CURRICULUM VITAE: Zhenning LI

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EDUCATION

09/2014 – 06/2019 **Ph.D.**

Major in Meteorology, Sun Yat-sen University, Supervisor: Prof. Song Yang

09/2016 – 09/2017 **Visiting Ph.D. Student**

Department of Geography, University of California, Berkeley, Co-Supervisor: Prof. John Chiang

09/2010 – 06/2014 **B.S.**

Major in Atmospheric Sciences, Sun Yat-sen University, GPA: 4.1/5.0 **(Top 5%)**

PROFESSIONAL EMPLOYMENTS

04/2021 – 03/2023* **Research Assistant Professor**

Division of Environment and Sustainability, Hong Kong University of Science and Technology

10/2019 – 03/2021 **Postdoctoral Fellow**

Institute of Environment, Energy and Sustainability, the CUHK, Co-Supervisor: Prof. Francis Tam

07/2019 – 09/2019 **Summer Intern**

Guangdong Key Laboratory of Regional Numerical Weather Prediction, CMA

SKILLS

Languages

English: Generally fluent, **TOEFL: 101/120 (R25+L30+S22+W24) & CET6: 552**

Chinese (Mandarin): Native

Expertise

Modeling: Rich experience in application of **regional/global coupled modeling frameworks** in hierarchical configurations ranging from **idealized dynamical core** to **fully-coupled** simulations, proficient at designing and implementing comprehensive experiments which require targeting, modifying, and embedding the model source code tree (developed toolkits: 1 2); Experience in building an operational regional forecast system (WRF-based) and implementing data assimilation system (WRFDA).

System Architecture: Proficient with **the Linux (UNIX-like)** environments, **high-performance computers** (e.g. **Tianhe-2A**) and cloud services (e.g. Amazon AWS); Rich experience in **porting, customizing, and optimizing** comprehensive models (e.g. **WRF, ROMS, SWAN,** CESM, and GFDL FMS etc.) onto new parallel platforms; with knowledge of **load-balancing**, troubleshooting, and maintaining of systems.

Toolbox Stack: {Proficient at: **python** (np, pd, mpl, cartopy), NCL, shell scripts (bash/csh), **FORTRAN**}; {Familiar with: **MATLAB**, **ML** (scikit-learn, TensorFlow), **parallel programming** (MPI/multiprocessing)}; {Knowledge of: Web Development (js, php, WordPress), OOP (C++, VB), C, mysql}; {Certificates: China National Computer Rank Examination, both in Grade 2 (VB), and Grade 3 (**Network**)}.

AWARDS

11/2017 First Prize in the poster session of International Workshop on Tropical-Subtropical Weather, Climate and Oceans, Guangzhou, China **(Top 5%)**

12/2014 Third Prize in the China Graduate Student Forum on Climate Change, Beijing, China **(Top 10%)**

09/2013 China National Scholarship for Undergraduate Students **(Top 1%)**

* Open-ended

PROJECTS & PROFESSIONAL SERVICES

10/2019 – 12/2020 Developer of Regional Air-Wave-Sea Coupling System over the South China Sea

Potential cooperated project with the Hong Kong Observatory, customize the COAWST (WRF+ROMS+SWAN) architecture, optimize grid system and bathymetry over the SCS region by Liner Programming, and configure task-based MCT load-balancing among individual components. [Ref Link, Refer: Prof. Francis Tam]

05/2019 – 04/2021 Developer of the ML-based Operational Monthly Anomaly Forecast System

Cooperated project with the National Climate Center (NCC), China, use LASSO/Random Forest regression to extract predictors from massive circulation metric libs, carry out operational forecast at station-level temperature and precipitation in mainland China, an event-listening system has already deployed on the pilot testbed at the NCC. [Ref Demo, Refer: Prof. Song Yang and Dr. Qingquan Li]

01/2018 – 03/2018 Developer of Real-Time WRF Forecast Platform for Shandong Peninsula

Use idle computing resources to drive the WRF model to carry out 72-hr operational numerical forecast for the Shandong Peninsula, forecast results uploaded and displayed on github page.[Ref Demo]

03/2014 – 06/2019 Administrator of Research Group IT Facilities and Website

Establish an internal team website for fresh member training and data distribution, ensure servers and storage clusters functioning properly, responsible for technical negotiation with high-performance computing venders, train basic Linux and modeling skills among team members. [Refer: Prof. Song Yang]

11/2012 – 11/2013 Leader of the Laboratory Open Fund Project for Undergraduates

Leader for the laboratory open fund project "Automatic All-sky Cloud Cover Observation System" for undergraduate students in Sun Yat-sen University, achievements including an operational webpage and a set of image processing and pattern recognition algorithms for cloud cover detection [GitHub Repo].

RESEARCH STATEMENTS

I used to focus on atmospheric circulation responses to tropical convections by conducting comprehensive GCM experiments for the doctoral research, and developed a set of open-source toolkits. After graduation, I turned my interests towards regional scales and computing optimization. I customized a regional coupling framework with load-balanced parallelism to investigate how ocean and sea wave physics affect evolution of tropical cyclones over the South China Sea. Recently, I developed a super lightweight Lagrangian model to trace massive air parcels efficiently. I treat myself as a fast learner, and fascinated by sheer joy of making things work via coding.

SELECTED CONFERENCES

12/2018 2016 AGU's Fall Meeting, San Francisco, USA, poster presentation
11/2017 Workshop on Analysis and Modeling of Climate Variations, Seoul, South Korea, oral presentation
02/2017 2017 BASC SYMPOSIUM, Berkeley, USA, poster presentation
01/2017 AMS 97th Annual Meeting, Seattle, USA, poster presentation
08/2016 2015 AOGS Annual Meeting, Beijing, China, oral presentation

PUBLICATIONS

Since 2015, I have published **5** papers as **the first or corresponding author**, and **17** co-authored papers in total, with Google Scholar **citation counts 213** and **H-Index 8**† (please check the full list in the appendix).

† Data collected by Mar 29, 2020

APPENDIX: PUBLICATION LIST

Lu, X., Sha, Y.H., **Li, Z.**, Huang, Y., Chen, W., Chen, D., Shen, J., Chen, Y. and Fung, J.C., 2021. Development and application of a hybrid long-short term memory–three dimensional variational technique for the improvement of PM2. 5 forecasting. Science of The Total Environment, 770, p.144221.

Li, Z., Yang, S., Tam, C.Y. and Hu, C., 2021. Strengthening western equatorial Pacific and Maritime Continent atmospheric convection and its modulation on the trade wind during spring of 1901–2010. International Journal of Climatology, 41(2), pp.1455-1464.

Huang, Y., Lu, X., Fung, J.C., Sarwar, G., **Li, Z.**, Li, Q., Saiz-Lopez, A. and Lau, A.K., 2021. Effect of bromine and iodine chemistry on tropospheric ozone over Asia-Pacific using the CMAQ model. Chemosphere, 262, p.127595.

Lu, M., Kuang, Z., Yang, S., **Li, Z.** and Fan, H., 2020. A Bridging Role of Winter Snow over Northern China and Southern Mongolia in Linking the East Asian Winter and Summer Monsoons. Journal of Climate, doi: doi.org/10.1175/JCLI-D-20-0298.1

Hu, C., Lian, T., Cheung, H.N., Qiao, S., **Li, Z.**, Deng, K., Yang, S. and Chen, D., 2020. Mixed diversity of shifting IOD and El Niño dominates the location of Maritime Continent autumn drought. National Science Review, doi: doi.org/10.1093/nsr/nwaa020

Yang, S., Zhang, T., **Li, Z.** and Dong, S., 2019. Climate variability over the Maritime Continent and its role in global climate variation: A review. Journal of Meteorological Research, 33(6), pp.993-1015.

Fan, H., Huang, B., Yang, S., **Li, Z.** and Deng, K., 2019. Seasonally-dependent impact of easterly wind bursts on the development of El Niño events. Climate Dynamics, 53(3-4), pp.1527-1546.

Hu, X., Sejas, S. A., Cai, M., **Li, Z.,** and Yang, S., 2019. Atmospheric Dynamics Footprint on the January 2016 Ice Sheet Melting in West Antarctica. *Geophys. Res. Lett.*, doi: 10.1029/2018GL081374

Lu, M., Huang, B., **Li, Z.**[*]**,** Yang, S. and Wang, Z., 2018. Role of Atlantic air–sea interaction in modulating the effect of Tibetan Plateau heating on the upstream climate over Afro-Eurasia–Atlantic regions. *Climate Dyn.*, pp.1-11.

Li, Z., Yang, S., Hu, X., Dong, W., and He, B., 2018. Charge in Long-lasting El Niño Events by Convection-induced Wind Anomalies over the Western Pacific in Boreal Spring. *J. Climate*, 31(10), pp.3755-3763.

He, S., Yang, S., Lu M., and **Li Z.**, 2018. Afro-Eurasian Intermediate-Frequency Teleconnection and Modulation by ENSO. *J. Climate*, 31, 8121–8139, https://doi.org/10.1175/JCLI-D-18-0130.1

Li, G., Jian, Y., Yang, S., Du, Y., Wang, Z., **Li, Z.,** Zhuang, W., Jiang, W. and Huang, G., 2018. Effect of excessive equatorial Pacific cold tongue bias on the El Niño-Northwest Pacific summer monsoon relationship in CMIP5 multi-model ensemble. *Climate Dyn.*, pp.1-18.

Yang, S., **Li, Z.,** Yu, J.Y., Hu, X., Dong, W. and He, S., 2018. El Niño–Southern oscillation and its impact in the changing climate. *Natl. Sci. Rev.*, doi: 10.1093/nsr/nwy046.

Deng, T., Huang, Y., **Li, Z.,** Wang, N., Wang, S., Zou, Y., Yin, C. and Fan, S., 2018. Numerical simulations for the sources apportionment and control strategies of $PM_{2.5}$ over Pearl River Delta, China, part II: Vertical distribution and emission reduction strategies. *Sci. Total Environ.*, doi:10.1016/j.scitotenv.2018.04.209.

Huang, Y., Deng, T., **Li, Z.,** Wang, N., Yin, C., Wang, S. and Fan, S., 2018. Numerical simulations for the sources apportionment and control strategies of $PM_{2.5}$ over Pearl River Delta, China, part I: Inventory and $PM_{2.5}$ sources apportionment. *Sci. Total Environ.*, doi: 10.1016/j.scitotenv.2018.04.208.

Jiang, X., Wang, Z. and **Li, Z.**, 2018. Signature of the South China Sea summer monsoon onset on spring-to-summer transition of rainfall in the middle and lower reaches of the Yangtze River basin. *Climate Dyn.*, pp.1-12.

Li, Z. and Yang, S., 2017. Influences of spring-to-summer sea surface temperatures over different Indian Ocean domains on the Asian summer monsoon. *Asia-Pac. J. Atmos. Sci.*, 53(4), pp.471-487.

Lu, M., Yang, S., **Li, Z.**, He, B., He, S. and Wang, Z., 2017. Possible effect of the Tibetan Plateau on the "upstream" climate over West Asia, North Africa, South Europe and the North Atlantic. *Climate Dyn.*, pp.1-14.

He, S., Yang, S. and **Li, Z.**, 2017. Influence of latent heating over the Asian and western Pacific monsoon region on Sahel summer rainfall. *Sci. Rep.*, 7(1), p.7680.

Li, Z., Yang, S., He, B. and Hu, C., 2016. Intensified springtime deep convection over the South China Sea and the Philippine sea dries Southern China. *Sci. Rep.*, 6, p.30470.

Hu, C., Yang, S., Wu, Q., **Li, Z.**, Chen, J., Deng, K., Zhang, T., and Zhang, C., 2016. Shifting El Niño inhibits summer Arctic warming and Arctic sea-ice melting over the Canada Basin. *Nat. Comm*., doi: 10.1038/ncomms11721.

Hu, C., Wu, Q., Yang, S., Yao, Y., Chan, D., **Li, Z.** and Deng, K., 2016. A Linkage Observed between Austral Autumn Antarctic Oscillation and Preceding Southern Ocean SST Anomalies. *J. Climate*, 29(6), pp.2109-2122.

He, B., Yang, S. and **Li, Z.**, 2015. Role of atmospheric heating over the South China Sea and western Pacific regions in modulating Asian summer climate under the global warming background. *Climate Dyn.*, 46(9), pp. 2897–2908.