References attachment for: Ensemble Machine Learning and Multi-Stage Data Reconstruction Methods for High-Resolution Air Quality Mapping in Great Britain (2003-2021). (under submission 16-04-2024)

Main and poster-relevant references highlighted.

Satellite icons created by mavadee - Flaticon

Anenberg, Susan C., Joshua Miller, Daven K. Henze, Ray Minjares, and Pattanun Achakulwisut. 2019. "The Global Burden of Transportation Tailpipe Emissions on Air Pollution-Related Mortality in 2010 and 2015." Environmental Research Letters 14 (9): 094012. https://doi.org/10.1088/1748-9326/ab35fc.

Beck, Hylke E., Niklaus E. Zimmermann, Tim R. McVicar, Noemi Vergopolan, Alexis Berg, and Eric F. Wood. 2018. "Present and Future Köppen-Geiger Climate Classification Maps at 1-Km Resolution." Scientific Data 5 (1): 180214. https://doi.org/10.1038/sdata.2018.214.

Breiman, Leo. 1996. "Stacked Regressions." Machine Learning 24 (1): 49–64. https://doi.org/10.1007/BF00117832.

———. 2001. "Random Forests." Machine Learning 45 (1): 5–32. https://doi.org/10.1023/A:1010933404324.

Bruin, Sytze de, Dick J. Brus, Gerard B. M. Heuvelink, Tom van Ebbenhorst Tengbergen, and Alexandre M. J-C. Wadoux. 2022. "Dealing with Clustered Samples for Assessing Map Accuracy by Cross-Validation." Ecological Informatics 69 (July): 101665. https://doi.org/10.1016/j.ecoinf.2022.101665.

Carslaw, David C., and Karl Ropkins. 2012. "Openair — An R Package for Air Quality Data Analysis." Environmental Modelling & Software 27–28 (January): 52–61. https://doi.org/10.1016/j.envsoft.2011.09.008.

Chen, Tianqi, and Carlos Guestrin. 2016. "XGBoost: A Scalable Tree Boosting System." In Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 785–94. KDD '16. New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/2939672.2939785.

Chen, Tianqi, Tong He, Michael Benesty, Vadim Khotilovich, Yuan Tang, Hyunsu Cho, Kailong Chen, et al. 2023. "Xgboost: Extreme Gradient Boosting." https://cran.r-project.org/web/packages/xgboost/index.html.

Civil Aviation Authority. 2023. "UK Airport Data." UK Airport Data. 2023. https://www.caa.co.uk/data-and-analysis/uk-aviation-market/airports/uk-airport-data/.

COPERNICUS, and European Space Agency. 2021. "Sentinel-5 - Missions - Sentinel Online." Sentinel 5 Mission. 2021. https://copernicus.eu/missions/sentinel-5.

Copernicus Land Monitoring Service. 2016. "European Digital Elevation Model (EU-DEM), Version 1.1." Land item. https://land.copernicus.eu/imagery-in-situ/eu-dem/eu-dem-v1.1/view.

——. 2019. "Corine Land Cover (CLC) 2018, Version 2020_20u1." Land item. https://land.copernicus.eu/pan-european/corine-land-cover/clc2018.

——. 2020. "Imperviousness Density 2018." Land item. https://land.copernicus.eu/pan-european/high-resolution-layers/imperviousness/status-maps/imperviousness-density-2018.

Danesh Yazdi, Mahdieh, Zheng Kuang, Konstantina Dimakopoulou, Benjamin Barratt, Esra Suel, Heresh Amini, Alexei Lyapustin, Klea Katsouyanni, and Joel Schwartz. 2020. "Predicting Fine Particulate Matter (PM2.5) in the Greater London Area: An Ensemble Approach Using Machine Learning Methods." Remote Sensing 12 (6): 914. https://doi.org/10.3390/rs12060914.

Department for Environment Food and Rural Affairs. 2023. "Modelled Background Pollution Data." https://uk-air.defra.gov.uk/data/pcm-data.

———. 2024. "Automatic Urban and Rural Network (AURN)." Department for Environment, Food and Rural Affairs (Defra), Nobel House, 17 Smith Square, London SW1P 3JR helpline@defra.gsi.gov.uk. UK; United Kingdom. 2024. https://uk-air.defra.gov.uk/networks/network-info?view=aurn.

Department for Transport. 2023. "Road Traffic Statistics - AADF Data - Major and Minor Roads." https://roadtraffic.dft.gov.uk/downloads.

Di, Qian, Heresh Amini, Liuhua Shi, Itai Kloog, Rachel Silvern, James Kelly, M. Benjamin Sabath, et al. 2020. "Assessing NO 2 Concentration and Model Uncertainty with High Spatiotemporal Resolution across the Contiguous United States Using Ensemble Model Averaging." Environmental Science & Technology 54 (3): 1372–84. https://doi.org/10.1021/acs.est.9b03358.

Di, Qian, Itai Kloog, Petros Koutrakis, Alexei Lyapustin, Yujie Wang, and Joel Schwartz. 2016. "Assessing PM2.5 Exposures with High Spatiotemporal Resolution across the Continental United States." Environmental Science & Technology 50 (9): 4712–21. https://doi.org/10.1021/acs.est.5b06121.

Didan, Kamel. 2021. "MODIS/Terra Vegetation Indices Monthly L3 Global 1km SIN Grid V061." NASA EOSDIS Land Processes Distributed Active Archive Center. https://doi.org/10.5067/MODIS/MOD13A3.061.

Dimakopoulou, Konstantina, Evangelia Samoli, Antonis Analitis, Joel Schwartz, Sean Beevers, Nutthida Kitwiroon, Andrew Beddows, et al. 2022. "Development and Evaluation of Spatio-Temporal Air Pollution Exposure Models and Their Combinations in the Greater London Area, UK." International Journal of Environmental Research and Public Health 19 (9): 5401. https://doi.org/10.3390/ijerph19095401.

Earth Science Data Systems, NASA. 2021a. "GES DISC - Homepage." 2021. https://disc.gsfc.nasa.gov/.

- ———. 2021b. "LP DAAC Homepage." 2021. https://lpdaac.usgs.gov/.
- ——. 2021c. "EOSDIS Distributed Active Archive Centers (DAAC)." Section Landing. Earthdata. Earth Science Data Systems, NASA. August 16, 2021. https://www.earthdata.nasa.gov/eosdis/daacs.

Elvidge, Christopher D, Kimberly Baugh, Mikhail Zhizhin, Feng Chi Hsu, and Tilottama Ghosh. 2017. "VIIRS Night-Time Lights." International Journal of Remote Sensing 38 (21): 5860–79.

European Environment Agency (EEA). 2024. "Air Quality E-Reporting (AQ e-Reporting)." 2024. https://www.eea.europa.eu/en/datahub/datahubitem-view/3b390c9c-f321-490a-b25a-ae93b2ed80c1.

European Environment Agency (EEA), and European Topic Centre on Air Pollution and Climate Change Mitigation, European Environment Information and Observation Network. 2014. "Airbase

European Air Quality Database Version 8." https://www.eea.europa.eu/en/datahub/datahubitemview/3b390c9c-f321-490a-b25a-ae93b2ed80c1.

Friedman, Jerome H., Trevor Hastie, and Rob Tibshirani. 2010. "Regularization Paths for Generalized Linear Models via Coordinate Descent." Journal of Statistical Software 33 (February): 1–22. https://doi.org/10.18637/jss.v033.i01.

Ge, Yao, Mathew R. Heal, David S. Stevenson, Peter Wind, and Massimo Vieno. 2021. "Evaluation of Global EMEP MSC-W (Rv4.34) WRF (v3.9.1.1) Model Surface Concentrations and Wet Deposition of Reactive N and S with Measurements." Geoscientific Model Development 14 (11): 7021–46. https://doi.org/10.5194/gmd-14-7021-2021.

Goldberg, Daniel L., Pawan Gupta, Kai Wang, Chinmay Jena, Yang Zhang, Zifeng Lu, and David G. Streets. 2019. "Using Gap-Filled MAIAC AOD and WRF-Chem to Estimate Daily PM2.5 Concentrations at 1 Km Resolution in the Eastern United States." Atmospheric Environment 199 (February): 443–52. https://doi.org/10.1016/j.atmosenv.2018.11.049.

Grange, Stuart K. 2019. "Technical Note: Saqgetr R Package." https://drive.google.com/open?id=1lgDODHqBHewCTKLdAAxRyR7ml8ht6Ods.

Gulia, Sunil, Shiva Nagendra, and Mukesh Khare. 2015. "Comparative Evaluation of Air Quality Dispersion Models for PM2.5 at Air Quality Control Regions in Indian and UK Cities." MAPAN 30 (4): 249–60. https://doi.org/10.1007/s12647-015-0149-x.

Gutiérrez-Avila, Iván, Kodi B. Arfer, Daniel Carrión, Johnathan Rush, Itai Kloog, Aaron R. Naeger, Michel Grutter, Víctor Hugo Páramo-Figueroa, Horacio Riojas-Rodríguez, and Allan C. Just. 2022. "Prediction of Daily Mean and One-Hour Maximum PM2.5 Concentrations and Applications in Central Mexico Using Satellite-Based Machine-Learning Models." Journal of Exposure Science & Environmental Epidemiology 32 (6): 917–25. https://doi.org/10.1038/s41370-022-00471-4.

Hale, Thomas, Noam Angrist, Rafael Goldszmidt, Beatriz Kira, Anna Petherick, Toby Phillips, Samuel Webster, et al. 2021. "A Global Panel Database of Pandemic Policies (Oxford COVID-19 Government Response Tracker)." Nature Human Behaviour 5 (4): 529–38. https://doi.org/10.1038/s41562-021-01079-8.

He, M.Z., M. Yitshak-Sade, A.C. Just, I. Gutiérrez-Avila, M. Dorman, K. de Hoogh, B. Mijling, R.O. Wright, and I. Kloog. 2023. "Predicting Fine-Scale Daily NO2 over Mexico City Using an Ensemble Modeling Approach." Atmospheric Pollution Research 14 (6). https://doi.org/10.1016/j.apr.2023.101763.

Hersbach, Hans, Bill Bell, Paul Berrisford, Shoji Hirahara, András Horányi, Joaquín Muñoz-Sabater, Julien Nicolas, et al. 2020. "The ERA5 Global Reanalysis." Quarterly Journal of the Royal Meteorological Society 146 (730): 1999–2049. https://doi.org/10.1002/qj.3803.

Hoek, Gerard, Rob Beelen, Kees de Hoogh, Danielle Vienneau, John Gulliver, Paul Fischer, and David Briggs. 2008. "A Review of Land-Use Regression Models to Assess Spatial Variation of Outdoor Air Pollution." Atmospheric Environment 42 (33): 7561–78. https://doi.org/10.1016/j.atmosenv.2008.05.057.

Hoerl, Arthur E., and Robert W. Kennard. 1970. "Ridge Regression: Biased Estimation for Nonorthogonal Problems." Technometrics 12 (1): 55–67. https://doi.org/10.1080/00401706.1970.10488634.

Holmes, N.S., and L. Morawska. 2006. "A Review of Dispersion Modelling and Its Application to the Dispersion of Particles: An Overview of Different Dispersion Models Available." Atmospheric Environment 40 (30): 5902–28. https://doi.org/10.1016/j.atmosenv.2006.06.003.

Hoogh, Kees de, Apolline Saucy, Alexandra Shtein, Joel Schwartz, Erin A. West, Alexandra Strassmann, Milo Puhan, Martin Röösli, Massimo Stafoggia, and Itai Kloog. 2019. "Predicting Fine-Scale Daily NO 2 for 2005–2016 Incorporating OMI Satellite Data Across Switzerland." Environmental Science & Technology 53 (17): 10279–87. https://doi.org/10.1021/acs.est.9b03107.

Huangfu, Peijue, and Richard Atkinson. 2020. "Long-Term Exposure to NO2 and O3 and All-Cause and Respiratory Mortality: A Systematic Review and Meta-Analysis." Environment International 144 (November): 105998. https://doi.org/10.1016/j.envint.2020.105998.

Imperial College London. 2024. "London Air Quality Network." 2024. https://www.londonair.org.uk/LondonAir/Default.aspx.

Inness, Antje, Melanie Ades, Anna Agustí-Panareda, Jérôme Barré, Anna Benedictow, Anne-Marlene Blechschmidt, Juan Jose Dominguez, et al. 2019. "The CAMS Reanalysis of Atmospheric Composition." Atmospheric Chemistry and Physics 19 (6): 3515–56. https://doi.org/10.5194/acp-19-3515-2019.

Johnson, Joel B. 2022. "An Introduction to Atmospheric Pollutant Dispersion Modelling." Environmental Sciences Proceedings 19 (1): 18. https://doi.org/10.3390/ecas2022-12826.

Ke, Guolin, Qi Meng, Thomas Finley, Taifeng Wang, Wei Chen, Weidong Ma, Qiwei Ye, and Tie-Yan Liu. 2017. "LightGBM: A Highly Efficient Gradient Boosting Decision Tree." Advances in Neural Information Processing Systems 30.

https://proceedings.neurips.cc/paper_files/paper/2017/hash/6449f44a102fde848669bdd9eb6b76fa -Abstract.html.

Kianian, Behzad, Yang Liu, and Howard H. Chang. 2021. "Imputing Satellite-Derived Aerosol Optical Depth Using a Multi-Resolution Spatial Model and Random Forest for PM2.5 Prediction." Remote Sensing 13 (1): 126. https://doi.org/10.3390/rs13010126.

Krotkov, Nickolay A., Lamsal N. Lok, Sergey V Marchenko, E. A. Celarier, Eric J Bucsela, William H Swartz, and Joanna Joiner. 2013. "OMI/Aura NO2 Cloud-Screened Total and Tropospheric Column Daily L3 Global 0.25deg Lat/Lon Grid." NASA Goddard Earth Sciences Data and Information Services Center. https://doi.org/10.5067/AURA/OMI/DATA3007.

Laan, Mark J. van der, Eric C. Polley, and Alan E. Hubbard. 2007. "Super Learner." Statistical Applications in Genetics and Molecular Biology 6: Article25. https://doi.org/10.2202/1544-6115.1309.

Lang, Michel, Martin Binder, Jakob Richter, Patrick Schratz, Florian Pfisterer, Stefan Coors, Quay Au, Giuseppe Casalicchio, Lars Kotthoff, and Bernd Bischl. 2019. "Mlr3: A Modern Object-Oriented Machine Learning Framework in R." Journal of Open Source Software 4 (44): 1903. https://doi.org/10.21105/joss.01903.

Lin, Chun, Mathew R. Heal, Massimo Vieno, Ian A. MacKenzie, Ben G. Armstrong, Barbara K. Butland, Ai Milojevic, et al. 2017. "Spatiotemporal Evaluation of EMEP4UK-WRF v4.3 Atmospheric Chemistry Transport Simulations of Health-Related Metrics for NO2, O3, PM10, and PM2. 5 for 2001–2010." Geoscientific Model Development 10 (4): 1767–87. https://doi.org/10.5194/gmd-10-1767-2017.

Linnenbrink, Jan, Carles Milà, Marvin Ludwig, and Hanna Meyer. 2023. "kNNDM: K-Fold Nearest Neighbour Distance Matching Cross-Validation for Map Accuracy Estimation." Preprint. Earth and space science informatics. https://doi.org/10.5194/egusphere-2023-1308.

Liu, Cong, Renjie Chen, Francesco Sera, Ana M. Vicedo-Cabrera, Yuming Guo, Shilu Tong, Micheline S.Z.S. Coelho, et al. 2019. "Ambient Particulate Air Pollution and Daily Mortality in 652 Cities." New England Journal of Medicine 381 (8): 705–15. https://doi.org/10.1056/NEJMoa1817364.

Liu, Riyang, Zongwei Ma, Antonio Gasparrini, Arturo De La Cruz, Jun Bi, and Kai Chen. 2023. "Integrating Augmented In Situ Measurements and a Spatiotemporal Machine Learning Model To Back Extrapolate Historical Particulate Matter Pollution over the United Kingdom: 1980–2019." Environmental Science & Technology 57 (51): 21605–15. https://doi.org/10.1021/acs.est.3c05424.

Liu, Tze-Li, Benjamin Flückiger, and Kees de Hoogh. 2022. "A Comparison of Statistical and Machine-Learning Approaches for Spatiotemporal Modeling of Nitrogen Dioxide across Switzerland." Atmospheric Pollution Research 13 (12): 101611. https://doi.org/10.1016/j.apr.2022.101611.

Lyapustin, Alexei, and Yujie Wang. 2018. "MCD19A2 MODIS/Terra+Aqua Land Aerosol Optical Depth Daily L2G Global 1km SIN Grid V006." NASA EOSDIS Land Processes Distributed Active Archive Center. https://doi.org/10.5067/MODIS/MCD19A2.006.

Meyer, Hanna, and Edzer Pebesma. 2021. "Predicting into Unknown Space? Estimating the Area of Applicability of Spatial Prediction Models." Methods in Ecology and Evolution 12 (9): 1620–33. https://doi.org/10.1111/2041-210X.13650.

Mills, I. C., R. W. Atkinson, H. R. Anderson, R. L. Maynard, and D. P. Strachan. 2016. "Distinguishing the Associations between Daily Mortality and Hospital Admissions and Nitrogen Dioxide from Those of Particulate Matter: A Systematic Review and Meta-Analysis." BMJ Open 6 (7): e010751. https://doi.org/10.1136/bmjopen-2015-010751.

Mills, I. C., R. W. Atkinson, S. Kang, H. Walton, and H. R. Anderson. 2015. "Quantitative Systematic Review of the Associations between Short-Term Exposure to Nitrogen Dioxide and Mortality and Hospital Admissions." BMJ Open 5 (5): e006946. https://doi.org/10.1136/bmjopen-2014-006946.

Muñoz-Sabater, Joaquín, Emanuel Dutra, Anna Agustí-Panareda, Clément Albergel, Gabriele Arduini, Gianpaolo Balsamo, Souhail Boussetta, et al. 2021. "ERA5-Land: A State-of-the-Art Global Reanalysis Dataset for Land Applications." Earth System Science Data 13 (9): 4349–83. https://doi.org/10.5194/essd-13-4349-2021.

Office for National Statistics. 2023. "UK Population Estimates." Office for National Statistics. May 12, 2023.

https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestim ates.

ONS. 2023. "Coronavirus in the UK | newCasesBySpecimenDate." https://coronavirus.data.gov.uk/details/download.

Ordnance Survey. 2023. "OS Open Roads | Data Products." https://www.ordnancesurvey.co.uk/business-government/products/open-map-roads.

———. (2021) 2023. "OS British National Grids." Ordnance Survey. https://github.com/OrdnanceSurvey/OS-British-National-Grids.

Orru, Hans, Henrik Olstrup, Jaakko Kukkonen, Susana López-Aparicio, David Segersson, Camilla Geels, Tanel Tamm, et al. 2022. "Health Impacts of PM2.5 Originating from Residential Wood Combustion in Four Nordic Cities." BMC Public Health 22 (1): 1286. https://doi.org/10.1186/s12889-022-13622-x.

Posit Team. 2023. "RStudio: Integrated Development Environment for R." Boston, MA: Posit Software, PBC. http://www.posit.co/.

Probst, Philipp, Marvin N. Wright, and Anne-Laure Boulesteix. 2019. "Hyperparameters and Tuning Strategies for Random Forest." WIREs Data Mining and Knowledge Discovery 9 (3): e1301. https://doi.org/10.1002/widm.1301.

R Core Team. 2023. "R: A Language and Environment for Statistical Computing." Vienna, Austria: R Foundation for Statistical Computing. http://www.R-project.org/.

Reis, S., T. Liska, S. Steinle, E. Carnell, D. Leaver, E. Roberts, M. Vieno, R. Beck, and U. Dragosits. 2017. "UK Gridded Population 2011 Based on Census 2011 and Land Cover Map 2015." NERC Environmental Information Data Centre. https://doi.org/10.5285/0995e94d-6d42-40c1-8ed4-5090d82471e1.

Ricardo Energy & Environment. 2024. "Air Quality in England." 2024. https://www.airqualityengland.co.uk/.

Rittner, Ralf, Susanna Gustafsson, Mårten Spanne, and Ebba Malmqvist. 2020. "Particle Concentrations, Dispersion Modelling and Evaluation in Southern Sweden." SN Applied Sciences 2 (6): 1013. https://doi.org/10.1007/s42452-020-2769-1.

Ryan, Patrick H., and Grace K. LeMasters. 2007. "A Review of Land-Use Regression Models for Characterizing Intraurban Air Pollution Exposure." Inhalation Toxicology 19 (Suppl 1): 127–33. https://doi.org/10.1080/08958370701495998.

Rybarczyk, Yves, and Rasa Zalakeviciute. 2018. "Machine Learning Approaches for Outdoor Air Quality Modelling: A Systematic Review." Applied Sciences 8 (12): 2570. https://doi.org/10.3390/app8122570.

Scheffler, J., and M. Vieno. 2022. "European Monitoring and Evaluation Program Model for the UK (EMEP4UK) Daily Atmospheric Composition for 2002-2021." NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/ca302d30-7b8b-46ec-90b6-67b79df00c92.

Schneider, Rochelle, Ana Vicedo-Cabrera, Francesco Sera, Pierre Masselot, Massimo Stafoggia, Kees de Hoogh, Itai Kloog, Stefan Reis, Massimo Vieno, and Antonio Gasparrini. 2020. "A Satellite-Based Spatio-Temporal Machine Learning Model to Reconstruct Daily PM2.5 Concentrations across Great Britain." Remote Sensing 12 (22): 3803. https://doi.org/10.3390/rs12223803.

Scottish Government. 2024. "Scottish Air Quality." 2024. https://www.scottishairquality.scot/.

Shi, Yu, Guolin Ke, Damien Soukhavong, James Lamb, Qi Meng, Thomas Finley, Taifeng Wang, et al. 2023. "Lightgbm: Light Gradient Boosting Machine." https://cran.r-project.org/web/packages/lightgbm/index.html.

Shtein, Alexandra, Itai Kloog, Joel Schwartz, Camillo Silibello, Paola Michelozzi, Claudio Gariazzo, Giovanni Viegi, et al. 2020. "Estimating Daily PM2.5 and PM10 over Italy Using an Ensemble Model." Environmental Science & Technology 54 (1): 120–28. https://doi.org/10.1021/acs.est.9b04279.

Stafoggia, Massimo, Tom Bellander, Simone Bucci, Marina Davoli, Kees De Hoogh, Francesca De' Donato, Claudio Gariazzo, et al. 2019. "Estimation of Daily PM10 and PM2.5 Concentrations in Italy, 2013–2015, Using a Spatiotemporal Land-Use Random-Forest Model." Environment International 124 (March): 170–79. https://doi.org/10.1016/j.envint.2019.01.016.

Stafoggia, Massimo, Christer Johansson, Paul Glantz, Matteo Renzi, Alexandra Shtein, Kees de Hoogh, Itai Kloog, Marina Davoli, Paola Michelozzi, and Tom Bellander. 2020. "A Random Forest Approach to Estimate Daily Particulate Matter, Nitrogen Dioxide, and Ozone at Fine Spatial Resolution in Sweden." Atmosphere 11 (3): 239. https://doi.org/10.3390/atmos11030239.

Stafoggia, Massimo, Joel Schwartz, Chiara Badaloni, Tom Bellander, Ester Alessandrini, Giorgio Cattani, Francesca de' Donato, et al. 2017. "Estimation of Daily PM10 Concentrations in Italy (2006–2012) Using Finely Resolved Satellite Data, Land Use Variables and Meteorology." Environment International 99 (February): 234–44. https://doi.org/10.1016/j.envint.2016.11.024.

Tadić, Jovan M., Velibor Ilić, and Sebastien Biraud. 2015. "Examination of Geostatistical and Machine-Learning Techniques as Interpolators in Anisotropic Atmospheric Environments." Atmospheric Environment 111 (June): 28–38. https://doi.org/10.1016/j.atmosenv.2015.03.063.

Tian, Zhongyan, Jing Wei, and Zhanqing Li. 2023. "How Important Is Satellite-Retrieved Aerosol Optical Depth in Deriving Surface PM2.5 Using Machine Learning?" Remote Sensing 15 (15): 3780. https://doi.org/10.3390/rs15153780.

Tibshirani, Robert. 1996. "Regression Shrinkage and Selection Via the Lasso." Journal of the Royal Statistical Society: Series B (Methodological) 58 (1): 267–88. https://doi.org/10.1111/j.2517-6161.1996.tb02080.x.

Wadoux, Alexandre M. J. C., Gerard B. M. Heuvelink, Sytze De Bruin, and Dick J. Brus. 2021. "Spatial Cross-Validation Is Not the Right Way to Evaluate Map Accuracy." Ecological Modelling 457 (October): 109692. https://doi.org/10.1016/j.ecolmodel.2021.109692.

Wang, Weiyi, Daniela Fecht, Sean Beevers, and John Gulliver. 2022. "Predicting Daily Concentrations of Nitrogen Dioxide, Particulate Matter and Ozone at Fine Spatial Scale in Great Britain." Atmospheric Pollution Research 13 (8): 101506. https://doi.org/10.1016/j.apr.2022.101506.

Welsh Government. 2024. "Air Quality In Wales." 2024. https://www.airquality.gov.wales/.

World Health Organization. 2016. "Ambient Air Pollution: A Global Assesment of Exposure and Burden of Disease." World Health Organization. https://apps.who.int/iris/bitstream/handle/10665/250141/9789241511/9789241511/97892415113 53-eng.pdf?sequence=1.

Wright, Marvin N., and Andreas Ziegler. 2017. "Ranger: A Fast Implementation of Random Forests for High Dimensional Data in C++ and R." Journal of Statistical Software 77 (March): 1–17. https://doi.org/10.18637/jss.v077.i01.

Yu, Wenhua, Shanshan Li, Tingting Ye, Rongbin Xu, Jiangning Song, and Yuming Guo. 2022. "Deep Ensemble Machine Learning Framework for the Estimation of PM2.5 Concentrations." Environmental Health Perspectives 130 (3): 037004. https://doi.org/10.1289/EHP9752.

Yu, Wenhua, Tingting Ye, Yiwen Zhang, Rongbin Xu, Yadong Lei, Zhuying Chen, Zhengyu Yang, et al. 2023. "Global Estimates of Daily Ambient Fine Particulate Matter Concentrations and Unequal

Spatiotemporal Distribution of Population Exposure: A Machine Learning Modelling Study." The Lancet Planetary Health 7 (3): e209–18. https://doi.org/10.1016/S2542-5196(23)00008-6.