Stuart K. Grange

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Education

Doctor of Philosophy, Chemistry, University of York, 2019

Master's of Science with First Class Honours, Environmental Science, University of Auckland, 2011

Postgraduate Diploma in Science with Distinction, Environmental Science, University of Auckland, 2010

Bachelor of Science, Zoology and Geography, University of Otago, 2008

Employment

Current

University of Bern, Postdoctoral researcher, Bern, Switzerland, June 2025–now. A postdoctoral researcher within the Climate and Environmental Physics Division and Physics Institute. My work sits within Switzerland's Integrated Carbon Observation System (ICOS-CH) project with an emphasis on the observations collected at the high-alpine Jungfraujoch observatory.

History

Queensland University of Technology (QUT), Postdoctoral researcher, Brisbane, Australia, January 2025–May 2025. A postdoctoral researcher in the Thrive Research Unit within the International Laboratory for Air Quality & Health (ILAQH) and School of Earth and Atmospheric Sciences. My main projects are: the integration of the indoor air quality dimension into a building management system (BMS) to develop air quality management algorithms and to test if proposed indoor air quality guidelines can be achieved in an operational building (primarily by the supervision of students), acting as a coordinator for the evaluation of a handheld ultrafine particle (UFP) monitor to support good practice statements published by the World Health Organization (WHO), and the development, management, and use of environmental sensors and their observations for academic research.

Empa, Swiss Federal Laboratories for Materials Science and Technology, Scientist, Dübendorf, Switzerland, November 2022–September 2024. A scientist in the Air Pollution/Environmental Technology Laboratory and Ambient Air Pollution/NABEL group leading Zürich's CO_2 ICOS Cities sensor network data collection and analysis pipeline. My main responsibilities were to design, develop, and maintain time series data processing chains to manage the dynamic nature of the CO_2 sensor network and apply physical corrections and calibration algorithms to improve the sensors' measurement performance. My current h-index is 23.

Empa, Swiss Federal Laboratories for Materials Science and Technology, Postdoctoral researcher, Dübendorf, Switzerland, May 2019–October 2022. A researcher in the Air Pollution/Environmental Technology Laboratory and Ambient Air Pollution/NABEL group that first had a 24-month research project titled: "analysis of air quality data". This was a particulate matter (PM) characterisation project applying source apportionment, trend analysis, and exploring oxidative potential (OP). Other sub-projects included: source apportionment of black carbon (BC), trends in Switzerland's visibility, intervention activities and their effect on ambient air quality, and vehicle emissions investigations as determined by remote sensing. Further activities included the investigation of the effect of COVID-19 lockdowns on local air quality, ammonia trend analysis, and applying machine learning techniques in the air quality domain.

University of York, Visiting research associate, York, United Kingdom, May 2019–December 2024.[‡] A visiting research associate in the Wolfson Atmospheric Chemistry Laboratories (WACL) to maintain and enable collaboration between Empa and WACL.

[‡]Not employed, but on the staff list

University of York, PhD student, York, United Kingdom, April 2016–March 2019. A student studying at the Wolfson Atmospheric Chemistry Laboratories (WACL). My research focused on the development of software for the analysis of atmospheric composition data. Projects included: the enhancement of bivariate polar plots by implementing correlation and regression techniques, investigating Europe-wide trends in air quality monitoring data using the issues surrounding vehicular diesel emissions as a theme, and applications of machine learning methods to the atmospheric sciences. The beneficiary of the Wild Fund Scholarship, a placement grant used for six months at Empa, Dübendorf, Switzerland, and winner of the Kathleen Mary Stott (KMS) Prize. Defence (*viva voce*) date: February 27, 2019.

Ricardo Energy & Environment, Consultant, October 2016–April 2019, Harwell, United Kingdom.[§] A part-time consultancy role under an umbrella company. The main tasks involved giving direction and advice on technical data developments and addressing R training needs.

Ricardo Energy & Environment, Air Quality & Environment Consultant, April 2015–April 2016, Harwell, United Kingdom. A utility role with input to many projects with domain-specific and data science knowledge. Project examples included: the delivery of air quality e-Reporting documents, the development of service sensor observation services (SOS), and the processing of satellite-based air quality forecast data. Other activities include the development of internal R packages, staff training, maintenance of databases, handling of spatial data objects, HYSPLIT trajectory analysis, and involvement in presenting R data analysis workshops.

University of Auckland, Research assistant, 2011–2012 & 2013–2014, Auckland, New Zealand. Multiple projects and roles involving the management of environmental data, usually for academic publication and other classes of reporting. Projects included: deploying a low-cost ozone monitoring network, investigating pollutant patterns in a roadside environment, project-managing a personal exposure air quality field campaign, maintenance of a city-scale industrial air emission inventory, statistical analysis of woodburner emission factors, boundary layer structure and evolution research, and the influences of meteorology at different scales on local air quality.

Aeroqual Limited, Technical advisor, March 2012–December 2012, Auckland, New Zealand. Within the technical team and responsible tasks included the reporting and delivery of air quality monitoring data, the calibration of particulate monitors and gas analysers, and performance testing of Aeroqual Limited's environmental air quality monitors.

GNS Science, Air particulates technician, October 2010–May 2011, Lower Hutt, New Zealand. Scientific contribution to air quality research with an emphasis on particulate matter. Set-up, siting, and operation of air quality monitoring equipment. Operation and loading of a particle accelerator for source apportionment of particulate matter by proton-induced X-ray emission (PIXE).

GNS Science, Stable isotopes laboratory technician, October 2010–May 2011, Lower Hutt, New Zealand. Extraction and preparation of samples for light stable isotope analysis (H, O, N, C, and S). Routine operation of several IRMS mass spectrometers.

AsureQuality Limited, Pesticide residue analysis laboratory technician, November 2008–October 2009, Lower Hutt, New Zealand. Preparation of samples such as fruit, vegetables, grain, milk products, fish, honey, water (and *et al.*) for future extraction techniques in accordance with various internal and external standards. Solvent extraction methods of the above sample types with a particular emphasis on a variety of clean-up procedures. Routine gas chromatograph-mass spectrometer (GC-MS) maintenance, operation, and data processing.

Referees

Dr. Christoph Hüglin, Group leader, Air Pollution/Environmental Technology Laboratory, Empa, Swiss Federal Laboratories for Materials Science and Technology, +41 58 765 4654, christoph.hueglin@empa.ch

Dr. David Carslaw, Professor, Department of Chemistry, University of York, +44 1904 324753, david.carslaw@york.ac.uk

Dr. Jennifer (Jenny) Salmond, Professor, Environment, University of Auckland, +64 9923 8650, j.salmond@auckland.ac.nz

[§]Not employed directly, but through an intermediary company, Matchtech Group (UK) Ltd.

Computer programming skills

Languages: R, Python, SQL, Bash

Databases: SQLite, MySQL, and PostgreSQL (with PostGIS)

Mapping: Leaflet

Document preparation: LaTeX, Markdown

Teaching

R training courses[‡]

June 2024 (three sessions), Clean Air Society of Australia and New Zealand (CASANZ) Advanced R/openair online training

June–July 2023 (three sessions), Clean Air Society of Australia and New Zealand (CASANZ) Advanced R/openair online training

November 2022 (three sessions), Clean Air Society of Australia and New Zealand (CASANZ) Advanced R/openair online training

November 26, 2018, Ricardo Energy & Environment, Glasgow, United Kingdom

May 30, 2018, Ricardo Energy & Environment, London, United Kingdom

March 3, 2018, University of York, York, United Kingdom

April 25, 2017, Ricardo Energy & Environment, Glasgow, United Kingdom

January 31, 2017, Ricardo Energy & Environment, Harwell, United Kingdom

December 14, 2015, Aarhus University, Roskilde, Denmark

Prizes and awards

Kathleen Mary Stott (KMS) Prize, PhD research excellence, October 2018

Wild Chemistry Fund Scholarship, Support for international PhD students, October 2016–February 2019

Best student presentation award, The Meteorological Society of New Zealand Annual Conference, Nelson, New Zealand, November 14–15, 2011

GNS Science Master's of Science support, January 2010–November 2011

Outstanding scholarship for Physical Education, National Certificate of Educational Achievement (NCEA) level 3, December 2005

Approved research projects

The Swiss National Science Foundation (SNSF), Postdoc.Mobility, awarded in June 2022, CHF 115 600 (EUR 114 000/GBP 97 000/USD 118 000) but declined in July 2022

[‡]Generally three-day courses with David Carslaw

Publications

Brunner, D., Suter, I., Bernet, L., Constantin, L., Grange, S. K., Rubli, P., Li, J., Chen, J., Bigi, A., and Emmenegger, L. (2025). Building-resolving simulations of anthropogenic and biospheric CO_2 in the city of Zurich with GRAMM/GRAL. *EGUsphere (under review for Atmospheric Chemistry and Physics)*, pp. 1–34. URL: https://egusphere.copernicus.org/preprints/2025/egusphere-2025-640.

Grange, S. K., Rubli, P., Fischer, A., Brunner, D., Hueglin, C., and Emmenegger, L. (2025). The ZiCOS-M CO_2 sensor network: measurement performance and CO_2 variability across Zurich. *Atmospheric Chemistry and Physics* 25.5, pp. 2781–2806. URL: https://acp.copernicus.org/articles/25/2781/2025/.

Liu, Y., Jin, B., Zhang, X., Liu, X., Wang, T., Thuy Dinh, V. N., Jaffrezo, J.-L., Uzu, G., Dominutti, P., Darfeuil, S., Favez, O., Conil, S., Marchand, N., Castillo, S., de la Rosa, J. D., Grange, S. K., Hueglin, C., Eleftheriadis, K., Diapouli, E., Manousakas, M.-I., Gini, M., Calzolai, G., Alves, C., Monge, M., Reche, C., Harrison, R. M., Hopke, P. K., Alastuey, A., and Querol, X. (2025). Source apportionment of PM_{10} particles in the urban atmosphere using PMF and LPO-XGBoost. *Environmental Research*, p. 121659. URL: https://www.sciencedirect.com/science/article/pii/S0013935125009107.

Liu, X., Zhang, X., Wang, T., Jin, B., Wu, L., Lara, R., Monge, M., Reche, C., Jaffrezo, J.-L., Uzu, G., Dominutti, P., Darfeuil, S., Favez, O., Conil, S., Marchand, N., Castillo, S., Rosa, J. D. de la, Grange, S., Eleftheriadis, K., Diapouli, E., Gini, M. I., Nava, S., Alves, C., Wang, X., Xu, Y., Green, D. C., Beddows, D. C. S., Harrison, R. M., Alastuey, A., and Querol, X. (2024). PM_{10}-bound trace elements in pan-European urban atmosphere. *Environmental Research* 260, p. 119630. URL: https://www.sciencedirect.com/science/article/pii/S0013935124015354.

Borlaza, L. J., Ngoc Thuy, V. D., Grange, S., Socquet, S., Moussu, E., Mary, G., Favez, O., Hueglin, C., Jaffrezo, J.-L., and Uzu, G. (2023). Impact of COVID-19 lockdown on particulate matter oxidative potential at urban background versus traffic sites. *Environmental Science: Atmospheres*. URL: http://dx.doi.org/10.1039/D3EA00013C.

Colombi, N. K., Jacob, D. J., Yang, L. H., Zhai, S., Shah, V., Grange, S. K., Yantosca, R. M., Kim, S., and Liao, H. (2023). Why is ozone in South Korea and the Seoul metropolitan area so high and increasing? *Atmospheric Chemistry and Physics* 23.7, pp. 4031–4044. URL: https://acp.copernicus.org/articles/23/4031/2023/.

Grange, S. K., Sintermann, J., and Hueglin, C. (2023). Meteorologically normalised long-term trends of atmospheric ammonia (NH_3) in Switzerland/Liechtenstein and the explanatory role of gas-aerosol partitioning. *Science of The Total Environment* 900, p. 165844. URL: https://www.sciencedirect.com/science/article/pii/S0048969723044698.

Warburton, T., Grange, S. K., Hopkins, J. R., Andrews, S. J., Lewis, A. C., Owen, N., Jordan, C., Adamson, G., and Xia, B. (2023). The impact of plug-in fragrance diffusers on residential indoor VOC concentrations. *Environmental Science: Processes & Impacts*. URL: http://dx.doi.org/10.1039/D2EM00444E.

Brighty, A., Jacob, V., Uzu, G., Borlaza, L., Conil, S., Hueglin, C., Grange, S. K., Favez, O., Trébuchon, C., and Jaffrezo, J.-L. (2022). Cellulose in atmospheric particulate matter at rural and urban sites across France and Switzerland. *Atmospheric Chemistry and Physics* 22.9, pp. 6021–6043. URL: https://acp.copernicus.org/articles/22/6021/2022/.

Grange, S. K., Uzu, G., Weber, S., Jaffrezo, J.-L., and Hueglin, C. (2022). Linking Switzerland's PM_{10} and $PM_{2.5}$ oxidative potential (OP) with emission sources. *Atmospheric Chemistry and Physics* 22.10, pp. 7029–7050. URL: https://acp.copernicus.org/articles/22/7029/2022/.

Lovrić, M., Antunović, M., Šunić, I., Vuković, M., Kecorius, S., Kröll, M., Bešlić, I., Godec, R., Pehnec, G., Geiger, B. C., Grange, S., and Šimić, I. (2022). Machine Learning and Meteorological Normalization for Assessment of Particulate Matter Changes during the COVID-19 Lockdown in Zagreb, Croatia. *International Journal of Environmental Research and Public Health* 19.11. URL: https://www.mdpi.com/1660-4601/19/11/6937.

Shaw, J. T., Allen, G., Topping, D., Grange, S. K., Barker, P., Pitt, J., and Ward, R. S. (2022). A case study application of machine-learning for the detection of greenhouse gas emission sources. *Atmospheric Pollution Research* 13.10, p. 101563. URL: https://www.sciencedirect.com/science/article/pii/S1309104222002446.

Grange, S. K., Fischer, A., Zellweger, C., Alastuey, A., Quero, X., Jaffrezo, J.-l., Weber, S., Uzu, G., and Hueglin, C. (2021a). Switzerland's PM_{10} and $PM_{2.5}$ environmental increments show the importance of non-exhaust emissions. *Atmospheric Environment: X* 12, p. 100145. URL: https://www.sciencedirect.com/science/article/pii/S2590162121000459.

Grange, S. K., Lee, J. D., Drysdale, W. S., Lewis, A. C., Hueglin, C., Emmenegger, L., and Carslaw, D. C. (2021b). COVID-19 lockdowns highlight a risk of increasing ozone pollution in European urban areas. *Atmospheric Chemistry and Physics* 21.5, pp. 4169–4185. URL: https://acp.copernicus.org/articles/21/4169/2021/.

Heeley-Hill, A. C., Grange, S. K., Ward, M. W., Lewis, A. C., Owen, N., Jordan, C., Hodgson, G., and Adamson, G. (2021). Frequency of use of household products containing VOCs and indoor atmospheric concentrations in homes. *Environmental Science: Processes & Impacts* 23 (5), pp. 699–713. URL: http://dx.doi.org/10.1039/D0EM00504E.

Boleti, E., Hueglin, C., Grange, S. K., Prévôt, A. S. H., and Takahama, S. (2020). Temporal and spatial analysis of ozone concentrations in Europe based on timescale decomposition and a multi-clustering approach. *Atmospheric Chemistry and Physics* 20.14, pp. 9051–9066. URL: https://www.atmos-chem-phys.net/20/9051/2020/.

Grange, S. K., Lötscher, H., Fischer, A., Emmenegger, L., and Hueglin, C. (2020a). Evaluation of equivalent black carbon source apportionment using observations from Switzerland between 2008 and 2018. *Atmospheric Measurement Techniques* 13.4, pp. 1867–1885. URL: https://www.atmos-meas-tech.net/13/1867/2020/.

Grange, S. K., Farren, N. J., Vaughan, A. R., Davison, J., and Carslaw, D. C. (2020b). Post-Dieselgate: Evidence of NO_x Emission Reductions Using On-Road Remote Sensing. *Environmental Science and Technology Letters* 7.6, pp. 382–387. URL: https://doi.org/10.1021/acs.estlett.0c00188.

Lovrić, M., Pavlović, K., Vuković, M., Grange, S. K., Haberl, M., and Kern, R. (2020). Understanding the true effects of the COVID-19 lockdown on air pollution by means of machine learning. *Environmental Pollution*, p. 115900. URL: http://www.sciencedirect.com/science/article/pii/S0269749120365891.

Grange, S. K. and Carslaw, D. C. (2019). Using meteorological normalisation to detect interventions in air quality time series. *Science of The Total Environment* 653, pp. 578–588. URL: http://www.sciencedirect.com/science/article/pii/S004896971834244X.

Grange, S. K., Farren, N. J., Vaughan, A. R., Rose, R. A., and Carslaw, D. C. (2019). Strong Temperature Dependence for Light-Duty Diesel Vehicle NO_x Emissions. *Environmental Science & Technology* 53.11, pp. 6587–6596. URL: https://doi.org/10.1021/acs.est.9b01024.

Bigi, A., Mueller, M., Grange, S. K., Ghermandi, G., and Hueglin, C. (2018). Performance of NO, NO_2 low cost sensors and three calibration approaches within a real world application. *Atmospheric Measurement Techniques* 11.6, pp. 3717–3735. URL: https://www.atmos-meas-tech.net/11/3717/2018/.

Grange, S. K., Carslaw, D. C., Lewis, A. C., Boleti, E., and Hueglin, C. (2018). Random forest meteorological normalisation models for Swiss PM_{10} trend analysis. *Atmospheric Chemistry and Physics* 18.9, pp. 6223–6239. URL: https://acp.copernicus.org/articles/18/6223/2018.

Hu, L., Keller, C. A., Long, M. S., Sherwen, T., Auer, B., Da Silva, A., Nielsen, J. E., Pawson, S., Thompson, M. A., Trayanov, A. L., Travis, K. R., Grange, S. K., Evans, M. J., and Jacob, D. J. (2018). Global simulation of tropospheric chemistry at 12.5 km resolution: performance and evaluation of the GEOS-Chem chemical module (v10-1) within the NASA GEOS Earth system model (GEOS-5 ESM). *Geoscientific Model Development* 11.11, pp. 4603–4620. URL: https://www.geosci-model-dev.net/11/4603/2018/.

Grange, S. K., Lewis, A. C., Moller, S. J., and Carslaw, D. C. (2017). Lower vehicular primary emissions of NO_2 in Europe than assumed in policy projections. *Nature Geoscience*‡ 10.12, pp. 914–918. URL: https://doi.org/10.1038/s41561-017-0009-0.

Weissert, L., Salmond, J., Miskell, G., Alavi-Shoshtari, M., Grange, S., Henshaw, G., and Williams, D. (2017). Use of a dense monitoring network of low-cost instruments to observe local changes in the diurnal ozone cycles as marine air passes over a geographically isolated urban centre. *Science of The Total Environment* 575, pp. 67–78. URL: http://www.sciencedirect.com/science/article/pii/S004896971632160X.

Grange, S. K., Lewis, A. C., and Carslaw, D. C. (2016). Source apportionment advances using polar plots of bivariate correlation and regression statistics. *Atmospheric Environment* 145, pp. 128–134. URL: http://www.sciencedirect.com/science/article/pii/S1352231016307166.

Miskell, G., Salmond, J., Alavi-Shoshtari, M., Bart, M., Ainslie, B., Grange, S., Mckendry, I., Henshaw, G., and Williams, D. E. (2015). Data verification tools for minimizing management costs of dense air-quality monitoring networks. *Environmental Science & Technology* 50.2, pp. 835–846. URL: http://dx.doi.org/10.1021/acs.est.5b04421.

Bart, M., Williams, D., Ainslie, B., McKendry, I., Salmond, J., Grange, S., Alavi-Shoshtari, M., Steyn, D., and Henshaw, G. (2014). High Density Ozone Monitoring using Gas Sensitive Semi-Conductor Sensors in the

‡Featured on the cover of the journal's issue

Lower Fraser Valley, British Columbia. *Environmental Science & Technology* 48.7, pp. 3970–3977. URL: https://pubs.acs.org/doi/10.1021/es404610t.

Grange, S. K., Dirks, K. N., Costello, S. B., and Salmond, J. A. (2014). Cycleways and footpaths: What separation is needed for equivalent air pollution dose between travel modes? *Transportation Research Part D: Transport and Environment* 32.0, pp. 111–119. URL: http://www.sciencedirect.com/science/article/pii/S1361920914000996.

Grange, S. K., Salmond, J. A., Trompetter, W. J., Davy, P. K., and Ancelet, T. (2013). Effect of atmospheric stability on the impact of domestic wood combustion to air quality of a small urban township in winter. *Atmospheric Environment* 70, pp. 28–38. URL: http://www.sciencedirect.com/science/article/pii/S1352231013000411.

Trompetter, W. J., Grange, S. K., Davy, P. K., and Ancelet, T. (2013). Vertical and temporal variations of black carbon in New Zealand urban areas during winter. *Atmospheric Environment* 75, pp. 179–187. URL: http://www.sciencedirect.com/science/article/pii/S1352231013002902.

Conference papers and presentations

Bernet, L., Constantin, L., Emmenegger, L., Grange, S. K., Hüglin, C., Rubli, P., and Brunner, D. (2025). CO_2 emission estimates in the city of Zurich: combining building-resolved modelling with a dense urban monitoring network. DACH 2025 Conference. June 23–28, 2025. Oeschger Center, University of Bern, Switzerland. URL: https://drive.google.com/file/d/19h1Yd1404MkxDhI_Jei65CRE4eXAU_iT/view?usp=drive_link.

Emmenegger, L., Bernet, L., Constantin, L., Christen, A., Fischer, A., Grange, S. K., Hammer, S., Hörger, C., Hüglin, C., Kljun, N., Marbet, S., Molinier, B., Ponomarev, N., Rubli, P., Stagakis, S., and Brunner, D. (2025). Towards observation-based CO_2 emission estimates for the city of Zürich – a lively journey. Urban Greenhouse Gas Conference and Stakeholder Summit 2025. April 7–9, 2025. Geneva, Switzerland. URL: https://drive.google.com/file/d/1pdgt4xyJu5Xe2Td_mFmb7Ahg46xaofoj/view?usp=drive_link.

Grange, S. K., Jayaratne, R., Josa-Cullere, A., Brown, A., Kumar, P., Green, L., Green, D., Fierz, M., Asbach, C., Hueglin, C., Patel, H., Silvonen, V., Rönkkö, T., Timonen, H., Teinilä, K., Petäjä, T., Niemi, J., Lazaridis, M., Chatoutsidou, S. E., Wang, H., Stabile, L., Buonanno, G., Chen, H., Zhu, Y., Alastuey, A., Querol, X., Baron, L., and Morawska, L. (2025). Evaluation of the Naneos Partector 2 Pro ultrafine particle monitor to support WHO's 2021 good practice statements. 6th Workplace & Indoor Aerosols Conference (WIAC2025), May 6–8, 2025. Gaeta, Latina, Lazio, Italy. Presented by Lidia Morawska. URL: https://drive.google.com/file/d/1At68emaicrb1h7JIwNHkrS--VRtmg-fP/view?usp=drive_link.

Karvonen, A., Havu, M., Grange, S. K., Ponomarev, N., Stagakis, S., Molinier, B., Kljun, N., Brunner, D., Emmenegger, L., and Järvi, L. (2025). Utilizing urban land surface model SUEWS to estimate effects of green infrastructures to carbon and heat balances in Zürich, Switzerland. ICUC12 – 12th International Conference on Urban Climate. July 7–11, 2025. Rotterdam, The Netherlands. URL: https://drive.google.com/file/d/1QrtOxa3IuNuO7OCvMjoOBcMKLrbdV_X3/view?usp=drive_link.

Zhao, B., Grange, S. K., Gupta, U., Larbi, M., and Morawska, L. (2025). Enhancing Existing BMS Capabilities for Indoor Air Quality Optimization. Clean Indoor Air for ALL conference. 13–15 October, 2025, Amora Riverwalk Melbourne. URL: https://drive.google.com/file/d/1w1-12mglHmkSzgwJpZc84pwM5Hasno51/view?usp=drive_link.

Aigner, P., Kühbacher, D., Wenzel, A., Schmitt, A., Böhm, F., Makowski, M., Kürzinger, K., Laurent, O., Rubli, P., Grange, S., Emmenegger, L., and Chen, J. (2024). ACROPOLIS. Autonomous and Calibrated Roof-top Observatory for MetroPOLItan Sensing. ICOS Science Conference 2024. September 10–12, 2024, Versailles Palais des Congrès, France. URL: https://drive.google.com/file/d/1cJ6IA7yW-NWQREARGQmmO3YpuXJEOUTj/view?usp=drive_link.

Emmenegger, L., Bernet, L., Brunner, D., Christen, A., D'Onofrio, C., Fischer, A., Hammer, S., Grange, S., Hilland, R., Järvi, L., Kunz, A.-K., Kutsch, W., Kljun, N., Mauder, M., Mensah, A. A., Rubli, P., Stagakis, S., Vermeulen, A., Vogt, R., and the ICOS Cities team (2024). ICOS Cities: Observation-based greenhouse gas emissions monitoring: first results from the Zürich pilot city. 14th International Conference on Air Quality, Helsinki, Finland, 13–17 May, 2024; a poster presentation. URL: https://drive.google.com/file/d/1IrwZN8twPxIBPz5vG0fm6szGOpQW9uBd/view?usp=sharing.

Grange, S., Rubli, P., Fischer, A., Hueglin, C., Ponomarev, N., Brunner, D., and Emmenegger, L. (2024a). Design, deployment, and insights from Zürich city's mid- and low-cost CO_2 sensor network. EGU General Assembly 2024, Vienna, Austria, 14–19 April 2024, EGU24-5221. Session AS3.38 – Science-based, measurement-based greenhouse gas monitoring and emission estimates in support of national, sub-national, city and industrial

climate change mitigation. Presented by Lukas Emmenegger. URL: https://drive.google.com/file/d/1OYAB7ot6BW25zf6MRwji71z85tDICri_/view?usp=sharing.

Grange, S. K. (2024). Robust trend analysis and intervention detection of air pollutants with the use of machine learning models. Clean Air Society of Australia and New Zealand (CASANZ) AIR TALKS 2024 – Modelling. Presented online on February 29, 2024. URL: https://drive.google.com/file/d/1TUqrUjs9gt4SpwE1AxEPcJaEV1u8gZZQ/view?usp=drive_link.

Grange, S. K., Rubli, P., Fischer, A., Hueglin, C., Ponomarev, N., Brunner, D., and Emmenegger, L. (2024b). Design, operation, and insights from Zürich city's mid- and low-cost ICOS Cities CO_2 sensor network. ICOS Science Conference 2024, September 10–12 2024, Versailles Palais des Congrès, France. URL: https://drive.google.com/file/d/1LjuGZPcwwe_DfAIQDyUFJUTEqmVmoWDC/view?usp=drive_link.

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