Duo Chan

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Climate and Data Scientist

I develop statistical methods and physical models to understand past climate change and climate dynamics, with an ultimate goal to improve the accuracy of climate predictions.

Education

2015-21	Ph.D. in Earth and Planetary Sciences, Harvard University (Advisor: Peter Huybers)
2013-15	M.S. in Meteorology, Nanjing University, China
2009-13	B.S. in Applied Meteorology and Minor in Finance, Nanjing University, China

Appointments

2023-	Lecturer (Assistant Professor equivalent), School of Ocean and Earth Science, University of Southampton
2021-23	Postdoctoral Scholar, Physical Oceanography Department, WHOI

Awards and Honours

2021	Weston Howland Jr. Postdoctoral Fellowship, WHOI
2021	High Meadows Environmental Institute Fellowship, Princeton (Declined)
2021	Outstanding Student Oral Presentation, 101st AMS
2020	Harvard Horizons Fellowship
2019	Harvard GSAS professional development award
2015-16	William Benjamin and Jill Kowal Graduate Aid Fund in Environmental Studies

Teaching

Lecturer Computational Data Analysis for Geophysicists and Ocean Scientists (Fall, 2023/2024)
Teaching Assistant Dynamical Insights from Data (Fall, 2022), Paleoclimate as prologue (Spring, 2021; Fall, 2016), Climate change debate (Spring, 2019), General Circulation of the Atmosphere (Fall, 2014)

Professional Service

PhD Supervisor Khalil Greene (2024-)
Postdoc Mentor Se-yong Song (2023-)
Ph.D. Mentor Glenn Liu (2022-) | Yifei Fan (2021-) | Chenggong Wang (2021-2022) | Charlotte Henke (2021) | Sarah King (2020-2021) | David Ma (Summer, 2020) | Alexandria Berry (2018-19)
Reviewer PNAS | Nat. Commun. | Sci. Adv. | J. Clim. | GRL | JGR Atmosphere | Earth's Future | Clim. Dyn. | JTECH | Earth Space Sci. | Remote Sensing | Sustainability | SERRA | NOAA Small Business Research Funding
Presentation Judge AGU (2022) | Ocean Science Meeting (2022) | National Collegiate Research Conference (2022)
Organizer AGU co-convener (2023; GC084) | Harvard ClimaTea seminar (2017)
Outreach Teach Climate Science at Perry School (public middle school in south Boston; Winter, 2019-20)

Media Coverage

05 /02/ 2024 Oceans May Have Already Seen 1.7°C of Warming (Eos)
05 /02/ 2024 Expert reaction to sponge skeleton data and passing 1.5C (UK's Science Media Centre)
31 /01/ 2024 Is the world 1.3°C or 1.5°C warmer? Historical ship logs hold answers (Science Insider)
20 /10/ 2023 Crowdsourced Science Pulls Off a Daring WWII Data Rescue (Eos)
29 /06/ 2021 To understand the future of hurricanes, look to the past (AAAS EurekAlert!)
19 /08/ 2019 How Much Hotter Are The Oceans? The Answer Begins With A Bucket (National Public Radio)
17/ 07/ 2019 Corrections to ocean-temperature record resolve puzzling regional differences (Nature News Views)
07/ 01/ 2016 2015's key climate science research advances (Yale Climate Connections)

Peer-reviewed Publications *(* co-first author; † student or mentee; ___ corresponding author)*

[26] Sippel S., Kent E.C., Meinshausen N., **Chan D.**, et al. (2024). Early-twentieth-century cold bias in ocean surface temperature observations. Nature 635, 618–624.

[25] **Chan D.**, Gebbie G., Huybers P., & Kent E. (2024). A Dynamically Consistent ENsemble of Temperature at the Earth surface since 1850 from the DCENT dataset. Scientific Data.

[24] **Fan Y.**†, **Chan D.**, Zhang P., & Li L. (2024). Disagreement on the North Atlantic Cold Blob Formation Mechanisms among Climate Models. Journal of Climate.

[23] **Wang, C.**†, Yang, W., Vecchi, G., Zhang, B., Soden, B. J., **Chan, D**. (2024). Diagnosing the factors that contribute to the intermodel spread of climate feedback in CMIP6. Journal of Climate.

[22] **Chan D.**, Gebbie G., & Huybers P. (2024). Ensemble of land-surface air temperatures between 1880-2022 using revised pair-wise homogenization algorithms accounting for auto-correlation. Journal of Climate, 37(7), 2325–2345.

[21] Yin X., Huang B., **Chan D.**, Graham G., Hu Z., Zhang H. (2024) Sea-surface temperatures [in "State of the Climate in 2023"]. BAMS, 105(8), S163–S168.

[20] Ridgen A., Golden C., **Chan D.**, & Huyber P. (2024). Climate change linked to ongoing drought in Southern Madagascar. NPJ climate and atmospheric science, In press.

[19] Bao X., Zhang S., Jiang G., **Chan D.**, Hu Y., Wu H., Li H., Wang X., & Ynag T. (2023). Climate changes in the Cryogenian nonglacial epoch: A global synthesis with new findings from the Datangpo Formation in South China. Global and Planetary Change, 229, 104234.

[18] Yin X., Huang B., Hu Z., **Chan D.**, Zhang H. (2023) Sea-surface temperatures [in "State of the Climate in 2022"]. BAMS, 104(9), S153–S156.

[17] **Chan D.**, Gebbie G., & Huybers P. (2023). Global and Regional Discrepancies between Early 20th Century Coastal Air and Sea-Surface Temperature Detected by a Coupled Energy-Balance Analysis. Journal of Climate. 36(9), 2205-20.

[16] Proctor J., Rigden A., **Chan D.**, & Huybers P. (2022). Soil moisture measurements improve prediction of crop yields and reduce projected climate change damages. Nature Food, 3(9): 753.

[15] **Chan D.**, Rigden A., Proctor J., Chan P. H. & Huybers P. (2022). Differences in radiative forcing, not sensitivity, explain differences in summertime land temperature variance change between CMIP5 and CMIP6. Earth's Future, e2021EF002402.

[14] **Chan D.**, Vecchi G., Yang W. & Huybers P (2021). Improved simulation of 19th- and 20th-century North Atlantic hurricane frequency after correcting historical sea surface temperatures. Science Advances. 7(26), eabg6931.

[13] **Chan D.**, & Huybers P (2021). Correcting sea surface temperature observations removes World War II warm anomaly. Journal of Climate, 34(11), 4585-602.

[12] **Chan D.** (2021). Combining statistical, physical, and historical evidence to improve historical sea surface temperature records. Harvard Data Science Review. 3(1), doi: 10.1162/99608f92.edcee38f

[11] Dai C., **Chan D.***, Huybers P., & Pillai, N. (2021). Late 19th-century navigational uncertainties and their influence on sea surface temperature estimates. Annals of Applied Statistics, 15(1): 22-40.

[10] **Chan D.**, & Huybers P. (2020). Systematic differences in bucket sea surface temperatures caused by misclassification of engine room intake measurements. Journal of Climate. 33(18), 7735–53

[9] **Chan D.**, Cobb A., Vargas L., Battisti D., & Huybers P. (2020). Summertime temperature variability increases with local warming in mid-latitude regions. Geophysical Research Letters, e2020GL087624.

[8] **Chan D.**, Zhang, Y., Wu Q., & Dai X. (2020). Quantifying the dynamics of the interannual variabilities of the wintertime East Asian Jet Core. Climate Dynamics, 54(3), 2447-63.

[7] **Chan D.**, Kent E., Berry D. & Huybers P. (2019). Correcting datasets leads to more homogeneous early 20th century sea surface warming. Nature, 571, 393-397. (covered by NPR)

[6] **Chan D.** & Huybers P. (2019). Systematic differences in bucket sea surface temperature measurements amongst nations identified using a linear-mixed-effect method. Journal of Climate, 32(5), 2569-89.

[5] **Chan D.**, Wu Q., Jiang G., & Dai X. (2016). Projected shifts in Köppen climate zones over China and their temporal evolution in CMIP5 multi-model simulations. Advances in Atmospheric Sciences, 3(33), 283-93.

[4] Hu C., Wu Q., Yang S., Yao Y., **Chan D.**, Li Z., & Deng K. (2016). A linkage observed between austral autumn Antarctic Oscillation and preceding Southern Ocean SST anomalies. Journal of Climate, 29(6), 2109-22.

[3] Wu Q., Cheng L., **Chan D.**, Yao Y., Hu H., & Yao Y. (2016). Suppressed mid-latitude summer atmospheric warming by Arctic sea ice loss during 1979–2012. Geophysical Research Letters, 43(6), 2792-800.

[2] **Chan D.**, & Wu Q. (2015). Significant anthropogenic-induced changes of climate classes since 1950. Scientific Reports. 5. 13487. (covered by Yale Climate Connections)

[1] **Chan D.**, & Wu Q. (2015). Attributing observed SST trends and sub-continental land warming to anthropogenic forcing during 1979–2005. Journal of Climate, 28, 3152–70.

Sea-Going Experience

2021 One Ocean Expedition, Statsraad Lehmkuhl: Miami-New York, Dec. 10-18

Conferences and Presentations

Invited Talks

[6] Recent advancements in historical earth surface temperature analysis and insights into climate change from enhanced data. (Pacific Climate Impacts Consortium, 2024 | Helmholtz Centre for Polar and Marine Research, 2024 | U Southampton (Math), 2024 | U Leipzig, 2024 | U Bremen, 2024 | UK Met Office, 2024 | Plenary Talk, IMSC, France, 2024 | UCL, London, 2024)

[5] Combining the physics of air-sea interaction and data-driven methods to improve historical estimates of earth surface temperatures (Ocean University of China, 2023 | Duke Kunshan, 2023 | Hanyang University, 2023 | MIT, 2023 | UC Colorado, 2023 | NCAR, 2023 | U Chicago, 2023 | WHOI GFD summer school, 2022 | U Miami, 2022).

[4] Are we already at a 1.5°C warming threshold? (U Southampton (SOES), 2022).

[3] Combining statistical, physical, and historical methods to improve historical sea surface temperature data (Zhejiang University, 2022 | Ocean Dynamics Seminar, 2022 | Penn State U, 2022 | UC Irvine, 2021 | U Washington, 2021 | WHOI, 2021 | Nanjing University, 2021 | U.K. National Oceanography Centre, 2021 | Harvard Horizons, 2021 | Princeton, 2020 | Yale, 2020).

[2] Applying statistical methods to climate reconstructions – Late 19th-century navigational errors and their influence on sea surface temperatures (Joint Statistical Meeting, 2020).

[1] Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (Fudan University, 2019 | Nanjing University, 2019).

Recent Conference Talks

[3] Improved Homogenisation of Observation (DCENT) Shows Steadier and Faster Historical Global Warming (AMS, 2025).

[2] Discrepancies between Coastal Air and Sea-Surface Temperature and Implications for Global Mean Temperature Estimates (AMS, 2023 | AGU, 2022 | 47 NOAA Climate Diagnostic and Prediction Workshop, 2022).

[1] Coastal air-sea coupling represented using a simple model implications for historical warming. (OSM, 2022).