

Duo Chan

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I use statistical methods and physical modeling to understand the dynamics of climate variation. My recent work involves correcting biases in historical ocean temperatures to understand the role of ocean in shaping weather and climate, as well as developing simple models to understand processes responsible for changes in land temperature distribution and extreme events.

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

2021- Postdoctoral Fellow, Physical Oceanography Department, WHOI

AWARDS AND HONORS

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

PROFESSIONAL SERVICE

Reviewer: *PNAS, GRL, Journal of Climate, Climate Dynamics, Earth and Space Science, Stochastic Environmental Research and Risk Assessment, 2021 NOAA Small Business Innovation Research Funding*

Organizer: Harvard ClimaTea seminar (2017)

Mentor or Advisor: Chenggong Wang (2021-), Charlotte Henke (2021-), National Collegiate Research Conference (2021), David Ma (Summer, 2020), Sarah King (2020-2021), Alexandria Berry (2018-19), Junjie Dong (2017-2021)

PUBLICATIONS

Manuscripts under review or in prep.

- **Chan D.**, Rigden A., Proctor J., & Huybers P. Why continental summertime monthly temperature variance increase in some models but not others? Under review at *Earth's Future*.
- **Chan D.**, & Huybers P. Combining global and groupwise corrections towards a better estimate of historical sea surface temperatures. In prep.
- Proctor J., Rigden A., **Chan D.**, & Huybers P. Soil moisture measurements improve prediction of crop yields and reduce projected climate change damages. In prep.
- Rigden A., Proctor J., **Chan D.**, & Huybers P. Solar-induced fluorescence improves estimation of global crop productivity by identifying the critical growing season. In prep.

Peer-reviewed publication (* co-first author)

[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), 4585-4602.
- [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), 7735–7753
- [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), 2447-2463.
- [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. (Selected media coverage: [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), 2569-2589.
- [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), 2109-2122.
- [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), 2792-2800.
- [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), 283-293.
- [2] **Chan, D.**, & Wu, Q. (2015). Significant anthropogenic-induced changes of climate classes since 1950. *Scientific Reports*. 5. 13487. (Selected media coverage: [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, 3152–3170.

Ph.D. Thesis: Combining statistical, physical, and historical methods to improve the quality and interpretations of historical sea surface temperature data.

TEACHING EXPERIENCE

Teaching Assistant: Responsibilities included developing new class materials, preparing and giving lectures, leading class discussions, grading all assignments, and meeting with students individually. I have an average Harvard course evaluation score (Q-score) of 4.6 out of 5.0.

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| [5] Paleoclimate as prologue (Spring, 2021) | Harvard EPS, 4 undergrads (UGs) and 5 grads (Gs) |
| [4] Weather, Water, and Climate (Winter, 2019-20) | Perry School, ~10 7 th grades (Public school outreach) |
| [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

- Combining statistical, physical, and historical methods to improve historical sea surface temperature data (*Yale University*, Oct. 2020, *Princeton University*, Nov. 2020, *U.K. National Oceanography Centre*, Mar. 2021, *Nanjing University*, 2021, *WHOI*, 2021, *University of Washington*, 2021, *UC Irvine*, 2021)
- Applying statistical methods to climate reconstructions -- Late 19th-century navigational errors and their influence on sea surface temperatures (*Virtual Joint Statistical Meeting*, 2020)
- Climate detective: Combining statistical, physical, and historical methods to improve historical sea surface temperature data (*Harvard Horizons*, 2020, postponed to 2021 due to COVID19)
- Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (*Fudan University*, 2019; *Nanjing University*, 2019)

Conference Talks

- Improved simulation of 19th and 20th-century hurricane frequency after correcting historical sea surface temperatures (*AMS*, 2021)
- Correcting sea surface temperature observations removes World War II warm anomaly (*AGU*, 2020)
- Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (*International meeting on statistical climatology*, 2019; *CLIMAR5 Workshop on Advances in Marine Climatology*, 2019)
- Remote control of surface soil moisture on projections of summertime mid-latitude land temperature variability (*ACDC, 10-year reunion*, 2019; *EGU*, 2018)
- On the dynamics of the interannual variability of the East Asian jet (*15th AOGS Meeting*, 2018)

Posters

- Improved SSTs better predict multi-decadal variability of Atlantic TC count (*AGU*, 2019; *AMS*, 2020)
- Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (*AGU* 2018; *Frontiers in Oceanic, Atmospheric, and Cryospheric Boundary Layers*, KITP, 2018; *AGU* 2017)
- Are the diurnal cycles of sea surface temperature increasing since the 1970s? (*AGU*, 2016)
- Significant anthropogenic-induced changes of climate classes since 1950 (*AGU*, 2014)
- Attribution of observed SST trends and sub-continental land warming to anthropogenic forcing during 1979-2005 (*AGU*, 2013)
- Inter-annual variability in the position and strength of the East Asian jet stream and its relation to large-scale circulation (*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