

Duo Chan

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I use statistical methods and physical modeling to understand the dynamics of Earth's climate. My recent work involves reconstructing historical ocean temperatures to understand how the ocean shapes weather and climate. I am also working on land-atmosphere interactions to understand changes in land temperature distributions 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 **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: *Science Advances*, *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: Yifei-Fan (2021-), 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

Peer-reviewed publication (* co-first author)

- [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* (in press).
- [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.

Manuscripts under review or in prep.

- **Chan D.**, Gebbie G., & Huybers P. Combining common and groupwise corrections towards an improved 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. Under review at *Nature Food*.
- 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.
- Wang C., **Chan D.**, Soden B., Yang W., & Vecchi G. Using interhemispheric temperature asymmetry to constrain climate sensitivity. In prep.

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 |

SEA-GOING EXPERIENCE

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

CONFERENCES AND PRESENTATIONS

Invited Talks

- Combining statistical, physical, and historical methods to improve historical sea surface temperature data (*PSU*, 2022; *UC Irvine*, 2021; *University of Washington*, 2021; *WHOI*, 2021; *Nanjing University*, 2021; *U.K. National Oceanography Centre*, 2021; *Harvard Horizons*, 2021; *Princeton University*, 2020; *Yale University*, 2020)
- Applying statistical methods to climate reconstructions -- Late 19th-century navigational errors and their influence on sea surface temperatures (*Virtual Joint Statistical Meeting*, 2020)
- Correcting datasets leads to more homogeneous early-twentieth-century sea surface warming (*Fudan University*, 2019; *Nanjing University*, 2019)

Conference Talks

- Combining common and groupwise corrections towards an improved estimate of historical sea surface temperatures (OSM, 2022).
- Why the variance of continental summer temperature increases in some models but not others? (*AGU*, 2021)
- Improved simulation of 19th and 20th-century hurricane frequency after correcting historical SSTs (*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 and sub-continental land warming during 1979-2005 (*AGU*, 2013)
- 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