Dong Yeong Chang

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Position:

- Research Professor, Institute of Environmental Planning, Seoul National University
- Deputy Director, ClimateTech Center, Seoul National University

Research Areas:

- Climate feedback with Anthropogenic Activities: Wildfire, Air Pollution (PM, Methane, Microplastic)
- Carbon Neutrality Strategies (Methane Detection, Quantification, and Mitigation)
- Urban & Societal applications of Climate Adaptation and Mitigation (ClimateTech, Nature-based Solution)

Keywords: Carbon neutrality, Methane, Climate feedback (Air Pollution, Wildfire)

Professional Experience

2025/11 -Present: Consultant-International Climate Change Specialist, Asian Development Bank (ADB)
2024/11 - 2025/12: Research Advisor, Greenpeace - Climate Change and Wildfires
2024/09 -Present: Advisory Board Member, Asia Urban Forest Network (AUFN)
2024/03 -Present: Advisory Board Member, Institute for Climate and Energy Policy (ICEP),Korea
2023/09 -Present: Deputy Director, Climate Technology Research Institute, Seoul National University
2021/05 -Present: Guest Researcher, Max-Planck-Institute for Chemistry, Mainz, Germany
2020/09 -Present: Research Associate Professor, Institute of Environmental Planning, Seoul National University, Korea
2018/09 - 2019/02: Lecturer, Cloud Microphysics and Precipitation, Ewha Womans University, Korea
2018/03 - 2018/08: Lecturer, Cloud Microphysics and Precipitation, Yonsei University, Korea
2017/09 - 2020/08: Research Professor, Atmospheric Sciences Department, Yonsei University, Korea
2014/10 - 2017/09: Postdoctoral Research Fellow, Max-Planck-Institute for Chemistry, Mainz, Germany
2009/10 - 2014/09: Ph.D. Candidate, Max-Planck-Institute for Chemistry, Mainz, Germany
2009/04 - 2009/09: Intern, Max-Planck-Institute for Chemistry, Mainz, Germany

Education

- **Ph.D. in Meteorology**
  Dec 2014, Max Planck Institute for Chemistry, Mainz, Germany,
  Johannes Gutenberg Mainz University, Mainz, Germany
  Dissertation: "Aerosol-cloud interaction studied with atmospheric chemistry model"
  Advisor: Prof. Jos Lelieveld
- **M.S. in Environmental Engineering**
  Feb 2007, Ewha Womans University, Seoul, Korea
  Thesis: "Numerical study on the effect of CCN properties on stratocumulus development and precipitation using LES cloud model"
- **B.S. in Environmental Engineering**
  Feb 2005, Ewha Womans University, Seoul, Korea

Ongoing Research Projects (as Principal Investigator)

1. ASEAN-Korea Cooperation for Methane Mitigation (AKCMM) (2025-2027)
Hosted by Global Green Growth Institute (GGGI) — Project Manager (Brunei & Malaysia)
: Leading bilateral methane-mitigation initiatives in Brunei and Malaysia, focusing on methane inventory enhancement, MMRV (Monitoring, Measurement, Reporting & Verification) system improvement, and policy-technical advisory for national methane-reduction and carbon-neutrality strategies.

2. Korean Carbon Project: Hybrid High-Spatiotemporal Resolution of Greenhouse Gases Inventory for Korea funded by Ministry of Environment, Korea - Environmental R&D Program (2023-2027) — Sub-Principal Investigator (Sub-PI)
: Developing integrated spatial data systems to generate high-resolution, observation-constrained GHG maps across the Republic of Korea, supporting national carbon neutral strategy via the improvement of CO2 and CH4 emission monitoring, validation, and inventory accuracy.

3. Ocean-Land-Atmosphere Carbon Budget Quantification and Carbon-Neutral Policy Development— Subproject Lead: Marine Carbon Budget for the Korean Peninsula
Basic Science & Policy Integration Program (2023-2025)
:Quantifying cross-domain carbon fluxes (ocean, land, and atmosphere) and conducting a comprehensive marine carbon budget analysis to provide scientific foundations for carbon-neutral policy frameworks.

4.Development of Greenhouse Gas Emission Monitoring and Simulation Technology for Semiconductor Processes
National R&D Program (2023-2028) — Lead Researcher for GWP Estimation Model
: Developing process-level emission monitoring and simulation-based GWP estimation models to optimize the use of etching, deposition, and cleaning process gases, supporting emission reduction and process optimization in semiconductor manufacturing.

Selected International Collaboration Experience (2021-2025)

- **Max Planck Institute for Chemistry (MPIC), Germany** — long-standing institutional collaboration (2009-present; Guest Researcher, 2021-present) with a formal collaboration framework (MoU, 2023): co-developed research agendas and sustained structured technical exchanges and review cycles.
- **Environmental Defense Fund (EDF), International** — formalized technical collaboration on methane monitoring and reduction strategies (2022-present): coordinated structured technical exchanges (workplans, deliverable tracking, and data/QA discussions) with multi-partner teams.
- **Japan Aerospace Exploration Agency (JAXA), Japan** — MoU-based collaboration (2023-present) on satellite validation for GHG monitoring: coordinated validation planning and QA-oriented technical exchanges.
- **National Aeronautics and Space Administration (NASA)**, **USA**— collaboration on satellite validation with methane monitoring (EMIT) and air-quality monitoring during wildfires (INSPYERE)**:** maintained structured technical exchanges and follow-up deliverables across partners.
- **Global Green Growth Institute (GGGI), International** — formalized program collaboration (AKCMM)**:** managed structured engagement with country counterparts (Brunei & Malaysia) and partner institutions to deliver methane inventory/MMRV and policy support (2025-2027)
- **Climate Change Specialist** for **the Asian Development Bank (ADB) project,** providing climate risk, climate change, and GHG assessments for infrastructure projects using IPCC- and ADB-aligned methodologies. Evaluating Paris Agreement alignment (NDCs, low-emission and climate-resilient pathways) and identified eligible climate adaptation finance components.(2025-2026)

Additional Professional Activities

- **2024** – Contributed article to KIST Clean Air Insight: “The Era of Climate Crisis and Carbon Neutrality: What is ClimateTech?”
- **November 2024** – Public Lecture, University and City Forum: “How the ClimateTech Industry Transforms Universities and Cities”
- **2024** – Lead Author, Policy Report by KEI: “Improvement Strategies for Methane Measurement, Monitoring, Reporting, and Verification (MMRV) toward Methane Reduction Implementation”
- **December 2023** – Lecture, KOFST Course: “Climate Change, Climate Crisis, and the Era of Carbon Neutrality”
- **November 2023** – Public Lecture at Suwon Climate Change Experience Center: “Understanding Carbon Neutrality and ClimateTech”
- **2023** – Acquired Level 1 Greenhouse Gas Emissions Rights Management Engineer Certification

Selected Recent Publications (2021-2026)

1. Quantifying meteorological impacts on local landfill methane emissions using field measurements and machine learning, Kim, D., Jeong, S., **Chang, D. Y.**, & Joo, J. Atmospheric Chemistry and Physics, 2026. (In press)

2. Climate and economic benefits of methane measurement, monitoring, reporting, and verification (MMRV) frame work, **D.Y. Chang** and S. Jeong, Atmosphere, 2025.

3. The Role of Urban Forests in Mitigation of Particulate Air Pollution: Evidence from Ground Observations in South Korea, J. Seo, H.-R. Oh, D.R. Park, Y. Kim, **D. Y. Chang***, C.R. Park, H.-D. Sou, S. Jeong, Urban Climate, Jan. 2025

4. Korea Environment Institute Policy Report 2024-07: "Improvement Measures for Methane Measurement, Monitoring, Reporting, and Verification (MMRV) to Implement Methane Reduction”,H.-S. Choi, **D. Y. Chang**, et al., 2024

5. Siberian wildfire dilemma: Controlling the uncontrollable?, Labzovskii, D Belikov, **D.Y. Chang**, E Hekman, European Journal of Environmental Sciences 14 (2), 72-78, 2024

6. Assessing the Impact of Urbanization on Forest Carbon Stocks and Social Costs using a Machine Learning Approach, **D. Y. Chang**, S. Jeong, and J. Shin, Science of Total Environment, Sep. 2024

7. Rising atmospheric levels of fine particulate matter reduce the degree of linear polarisation of light, Y. Cho, S. Jeong, and **D. Y. Chang**, J. Lelieveld, A. Pozzer, C.-E. Park, J. Joo, C.-R. Park, Nature Communications Earth & Environ, Sep. 2024

8. Implications of carbon leakage: Analysis of domestic vs. international emission ratios in manufacturing companies of major countries, W. Jang, **D.Y. Chang,** and S. Jeong, Journal of Climate Change Research, 2024

9. Unprecedented wildfires in Korea: a historical evidence of increasing wildfire activity by climate change, **D. Y. Chang et al.**, Agriculture and Forest Meteorology, Feb. 2024

10. Aerosol radiative forcing of forest fires unprecedented in South Korea, 2022 captured by Korean geostationary satellites, GK-2A AMI and GK-2B GEMS, Seong, and, **D. Y. Chang** et al., Environmental Pollution, Feb. 2024

11. Missing methane emissions from urban sewer networks, J. Joo, S. Jeong, J. Shin, and **D. Y. Chang,** 2023. Environmental Pollution.

12. First quantification and characteristics of atmospheric microplastics observed in Seoul, **Chang et al.,** 2023**,** Environmental Pollution.

13. Estimation of Forest Carbon Stock in South Korea Using Machine Learning with High-Resolution, Remote Sensing Data, J. Shin, S. Jeong, and **D. Y. Chang,** Atmosphere Korean Meteorological Society 33,1, 61-72, 2023.

14. Different responses of surface freeze and thaw phenology changes to warming among Arctic permafrost types, X. Chen, S. Jeong, and, **D. Y. Chang et al.,** Remote Sensing of Environment, 272, 112956, 2022

15. Finding the missing link in methane emission inventories using aircraft and mobile observations, **Chang et al.,** Asia-Pacific Journal of Atmospheric Sciences, 2021.

16. Variability of aerosol-cloud interactions induced by different cloud droplet nucleation schemes, **Chang et al.,** Atmospheric Research, 250, 2021. https://doi.org/10.1016/j.atmosres.2020.105367.

17. Direct radiative forcing of Biomass burning aerosols from unprecedented Australian Bushfires in 2019-2020, **Chang et al.,** Environmental Research Letters, 2021.

18. Optimization of Sulfate Aerosol Hygroscopicity Parameter in WRF-Chem, A.-H. Kim, S. S. Yum, and **D. Y. Chang,** Geoscientific Model Development, 2021.

[Under Review / In Revision / Submitted]

1. Joo, J., Jeong, S., et al., **Chang, D. Y.** Quantification of fugitive methane emissions from an LNG gas-fired power plant in Seoul, South Korea. Atmospheric Measurement Techniques, 2026. (In revision)
2. Sim, H., & **Chang, D. Y.*** Climate-driven wildfires: A systematic review of prolongation, spontaneity, and scale with lessons from California. Earth's Future, 2025. (Under review)
3. Martin, A., Klingmüller, K., Steil, B., Gromov, S., Lee, Y.-R., **Chang, D. Y.**, Surawski, N., Lelieveld, J., Jeong, S., Pozzer, A., et al. Interactive simulation of methane and hydrogen soil deposition in EMAC v2.55 using the newly implemented BIODEP submodel. Atmospheric Chemistry and Physics Discussions, 2026. (Submitted)

[In preparation]

4. **Chang, D. Y.** and Jeong, S. Quantifying the impact of heatwaves on building CO_2 emissions in Korea using machine learning techniques. Environmental Science & Technology, 2026. (In preparation)
5. Lee, Y.-R., Jeong, S., **Chang, D. Y.**, & Joo, J. Detecting methane point-source emissions in urban areas using EMIT satellite observations. Atmospheric Measurement Techniques, 2026 (In preparation)
6. Shin, J., Jeong, S., & **Chang, D. Y.** Estimation of high-resolution vegetation indices time series using an ensemble of smoothing techniques with Landsat-MODIS data. Remote Sensing of Environment, 2026. (In preparation)
7. A Spatiotemporally Resolved Methane Inventory for Metropolitan Seoul: Unveiling Urban Emissions and Inventory Gaps through Mobile Monitoring, **D. Y. Chang** et al. (In preparation)
8. Advancing Carbon Neutrality Policy Evaluation through High-Resolution GHG emissions Map from Korean Carbon Project, **D. Y. Chang** et al. (In preparation)