Hao-Jhe Hong

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EDUCATION

2016/08 – 2020/04	Ph.D.	Depart. of Atmospheric Sciences, University of Utah, USA
2010/09 – 2013/12	M.S.	Depart. of Atmospheric Sciences, National Central University, Taiwan
2006/09 – 2010/06	B.A.	Depart. of Atmospheric Sciences, National Central University, Taiwan

EMPLOYMENT

2020/06 - present	Postdoctoral Researcher	RCEC, Academia Sinica, Taiwan
2016/01-2016/07	Research Assistant	Department of Atmospheric Sciences, National Central University, Taiwan
2015/06-2015/12	Research Assistant	Department of Environmental Engineering, National Chung Hsing University, Taiwan
2015/03-2015/05	Research Assistant	Department of Atmospheric Sciences, National Central University, Taiwan

ACADEMIC SERVICE

Journal reviewer:

Atmospheric Chemistry and Physics (ACP)
Geophysical Research Letter (GRL)
Terrestrial, Atmospheric and Oceanic sciences journal (TAO)

RESEARCH INTEREST

My research interests focus on (1) interaction between stratospheric dynamics and ozone and (2) the North Pacific SST variability. The former research aims to understand the feedback between stratospheric ozone and the circulation and their impact on the coupled stratosphere-troposphere system. The latter study investigates the causes of the increasing SST variability over the North Pacific during the recent decades.

RESEARCH HIGHLIGHTS

1. **Ozone-Circulation Interaction in the Stratosphere**
   Ozone is a key constituent of the stratosphere that modulates the thermal structure of the atmosphere and prevents harmful ultraviolet radiation from the surface. It is well known that

during the Arctic circulation extremes, e.g., Stratospheric Sudden Warming, anomalous high ozone concentration occurred in the polar cap region due to enhanced dynamical ozone transport from the lower latitudes. Our study indicated that significant decreases in ozone were also observed in the tropics, highlighting the global influences of Arctic circulation extremes. We also developed a simplified chemistry-dynamical model (SCDM V1.0), which couples a linear ozone scheme and a shortwave radiative parameterization into a widely used idealized model. The new model is economical and has the advantage of isolating the ozone effect on circulation. Our ongoing work is to use the model for an in-depth study of the role of interactive ozone in the variability of the coupled stratosphere-troposphere system.

2. **The North Pacific SST Variability**

   The Northeast Pacific (NEP) had two record-breaking marine heatwave events (MHWs) in the winters of 2013–2015 and summer of 2019, which had a detrimental impact on the fisheries, marine ecosystems, and climate in North America. Here, we investigated the cause of sea surface temperature (SST) variability in NEP during late spring–summer of 1981–2020. The regression circulation anomalies to the principal component of leading EOF mode suggested that the warm NEP SST were characterized by a cyclonic circulation anomaly in the midlatitude North Pacific and a warming SST center in the Gulf of Alaska. We noted that this cyclonic circulation anomaly, attributable to a barotropic atmospheric wave originating from the tropical central Pacific (CP) in the preceding spring, reduced the surface heat flux loss from the ocean to the atmosphere in the NEP and led to the warm SST anomalies in summer. This finding was confirmed by not only empirical diagnosis but also long-term numerical simulations forced by the observed SST perturbations in the tropical CP. Our results highlight the role of the tropical CP SST in driving the summertime North Pacific SST variability through the atmospheric bridge in recent decades.

PUBLICATION (*: corresponding author)

Hong, H.-J. and Hsu, H.-H.*: Remote tropical central Pacific influence on driving sea surface temperature variability in the Northeast Pacific, Environ. Res. Lett., 18, 044005, https://doi.org/10.1088/1748-9326/acc087, 2023.

Hsu, P.-C., Hsu, H.-H.*, **Hong, H.-J.**, Chen, Y.-T., Chen, Y.-L., Tseng, W.-L.: 2021 Texas cold snap: Manifestation of natural variability and a recent warming trend, Weather Clim. Extrem., 37, 100476, https://doi.org/10.1016/j.wace.2022.100476, 2022.

Hong, H.-J.* and Reichler, T.: The Simplified Chemistry-Dynamical Model (SCDM V1.0), Geosci. Model Dev., 14, 6647–6660, https://doi.org/10.5194/gmd-14-6647-2021, 2021.

Hong, H.-J.* and Reichler, T.: Local and remote response of ozone to Arctic stratospheric circulation extremes, Atmos. Chem. Phys., 21, 1159–1171, https://doi.org/10.5194/acp-21-1159-2021, 2021.

CONFERENCE AND WORKSHOP PROCEEDING

Hong, H.-J. and Hsu, H.-H.: Remote Tropical Central Pacific Influence on Driving Sea Surface Temperature Variability in the Northeast Pacific. 20th Asia Oceania Geosciences Society (AOGS) Annual Meeting, 30 July-04 August 2023, Singapore (oral).

Hong, H.-J. and Hsu, H.-H.: Remote tropical influence on triggering the marine heatwave mode over the Northeast Pacific. 5th Climate Hotpots in Action (CHiA) Forum, 17-19 August 2022, Taipei (oral).

Hong, H.-J. and Reichler, T.: A Simplified Chemistry-Dynamical Model (SCDM V1.0). 19th Asia Oceania Geosciences Society (AOGS) Annual Meeting, 01-05 August 2022, virtual meeting (oral).

Hong, H.-J. and Reichler, T.: A Simplified Chemistry-Dynamical Model (SCDM V1.0). 16th International Global Atmospheric Chemistry (IGAC) Scientific Conference, 12-17 September 2021, virtual conference (poster).

Hong, H.-J.: 16th IGAC Early Career Researcher (ECR) Collaboration and Networking Capacity Building Workshop, 7-10 September 2021, virtual workshop.

Hong, H.-J.: Polar Amplification Model Intercomparison Project (PAMIP) Workshop, 30 March-1 April 2021, virtual workshop.