Xingyi WU

Atmospheric Environment | PhD applicant for Fall 2027
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EDUCATION

Southern University of Science and Technology (SUSTech) **Shenzhen, China**
M.S. in Geophysics, GPA: 3.47/4.0 Expected July 2027
Supervisor: **Prof. Lei Zhu** | zhul3@sustech.edu.cn
Willing to provide a reference letter upon request.
Research: Satellite observation and model interpretation of glyoxal diurnal variations over Asia

Nanjing University of Information Science & Technology (NUIST) **Nanjing, China**
B.S. in Atmospheric Science, GPA: 3.66/5.0 July 2024
Supervisor: **Prof. Jianbing Jin**
Research: Relationship between seasonal methane observations and rice cultivation in China

RESEARCH EXPERIENCE

Validation of GEMS glyoxal retrievals against TROPOMI, MAX-DOAS, and GEOS-Chem 2024-2026

- **Research problem.** How reliable can we trust GEMS glyoxal product, and what may cause discrepancies?
- **Key findings.** GEMS shows an overall agreement over land but tends to underestimate glyoxal columns. Differences in differential slant columns, the reference sector, and *a prior* profile help explain the discrepancies between satellite products.
- **My contributions.** Prepared observational datasets using multi-source satellite, ground-based, and model results in Python. Read the retrieval documentation and examined how individual retrieval steps affect the product comparison.

Urban diurnal glyoxal sources and sinks revealed by GEMS and GEOS-Chem 2025-present

- **Research problem.** What drives the different diurnal glyoxal patterns observed by GEMS over urban hotspots?
- **Key findings.** Analysis of urban hotspots shows that whether CHOCHO develops a midday maximum or minimum depends on the evolving competition between secondary production and chemical loss.
- **My contributions.** Ran GEOS-Chem simulations on HPC systems, discussed model updates with the developer, and used Python to analyze glyoxal production and loss pathways underlying intercity differences.

Seasonal Methane Concentration Variations Related to Rice Cultivation in China 2024

- **Research problem.** Can satellite methane observations be used to characterize regional rice cultivation patterns?
- **Key findings.** Identify four regional patterns of methane seasonality from 2018 to 2022 and examined their relationship with rice cultivation with rice planting density and planting patterns.
- **My contributions.** Proposed the time-series analysis approach, collected satellite methane and rice cultivation data, and carried out the STL decomposition and K-means clustering.

TECHNICAL SKILLS

Programming: Python (main), MATLAB, Fortran, C
Atmospheric Models: GEOS-Chem (main), WRF-Chem, BOXMOX
Computing: Linux, High performance computing (HPC)
Dataset: GEMS and TROPOMI products, EDGAR emission inventories, ASIA-AQ and KORUS-AQ airborne observations, JPL chemical kinetics, Google Earth Engine

PUBLICATIONS

1. **Wu, X.**, Zhu, L. *, Zhang, A., Li, X., Fu, W., Kwon, H.-A., Park, R. J., Ha, E. S., Lee, G. T., Liu, S., Li, Y., Zhang, X., Zhang, P., Zhang, J., Huang, Y., Zhang, L., Li, J., Luan, X., Fu, T.-M., Yang, X., Shen, H., Ye, J., and Wang, C.: **Evaluation of GEMS glyoxal retrievals with TROPOMI product, MAX-DOAS observations, and GEOS-Chem simulations**, *Earth and Space Science*, *under review*.

2. **Wu, X.**, Zhu, L. *, Zhang, A., Fu, T.-M., Zhang, X., Fu, W., Kwon, H.-A., Park, R. J., Ha, E. S., Lee, G. T., Liu, S., Li, X., Li, Y., Zhang P., Zhang J., Huang Y., Zhang L., Zhao Y., Li J., Zhang M., Luan X., Yang, X., Shen, H., Ye, J., and Wang, C.: **Geostationary Satellite Observations Reveal Dynamic Chemical Controls on Summertime Diurnal Glyoxal Across Asian Urban Hotspots**, *submitted*.

3. **Wu, X.**, Jin J. *, Xia J., Fang, L., and Liao H.: **Seasonal Methane Concentration Variations Related to Rice Cultivation in China**, *Chinese Journal of Atmospheric Sciences*, 50(2): 463−477, https://doi.org/10.3878/j.issn.1006-9895.2504.24111, 2026. (*in Chinese*)

4. Zhang, X., Zhu L. *, Wang, J., Ye, C., Li, X., **Wu, X.**, Yuan, W., Luan, X., Li, Y., Zhang, P., Zhang, J., Huang, Y., Zhang, L., Li, J., Liu, S., and Wang, C.: **Quantifying nitrous acid (HONO) formation and its impact on oxidation capacity over the Tibetan Plateau: Insights from an observation-constrained box model**, *Atmospheric Environment*, 131, e2026JD046455, https://doi.org/10.1016/j.atmosenv.2026.122396, 2026.

5. Li, X., Liu, S. *, Zhu, L. *, Zhang, P., Zhang, X., Li, Y., **Wu, X.**, Zhang, J., Huang, Y., Luan, X., Zhang, L., Yang, X., Shen, H., Ye, J., Wang, C., and Fu, T.-M.: **Vertical Redistribution of Ozone Precursor Proxies during Typhoon Peripheral Periods: Insights from MAX-DOAS and GEOS-Chem**, *Journal of Geophysical Research-Atmospheres*, 131, e2026JD046455, https://doi.org/10.1029/2026JD046455, 2026.

PRESENTATION

1. Oral presentation, **Investigating Glyoxal (CHOCHO) Sources and Sinks in the Pearl River Delta through GEMS Satellite Observations and BOXMOX Model Simulations**, *the Asia-Oceania Geosciences Society (AOGS) 2025 Annual Meeting*, Singapore, Singapore, Jul 30, 2025.

2. Oral presentation, **Evaluation and Interpretation of GEMS Glyoxal Products**, *the 17th GEMS International Workshop*, Seoul, Korea, Sep 10, 2026.

3. Oral presentation, **Satellite Observations and Chemical Simulations of Diurnal Glyoxal Variations in Urban Areas**, *the 6th Strait Urban Environment Forum*, Fuzhou, China, Nov 7, 2025. (**Excellent Presentation Award**)

4. Oral presentation, **Multi-scale Observations and Chemical Simulations of Urban Diurnal Glyoxal Variations**, *the 13th National Conference on Environmental Chemistry (NCEC 2025)*, Jiangmen, China, Nov 30, 2025.

AWARDS & HONORS

- Highest-Tier Research Assistantship Stipend for Master's Students, SUSTech, 2026
- First-Class Academic Scholarship for Graduate Students, SUSTech, 2025
- International Conference Grant, 10000 RMB, SUSTech, 2025
- Outstanding Postgraduate Teaching Assistant, SUSTech, 2025
- Outstanding Postgraduate Students, SUSTech, 2024–2025
- Outstanding Undergraduate Graduates, NUIST, 2024

LANGUAGE

English: IELTS Academic: 6.5 (Aug 2026); CET-6: 526, **Mandarin**: native