

Lu Zhang

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Research interests

- Atmospheric aerosol measurements
- Aerosol-cloud interactions

Education

University of Chinese Academy of Sciences 2014 – 2017

PhD, Meteorology

Dissertation: Long-term measurements and modelling studies of aerosol hygroscopicity in Lin'an, China

Chinese Academy of Meteorological Sciences 2011 – 2014

MS, Meteorology

Thesis: Long-term measurements of the influence of relative humidity on aerosol scattering properties in the Yangtze River Delta of China

Lanzhou University, China 2007 – 2011

BS (Hons), Atmospheric Sciences

Excellent Graduate of Lanzhou University, GPA 3.64/4.0

Research Experience

Postdoctoral Researcher 2024 – present

Department of Environmental Sciences, Aarhus University

Investigate aerosol-cloud interactions in the Arctic

Guest Researcher 2023 – 2024

Department of Geosciences, University of Oslo

Learn NorESM model and use it to evaluate the influence of organic hygroscopicity on cloud condensation nuclei concentration and climate forcing

Postdoctoral Researcher 2020 – 2023

Department of Geophysics, Tel Aviv University

Investigate optical properties of dust and carbon-containing particles, aerosol-moisture interactions, and influence of cloud processing and ageing on aerosol properties

- Quantified **absorption attribution** of black carbon, brown carbon, and other absorbers, e.g. iron oxides, in biomass burning aerosols in the south-eastern Atlantic, and underscored the importance of **iron oxides** on absorption in that region (*doi: 10.5194/acp-22-9199-2022*);
- Examined the vertical distribution of aerosol physical and chemical properties with airborne measurements. Discovered the **significant contribution of organic aerosols**, which are usually considered hydrophobic or slightly hygroscopic, to the total aerosol liquid water content in the southeast Atlantic Ocean (*https://doi.org/10.5194/egusphere-2023-2319*);
- Investigated aerosol-moisture interactions over the southeast Atlantic Ocean and came up with an empirical parameterization between chemical composition and optical properties under various relative humidity (*https://doi.org/10.5194/egusphere-2023-2199*);
- Successfully applied for the **ATMO access** funding and will collaborate with France CNRC to investigate the sulfate formation under the presence of dust using their multi-phase atmospheric simulation **chamber**, to mimic the process dust passes through polluted cities (*Ongoing project*).

INCOPRO Inc., London

Perform intellectual property and brand protection for clients with both legal and law enforcement expertise and cutting-edge software. Provide data acquisition tools in **Python** for group members.

MS and PhD study

2011 – 2017

University of Chinese Academy of Sciences

Investigate aerosol optical properties, new particle formation, and cloud condensation nuclei activation

- Participate in the national key project Aerosol-cloud-radiation feedback mechanisms and their interaction with the Asian monsoon.
- Conducted several **long-term field experiments** in Tai Mount, Beijing, Linan, Gucheng, and Shang Dianzi background stations. Led a small group packing and unpacking instruments, setting up the laboratory, assembling instruments, conducting calibration, daily maintenance, and troubleshooting;
- Investigated the influence of humidity on aerosol scattering properties and resulting radiative forcing, underscored the influence of nitrate on aerosol hygroscopic growth (doi: 10.5194/acp-15-8439-2015).

Relevant Skills

- **Language:** Native in Chinese, fluent in English, IELTS 8.0 (2018), GRE 1320+3.0 (2010)
- **Scientific computing:**
 - Programming language: Python, Igor, Fortran
 - Model simulation: Mie model, ISORROPIA II, HYSPLIT, PSCF, CWT, NorESM
- **Research skills:**
 - Conduct field and laboratory experiments
 - Instruments: Humidified Neph, MAAP, CCN, AMS, SMPS, CPC, DMA, SP2, MOUDI, SEM, HTDMA
- **Professional Services:**
 - Reviewer for Geophysical Research Letters, Remote sensing, Atmosphere
 - Guest editor for journal Atmosphere
- **Mentoring:**
 - Lead master students to do field experiments, set up laboratory, and carry out daily maintenance and trouble shooting
 - Tutor at Climatematic Academy

Selected publications

- **Zhang, L**, Segal-Rozenhaimer M, Che, H, Dang, C, Sun, J, Kuang, Y, Formenti, P (2023) Prominent role of organics in aerosol liquid water content over the south-eastern Atlantic during biomass burning season. EGU sphere [preprint]. <https://doi.org/10.5194/egusphere-2023-2319>.
- **Zhang, L**, Segal-Rozenhaimer, M, Che, H, Dang, C, Sun, J, Kuang, Y, Howell, S, Formenti, P (2023) Aerosol hygroscopicity over the South-East Atlantic Ocean during the biomass burning season: Part I – From the perspective of scattering enhancement. EGU sphere [preprint]. <https://doi.org/10.5194/egusphere-2023-2199>.
- **Zhang, L**, Segal-Rozenhaimer, M, Che, H, Dang, C, Sedlacek, A, Lewis, E, Dobracki, A, Wong, J, Formenti, P, Howell, S, Nenes, A (2022) Light Absorption by Brown Carbon over the South-East Atlantic Ocean, Atmospheric Chemistry and Physics, 14(22).
- **Zhang, L**, Sun, J, Shen, X, Che, H, Ma, Q, Zhang, Y, Zhang, X, Ogren, J. (2015) Observations of relative humidity effects on aerosol light scattering in the Yangtze River Delta of China. Atmospheric Chemistry and Physics, 15(14): 8439-8454.
- Che, H, Segal-Rozenhaimer, M, **Zhang, L**, Dang, C, Howell, S, Formenti, P (2023) Aerosol hygroscopicity over the South-East Atlantic Ocean during the biomass burning season: Part II – From the perspective of cloud condensation nuclei. Atmospheric Chemistry and Physics. (In preparation)

- Che, H, Segal-Rozenhaimer, M, **Zhang, L**, Dang, C, Zuidema, P, Dobracki, A, Sedlacek, A, Coe, H, Wu, H, Taylor, J, Zhang, X, Redemann, J, Haywood, J (2022) Cloud processing and weeklong ageing significantly affect the biomass burning aerosols over the south-eastern Atlantic, *Communications Earth & Environment*, 3, 182.
- Che, H, Segal-Rozenhaimer, M, **Zhang, L**, Dang, C, Zuidema, P, Sedlacek, A, Zhang, X, Flynn, C (2022) Seasonal variations in fire conditions are important drivers to the trend of aerosol optical properties over the south-eastern Atlantic, *Atmospheric Chemistry and Physics*, 14(22).
- Dang, C, Segal-Rozenhaimer, M, Che, H, **Zhang, L**, Formenti, P, Taylor, J, Dobracki, A, Purdue, S, Wong, J, Nenes, A, Sedlacek, A, Coe, H, Redemann, J, Zuidema, P, Howell, S, Haywood, J (2022) Biomass Burning and Marine Aerosol Processing over the Southeast Atlantic Ocean: A TEM Single-Particle Analysis. *Atmospheric Chemistry and Physics*, 14(22).
- Shen, X, Sun, J, Kivekäs, N, Kristensson, A, Zhang, X, Zhang, Y, **Zhang, L**, Fan, R, Qi, X, Ma, Q, Zhou, H (2018) Spatial Distribution and Occurrence Probability of Regional New Particle Formation Events in Eastern China. *Atmospheric Chemistry and Physics*, 18 (2), 587–599.
- Qi, X, Sun, J, **Zhang, L**, Shen, X, Zhang, X, Zhang, Y (2018) Aerosol Hygroscopicity during the Haze Red-Alert Period in December 2016 at a Rural Site of the North China Plain. *Journal of Meteorological Research*, 32, 38-48.
- Zhang, Z, Zhang, X, Zhang, Y, Wang, Y, Zhou, H, Shen, X, Che, H, Sun, J, **Zhang, L** (2017) Characteristics of chemical composition and role of meteorological factors during heavy aerosol pollution episodes in northern Beijing area in autumn and winter of 2015. *Tellus B: Chemical and Physical Meteorology*, 69:1, DOI: 10.1080/16000889.2017.1347484.
- Zhong, J, Zhang, X, Wang, Y, Sun, J, Zhang, Y, Wang, J, Tan, K, Shen, X, Che, H, **Zhang, L**, Zhang, Z, Qi, X, Zhao, H, Ren, S, Li, Y (2017) Relative contributions of boundary-layer meteorological factors to the explosive growth of PM_{2.5} during the red-alert heavy pollution episodes in Beijing in December 2016. *J Meteorol Res*, 31, 809–819.
- Che, H, Zhang, X, **Zhang, L**, Wang, Y, Zhang, Y, Shen, X, Ma, Q, Sun, J, Zhong, J (2017) Prediction of size-resolved number concentration of cloud condensation nuclei and long-term measurements of their activation characteristics. *Scientific Reports*, 7:5819.
- Sun, J, **Zhang, L**, Shen, X, Che, H, Zhang, Y, Fan, R, Ma, Q, Yue, Y, Yu, X (2016) A review of the effects of relative humidity on aerosol scattering properties. *Acta Meteorologica Sinica* 74 (5), 672-682.
- Che, H, Zhang, X, Wang, Y, **Zhang, L**, Shen, X, Zhang, Y, Ma, Q, Sun, J, Zhang, Y, Wang, T (2016) Characterization and parameterization of aerosol cloud condensation nuclei activation under different pollution conditions. *Scientific Reports*, 6:24497.
- Shen, X, Sun, J, Zhang, X, Zhang, Y, **Zhang, L**, Che, H, Ma, Q, Yu, X, Yue, Y, Zhang, Y (2015) Characterization of submicron aerosols and effect on visibility during a severe haze-fog episode in Yangtze River Delta, China. *Atmospheric Environment*, 120:307-316