Wan-Ru Huang
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科研兴趣

本實驗室多年來致力於探討**「氣候變遷下臺灣與鄰近地區的降水特性變化及相關機制」**(Table1)。特別是針對**「大尺度環流的長期變遷對臺灣與華南地區日夜變化降水事件(diurnal rainfall events; 如午後對流)之影響」**這個議題有一系列的分析及成果，研究內容包括觀測 (含衛星觀測及測站觀測) 資料及模式模擬(含全球模式及區域模式)資料的分析，分析的時間尺度包括:氣候平均場、長期趨勢、年代際變化、年際變化、季內震盪變化，以及未來氣候變遷下的推估。
透過多種觀測資料的分析後我們發現：(1) 臺灣的日夜變化降水事件，其時間分布有區域性差異，且此差異與「大尺度與區域尺度日夜環流之間的交互作用」有關（Huang and Wang, 2014; Huang and Chang, 2018a）。(2) 臺灣與華南地區梅雨季的鋒面降水及午後對流降水皆存在著長期趨勢變化，且此趨勢變化和大氣環流熱力、動力過程的長期變遷有關（Huang and Chen, 2015a; Chang and Huang*, 2016）。(3)「臺灣地區午後對流降水之長期趨勢」存在著顯著的區域性差異，且此差異亦是受到大尺度環流變遷的影響（Huang et al., 2015b）。(4)臺灣地區午後對流降水的發生頻率及降雨強度會受到大尺度環流季內震盪現象（Huang and Chang, 2018b），東太平洋海溫的年際變化影響 (Huang et al., 2019a)及年代際變化影響 (Huang et al., 2018c)。
此外，透過多種CMIP5、6（Coupled Model Intercomparison Project Phase 5、Phase 6）氣候模式資料分析、區域模式降尺度資料分析，我們檢視了不同模式對東亞(含臺灣)地區未來降水變化之推估結果。我們的研究發現：(1) 18 個CMIP5模式中以CMCC-CM模式最能掌握東亞地區梅雨季日夜變化降水之時空分布情況。此模式推估未來臺灣與華南地區受到「具東移傳播特性的降水系統影響」之機會將變多（Huang and Wang, 2017）。(2) 將全球模式資料透過WRF模式進行動力降尺度後的結果，能有效改善模式表徵臺灣夏季日夜變化降水事件的時、空分布特性（Huang et al., 2016a），且此方法亦適用於改善模式表徵華南與呂宋地區夏季日夜降水的時、空特性分布（Huang et al., 2016b）。(3) 區域模式降尺度推估未來因受到大尺度氣候變遷的影響，各類型的降水（含午後對流、鋒面、颱風及其他南來的降水系統）對臺灣夏季降水量的貢獻將有所不同（Huang et al., 2016c），其中午後對流的頻率將較現在少。(4) 最新一代的CMIP6模式中，以EC-Earth3 系列產品對臺灣、華南及呂宋午後對流降雨事件的頻率、強度表現為最好。大部分的CMIP6模式都預測未來臺灣的午後對流降雨事件有頻率減少、強度增強的現象。此和大氣的動力、熱力條件變化有關 (Huang et al. 2021a)。
近來，我們亦針對臺灣的極端降水變化在過去(Huang et al., 2019b) 及未來(Huang et al., 2019c)有可能會如何受到大尺度環流變化進行相關研究。並且針對「**新一代衛星資料對臺灣降水特色的表現能力評估與應用**」有一系列相關成果發表(Huang et al., 2018d; Huang et al., 2020; Liu and Huang, 2020; Huang et al., 2021b,c,d; Hsu et al., 2021a,b)。此外，我們亦使用MODIS衛星觀測資料搭配地面觀測資料進行分析，了解中南半島春季生質燃燒對臺灣鹿林山觀測到的PM10的年際變化之可能影響，並從環流、降水場的變化提供相關動力、熱力解釋 (Huang et al., 2016d)。這些研究成果皆有助於我們了解臺灣與鄰近地區的降水有可能會如何受到氣候變遷的影響。

雇用

Department of Earth Sciences (Include Institute of Marine Environmental Science and Technology)

2月 1 2005 → present

研究成果

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奖项

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Huang, W.-R. (获奖人), 2017

中華民國大氣科學期刊優良論文獎
Lee, C.-A. (获奖人) & Huang, W.-R. (获奖人), 2019

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國立臺灣師範大學107年度研究績優獎 (2019)
Huang, W.-R. (获奖人), 2019

國立臺灣師範大學優聘教授 (2014-2018)
Huang, W.-R. (获奖人), 2018

國立臺灣師範大學特聘教授 (2019-2021)
Huang, W.-R. (获奖人), 2021

地球科學集刊 (Terr. Atmos. Ocean. Sci. Journal) 2017-2018 優良審查人獎
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Huang, W.-R. (获奖人), 2017

科技部吳大猷先生紀念獎
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科技部補助大專校院獎勵特殊優秀人才
Huang, W.-R. (获奖人), 2016

科技部補助大專校院獎勵特殊優秀人才
Huang, W.-R. (获奖人), 2017

科技部補助大專校院獎勵特殊優秀人才
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科技部補助大專校院獎勵特殊優秀人才
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科技部補助大專校院獎勵特殊優秀人才
Huang, W.-R. (获奖人), 2020

奖励

Create from award testing
Alan A., C. (PI) & Huang, W.-R. (PI)
Anesteziologie a intenzivní medicína: US$9,999.00

项目

多重時間尺度環流擾動對台灣與臨近地區日夜變化降水特性之影響
Huang, W.-R. (PI)
8/1/17 → 10/31/21

子計畫:梅雨期台灣地區中尺度降雨氣候與概念模式之建立-CFSv2的應用(II)
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