

ACADEMIA SINICA  
EARLY-CAREER INVESTIGATOR  
RESEARCH ACHIEVEMENT AWARD



黃彥婷

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代表著作：

- 📖 Tseng, H.-T., **Hwang, Y.-T.**, Xie, S.-P., Tseng, Y.-H., Kang, S. M., Luongo, M. T., and I. Eisenman. 2023, Jul. 13th, Fast and Slow Responses of the Tropical Pacific to Radiative Forcing in Northern High Latitudes, *Journal of Climate*, 36.16, 5337-5349.
- 📖 **Hwang, Y.-T.** and P.-C. Chung, 2021, Mar. 25th, Seasonal Sensitivity of the Cross-Equatorial Hadley Cell Response to Extratropical Thermal Forcings, *Journal of Climate*, 34.9, 3327-3342.
- 📖 **Hwang, Y.-T.**, H.-Y. Tseng, K.-C. Li, S.M. Kang, Y.-J. Chen, and J. C. H. Chiang, 2021, Apr. 2nd, Relative Roles of Energy and Momentum Fluxes in the Tropical Response to Extratropical Thermal Forcing. *Journal of Climate*, 34.10, 3771-3786.

## 簡評：

黃博士清楚詮釋北半球中緯度熱強迫引發大氣擾動，透過跨時空尺度海洋-大氣-雲-輻射交互作用，影響熱帶氣候。她的研究統整海洋大氣系統的能量傳送與動力過程，從新研究視角，提出具說服力的氣候變遷機制，成果備受矚目。

Dr. Hwang explains vividly how the midlatitude-thermal-forcing induced physical processes affect tropical climate, through cross spatiotemporal scale ocean-atmosphere-cloud-radiation interactions. The internationally well-recognized mechanism that fusions the energy transport and physical processes in the ocean-atmosphere system provides a new angle for climate change research.

## 簡歷：

黃彥婷博士是氣候動力學專家，專注於地球系統的能量收支變化和大氣環流的交互作用。她所領導的氣候動力與全球變遷研究團隊，致力於建立更完整的理論基礎，提升氣候變遷預測和地球系統模式的準確性。

黃博士於 2013 年在美國華盛頓大學 (University of Washington) 取得大氣科學博士學位，並於同年夏天訪問美國國家大氣研究中心 (NCAR)，隨後於斯克里普斯海洋研究所 (Scripps Institution of Oceanography) 擔任博士後研究員。自 2014 年起，她在國立台灣大學大氣科學系任教。

黃博士活躍於多項國際合作計畫，在世界氣候研究中心的支持下主導了多模式雲反饋比較計畫 (CFMIP)、熱帶太平洋海溫分佈變異小組 (TROPICS) 及風暴路徑工作坊等。她現任亞洲大洋洲地球科學學會秘書，並擔任歐洲地球科學聯盟《天氣與氣候動力》期刊的共同編輯。

Dr. Yen-Ting Hwang is an expert in climate dynamics, specializing in the interactions between atmospheric circulation and energy fluxes. She leads the Climate Dynamics and Global Change Research Group at National Taiwan University, dedicated to establishing a more comprehensive theoretical foundation to enhance the accuracy of climate change predictions and Earth system models.

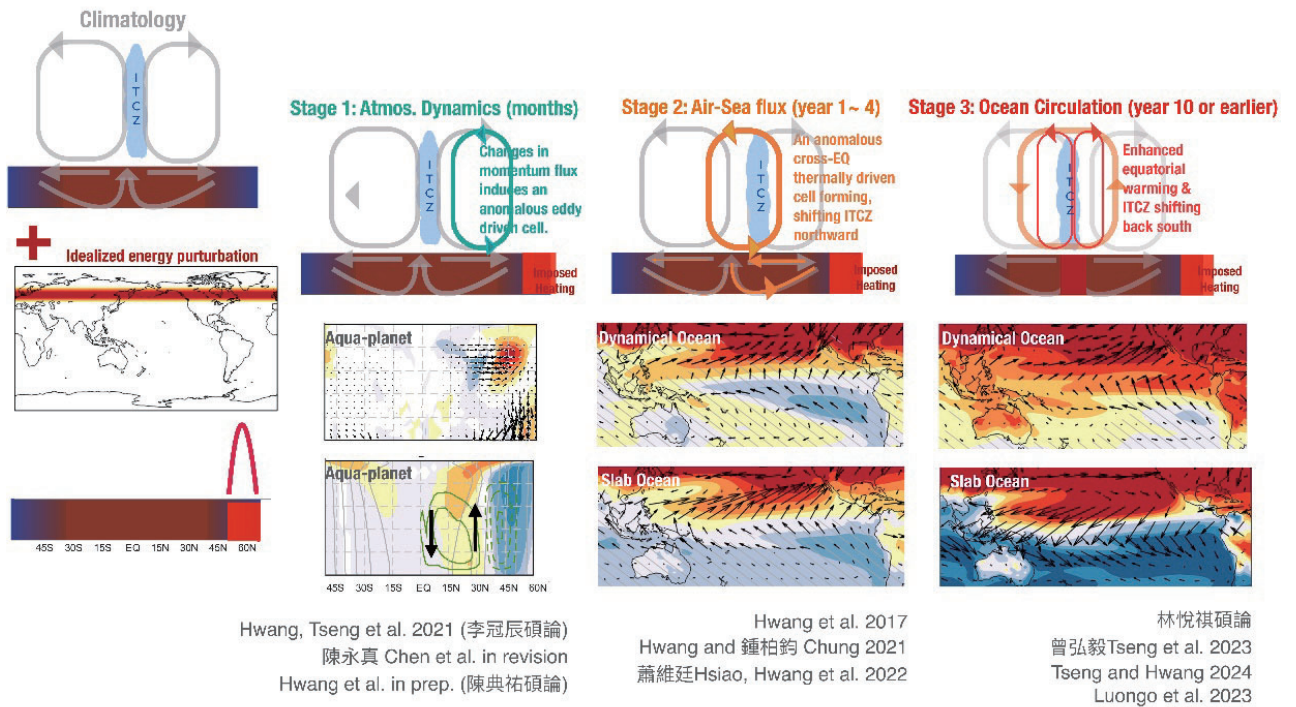
Dr. Hwang earned her Ph.D. in Atmospheric Sciences from the University of Washington in 2013. During the summer of the same year, she visited the National Center for Atmospheric Research, followed by a postdoctoral research position at the Scripps Institution of Oceanography. Since 2014, she has been a faculty member in the Department of Atmospheric Sciences at National Taiwan University.

Dr. Hwang is actively involved in several international collaborative projects. Supported by the World Climate Research Program, she has led initiatives such as the Cloud Feedback Model Intercomparison Project (CFMIP), the TROPICS working group on tropical Pacific Sea surface temperature variability, and the Storm Track Workshop. She currently serves as the Secretary of the Asia Oceania Geosciences Society and as a co-editor for the *Weather and Climate Dynamics journal* of the European Geosciences Union.

### 代表作簡介：

熱帶太平洋被譽為大氣環流的心臟。當聖嬰現象發生時，中太平洋異常溫暖的海水促使對流東移，激發大氣波動，進而引發中高緯度特定區域的洪水或乾旱。在人為排放的溫室氣體與氣溶膠影響下，越來越多證據顯示熱帶太平洋正受到其他區域的影響。然而，中高緯度對熱帶的遙相關機制錯綜複雜，且氣候模式的模擬存在偏差。為應對這一挑戰，黃博士帶領團隊利用漸進複雜度的數值模式，系統探討高緯度能量變化如何透過大氣波動、海氣交互作用及海洋環流等機制，

在季節際、年際與年代際時間尺度上影響熱帶太平洋氣候。研究成果不僅突破了傳統理論，揭示跨半球與跨洋盆遙相關機制，為解釋觀測中熱帶太平洋海溫變化趨勢提供新視角，也為改進氣候模式提出建議。



The tropical Pacific is often referred to as the engine of atmospheric circulation. During El Niño events, anomalously warm waters in the central Pacific shift convection eastward, triggering atmospheric waves that lead to floods or droughts in various mid- and high-latitude regions. Under the influence of anthropogenic greenhouse gas and aerosol emissions, growing evidence suggests that the tropical Pacific is increasingly influenced by other regions. However, the teleconnection mechanisms linking mid- and high latitudes to the tropics are highly complex, and climate models exhibit biases in simulating these interactions.

To address the challenge, Dr. Hwang and her team utilize a climate model hierarchy to systematically explore how high-latitude energy changes influence the tropical Pacific climate through mechanisms with three

distinct timescales -- atmospheric waves, air-sea flux, and ocean circulation. The findings not only challenge traditional theories but also reveal interhemispheric and inter-basin teleconnection mechanisms, offering a new perspective on observed tropical Pacific Sea surface temperature trends and providing recommendations for improving climate models.

### 得獎感言：

獲得中研院年輕學者研究成果獎，是對我和研究團隊的極大肯定。感謝國科會年輕學者養成計畫提供穩定的經費，讓我們得以深入探討理論機制，再連結模式與觀測，實現一點點突破。我衷心感謝研究團隊的學生與助理，謝謝你們陪我一起燃燒青春；也感謝栽培我的老師、台大大氣與國科會大氣學門的前輩與夥伴，謝謝你們對媽媽科學家的支持。最後，感謝我的媽媽、婆婆、還有老公、杉杉和棠棠，感謝你們的包容與愛。我將這份榮譽獻給天上的父親。

Receiving the Academia Sinica Early-Career Investigator Research Achievement Award is a tremendous honor for both me and my research team. I am deeply grateful to the National Science and Technology Council's Young Scholar Program for providing stable funding, which enabled us to explore theoretical mechanisms, link models with observations, and achieve meaningful breakthroughs.

My heartfelt appreciation goes to the students and assistants in my research team—thank you for your dedication, sweat, and tears. I am also deeply thankful to the mentors who nurtured me, as well as the seniors and colleagues in NTU Atmospheric Sciences and the atmospheric science community at NSTC, for your unwavering support of a parent-scientist.

Finally, I want to express my gratitude to my family—my mother, my mother-in-law, my husband Ethan, Shawn, and Tammy—for their understanding and love. I dedicate this honor to my father.