Dongjin Cho

Senior researcher
Seoul National University
djcho1582@gmail.com
https://www.researchgate.net/profile/Dongjin-Cho

EDUCATION

Mar. 2018 ~ Feb. 2023	**Ulsan National Institute of Science and Technology** School of Urban and Environmental Engineering	Ulsan, Korea

Thesis: Short-term forecasting of summer air temperatures using machine learning in South Korea
Advisor: Jungho Im

Ph.D. in Urban and Environmental Engineering

Mar. 2014 ~ Feb. 2018	**Ulsan National Institute of Science and Technology** School of Urban and Environmental Engineering	Ulsan, Korea

B.S. in Urban and Environmental Engineering

RESEARCH EXPERIENCES

- Postdoctoral Researcher at Department of Civil Urban Earth and Environmental Engineering, Ulsan National Institute of Science and Technology, Korea (Mar. 2023 ~ Feb. 2024)

- Postdoctoral Researcher at Environmental planning institute, Seoul National University, Korea (Mar. 2024 ~ Feb. 2025)

- Senior Researcher at Environmental planning institute, Seoul National University, Korea (Mar. 2025 ~ Present)

RESEARCH INTERESTS

- Weather forecasting
- Environmental monitoring
- Artificial intelligence
- Remote sensing application
- Numerical weather prediction models

PUBLICATIONS (PEER-REVIEWED RESEARCH PAPERS)

1. Yoo, C., Im, J., Park, S., & **Cho, D.** (2017). Thermal characteristics of Daegu using land cover data and satellite-derived surface temperature downscaled based on machine learning. Korean Journal of Remote Sensing, 33(6_2), 1101-1118.

2. Yoo, C., Park, S., Kim, Y., & **Cho, D.** (2019). Analysis of thermal environment by urban expansion

using KOMPSAT and Landsat 8: Sejong City. Korean Journal of Remote Sensing, 35(6_4), 1403-1415.

3. **Cho, D**[1]., Yoo, C[1]., Im, J., & Cha, D. H. (2020). Comparative assessment of various machine learning-based bias correction methods for numerical weather prediction model forecasts of extreme air temperatures in urban areas. Earth and Space Science, 7(4), e2019EA000740.

4. Yoo, C., Im, J., **Cho, D.**, Yokoya, N., Xia, J., & Bechtel, B. (2020). Estimation of all-weather 1 km MODIS land surface temperature for humid summer days. Remote Sensing, 12(9), 1398.

5. **Cho, D.**, Yoo, C., Im, J., Lee, Y., & Lee, J. (2020). Improvement of spatial interpolation accuracy of daily maximum air temperature in urban areas using a stacking ensemble technique. GIScience & Remote Sensing, 57(5), 633-649.

6. Yoo, C., Im, J., Park, S., & **Cho, D.** (2020). Spatial downscaling of MODIS land surface temperature: Recent research trends, challenges, and future directions. Korean Journal of Remote Sensing, 36(4), 609-626.

7. Yoo, C., Lee, Y., **Cho, D.**, Im, J., & Han, D. (2020). Improving local climate zone classification using incomplete building data and Sentinel 2 images based on convolutional neural networks. Remote Sensing, 12(21), 3552.

8. Lee, J., Yoo, C., Im, J., Shin, Y., & **Cho, D.** (2020). Multi-task Learning Based Tropical Cyclone Intensity Monitoring and Forecasting through Fusion of Geostationary Satellite Data and Numerical Forecasting Model Output. Korean Journal of Remote Sensing, 36(5_3), 1037-1051.

9. Kang, Y., **Cho, D.**, Han, D., Im, J., Lim, J., Oh, K. H., & Kwon, E. (2021). Sensitivity analysis for CAS500-4 atmospheric correction using simulated images and suggestion of the use of geostationary satellite-based atmospheric parameters. Korean Journal of Remote Sensing, 37(5_1), 1029-1042.

10. Kang, E., Yoo, C., Shin, Y., **Cho, D.**, & Im, J. (2021). Comparative Assessment of Linear Regression and Machine Learning for Analyzing the Spatial Distribution of Ground-level NO2 Concentrations: A Case Study for Seoul, Korea. Korean Journal of Remote Sensing, 37(6_1), 1739-1756.

11. Kang, Y., Kim, M., Kang, E., **Cho, D.**, & Im, J. (2022). Improved retrievals of aerosol optical depth and fine mode fraction from GOCI geostationary satellite data using machine learning over East Asia. ISPRS Journal of Photogrammetry and Remote Sensing, 183, 253-268.

12. **Cho, D**[1]., Yoo, C[1]., Son, B., Im, J., Yoon, D., & Cha, D. H. (2022). A novel ensemble learning for post-processing of NWP Model's next-day maximum air temperature forecast in summer using deep learning and statistical approaches. Weather and Climate Extremes, 35, 100410.

13. Yoon, D., Kim, K., Cha, D. H., Lee, M. I., Im, J., **Cho, D.**, & Min, K. H. (2022). Development of model output statistics based on the least absolute shrinkage and selection operator regression for forecasting next-day maximum temperature in South Korea. Quarterly Journal of the Royal Meteorological Society, 148(745), 1929-1944.

14. **Cho, D.**, Bae, D., Yoo, C., Im, J., Lee, Y., & Lee, S. (2022). All-sky 1 km MODIS land surface temperature reconstruction considering cloud effects based on machine learning. Remote Sensing, 14(8), 1815.

15. Yoo, C., Im, J., **Cho, D.**, Lee, Y., Bae, D., & Sismanidis, P. (2022). Downscaling MODIS nighttime land surface temperatures in urban areas using ASTER thermal data through local linear forest. International Journal of Applied Earth Observation and Geoinformation, 110, 102827.

16. Kim, Y. , Kang, E., **Cho, D.**, Lee, S., & Im, J. (2022). Improved Estimation of Hourly Surface Ozone Concentrations using Stacking Ensemble-based Spatial Interpolation. Journal of the Korean Association of Geographic Information Studies, 25(3), 74-99.

17. Jung, S., Choo, M., Im, J., & **Cho, D.** (2022). Generation of Daily High-resolution Sea Surface Temperature for the Seas around the Korean Peninsula Using Multi-satellite Data and Artificial Intelligence. Korean Journal of Remote Sensing, 38(5), 707-723.

18. Choo, M., Yoo, C., Im, J., **Cho, D.**, Kang, Y., Oh, H., & Lee, J. (2023). Trend Analysis of Vegetation Changes of Korean Fir (Abies koreana Wilson) in Hallasan and Jirisan Using MODIS Imagery. Korean Journal of Remote Sensing, 39(3), 325-338.

19. Lee, S., Yoo, C., Im, J., **Cho, D.**, Lee, Y., & Bae, D. (2023). A hybrid machine learning approach to investigate the changing urban thermal environment by dynamic land cover transformation: A case study of Suwon, republic of Korea. International Journal of Applied Earth Observation and Geoinformation, 122, 103408.

20. Yoo, C., Im, J., Weng, Q., **Cho, D.**, Kang, E., & Shin, Y. (2023). Diurnal urban heat risk assessment using extreme air temperatures and real-time population data in Seoul. Iscience, 26(11), 108123.

21. **Cho, D.**, Im, J., & Jung, S. (2024). A new statistical downscaling approach for short-term forecasting of summer air temperatures through a fusion of deep learning and spatial interpolation. Quarterly Journal of the Royal Meteorological Society, 150(760), 1222-1242

22. Lee, Y., **Cho, D.**, Im, J., Yoo, C., Lee, J., Ham, Y. G., & Lee, M. I. (2024). Unveiling teleconnection drivers for heatwave prediction in South Korea using explainable artificial intelligence. npj Climate and Atmospheric Science, 7(1), 176.

23. Kang, E[1]., **Cho, D**[1]., Lee, S., Im, J., Lee, D., & Yoo, C. (2024). An explainable AI framework for spatiotemporal risk factor analysis in public health: a case study of cardiovascular mortality in South Korea. GIScience & Remote Sensing, 61(1), 2436997.

24. Kim, Y., Lee, S., **Cho, D.**, & Im, J. (2024). Impact of COVID-19 on the urban heat island in Daegu using downscaled land surface temperature. Korean Journal of Remote Sensing, 40(6), 1109-1125.

25. Bae, D[1]., **Cho, D**[1]., Im, J., Yoo, C., Lee, Y., & Lee, S. (2025). Improved hourly all-sky land surface temperature estimation: Incorporating the temporal variability of cloud-radiation interactions. International Journal of Applied Earth Observation and Geoinformation, 138, 104468.

26. Jo, H. S., Ham, Y. G., Oh, S. H., Lee, J. G., Seong, M. G., **Cho, D.**, Lim, S., Kang, S. Y., Jeong, S., Lee, H. J., Lee, S., & Kwon, G. (2025). Recent Advances in AI-based Global Climate Modeling and Forecasting. Atmosphere, 35(4), 585–603.

27. Kim, Y., Park, S., Kim, H., Bae, D., Lee, Y., Lee, S., Chung, I., Jegal, S., Doh, H., **Cho, D.**, & Im, J. (2025). Long-Term (2013–2024) Reconstructed All-Sky Land Surface Temperature from MODIS Integrating Machine Learning and Cloud Conditions for South Korea. Korean Journal of Remote Sensing, 41(6), 1037-1056.

28. Park, S., Kim, H. J., Kim, Y., Lee, Y., **Cho, D.**, Yoo, C., Bae, D., Lee, S., & Im, J. (2025). Nationwide Local Climate Zone Mapping and Comparative Assessment of Urban Heat Island Effects in South Korea. Korean Journal of Remote Sensing, 41(6), 1207-1223.

29. Luo, J. J., Xia, J., Pan, B., Ham, Y. G., Li, X., Shanguan, W., Xue, W., Wang, Y., Mu, B., Hong, Y., Li, H., Zhong, X., Dai, K., Bai, L., Ling, F., Boers, N., Bretherton, C., Chen, B., **Cho, D.**, Gentine, P., Guo, Z., Huang, X., Kang, D., Kim, H. J., Kim, J. H., Lei, L., Meng, F., Oh, S. H., Qin, B., Shen, Z., Sun, Q., Tang, Y., Tong, X., Wan, B., Wang, L., Wang, Y., Wang, Y., Wu, J., Xiao, Y., Yao, L., Yang, S., Yuan, C., Yuan, S., Yu, T., Zhao, M. (2026). AI for atmosphere-ocean sciences: advancements, challenges, and ways forward. National Science Review, in press. https://doi.org/10.1093/nsr/nwag063

30. **Cho, D.**, Ham, Y. G., Jeong, S., & Kang, S. Y. (2026). A deep learning-based land-atmosphere coupled model for heatwave prediction. npj Climate and Atmospheric Science, in press. https://doi.org/10.1038/s41612-025-01311-6

BOOK (CHAPTERS)

- **Cho, D.**, Lee, S., & Im, J. (2024). Urban Summer Air Temperature Forecasting through a Fusion of a Numerical Weather Prediction Model with Machine Learning. In Handbook of Geospatial Approaches to Sustainable Cities (pp. 245-263). CRC Press.

INTERNATIONAL CONFERENCE PRESENTATIONS

1. **Cho, D.**, Yoo, C., & Im, J. (2018). Improving forecasting performance of urban air temperature using in-situ and satellite observation and numerical weather prediction model output. ICUC10

/ 14th Symposium on the Urban Environment, New York, USA.

2. **Cho, D.**, Yoo, C., Im, J., Lee, Y., & Lee, J. (2019). Improvement of spatial interpolation accuracy of daily maximum air temperature using stacking ensemble technique. AGU 2019, San Francisco, USA.

3. **Cho, D.**, Im, J., & Jung, S. (2023). Deep learning-based statistical downscaling for short-term forecasting of summer air temperatures. EGU 2023, Vienna, Austria.

4. **Cho, D.**, Bae, D., Yoo, C., Im, J., Lee, Y., & Lee, S. (2023). Machine learning-based all-sky 1 km MODIS land surface temperature reconstruction considering cloud effects. AOGS 2023, Singapore.

5. **Cho, D.**, Bae, D., Yoo, C., Im, J., Lee, Y., & Lee, S. (2023). Machine learning-based all-sky 1 km MODIS land surface temperature reconstruction considering cloud effects. ISPRS Geospatial Week (GSW 2023), Egypt.

6. **Cho, D.**, Ham, Y. G., Jeong, S., & Kang, S. Y. (2025). Deep learning-based atmosphere–land coupled model for heatwave prediction. BACO 2025, Busan, Republic of Korea.

AWARDS AND HONORS

- Grand award for Student Thesis Competition, Korean Association of Geographic Information Studies (KAGIS), Korea (Nov. 2017)

- Grand award for Student Thesis Competition, Korean Association of Geographic Information Studies (KAGIS), Korea (Nov. 2018)

- Grand award for Thesis Competition, National Institute of Meteorological Sciences, Korea (Apr. 2023)

- Outstanding Contribution in Reviewing, ISPRS Journal of Photogrammetry and Remote Sensing, Netherlands (Aug. 2023)

- Best Ph.D. Thesis Award, Korean Meteorological Society, Korea (Nov. 2023)

SKILLS AND TECHNIQUES

- **Programming Languages:** MATLAB, R, and Python for scientific computing, statistical modeling, and large-scale data analysis.

- **Meteorological & Environmental Data Handling:** Processing and analysis of numerical model outputs, remote sensing datasets, and in-situ observational data; multi-source data integration for environmental monitoring and prediction.

- **Machine Learning:** ANN, RF, SVM, Elastic net, and gradient boosting methods (e.g., XGBoost and LightGBM).

- **Deep Learning:** Advanced deep neural networks (e.g., RNN, CNN, ConvNeXt and U-Net), Transformer-based models (e.g., ViT and Swin Transformer) and diffusion models

- **Scientific Machine Learning & Explainable AI:** Domain knowledge guided loss design and architectures, robust handling of missing data, and model interpretation techniques (e.g., SHAP, LIME and CAM).