudes and altered environments further affect TC structure and energy.

In the second half of this talk, we will review a recent and impactful paper published in Nature: the Pangu-Weather. This framework switch from the deep-learning regression tasks to modeling the entire atmospheric circulation system with data-driven AI. Our preliminary tests of this new approach for weather prediction is also carried out. Subsequently, we discuss new opportunities and plans for integrating the above DL analysis/forecasting techniques into a full data-driven mesoscale weather prediction model.

敬請公告 歡迎參加

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