Tianlang Zhao

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Education

University of Alaska Fairbanks — Fairbanks, Alaska, United States
Ph.D. in Environmental Chemistry — *Aug. 2019 – Sep. 2025*
Thesis: Understanding the Sources and Variability of Air Pollution in Northern High Latitudes: Using Formaldehyde (HCHO) as a Tracer — Advisor: Prof. Jingqiu Mao

Nanjing University of Information Science & Technology — Nanjing, Jiangsu, China
B.S. in Atmospheric Science — *Sep. 2014 – Jun. 2018*

Awards & Honors

UAF Troth Yeddha' Fellowship	2024, 2025
UAF Department of Chemistry Student Excellence Award	2025
Selected participant, NCAR ASP Colloquium	2024
Alaska NSF EPSCoR Travel Award	2021, 2023, 2024
Student Award of American Institute of Chemists	2020

Publications

Peer-reviewed

1. **Zhao, T.**, Mao, J., Pandey, A., Zhao, X., Spinei Lind, E., Hanisco, T., Knowland, K. E., Shah, V., Kaiser, J. (2025). Summertime diurnal variability of formaldehyde over the contiguous United States: Constraints from Pandonia Global Network. *Geophysical Research Letters*. doi:10.1029/2025GL116033.
2. **Zhao, T.**, Mao, J., Ayazpour, Z., González Abad, G., Nowlan, C. R., Zheng, Y. (2024). Interannual variability of summertime formaldehyde (HCHO) vertical column density and its main drivers at northern high latitudes. *Atmospheric Chemistry and Physics*. doi:10.5194/acp-24-6105-2024.
3. **Zhao, T.**, Mao, J., Gupta, P., Zhang, H., Wang, J. (2024). Observational Constraints on the AOD–Surface $PM_{2.5}$ Relationship during Alaskan Wildfire Seasons. *ACS ES&T Air*. doi:10.1021/acsestair.4c00120.
4. **Zhao, T.**, Mao, J., *et al.* (2022). Source and variability of formaldehyde (HCHO) at northern high latitudes: an integrated satellite, aircraft, and model study. *Atmospheric Chemistry and Physics*. doi:10.5194/acp-22-7163-2022.
5. Mao, J., **Zhao, T.**, *et al.* (2021). Global impact of lightning-produced oxidants. *Geophysical Research Letters*. doi:10.1029/2021GL095740.
6. Liu, F., **Zhao, T.**, *et al.* (2018). Different global precipitation responses to solar, volcanic, and greenhouse gas forcings. *Journal of Geophysical Research: Atmospheres*. doi:10.1029/2017JD027391.

Non-peer-reviewed

1. **Zhao, T.**, (2024). Quick Guide: Use PGN to validate satellite products and model simulations. *HAQAST website*. PGN one-pager (PDF).

In preparation

1. **Zhao, T.**, Mao, J., Zhao, X., Griffin, D., Alwarda, R., Strong, K., Simpson, W. R., Friedrich, M. M., Tiefengraber, M., Gebetsberger, M., Cede, A., Spinei, E., Pandey, A., Hanisco, T. F. *Optimal-estimation Pandora profile retrievals for evaluating diurnal cycle of TEMPO HCHO over North America*. (Presented at TEMPO/GeoXO ACX Joint Science Team Workshop 2025).
2. **Zhao, T.**, Mao, J., Zhao, X., Griffin, D., Alwarda, R., Strong, K., Simpson, W. R., Friedrich, M. M., Tiefengraber, M., Gebetsberger, M., Cede, A., Spinei, E., Pandey, A., Shah, V., Knowland, K. E., Hanisco, T. F. *Diurnal cycle of HCHO column and vertical profile during extreme heat events and its connection with surface ozone over North America*. (Presented at AGU Fall Meeting 2024).

Invited Talks

- **Zhao, T.**, et al., Sep. 2025. *Evaluating the Performance of the GEOS-CF Model in Simulating Formaldehyde and Surface Ozone over North America*. **NASA GEOS-CF Group Seminar** (Talk).
- **Zhao, T.**, et al., Sep. 2025. *HCHO variation and its main drivers over North America*. **National Institute for Environmental Studies (NIES), Japan** (Talk).

Conference Presentations

- **Zhao, T.**, et al., Dec. 2025. *Optimal-Estimation Pandonia Global Network (PGN) Multi-Axis Retrievals for Evaluating diurnal cycle of TEMPO Formaldehyde (HCHO) over North America*. **AGU Fall Meeting 2025** (Poster).
- **Zhao, T.**, et al., Dec. 2025. *Formaldehyde vertical profile retrieval shows how models overestimate surface ozone during urban heatwaves*. **AGU Fall Meeting 2025** (Poster).
- **Zhao, T.**, et al., Aug. 2025. *Optimal-estimation Pandora profile retrievals for evaluating diurnal cycle of TEMPO HCHO over North America*. **TEMPO/GeoXO ACX Joint Science Team Workshop** (Talk).
- **Zhao, T.**, et al., Feb. 2025. *Excessive HCHO vertical diffusion contributes significant model bias in surface ozone during urban heatwaves*. **UAF Department of Chemistry Seminar** (Talk).
- **Zhao, T.**, et al., Dec. 2024. *Urban ozone air quality under extreme heat: insights from Pandonia Global Network (PGN) and EPA Air Quality System (AQS)*. **HAQAST TEMPO for Ozone Tiger Team Monthly Meeting** (Talk).
- **Zhao, T.**, et al., Dec. 2024. *Urban ozone air quality under extreme heat: insights from PGN and EPA AQS network*. **AGU Fall Meeting 2024** (Poster).
- **Zhao, T.**, et al., Aug. 2024. *Evaluating summertime diurnal variability of Formaldehyde (HCHO) over CONUS: using Pandonia Global Network (PGN)*. **HAQAST TEMPO for Ozone Tiger Team Monthly Meeting** (Talk).
- **Zhao, T.**, et al., Jun. 2024. *Global evaluation of summertime HCHO diurnal variability using PGN*. **11th International GEOS-Chem Meeting** (Talk).
- **Zhao, T.**, et al., May. 2024. *Evaluation of HCHO diurnal variability over North America using PGN*. **EGU General Assembly 2024** (Poster).
- **Zhao, T.**, et al., Apr. 2024. *Evaluation of Formaldehyde (HCHO) diurnal variability over North America using Pandonia Global Network (PGN)*. **Midnight Sun Science Symposium** (Talk).
- **Zhao, T.**, et al., Mar. 2024. *Evaluation of Formaldehyde (HCHO) diurnal variability over North America using Pandonia Global Network (PGN)*. **1st PGN User Group Forum** (Talk).

- **Zhao, T.**, et al., Dec. 2023. *Global evaluation of summertime HCHO diurnal variability using PGN.* **AGU Fall Meeting 2023** (Talk).
- **Zhao, T.**, et al., Sep. 2023. *Global evaluation of summertime HCHO diurnal variability using PGN.* **PGN 2nd User Group Workshop** (Poster).
- **Zhao, T.**, et al., Apr. 2023. *Constraining formaldehyde (HCHO) variability over northern high latitudes: an integrated satellite, aircraft and model perspective.* **Alaska Space Grant Program and the Alaska NASA EPSCoR Symposium** (Talk).
- **Zhao, T.**, et al., Dec. 2022. *Interannual variability of summertime HCHO VCD and its main drivers in northern high latitudes.* **AGU Fall Meeting 2022** (Poster).
- **Zhao, T.**, et al., Jun. 2022. *Deriving surface-level $PM_{2.5}$ in Alaska from satellite AOD and model during summer fire season.* **10th International GEOS-Chem Meeting** (Talk).
- **Zhao, T.**, et al., May. 2022. *Deriving surface-level $PM_{2.5}$ in Alaska from satellite AOD and model during summer fire season.* **ABoVE Science Team Meeting 8th** (Poster).
- **Zhao, T.**, et al., Dec. 2021. *Long-term AOD–$PM_{2.5}$ relationship in Alaska during summer fire season.* **AGU Fall Meeting 2021** (Poster).
- **Zhao, T.**, et al., Sep. 2021. *Constraining formaldehyde variability at northern high latitude: an integrated satellite, ground/aircraft and model perspective.* **IGAC 2021 virtual conference** (Talk).
- **Zhao, T.**, et al., May. 2021. *Constraining formaldehyde variability at northern high latitude: an integrated satellite, ground/aircraft and model perspective.* **PACES Open Science Meeting** (Talk).
- **Zhao, T.**, et al., Dec. 2020. *Constraining biogenic VOC emissions at northern high latitude: an integrated satellite, ground/aircraft and model perspective.* **AGU Fall Meeting 2020** (Talk).

Outreach & Media Coverage

Judge of Interior Alaska Science Fair	2024, 2025
Interviewed by Alaska Public Media on KUAC radio station (Fairbanks, Alaska): "AQI monitoring during Alaskan fire seasons"	2025
Interviewed/featured as lead author in UAF News story, "Method rapidly determines surface air quality during Alaska wildfires"	2024
Interviewed on local radio show "Six Minute Science" (Talkeetna, Alaska): "Episode 20: Wildfire Air Quality."	2024

Academic Involvements

Reviewer of *ACS ES&T Air, AGU Earth and Space Science, Atmospheric Pollution Research*	2024, 2025
Local operator of PGN Pandora No.174 instrument at Fairbanks, Alaska	2020–present
Conference student presentation judge/reviewer: AGU Fall Meeting 2024	2024
Participated in NASA HAQAST Tiger Team: *Analysis to support air quality and health TEMPO applications for surface ozone*	2024