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EDUCATION

2000/09~2008/01 Ph.D. Institute of Atmospheric Sciences, National Taiwan University, Taiwan

1995/09~1997/06 M.S. Institute of Environmental Engineering, National Chung-Hsing University, Taiwan

1991/09~1995/06 B.E. Department of Environmental Engineering, National Chung-Hsing University, Taiwan

EMPLOYMENT

2012/11~present Assistant Research Specialist, Research Center for Environmental Changes, Academia Sinica, Taiwan (also involved in Laboratory of Climate Change Research, Consortium for Climate Change Study, Ministry of Science and Technology, Taiwan).

2012/01~2012/11 Postdoctoral Fellow, Laboratory of Climate Change Research, Consortium for Climate Change Study, Ministry of Science and Technology, Taiwan

2008/02~2012/01 Postdoctoral Fellow, Research Center for Environmental Changes, Academia Sinica, Taiwan

2009/11~2011/10 Research Associate, Earth System Science Interdisciplinary Center, University of Maryland at College Park, Maryland, USA

2009/11~2011/10 Visitor, Mesoscale Atmospheric Processes Laboratory (in Dr. Wei-Kuo Tao's group), Goddard Space Flight Center, NASA, USA

2000/09~2008/01 Part-time Research Assistant and PhD Student, Research Center for Environmental Changes, Academia Sinica, Taiwan

1999/07~2000/08 Research Assistant, Environmental Changes Research Project Office, Institute of Earth Science, Academia Sinica, Taiwan

1997/07~1999/06 Sergeant, Chemical troops at Kin-men, Taiwan

1995/09~1997/06 Teaching Assistant of air pollutants monitoring and sampling Lab, Department of Environmental Engineering, National Chung-Hsing University, Taichung, Taiwan

1992/02~1995/08 Intern of air pollution control Lab 704, Department of Environmental Engineering, National Chung-Hsing University, Taichung, Taiwan

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RESEARCH INTEREST

For the past eight years or so, I have been devoted to modeling works related to building a new earth system model i.e., the Taiwan Earth System Model (TaiESM) especially focusing on developing a consistent framework of physical parameterization for simulating aerosol-cloud-precipitation interactions in convective and stratiform clouds of GCMs. Major works done and ongoing include 1) Tuning of TaiESM; 2) Using TaiESM for participating CMIP6 endorsed-MIP i.e. CFMIP3; 3) Implementation of GTS cloud microphysics into TaiESM; 4) Implementation of warm cloud microphysics for convective clouds of TaiESM; 5) Implementation of a full two-moment cloud microphysics for stratiform clouds of TaiESM; 6) Unifying cloud macrophysics and cloud microphysics scheme of TaiESM; and 7) Implementation of NASA Goddard radiative transfer scheme into TaiESM. I am also quite interested in developing other model evaluation tools e.g. development of a synergy of different scale models for understanding cloud microphysical processes of climate model as well as buildup of technical tools for evaluation of cloud and precipitation simulations of GCMs. In addition to the works related to model developments, I am also interested in understanding extreme precipitation change under global warming via using satellite observations and global model simulations.

RESEARCH HIGHLIGHTS

1. Cloud microphysics matters in simulating convective clouds in GCMs

A two-moment warm-cloud microphysical scheme is implemented into the cumulus parameterization scheme (CPS) of the NCAR CESM1.2.2 and Taiwan Earth System Model (TaiESM) version 1 for better descriptions of the warm-cloud and warm-rain processes. Many significant improvements regarding simulations of precipitation and clouds are observed ^[1]. This research work highlights the importance of applying more physics-based approach for converting cloud liquid mass to rainwater in the cumulus parameterization schemes in modern general circulation models (GCM). We also notice that inclusion of cloud microphysics in the CPS of TaiESM and NCAR CESM can lead to observable improvements in simulating eastward propagation of the Madden-Julian Oscillation (MJO) ^[2].

Reference: [1] Shiu et al. (xxx) and [2] Shiu et al. (xxx).

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REPRESENTATIVE PUBLICATIONS (*: corresponding author)

1. **Shiu, Chein-Jung***, Yi-Hsuan Chen, Jen-Ping Chen, I-Chun Tsai, Wei-Ting Chen, and Huang-Hsiung Hsu: Implementation of a two-moment warm-cloud and rain microphysics parameterization for convective clouds in a global climate model: Methodology and simulation results. (in revision: JGR-Atmosphere)
2. **Shiu, Chein-Jung***, Huang-Hsiung Hsu, Wan-Lin Tseng, Yi-Hsuan Chen, I-Chun Tsai, and Jen-Ping Chen: Does cumulus parameterization with convective microphysics matter in simulating Madden-Julian Oscillation? (to be submitted: Climate Dynamics)
3. **Shiu, Chein-Jung***, Yi-Chi Wang, Huang-Hsiung Hsu, Wei-Ting Chen, Hua-Lu Pan, Ruiyu Sun, Yi-Hsuan Chen, and Cheng-An Chen: A Probability Density Function-consistent macrophysics scheme for climate models. (submitted: Geoscientific Model Development)
4. **Shiu, Chein-Jung**, Shaw Chen Liu*, Huang-Hsiung Hsu, and You-Yu Mao: Observed trends in precipitation and precipitation intensity of tropical cyclones during 1983-2017. (to be submitted: GRL)
5. **Shiu, C.-J.**, Shaw Chen Liu*, Congbin Fu, Aiguo Dai and Ying Sun (2012): How Much do Precipitation Extremes Change in a Warming Climate? Geophys. Res. Lett., 39, L17707, doi:10.1029/2012GL052762.
6. Liu, Shaw Chen*, Congbin Fu, **C.-J. Shiu**, Jen-Ping Chen, Futing Wu, (2009): Temperature Dependence of Global Precipitation Extremes, Geophys. Res. Lett., 36, L17702, doi:10.1029/2009GL040218.
7. **Shiu, C.-J.**, S. C. Liu*, and J.-P. Chen, (2009): Diurnally asymmetric trends of temperature, humidity and precipitation in Taiwan, J. Climate, Vol. 22, No. 21, 5635–5649.
8. Chou, C. C.-K. *, C.-Y. Tsai, **C.-J. Shiu**, S. C. Liu, T. Zhu, (2009): Measurement of NO_y during CAREBEIJING-2006: Implications for the ozone production efficiency of NO_x. J. Geophys. Res. 114, Issue D7, CiteID D00G01.
9. **Shiu, C.-J.**, S. C. Liu*, C.-C. Chang, J.-P. Chen, C. C. K. Chou, C.-Y. Lin, and C.-Y. Young, (2007): “Photochemical Production of Ozone and Control Strategy for Southern Taiwan”, Atmos. Environ., 41, 9324–9340.
10. Liu, S. C. *, C.-H. Wang, **C.-J. Shiu**, H.-W. Chang, C.-K. Hsiao and S.-H. Liaw, (2002): “Reduction in Sunshine Duration over Taiwan: Causes and Implications”, Terrest. Atmos. Ocean. (TAO), 13, 523–545.