
Yixuan Zheng

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Research Interests

Mitigation of Air Pollution and Climate Change; Atmospheric Chemistry Modeling; Acid Deposition

Current Employment

Postdoctoral Research Scientist in Ken Caldeira's group, Department of Global Ecology, Carnegie Institution for Science, Stanford, California, U.S., August 2018-present

Education

- 2013.09-2018.07, Ph.D. in Atmospheric Science, Tsinghua Univ. (Supervisor: Qiang Zhang)
- 2016.09-2017.03, Exchange Ph.D. Student in Public and International Affairs, Princeton Univ.
- 2015.07-2015.08, Visiting Student, National Center for Atmospheric Research of the U.S.
- 2009.09-2013.7 B.E. in Geographic Information System, Wuhan Univ. (with honor)

Professional Skills

- Professional skill: Chemical transport modeling (WRF-CMAQ, WRF-Chem, GEOS-Chem), Emission inventory and emission projection model, Policy analysis, Statistical analysis
- Scripting language and software: Python, R, IDL, NCL, Bash, Matlab, C++, ArcGIS, etc.
- Language: Chinese (native), English (fluent)

Major Research and Projects

Research Interests: mitigation of air pollution and climate change, atmospheric chemistry modeling; acid deposition

- **Economic impacts of anthropogenic sulfate-induced cooling (Aug 2018-present)**
Applied earth system model and climate damage functions to estimate global cooling induced by anthropogenic sulfate aerosols and the associated economic impacts.
- **Variation and drivers of air pollution deaths over China (Feb 2017 - present)**
Simulated continuous air quality variations over China during 2000-2017 using the WRF-CMAQ model and then estimated the trend of PM_{2.5}-related deaths. Decomposed drivers of PM_{2.5}-related deaths by using an econometric model and a chemical transport model. Estimated impacts of environmental policies on the variation of PM_{2.5} and related deaths.
- **Potential of co-benefits from China's cement industry (Sep 2016 - Mar 2017)**
Potential of air quality, health and climate benefits from China's cement industry by 2030 were evaluated by emission projection model, air quality model, and epidemiological model.

- **Impact estimations of China's recent air quality policy (Feb 2016 – Nov 2016)**
Data fusion model with multi-source inputs was utilized to estimate air quality improvement and public health benefits of China's stringent clean air actions since 2013. Contribution of major measures were further estimated by scenario analysis.
- **Regional PM_{2.5} retrieval (Mar 2014 – Feb 2015)**
Developed statistical models for retrieving ground-level PM_{2.5} concentrations over three megalopolises in China based on aerosol optical depth measurements.
- **CO distribution in China (Sep 2012 - Jun 2013, Senior Thesis Project)**
Analyzed the spatial-temporal distribution of CO based on MOPPIT data and GEOS-Chem.

Publications and Presentations

- **Zheng Y.**, S. J. Davis, G. G. Persad, and K. Caldeira, Climate effects of sulfate aerosols reduce economic inequality, under review.
- Peng L., Q. Zhang, Z. Yao, ..., **Y. Zheng**, et al., Underreported coal in statistics: A survey-based solid fuel consumption and emission inventory for the rural residential sector in China, *Appl. Energy*, 2018, <https://doi.org/10.1016/j.apenergy.2018.11.043>
- Cheng, J, J. Su, T. Cui, ..., **Y. Zheng**, et al., Dominant role of emission reduction in PM_{2.5} air quality improvement in Beijing during 2013–2017: a model-based decomposition analysis, *Atmos. Chem. Phys.*, 2018, <https://doi.org/10.5194/acp-2018-1145>
- Xue, T., T. Guan, Y. Liu, **Y. Zheng**, et al., A national case-crossover study on ambient ozone pollution and first-ever stroke among Chinese adults: Interpreting a weak association via differential susceptibility, *Sci. Total Environ.*, 2018, doi.org/10.1016/j.scitotenv.2018.11.067
- Zheng, B., D. Tong, M. Li, ..., **Y. Zheng**, et al., Trends in China's anthropogenic emissions since 2010 as the consequence of clean air actions, *Atmos. Phys. Chem.*, 2018, 18, 14095-14111, <https://doi.org/10.5194/acp-18-14095-2018>
- Tong, D., Q. Zhang, F. Liu, G. Geng, **Y. Zheng**, et al., Current emissions and future mitigation pathways of coal-fired power plants in China from 2010 to 2030, *Environ. Sci. Technol.*, doi: 10.1021/acs.est.8b02919
- Liu, M., J. Lin, Y. Wang, ..., **Y. Zheng**, et al., Spatiotemporal variability of NO₂ and PM_{2.5} over Eastern China: observational and model analyses with a novel statistical method, *Atmos. Phys. Chem.*, 2018, 18, 12933-12952
- Zhang, Y., X. Li, M. Li, **Y. Zheng**, et al., Reduction in black carbon light absorption due to multi-pollutant emission control during APEC China 2014, *Atmos. Phys. Chem.*, 2018, 18: 10275-10287
- Li, H., B. Zheng, Q. Zhang, ..., **Y. Zheng**, et al., Nitrate-driven haze pollution during summertime over the North China Plain, *Atmos. Phys. Chem.*, 2018, 18:5293-306

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- Cai W., J. Hui, C. Wang, **Y. Zheng** et al., PM_{2.5} pollution-related health impacts of China's projected CO₂ mitigation in the power generation sector under the Paris Agreement, *Lancet Planet. Health*, 2018, 2: e151-e161.
 - Guan T., T. Xue, Y. Liu, **Y. Zheng**, et al., Differential susceptibility in ambient particle-related first-ever stroke onset risk: findings from a national case-crossover study, 2018, *Am. J. Epidemiol.*, <https://doi.org/10.1093/aje/kwy007>
 - Zhang, X., Q. Zhang, C. Hong, **Y. Zheng**, et al., Enhancement of PM_{2.5} concentrations by aerosol-meteorology interactions over China, *J. Geophys. Res.-Atmos.*, 2017, doi: 10.1002/2017JD027524
 - **Zheng Y.**, T. Xue, Q. Zhang, et al., Air quality improvements and health benefits from China's clean air action since 2013, *Environ. Res. Lett.*, 2017, 12, 114020
 - Xu, L., F. Duan, K. He, ..., **Y. Zheng**, et al., Characteristics of the secondary water-soluble ions in a typical autumn haze in Beijing, *Environ. Pollut.*, 2017, 227, 296-305
 - Geng, G., Q. Zhang, D. Tong, ..., **Y. Zheng**, et al., Chemical composition of ambient PM_{2.5} over China and relationship to precursor emissions during 2005–2012, *Atmos. Chem. Phys.*, 2017, 17, 9187-9203, 10.5194/acp-17-9187-2017
 - Li, X., Q. Zhang, Y. Zhang, ..., **Y. Zheng**, et al., Attribution of PM_{2.5} Exposure in Beijing-Tianjin-Hebei Region to Emissions: Implication to Control Strategies, *Chinese Sci. Bull.*, 2017, 62, 957-964
 - **Zheng Y.**, Q. Zhang, Y. Liu, et al., Estimating ground-level PM_{2.5} concentrations over three megalopolises in China using satellite-derived aerosol optical depth measurements, *Atmos. Environ.*, 2016, 232–42
 - Jiang, X., C. Hong, **Y. Zheng**, et al., To what extent can China's near-term air pollution control policy protect air quality and human health? A case study of the Pearl River Delta region, *Environ. Res. Lett.*, 2015, 10, 104006

Selected Honors

- **National Scholarship**, Ministry of Education of China, Nov. 2017
- **Guanghua Scholarship**, Tsinghua University, Oct. 2016
- **Best Poster Award**, Asia Oceania Geosciences Society 13th Annual Meeting, Aug. 2016
- **Shen Yungang Oceanology Scholarship**, Tsinghua University, Oct. 2015
- **Outstanding Graduate**, Wuhan University, Jun. 2013
- **National Scholarship**, Ministry of Education of China, Sep. 2012