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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:

Geophysical Research Letter (GRL)

Terrestrial, Atmospheric and Oceanic sciences journal (TAO)

RESEARCH INTEREST

My research interests focus on (1) stratospheric dynamics and ozone and (2) the Pacific marine heatwave. 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 recent marine heatwaves over the North Pacific.

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 Northeast Pacific Marine Heatwave

During 2010-2020, two record-breaking high ocean temperature events struck the Northeast Pacific (NEP), which led to devastating impacts on fisheries, marine ecosystems, and the climate of North America. We found that the occurrence of summertime marine heatwaves (MHW) can be attributed to a regime shift in the sea surface temperature (SST) variability, which showed an MHW-like pattern from 2001 to 2020. In our modeling study, this “MHW mode” can be forced by SST anomalies in the central equatorial Pacific through a barotropic wave propagation in the preceding spring. Our results highlight the role of the tropical Pacific in driving the SST variability in the extratropics during the recent decades.

PUBLICATION (*: corresponding author)

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 influence on triggering the marine heatwave mode over the Northeast Pacific. 5th Climate Hotspots 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.