Curriculum Vitae

Jongsoo Shin

Physical oceanography department,
Woods Hole Oceanographic Institution,
Woods Hole, Massachusetts, U.S.
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Education

2017-2022 Yonsei University, Seoul, South Korea
Ph. D. in Atmospheric Sciences
Advisor: Prof. Soon-Il An

Thesis: "Irreversible surface temperature change via the delayed North Atlantic and Southern Ocean response to a carbon dioxide removal scenario"

2015-2017 Yonsei University, Seoul, South Korea
M.S. in Atmospheric Sciences
Advisor: Prof. Soon-Il An

Thesis: "Mechanisms of heat waves over the Korean peninsula, and their projection in the 21st century"

2013-2015 Yonsei University, Seoul, South Korea
B.S. in Atmospheric Sciences

Relevant Skills

Languages: NCL, Fortran, Python

Models: CESM (v1 & v2), WRF, LBM

Research Experience

Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, U.S.

2023-present

Research Associate III

Project: "Large-Scale Atmospheric Circulation Response to Oyashio Extension Frontal Variability" - Funded by the U.S. National Science Foundation (NSF)

Supervisor: Dr. Young-Oh Kwon

POSTECH, Pohang, South Korea 2022-2023

Ph. D. Research Fellow

Project: “Center for Abrupt Climate” - Funded by the National Research Foundation of Korea (NRF)

Supervisor: Prof. Jong-Seong Kug

Yonsei University, Seoul, South Korea 2018-2022

Research Fellow

Project: “Irreversible Climate Change Research Center” - Funded by the National Research Foundation of Korea (NRF)

Supervisor: Prof. Soon-Il An

- Set up the model experimental design for the Carbon dioxide removal scenario
- Managed a large ensemble CESM simulation including model run, data transport (1,400TB), data post-processing (300TB), and data sharing
- Contributed to a team investigating reversibility and hysteresis of climate system (Published 10 papers, submitted 3 papers, and prepared more than 5 papers)

Yonsei University, Seoul, South Korea 2019-2020

Research Fellow

Project: “Climate model experiment for the irreversibility of climate system” - Funded by the national supercomputing center Supervisor: Prof. Soon-Il An

- The CESM1 porting, optimization, experiment, and data transport
- Ran a large ensemble CESM simulation using supercomputing resources of 160 million CPU core hours in 4,000 individual jobs

Yonsei University, Seoul, South Korea 2019-2020

Ph.D. Fellowship

Project: “The simulation of irreversible climate change using Earth system model: the study of variability in heat waves” - Funded by the National Research Foundation of Korea (NRF)

- Analyzed the heatwaves variability in Europe using CESM output

Publications

1. Kim, S. K., **Shin, J.**, An, S. I., Kim, H. J., Im, N., Xie, S. P., ... & Yeh, S. W. (2022). Widespread irreversible changes in surface temperature and precipitation in response to CO2 forcing. *Nature Climate Change*, *12*(9), 834-840.
2. An, S. I., **Shin, J.**, Yeh, S. W., Son, S. W., Kug, J. S., Min, S. K., & Kim, H. J. (2021). Global cooling hiatus driven by an AMOC overshoot in a carbon dioxide removal scenario. *Earth's Future*, *9*(7), e2021EF002165.
3. **Shin, J.**, Olson, R., & An, S. I. (2018). Projected heat wave characteristics over the Korean Peninsula during the twenty-first century. *Asia-Pacific Journal of Atmospheric Sciences*, *54*(1), 53-61.
4. **Shin, J.**, Olson, R., & An, S. I. (2019). Improved probabilistic twenty-first century

projections of sea surface temperature over East Asian marginal seas by considering uncertainty owing to model error and internal variability. *Climate Dynamics*, *53*(9), 6075-6087.

5. Kug, J. S., Oh, J. H., An, S. I., Yeh, S. W., Min, S. K., Son, S. W., ... & **Shin, J.** (2022). Hysteresis of the intertropical convergence zone to CO2 forcing. *Nature Climate Change*, *12*(1), 47-53.

6. Song, S. Y., Yeh, S. W., An, S. I., Kug, J. S., Min, S. K., Son, S. W., & **Shin, J.** (2022). Asymmetrical response of summer rainfall in East Asia to CO2 forcing. *Science Bulletin*, *67*(2), 213-222.

7. Yeh, S. W., Song, S. Y., Allan, R. P., An, S. I., & **Shin, J.** (2021). Contrasting response of hydrological cycle over land and ocean to a changing CO2 pathway. *npj Climate and Atmospheric Science*, *4*(1), 1-8.

8. An, S. I., Park, H. J., Kim, S. K., **Shin, J.**, Yeh, S. W., & Kug, J. S. (2022). Intensity changes of Indian Ocean dipole mode in a carbon dioxide removal scenario. *npj Climate and Atmospheric Science*, *5*(1), 1-8.

9. An, S. I., Park, S. E., **Shin, J.**, Yang, Y. M., Yeh, S. W., Son, S. W., & Kug, J. S. (2022). General circulation and global heat transport in a quadrupling CO2 pulse experiment. *Scientific Reports*, *12*(1), 1-11.

10. Oh, H., An, S. I., **Shin, J.**, Yeh, S. W., Min, S. K., Son, S. W., & Kug, J. S. (2022). Contrasting hysteresis behaviors of northern Hemisphere land monsoon precipitation to CO2 pathways. *Earth's Future*, *10*(6), e2021EF002623.

11. Oh, J. H., An, S. I., **Shin, J.**, & Kug, J. S. (2022). Centennial memory of the Arctic Ocean for future Arctic climate recovery in response to a carbon dioxide removal. *Earth's Future*, *10*(8), e2022EF002804.

12. Jo, S. Y., Seong, M. G., Min, S. K., Kug, J. S., Yeh, S. W., An, S. I., ... & **Shin, J.** (2022). Hysteresis behaviors in East Asian Extreme Precipitation Frequency to CO2 Pathway. *Geophysical Research Letters*, *49*(18), e2022GL099814.

13. Lee, Y. H., Yeh, S. W., Hong, J. S., **Shin, J.**, & An, S. I. (2023). Regime shift increase in East Asia's summer extreme hot day frequency across the late 1990s. *International Journal of Climatology*, 43(5), 2305-2317.

14. Mondal, S. K., An, S. I., Min, S. K., Kim, S. K., **Shin, J**., Paik, S., ... & Liu, C. (2023). Hysteresis and irreversibility of global extreme precipitation to anthropogenic CO2 emission. Weather and Climate Extremes, 100561.

15. Pathirana, G., Oh, J. H., Cai, W., An, S. I., Min, S. K., Jo, S. Y., **Shin, J.**, Kug, J. S. (2022) Explosive increase in convective Extreme El Nino events in the CO2 removal scenario Science Advances, 9(25), eadh2412.

16. Kim, S., Choi, Y. J., Son, S. W., An, S. I., Kug, J. S., Yeh, S. W., **Shin, J. (2022)** Hemispherically asymmetric Hadley cell response to CO2 removal. *Science advances*, *9*(30), eadg1801

17. Paik, S., An, S. I., Min, S. K., King, A. D., **Shin, J.** (2022) Hysteretic behavior of global to regional monsoon area under CO2 ramp-up and ramp-down. Earth's Future, 11(7), e2022EF003434

18. Sung, M. K., An, S. I., **Shin, J**., Park, J. H., Yang, Y. M., Kim, H. J., & Chang, M. (2023). Ocean fronts as decadal thermostats modulating continental warming hiatus. *Nature Communications*, *14*(1), 7777.

19. Oh, J. H., Kug, J. S., An, S. I., Jin, F. F., McPhaden, M. J., & **Shin, J**. (2024). Emergent

climate change patterns originating from deep ocean warming in climate mitigation scenarios. *Nature Climate Change*, 1-7.

20. Hwang, J., Son, S. W., An, S. I., Kug, J. S., Yeh, S. W., **Shin, J.** (2024) Asymmetric hysteresis response of midlatitude storm tracks to CO2 removal (Accepted in *Nature Climate Change*).
21. Liu, C., An, S. I., Jin, F. F., **Shin, J.**, Kug, J. S., Zhang, W., ... & Kim, S. K. (2023). Hysteresis of the El Niño–Southern Oscillation to CO2 forcing. *Science Advances*, *9*(31), eadh8442.
22. Liu, C., An, S. I., Jin, F. F., Stuecker, M. F., Zhang, W., Kug, J. S., ..., **Shin, J.**, & Kim, S. K. (2023). ENSO skewness hysteresis and associated changes in strong El Niño under a CO2 removal scenario. *npj Climate and Atmospheric Science*, *6*(1), 117.
23. Im, N., Kim, D., An, S. I., Paik, S., Kim, S. K., **Shin, J.**, ... & Oh, H. (2024). Hysteresis of European summer precipitation under a symmetric CO2 ramp-up and ramp-down pathway. *Environmental Research Letters*.
24. Yang, Y. M., **Shin, J.**, Park, S. W., Park, J. H., An, S. I., Kug, J. S., ... & Im, N. (2024). Fast reduction of Atlantic SST threatens Europe-wide gross primary productivity under positive and negative CO2 emissions. *npj Climate and Atmospheric Science*, *7*(1), 117.
25. Hwang, J., Son, S. W., Martineau, P., Sung, M. K., Barriopedro, D., An, S. I., ... & **Shin, J.** (2024). Basin-dependent response of Northern Hemisphere winter blocking frequency to CO2 removal. *npj Climate and Atmospheric Science*, *7*(1), 111.
26. Kim, G-I., …., **Shin, J**. (2024) Deep Ocean warming-induced El Niño changes under climate mitigation scenarios. *Nature communications*

Under revision and manuscript in preparing

- **Shin, J.**, An, S. I., Kug, J. S., Yeh, S. W., Son, S. W., Min, S. K., Yang, Y. M., & Park, J. H. (2024) Long-lasting Southern Ocean warming in a carbon dioxide removal scenario through warm water upwelling and sea ice-albedo feedback. (In preparing).
- **Shin, J.**, Park, S. W., Kug, J. S., An, S. I., Yang, Y. M. (2024) Land rainfall overshoot under negative Carbon dioxide emission driven scenario (NCC rejected)
- Kim, H-J., …. **Shin, J**. (2024) Pervasive fire danger continued under a negative emission scenario (under review in NC)