Duo Chan

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Climate Scientist

I develop statistical methods and physical models to understand past climate change and climate dynamics.

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

Professional Service

Reviewer PNAS | Nat. Commun. | Sci. Adv. | J. Clim. | GRL | Earth's Future | Clim. Dyn. | JTECH | Earth Space Sci. | Remote Sensing | Sustainability | SERRA | NOAA Small Business Innovation 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)
Mentor or Advisor Glenn Liu (2022-) | Yifei Fan (2021-) | Chenggong Wang (2021-) | Charlotte Henke (2021) | Sarah King (2020-2021) | David Ma (Summer, 2020) | Alexandria Berry (2018-19)
Outreach Teach Climate Science at Perry School (public middle school in south Boston; Winter, 2019-20)

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

[19] 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] 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.

[4] 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.

[3] **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.

[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.

Manuscripts under review. *(* co-first author; † student or mentee)*

[5] **Chan D.**, Gebbie G., Kent E., Huybers P. Have global surface temperatures already warmed by more than 1.5°C since 1880?

[4] **Chan D.**, Gebbie G., Huybers P. An ensemble of station-based land surface air temperatures since the 1880s homogenized by a revised pair-wise homogenization algorithm.

[3] Fan Y. †, **Chan D.**, Li L. Varying sensitivity between AMOC and subpolar North Atlantic SSTs.

[2] Rigden A., Golden C., **Chan D.**, Huybers P. Climate change will continue to affect water availability in Southern Madagascar.

[1] Yin X., Huang B., Hu Z.Z., **Chan D.**, Zhang H.M. Climate change will continue to affect water availability in Southern Madagascar.

Sea-Going Experience

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

Teaching Experience

Teaching Assistant Responsibilities include developing course materials, giving lectures, leading class discussions, grading assignments, and meeting with students individually. I have an average course evaluation score of 4.6 out of 5.0 at Harvard.

[5] Dynamical Insights from Data (Fall, 2022)	MIT class, guest lecturer, course materials from here.
[4] Paleoclimate as prologue (Spring, 2021)	Harvard EPS, 4 undergraduate (UG) and 5 graduate (G) students
[3] Climate change debate (Spring, 2019)	Harvard college, 28 UGs
[2] Paleoclimate as prologue (Fall, 2016)	Harvard EPS, 3 UGs and 6 Gs
[1] General Circulation of the Atmosphere (Fall, 2014)	Nanjing University, 5 UGs and 30 Gs

Conferences and Presentations

Invited Talks

[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, 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).

Conference Talks

[7] 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).

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

[5] Why the variance of continental summer temperature increases in some models but not others? (AGU, 2021).

[4] Improved simulation of 19th and 20th-century hurricane frequency after correcting historical SSTs (AMS, 2021).

[3] Correcting sea surface temperature observations removes World War II warm anomaly (AGU, 2020).

[2] Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (International Meeting on Statistical Climatology, 2019 | CLIMAR5 Workshop, 2019).

[1] On the dynamics of the interannual variability of the East Asian jet (AOGS, 2018).

Posters

[6] Improved SSTs better predict multi-decadal variability of Atlantic TC count (AGU, 2019 | AMS, 2020).

[5] Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (AGU 2018 | KITP UC Santa Barbara, 2018 | AGU 2017).

[4] Are the diurnal cycles of sea surface temperature increasing since the 1970s? (AGU, 2016).

[3] Significant anthropogenic-induced changes of climate classes since 1950 (AGU, 2014).

[2] Attribution of observed SST and sub-continental land warming during 1979-2005 (AGU, 2013).

[1] The dynamics of the Inter-annual variability in the position and strength of the East Asian jet stream (EGU, 2013).

Summer Schools

2019	Ecole Polytechnique: Fluid Dynamics of Sustainability and the Environment
2017	University of Bergen: Advanced Climate Dynamics Courses
2017	Beijing University: Climate, Weather, Pollution Health Consequences
2016	Chicago University: Rossbypalooza