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EDUCATION

2003 ~ 2008	Ph.D.	Department of Earth and Environmental Sciences, University of Michigan, Ann Arbor, MI, USA
1999 ~ 2001	M.S.	Institute of Oceanography, National Taiwan University, Taiwan
1996 ~ 1999	B.S.	Department of Earth Sciences, National Taiwan Normal University, Taiwan

EMPLOYMENT

2019/08 - present	Associate Research Fellow	RCEC, Academia Sinica, Taiwan
2011/08 - 2019/08	Assistant Research Fellow	RCEC, Academia Sinica, Taiwan
2008/10 - 2011/05	Postdoctoral Researcher	University of California, Berkeley, CA, USA

HONORS & AWARDS

2016 Annual Research Highlight, RCEC, Academia Sinica
2015 Sakura program fellow, Japan Society for the Promotion of Science

ACADEMIC SERVICE & RESEARCH PROJECTS

Journal reviewer:

Asia-Pacific Journal of Atmospheric Sciences, Climate Dynamics, Climate of the Past, Earth and Planetary Science Letters, Geology, Geophysical Research Letters, International Journal of Climatology, Journal of Climate, Journal of Geophysical Research – Atmospheres; Biogeosciences; Oceans, Nature Geoscience, Paleoceanography and Paleoclimatology, Quaternary International, Quaternary Science Reviews, Science, Scientific Reports, Terrestrial, Atmospheric and Oceanic Sciences

RESEARCH INTERESTS

My research interests include climate change of the past and future. I am particularly interested in how different factors influence climate change; what the past can reveal about the way climate system works, and how future climate will impact the environment and society. Specific topical interests including large scale climate response and teleconnection through ocean-atmosphere interactions, paleoclimate dynamics particular on monsoonal region and climate evolution for the past millennium.

RESEARCH HIGHLIGHTS

- **Glacial forcing and climate response:** Changes in the extent of land ice and atmospheric greenhouse gases concentrations were the major glacial forcings during the Pleistocene deglacial period. We explore the impact of glacial continental ice sheet topography on large-scale ocean-atmosphere climate in an intermediate complexity coupled model and. Other than the ice albedo effect, thickness of land ice has profound effect on climate mean state including i) a displacement of Pacific Intertropical Convergence Zone (ITCZ), ii) changes in seasonal Hadley circulation and iii) altered zonal thermo gradients. These results were also confirmed by a fully-coupled transient deglacial simulation. Analyses show that the evolution of Pacific deglacial climate with changing ice thickness has distinct quasi-linear and nonlinear parts. While the linear part is a direct response to the ice topographic changes, the nonlinear part was a result of the tropical thermocline adjustment and greenhouse forcing. This result leads us to an analysis on the correlation between mean SST and greenhouse radiative forcing. We combine a sea surface temperature records from Pacific warm pool to document a nonlinear relationship between climate sensitivity and greenhouse gas levels over the past four glacial/interglacial cycles. The sensitivity of the responses to GHG concentrations rises dramatically by a factor of 2–4 at atmospheric CO_2 levels of >220 ppm.
- **South Pacific jet evolution and climate impact:** A global atmospheric teleconnection was proposed to explain the connection between the Southern Hemisphere climate changes co-incident with North Atlantic cooling in earlier work. We argued that the climate expression and the effectiveness of teleconnection in midlatitude South Pacific might due to a modulation in the strength of the South Pacific Split Jet, a pronounced zonally-asymmetric feature of the wintertime Southern Hemisphere Westerlies. In light with the climatological similarity of seasonal Split Jet structure and wintertime Southern Annular Mode (SAM) phases, we contrast the impact of the two through simulating changes to the ocean circulation from Split Jet modulation, contrasting them against changes associated with SAM. Because the fact the both Split Jet and SAM have direct impact on ocean ventilation and implication on ocean-atmospheric CO2 source-sink fluxes, we explore the biogeochemistry effect in a biogeochemical model

PUBLICATIONS (*: corresponding author, underline as the five represented publications)

- Wang, P.-K., K.-H. E. Lin, Y.-C. Liao, H.-M. Liao, Y.-S. Lin, C.-T. Hsu, S.-M. Hsu, C.-W. Wan, **S.-Y. Lee**, I.-C. Fan, P.-H. Tan and T.-T. Ting, Construction of the REACHES climate database based on historical documents of China, Scientific Data, 5, Article number: 180288, 2018
- Wu, C.-H., **S.-Y. Lee** and J. C.H. Chiang, Relative influence of precession and obliquity in the early Holocene: Topographic modulation of subtropical seasonality during the Asian summer monsoon, *Quaternary Science Reviews*, 191, 238-255, 2018

- Chiang, J. C.H., K.S. Tokos, **S.-Y. Lee** and K. Matsumoto, Contrasting Impacts of the South Pacific Split Jet and the Southern Annular Mode Modulation on Southern Ocean Circulation and Biogeochemistry, *Paleoceanography and Paleoclimatology*, 33, 2-20, 2018
- Lo, L.[#], S.P. Chang, K.Y. Wei, **S.Y. Lee***, T.H. Ou, Y.C. Chen, C.K. Chuang, H.S. Mii, G.S. Burr, M.T. Chen, Y.H. Tung, M.C. Tsai, D. Hodell & C.C. Shen, Nonlinear climatic sensitivity to greenhouse gases over past 4 glacial/interglacial cycles, *Scientific Reports*, DOI: 10.1038/s41598-017-04031-x, 2017
- Wu, C.-H., **S.-Y. Lee**, J. C. H. Chiang and H.-H. Hsu, The influence of obliquity in the early Holocene Asian summer monsoon, *Geophysical Research Letter*, 43-9, 4525-4530, 2016
- Wu, C.-H., J.C.H. Chiang, H.-H. Hsu, and **S.-Y. Lee**, Orbital control of the Western North Pacific summer monsoon, *Climate Dynamics*, 46, 897-911, 2016
- Liu Y., L. Lo, Z. G.Shi, K. Y.Wei, C. J. Chou, Y. C. Chen, C.K. Chuang, C. C. Wu, H. S. Mii, Z. Peng, H. Amakawa, G.S. Burr, **S. Y. Lee**, K. L. DeLong, H. Elderfield, C. C. Shen, Obliquity pacing of the western Pacific Intertropical Convergence Zone over the past 282,000 years, *Nature Comminications*, 6, DOI: 10.1038/ncomms10018, 2015
- Wey H. W[#]., M. H. Lo, **S. Y. Lee**, J. Y. Yu, H. H. Hsu, Potential impacts of wintertime soil moisture anomalies from agricultural irrigation at low latitudes on regional and global climates, *Geophysical Research Letter*, 42-20, 8605-8614, 2015
- **Lee, S.-Y.**, J.C.H. Chiang, and P. Chang, Tropical Pacific response to continental ice sheet topography, *Climate Dynamics*, 44, 2429-2446, 2015
- Chiang, J. C. H., **S.-Y. Lee**, A. Putnam, and X. Wang: South Pacific Split Jet, ITCZ shifts, and atmospheric North-South linkages during abrupt climate changes of the last glacial period, *Earth and Planetary Science Letters*, 406, 233-246, 2014
- X.-Y. Jiang, Y. He, C.-C. Shen, **S.-Y. Lee**, B. Yang, K. Lin, and Z. Li: Decoupling of the East Asian summer monsoon between 20 and 17 ka, *Quaternary Research*, 82, 146-153, 2014
- Lo, L., C.-C. Shen, K.-Y. Wei, G. S. Burr, H.-S. Mii, M.-T. Chen, **S.-Y. Lee**, and M. C. Tsai, Millennial meridional dynamics of the Indo-Pacific Warm Pool during the last termination, *Climate of the Past*, 10, 2253-2261, 2014
- Li, T.-Y., C.-C. Shen, L.-J. Huang, X.-Y. Jiang, X.-L. Yang, **S.-Y. Lee**, H.-S. Mii, L. Lo: Stalagmite-inferred variability of the Asian summer monsoon during the penultimate glacial/interglacial period, *Climate of the Past*, 10, 1211-1219, 2014
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- **Lee, S.-Y.**, J.C.H. Chiang, K. Matsumoto, and K. Tokos, 2011, Southern Ocean wind response to North Atlantic cooling and the rise in atmospheric CO2: Modeling perspective and paleoceanographic implications". *Paleoceaonography*, 26, PA1214, doi:10.1029/2010PA002004.

- **Lee, S.-Y.** and Poulsen, C.J., 2009, Obliquity and precessional forcing of continental snowfall and melt, *Quaternary Science Reviews*, 28, 2663-2674.
- **Lee, S.-Y.** and Poulsen, C.J., 2008, Amplification of obliquity forcing through mean-annual and seasonal atmospheric feedback, *Climate of the Past*, 4, 205-231.
- **Lee, S.-Y.** and Poulsen, C.J., 2006, Sea-ice control on Plio-Pleistocene evolution of the tropical Pacific climate, *Earth and Planetary Science Letters*, 248, p. 238-247.
- Huh, C.-A., Su, C.-C., Wang, C.-H., **Lee, S.-Y.**, and Lin, I.-T., 2006, Sedimentation in the Southern Okinawa Trough – rate, budget, and turbidites, *Marine Geology*, 231,129-139.
- **Lee, S.-Y.** and Poulsen, C.J., 2005, Tropical Pacific climate response to obliquity forcing in the Pleistocene, *Paleocenography*, 20, PA4010,doi:10.1029/2005PA001161.
- **Lee, S.-Y.**, Huh, C.-A., Su, C.-C., and You. C.-F, 2004, Sedimentation in the Southern Okinawa Trough: Enhanced particle scavenging and teleconnection between the equatorial Pacific and western Pacific margin, *Deep-Sea Research I*, 51(11), 1769-1780.