Tianlang Zhao

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Education

	B.S. in Atmospheric Science
Sep 2014 - Jul 2018	Nanjing University of Information Science & Technology, China
	Advisor: Dr. Fei Liu
	Ph.D. candidate in Environmental Chemistry
Aug 2019 - present	University of Alaska Fairbanks, AK, United States
	Advisor: Dr. Jingqiu Mao

Ph.D. project perspective

My Ph.D. dissertation focuses on advancing our understanding of Arctic air pollution during wildfires, through an integrated approach that combines satellite observations, chemical transport models, in-situ measurements and ground-based remote sensing. My work highlights the predominant role of wildfires on Formaldehyde (HCHO) level in Alaska, and its interannual variability over Arctic region, compared to the relatively minor influence of biogenic emissions. Additionally, I developed an observation-based formula that provides quick and direct estimate of surface $PM_{2.5}$ across Alaska during wildfire events.

Building on my expertise in HCHO studies, I am leading two projects using Pandonia Global Network (PGN) to investigate (a) HCHO diurnal cycle and (b) surface O_3 bias in models during heatwaves, across the whole contiguous US in the summertime. These projects aim to provide critical insights into the nonlinear interactions between photochemistry and PBL turbulence, as well as climate extremes.

Publications

- **Zhao, T**., Mao, J., et al: Source and variability of formaldehyde (HCHO) at northern high latitudes: an integrated satellite, aircraft, and model study, Atmos. Chem. Phys., 22, 7163–7178, https://doi. org/10.5194/acp-22-7163-2022, 2022.
- **Zhao, T.**, Mao, J., Ayazpour, Z., González Abad, G., Nowlan, C. R., and Zheng, Y.: Interannual variability of summertime formaldehyde (HCHO) vertical column density and its main drivers at northern high latitudes, Atmos. Chem. Phys., 24, 6105–6121, https://doi.org/10.5194/acp-24-6105-2024, 2024.
- **Zhao, T.**, Mao, J., Gupta, P., Zhang, H., and Wang, J.: Observational Constraints on the Aerosol Optical Depth–Surface PM2.5 Relationship during Alaskan Wildfire Seasons, ACS EST Air, https://doi.org/10.1021/acsestair.4c00120, 2024.
- **Zhao, T**., Mao, J., Pandey, A., Zhao, X., Spinei Lind, E., Hanisco, T., Knowland, K Emma., Shah, V., Kaiser, J.: Evaluation of Formaldehyde (HCHO) diurnal variability over North America using Pandonia Global Network (PGN) (In Development)
- **Zhao, T**., Mao, J., Alwarda, R., Zhao, X., Pandey, A., Hanisco, T.: Urban ozone air quality under extreme heat: insights from Pandonia Global Network (PGN) and EPA Air Quality System (AQS) network (In Development)
- Mao, J., **Zhao, T**., et al: Global impact of lightning-produced oxidants. Geophysical Research Letters, 48, e2021GL095740. https://doi.org/10.1029/2021GL095740, 2021
- Liu, F., **Zhao, T**., et al: Different global precipitation responses to solar, volcanic, and greenhouse gas forcings. Journal of Geophysical Research: Atmospheres,123, 4060– 4072. https://doi.org/ 10.1029/2017JD027391

Conference Presentations

AGU 2024 fall meeting	(Poster, in-person) Urban ozone air quality under extreme heat: insights from Pandonia Global Network (PGN) and EPA Air Quality System (AQS) network
AGU 2023 fall meeting	(Oral, in-person) Global evaluation of Formaldehyde (HCHO) summertime diurnal variability using Pandonia Global Network (PGN)
The 10th International GEOS-Chem Meeting (June 2022)	(Oral, in-person) Deriving surface-level $PM_{2.5}$ in Alaska from satellite AOD and model during summer fire season
IGAC 2021 virtual conference & PACES meeting	(Oral, online) Constraining formaldehyde variability at northern high latitude: an integrated satellite, ground/aircraft and model perspective
AGU 2020 fall meeting	(Oral, online) Constraining biogenic volatile organic compound emissions at northern high latitude: an integrated satellite, ground/ aircraft and model perspective
EGU General Assembly 2024	(Poster, in-person) Evaluation of Formaldehyde (HCHO) diurnal variability over North America using Pandonia Global Network (PGN)
PGN 2nd User Group Workshop (Sep 2023)	(Poster, in-person) Global evaluation of Formaldehyde (HCHO) summertime diurnal variability using Pandonia Global Network (PGN)
AGU 2022 fall meeting	(Poster, in-person) Interannual variability of summertime formaldehyde (HCHO) vertical column density and its main drivers in northern high latitudes
AGU 2021 fall meeting	(Poster, in-person) Long-term AOD-$PM_{2.5}$ Relationship in Alaska during Summer Fire Season

Academic involvement

- Local operator of Pandonia Global Network (operating P174 instrument at Fairbanks, Alaska, US)
- Selected to participate the NCAR ASP Colloquium 2024
- Involved in NASA Health And Air Quality Applied Science Team (HAQAST) Tiger Team "Analysis to support air quality and health TEMPO applications for surface ozone"

Academic Awards and Honors

- Student Award of American Institute of Chemists, 2020
- Alaska NSF EPSCoR rolling travel award, 2021, 2023, 2024
- UAF Troth Yeddha' PhD Fellowship