Taochun Sun

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Education

2020–Present	Graduate Student	Department of Earth System Science	Tsinghua University
2016–2020	B.E.(GPA：**3.69/5.0**)	CGIST	Capital Normal University
2016-2020	Minor	College English Department	Capital Normal University

<u>Publications</u> (citation: 1200+)

Articles:

1. Xu, Z.; Zhang, Z.; Zhong, R.; Chen, D.; **Sun, T**.; Deng, X.; Li, Z.; Qin, C.-Z. Content-Sensitive Multilevel Point Cluster Construction for ALS Point Cloud Classification. *Remote Sens.* 2019, *11*, 342.

2. Liu, Z., Ciais, P., Deng, Z. *et al.* Near-real-time monitoring of global CO_2 emissions reveals the effects of the COVID-19 pandemic. *Nat Commun* 11, 5172 (2020).

3. Lu C, Adger W, Morrissey K, Zhang S, Venevsky S, Yin H, **Sun T**, *et al*. Scenarios of distributional dimensions of health co-benefits from decarbonizing urban transport. *The Lancet Planetary Health*, 2022, 6(6): e461-e474.

4. Dou X, Deng Z, **Sun T**, *et al.* Global and local carbon footprints of city of Hong Kong and Macao from 2000 to 2015[J]. *Resources, Conservation and Recycling*, 164: 105167.

5. Dou X, Liao C, Wang H, *et al.* Estimates of daily ground-level NO_2 concentrations in China based on Random Forest model integrated K-means[J]. *Advances in Applied Energy*, 2021, 2: 100017.

6. Liu Z, Cui D, Deng Z, *et al.* Impact on China's CO_2 emissions from COVID-19 pandemic[J]. *Kexue Tongbao/Chinese Science Bulletin*, 2021: 1912-1922.

7. Liu Z, Deng Z, Zhu B, et al. Global patterns of daily CO_2 emissions reductions in the first year of COVID-19[J]. *Nature Geoscience*, 2022: 1-6.

8. Dou X, Wang Y, Ciais P, *et al.* Near-real-time global gridded daily CO_2 emissions[J]. *The Innovation*, 2021: 100182.

9. Davis, S.J., Liu, Z., Deng, Z. *et al.* Emissions rebound from the COVID-19 pandemic. *Nature Climate Change* (2022). https://doi.org/10.1038/s41558-022-01332-6

10. Cui D, Liu Z, Duan C C, *et al.* Daily CO_2 emission for China's provinces in 2019 and 2020[J]. *Earth System Science Data Discussions*, 2021: 1-31.

11. Deng Z, Ciais P, Tzompa-Sosa Z A, et al. Comparing national greenhouse gas budgets reported in UNFCCC inventories against atmospheric inversions[J]. *Earth System Science Data*, 2022, 14(4): 1639-1675.

12. Liu Z, Zhu B, Ciais P, *et al.* De-carbonization of global energy use during the COVID-19 pandemic[J]. *arXiv preprint* arXiv:2102.03240, 2021.

13. Liu Z, **Sun T**, Yu Y, et al. Near-real-time carbon emission accounting technology toward carbon neutrality[J]. *Engineering*, 2022.

14. Cai W, Zhang C, Zhang H, *et al*. The 2021 China report of the Lancet Countdown on health and climate change: seizing the window of opportunity[J]. *The Lancet Public Health*, 2021, 6(12): e932-e947.

15. Lu C, Zhang S, Tan C, *et al.* Reduced health burden and economic benefits of cleaner fuel usage from household energy consumption across rural and urban China[J]. *Environmental Research Letters*, 2022, 17(1): 014039.

16. Rohith T, Ciais P, Jochen E, *et al.*, Drivers of Natural Gas Use in the United States Buildings, *Science Advances*, 2023 (under review)

Conference abstracts & papers:

1. **Sun T**, Geng Y, Rohith T, *et al.*, Carbon Monitor AutoForecast-Asia: a real-time emission estimates of the residential sector for Asian major emitters with an automatic machine learning framework. EGU General Assembly 2023 (**oral presentation**)

Books:

1. Climate change strategy: China's road to carbon neutrality (participant of the editorial committee)
2. Global daily carbon emissions report 2023 (participant of the editorial committee)

Mentorship

- ✓ 2023：Advisor of the historical daily emission reconstruction project for: **Zihan Qiu, Han Wang** (both third-year undergraduate student, artificial intelligence class, Tsinghua University)
- ✓ 2022：Advisor of the city emission inventories project for: **Jinpyo Hong** (fourth-year undergraduate student, computer science & technology department, Tsinghua University), **Zhongyan Li** (third-year undergraduate student, Weiyang college, Tsinghua University)

Honors and awards

- ✓ 2022：Scholarship of **comprehensive excellence** in Tsinghua University
- ✓ 2021：Scholarship of **excellent student work** in Tsinghua University
- ✓ 2020：Outstanding members of Tsinghua Summer League School for Graduate Students (36/250+)
- ✓ 2020：Outstanding graduates in Beijing

Student Work

- ✓ Campus ambassador in the Tsinghua University of Alibaba AI Earth project (2023)
- ✓ Member of the outreach in the Global Climate Innovation Center (2023)
- ✓ Member of the branding team of the MIT-CHIEF (2023)
- ✓ Teaching Assistant of the summer school of earth system modelling and applications held by the department of earth system science, Tsinghua University (2022)
- ✓ Teaching Assistant of the Climate X Leadership program in the Institute of Climate Change and Sustainable Development, Tsinghua University (2022)
- ✓ Author of the submission to inputs of the UNFCCC first global stocktake by the Carbon Monitor team (2022)
- ✓ Teaching Assistant (Internship) of the course *Key Topics in Green Finance* in the Schwarzman College (2021)
- ✓ Committee member of Sino-US Youth Dialogue on Climate Change (foundation liaison, plan, academic review, outreach, **climate change topic related preface writing of the official conference handbook, part of bilingual work for the materials and official videos**) (2021)
- ✓ Committee member of Global Youth Summit on Net-Zero Future (outreach with allied schools and **receive thank letters from Columbia, Yale and Oxford**, official website design, personal web publicization **retweeted by Philippe Ciais**, the foreign academian of CAS) (2021)
- ✓ Group Leader in the department of international communications in Graduate Union of Tsinghua (one of the departmental candidates of *the star of Graduate Union of Tsinghua*) (2021)
- ✓ Co-Leader of the Information & Technology group of the *T+Z Technology Review* in Graduates Union of Tsinghua (Leader of the publication of Harmony OS, **read by 4500+ people, publicized by Yuhao Jin in the graduate league of Tsinghua and official account of the graduate league of automation department in Tsinghua**)(2021)
- ✓ Volunteer in the *International Service Group* of Tsinghua University (XiaoyanOnline) (**excellent volunteer**) (2021)
- ✓ *Publicity Department* of The Communist Youth League Committee of Tsinghua University Graduate Students (2020)

- ✓ League branch secretary for league branch of class of graduate students in DESS for 2020 (2021-)
- ✓ CP branch publicity leader for CP branch of class of graduate students in DESS for 2020 (2020)
- ✓ Academic Department of both the Tsinghua Astronomy Society and the SABRI (2020-)
- ✓ Datapie Translation Group (correction, **cover article**)/ International Department of Huitiandi (correction, **cover article**) (2019-)

Fundamentals

Language:

Chinese (native), English (proficient), Deutsch (amateur)

Software:

◆ *Professional Softwares:*

ArcMap / ENVI / ERDAS :

Technology & methodology needed in the **geospatial industry**, e.g. mapping, geospatial analysis, GIS development & deployment, remote sensing imaging classification & assessment. ESRI individual challenge & team developer **prizes** (2018).

◆ *Computer Languages:*

Python :

Applications by Python, and its features. Familiar with the built-in functions, **data science related libraries** (Pandas, Matplotlib, Scikit-Learn, Numpy, Seaborn). Less familiar with **deep learning related libraries** (TensorFlow, Pytorch) and their derivative libraries (Pytorch-Geometric, Pytorch-Lightning). Some learning experience about **the source codes of relevant frameworks** (CPython, Pandas, Matplotlib, Scikit-Learn, Numpy, Seaborn, Plotnine). **GPA 4.0** (95) for the course *Advanced Machine Learning* in the department of computer science.

Based on the above-mentioned, I'm responsible for **the maintenance of servers in our group**, **maintenance & updating of the power sector in the *Carbon Monitor* project**, and some research topics including urban traffic emissions (see details in *Publications*).

Matlab / R / C / C++ :

Learning in the major courses, I can use for perfect applications to finish complicated tasks due to linguistic similarities among languages and understand the methodologies and logic behind common frameworks. Specific skills: **ggplot2, Matlab plotting and image analyses, C/C++ fundamentals (boost library, etc.).**

Courses:

Climate Science: climate change economics (B+), ecological economics (A-), advanced machine learning (A-), principles and methods of GIS (96), advanced mathematics (95), etc.

Legal Science: introduction to legal science (A-), international environmental law (undergraduate level in English) (B), energy law (B+), finance and financial law (B), international environmental law (graduate level) (B)

Research:

the *Carbon Monitor* ; urban carbon emissions, modelling & statistics, machine learning (deep learning) applications. Details in publications.

Miscellaneous:

Academic :

I sincerely hope what we have published could raise individual awareness of protecting our planet (including China aha) and focusing on significantly important issues, including pollution mitigation, carbon emissions and public health.

Student Work :

I participated in a series of climate-change-related events, highly related to my PhD research and my interests and arousing my social responsibility of tackling climate change by youth actions and research-inspired scientific evidences. Doing things for common good is my everlasting pursuit as one of the youth.

Volunteer :

I am in the International Service Group of the Tsinghua University, helping to translate from Chinese to English some important notes and notices. I'm also the member of DataPi THU, translating data science articles published on some renowned professional websites into Chinese (cover articles); and the member of Huitiandi international department to spread advances of remote sensing and geospatial industries (cover articles).