

# List of research activities

2023

CEREA



## **Atmospheric Environment Center**

### **École des Ponts & EDF R&D**

6-8 avenue Blaise Pascal  
Cité Descartes, Champs-sur-Marne  
77455 Marne-la-Vallée cedex 02, France  
Tel.: +33 (0) 1 64 15 21 57

<http://www.cerea-lab.fr>

**Director: Patrick Massin**

**Deputy director: Marc Bocquet**

**Deputy director: Martin Ferrand**

### Permanent research staff and faculty

MASSIN Patrick, EDF R&D, Director, PhD, HDR  
BOCQUET Marc, École des Ponts ParisTech, Senior Researcher, IGPEF, and Professor, PhD, HDR  
FERRAND Martin, EDF R&D, Research Engineer and Lecturer, PhD  
SARTELET Karine, École des Ponts ParisTech, Research Scientist, DR1, PhD, HDR  
FARCHI Alban, École des Ponts ParisTech, Research Scientist, IPEF, PhD  
KIM Youngseob, École des Ponts ParisTech, Research Engineer, PhD  
ROUSTAN Yelva, École des Ponts ParisTech, Research Scientist, CRHC, PhD, HDR

### Administrative staff

PERIAC Lydie, École des Ponts ParisTech

### Engineers

HERARD Jean-Marc, EDF R&D, Senior Researcher, EDF R&D, PhD, HDR  
BENHAMADOUCHE Sofiane, EDF R&D, Expert Researcher, PhD, HDR  
BONNEL Jérôme, EDF R&D, Expert Researcher, PhD  
DUPONT Éric, EDF R&D, Expert Researcher, PhD  
MINIER Jean Pierre, EDF R&D, Expert Researcher  
CARUYER Céline, EDF R&D, Research Engineer, PhD  
CHARLATCKA Rayna, EDF R&D, Research Engineer, PhD  
CHARWATH Marcus, EDF R&D, Research Engineer  
CUILHE Benoît, École des Ponts ParisTech, Research Engineer  
DEFOSSEZ Arièle EDF R&D, Research Engineer  
DEMENGEL Dominique, EDF R&D, Research Engineer  
LAB Maxence, École des Ponts ParisTech, Research Engineer  
LEFRANC Yannick, EDF R&D, Research engineer  
LE GUENNIC Clémentine, EDF R&D, Research engineer  
MOURADI REM Sophia, EDF R&D, Research Engineer, PhD  
NORDDINE Thomas, EDF R&D, Research Engineer  
PAYRE Camille, EDF R&D, Research Engineer, PhD  
QUEMENER Aurélie, École des Ponts ParisTech, Research Engineer, PhD  
DE VILLEROCHÉ Armand, École des Ponts ParisTech, Research Engineer  
WALD Jean-Francois, EDF R&D, Research Engineer, PhD  
WALL RIBOT Bénédicte, EDF R&D, Research Engineer, PhD  
WENDUM Denis, EDF R&D, Research Engineer

### Technicians

FAUCHEUX Aurélien, École des Ponts ParisTech, Technician

### Post-doctoral scientists

AMIOT Baptiste, École des Ponts ParisTech, PhD  
CHARRADI Bacem, École des Ponts ParisTech, PhD  
DUMONT LE BRAZIDEC Joffrey, École des Ponts ParisTech, PhD  
DURAND Antoine, École des Ponts ParisTech, PhD  
FAVRE Luc, École des Ponts ParisTech, PhD  
FINN Tobias, École des Ponts ParisTech, PhD  
LANNUQUE Victor, École des Ponts ParisTech, PhD  
LUGON CORNEJO VON MARTTENS Lya, École des Ponts ParisTech, PhD  
NARVAEZ CAMPO Gabriel, École des Ponts ParisTech, PhD  
PARK Soo-Jin, École des Ponts ParisTech, PhD  
SUYANG Lou, École des Ponts ParisTech, PhD  
VANDERBECKEN Pierre, École des Ponts ParisTech, PhD

### Emeritus and Associated Researchers

CARISSIMO Bertrand, École des Ponts ParisTech, Senior Researcher and Associate Professor, PhD, HDR  
BEAUCHENE Christian, École des Ponts ParisTech, Researcher  
MUSSON-GENON Luc, École des Ponts ParisTech, Researcher, PhD

### Ph.D. students

AMINO GALENTE Hector, EDF R&D, ED SIE  
BALVET Guilhem, EDF R&D, ED SIE  
BOUNOUAS Hanane, IRSN, École des Ponts ParisTech, ED SIE  
DURAND Charlotte, École des Ponts ParisTech, ED SIE  
JACQUOT Oscar, École des Ponts ParisTech, ED SIE  
JOSE Jerry, École des Ponts ParisTech, ED SIE  
LAB Maxence, École des Ponts ParisTech, ED SIE  
LADET Daphné, Total, École des Ponts ParisTech, ED SIE  
LANNES Marjolaine École des Ponts ParisTech, ED SIE  
LAUNAY Émilie, LCPP, École des Ponts ParisTech, ED SIE  
LEBAYON Aurélien, École des Ponts ParisTech, ED SIE  
LETOURNEL Pierre, CEA, École des Ponts ParisTech, ED SIE  
MAISON Alice, École des Ponts ParisTech, ED SIE  
SARICA Thibaud, École des Ponts ParisTech, ED SIE  
SQUARCIONI Alexis, École des Ponts ParisTech, ED SIE  
WANG Yunyi, École des Ponts ParisTech, EDF R&D, ED SIE  
WANG Zhizhao, École des Ponts ParisTech, ED SIE

### Interns

DISSON Lucas, ENS Lyon

## Published articles in peer-reviewed international journals

1. **J. Dumont Le Brazidec, M. Bocquet, O. Saunier, and Y. Roustan**, “Bayesian transdimensional inverse reconstruction of the  $^{137}\text{Cs}$  Fukushima-Daiichi release,” *Geosci. Model Dev.*, vol. 2022, pp. 1–23, 2023, [https://doi: 10.5194/gmd-2022-168](https://doi.org/10.5194/gmd-2022-168).
2. **M. Bocquet**, “Surrogate modelling for the climate sciences dynamics with machine learning and data assimilation,” *Front. Appl. Math. Stat.*, vol. 9, 2023, [https://doi: 10.3389/fams.2023.1133226](https://doi.org/10.3389/fams.2023.1133226).
3. **P. J. Vanderbecken, J. Dumont Le Brazidec, A. Farchi, M. Bocquet, Y. Roustan, É. Potier and G. Broquet**, “Accounting for meteorological biases in simulated plumes using smarter metrics”, *Atmos. Meas. Techniques*, vol. 16, nb. 6, pp. 1745-1766, 2023, [https://doi: 10.5194/amt-16-1745-2023](https://doi.org/10.5194/amt-16-1745-2023).
4. S. Cheng, C. Quilodran-Casas, S. Ouala, **A. Farchi**, C. Liu, P. Tandeo, R. Fablet, D. Lucor, B. Iooss, J. Brajard, D. Xiao, T. Janjic, W. Ding, Y. Guo, A. Carrassi, **M. Bocquet**, and R. Arcucci, “Machine learning with data assimilation and uncertainty quantification for dynamical systems: a review,” *IEEE/CAA Journal of Automatica Sinica*, vol. 10, pp. 1361–1387, 2023, [https://doi: 10.1109/JAS.2023.123537](https://doi.org/10.1109/JAS.2023.123537).
5. **T. S. Finn, C. Durand, A. Farchi, M. Bocquet, Y. Chen, A. Carrassi, and V. Dansereau**, “Deep learning subgrid-scale parametrisations for short-term forecasting of sea-ice dynamics with a Maxwell elasto-brittle rheology,” *The Cryosphere*, 17, pp. 2965–2991, 2023, <https://doi.org/10.5194/tc-17-2965-2023>.
6. **J. Dumont Le Brazidec, P. Vanderbecken, A. Farchi, M. Bocquet, J. Lian, G. Broquet, G. Kuhlmann, A. Danjou, and T. Lauvaux**. “Segmentation of XCO<sub>2</sub> images with deep learning: application to synthetic plumes from cities and power plants”, *Geosci. Model Dev.*, 16, 3997–4016, <https://doi.org/10.5194/gmd-16-3997-2023>, 2023.
7. **A. Farchi, M. Chrust, M. Bocquet, P. Laloyaux, and M. Bonavita**, “Online Model Error Correction With Neural Networks in the Incremental 4D-Var Framework,” *Journal of Advances in Modeling Earth Systems*, vol. 15, no. 9, p. e2022MS003474, 2023, <https://doi.org/10.1029/2022MS003474>.
8. A. U. Schmitt, F. Ament, F. Burgemeister, H. Dorff, **T. S. Finn**, A. Hansen, B. Kirsch, I. Lange, and J. Radtke, “Assessing the weather conditions for urban cyclists by spatially dense measurements with an agent-based approach,” *Meteorological Applications*, vol. 30, no. 6, p. e2164, 2023, <https://doi.org/10.1002/met.2164>.
9. C. Burgard, N. C. Jourdain, P. Mathiot, R. S. Smith, R. Schäfer, J. Caillet, **T. S. Finn**, and J. E. Johnson, “Emulating Present and Future Simulations of Melt Rates at the Base of Antarctic Ice Shelves With Neural Networks,” *Journal of Advances in Modeling Earth Systems*, vol. 15, no. 12, p. e2023MS003829, 2023, <https://doi.org/10.1029/2023MS003829>.
10. **V. Lannuque, D'Anna, B., Kostenidou, E., Couvidat, F., Martinez-Valiente, A., Eichler, P., Wisthaler, A., Müller, M., Temime-Roussel, B., Valorso, R., and Sartelet, K.**, “Gas-particle partitioning of toluene oxidation products: an experimental and modeling study”, *Atmos. Chem. Phys.*, 23, 15537-15560, 2023, <https://doi.org/10.5194/acp-23-15537-2023>

11. **Z. Wang**, Couvidat, F. and **Sartelet, K.**, “Implementation of a parallel reduction algorithm in the GENERator of reduced Organic Aerosol mechanisms (GENOA v2.0): Application to multiple monoterpene aerosol precursors”, *J. Aer. Sci.*, 174, 106248, 2023, <https://doi.org/10.1016/j.jaerosci.2023.106248>.
12. **T. Sarica, Maison, A., Roustan, Y., Ketzel, M., Jensen, S. S., Kim, Y., Chaillou, C., and Sartelet, K.**, “Modelling concentration heterogeneities in streets using the street-network model MUNICH”, *Geosci. Model Dev.*, 16, 5281-5303, 2023, <https://doi.org/10.5194/gmd-16-5281-2023>.
13. **T. Sarica, Sartelet K., Roustan Y., Kim Y., Lugon L., Marques B., D'Anna B., Chaillou C., Larrie C.**, “Sensitivity of pollutant concentrations in urban streets to asphalt and traffic-related emissions”, *Environ. Poll.*, 332, 121955, 2023, <https://doi.org/10.1016/j.envpol.2023.121955>.
14. C. Lin, Ooka R., Kikumoto H., Flageul C., **Kim Y., Wang Y., Maison A., Zhang Y., Sartelet K.**, “Large-eddy simulations on pollutant reduction effects of road-center hedge and solid barriers in an idealized street canyon”, *Building and Environment*, 241, 110464, 2023, <https://doi.org/10.1016/j.buildenv.2023.110464>.
15. **Wang, Y., Flageul, C., Maison, A., Carissimo, B. and Sartelet, K.**, “Impact of trees on gas concentrations and condensables in a 2-D street canyon using CFD coupled to chemistry modeling”, *Environ. Poll.*, 323, 121210, 2023, <https://doi.org/10.1016/j.envpol.2023.121210>.
16. Lin, C., **Wang, Y., Ooka, R., Flageul, C., Kim, Y., Kikumoto, H., Wang, Z., and Sartelet, K.**, “Modeling of street-scale pollutant dispersion by coupled simulation of chemical reaction, aerosol dynamics, and CFD”, *Atmos. Chem. Phys.*, 23, 1421-1436, 2023, <https://doi.org/10.5194/acp-23-1421-2023>.
17. Fiorentino E.-A., Chen H., Gandolfo A., **Lannuque V., Sartelet K.**, Wortham H., “Measurements and Modelling of OH and Peroxy Radicals in an Indoor Environment Under Different Light Conditions and VOC Levels”, *Atmos. Environ.*, 292, 119398, 2023, <https://doi.org/10.1016/j.atmosenv.2022.119398>.
18. **G. Balvet, J.-P. Minier, C. Henry, Y. Roustan and M. Ferrand**, “A time-step-robust algorithm to compute particle trajectories in 3-D unstructured meshes for Lagrangian stochastic methods,” *Monte Carlo Methods and Applications*, vol. 29, no. 2, pp. 95-126, 2023, <https://doi.org/10.1515/mcma-2023-2002>.
19. **G. Balvet, J.-P. Minier, Y. Roustan and M. Ferrand**, “Analysis of wall-modelled particle/mesh PDF methods for turbulent parietal flows,” *Monte Carlo Methods and Applications*, vol. 29, no. 4, pp. 275-305, 2023, <https://doi.org/10.1515/mcma-2023-2017>.
20. **T. Norddine, M. Ferrand, S. Benhamadouche** (2023) Realizability-preserving time-stepping for the differential Reynolds stress turbulence models. *Journal of Computational Physics*. <https://10.1016/j.jcp.2023.112511>
21. F. Souillé, C. Goeury, **R.S. Mouradi** (2023) Uncertainty analysis of single- and multiple-size-class frazil ice models. *CRYOSPHERE*. <https://10.5194/tc-17-1645-2023>
22. **M. Ferrand, J.-M. Hérard, T. Norddine, S. Ruget** (2023). Stable schemes for second-moment turbulent models for incompressible flows. *Comptes Rendus. Mécanique*, 351, 337-353, 10.5802/crmeca.202, <https://hal.archives-ouvertes.fr/hal-03776133>
23. T. Wang T., H. Liu, J. Li, S. Wang, **Y. Kim, Y. Sun, W. Yang, H. Du, Z. Wang** (2023) A two-way coupled regional urban-street network air quality model system for Beijing, China. *Geoscientific Model Development*. <https://10.5194/gmd-16-5585-2023>.

## Peer-reviewed chapters and proceedings

1. C. Gruzien and **M. Bocquet**, “A tutorial on Bayesian Data Assimilation,” in Applications of Data Assimilation and Inverse Problems in the Earth Sciences, A. Ismail-Zadeh, F. Castelli, D. Jones, and S. Sanchez, Eds. Cambridge: Cambridge University Press, 2023, pp. 27–48. [https://doi:10.1017/9781009180412](https://doi.org/10.1017/9781009180412).

## Non-peer-reviewed chapters and proceedings

1. **M. Bocquet**, and **A. Farchi**, “L’IA au service des géosciences et de la prévision du temps,” in *TRANSITIONS. Modèles et données pour l’environnement*, T. Lelièvre and D. Picard, Eds. Champs-sur-Marne: Les Presses des Ponts, 2023, pp. 50–57.
2. **K. Sartelet**, E. Athanasopoulou, B.R. Denby, E. Gerasopoulos, H. Fagerli and M. Kanakidou. “Definition of subgrid variability”, 2023. [https://riurbans.eu/wp-content/uploads/2023/06/RI-URBANS\\_M16.pdf](https://riurbans.eu/wp-content/uploads/2023/06/RI-URBANS_M16.pdf)
3. **K. Sartelet**, Hoek G., Athanasopoulou E., Bousiotis D., Dugay F., Harrison R., Hofman J., Ilie A., Kerckhoffs J., **Lugon L.**, Nicolae D., **Park S.**, Pope F., , Talianu C., Valari M., Vanpoppel M., Vasilescu J., Zhong J., “Mapping pollutants related to health effects”, RI-urbans milestone M21, 2023, [https://riurbans.eu/wp-content/uploads/2023/10/RI-URBANS\\_M21.pdf](https://riurbans.eu/wp-content/uploads/2023/10/RI-URBANS_M21.pdf)

## International conference oral presentations

1. **H. Bounouas**, P. Rroupsard, **E. Dupont**, **Y. Lefranc**, **A. Faucheux**, D. Hebert, O. Connan, P. Languionie, and **Y. Roustan**, *Study of atmospheric dispersion under low wind conditions in an urban environment*. European Geosciences Union General Assembly. Vienne, Autriche. April 23-28, 2023.
2. **F. Ieng**, **J. Dumont Le Brazidec**, G. Dufour, **M. Bocquet**, **A. Farchi**, M. Eremenko, and L. Wendling. “Automatic ozone plume detection in lower tropospheric ozone IASI satellite data: methods’ comparison. IntelliAQ workshop on Machine Learning for Air Quality. Cologne, Germany. March 6-7, 2023.
3. **J. Dumont Le Brazidec**, **P. Vanderbecken**, **A. Farchi**, **M. Bocquet**, **Y. Roustan**, et al. *Towards CO2 plume detection and inversion from satellites using deep neural networks*. Workshop "Mathematical Approaches of Atmospheric Constituents Data Assimilation and Inverse Modeling". Banff, Canada. March 19-24, 2023. [invited]
4. **A. Farchi**, M. Chrust, **M. Bocquet**, P. Laloyaux, and M. Bonavita. *Online model error correction with neural networks: From theory to the ECMWF forecasting system*. Workshop "Mathematical Approaches of Atmospheric Constituents Data Assimilation and Inverse Modeling". Banff, Canada. March 19-24, 2023. [invited]
5. **C. Durand**, **T. Finn**, **A. Farchi**, **M. Bocquet**, and Einar Ólason. *Deep learning for surrogate modelling of neXtSIM*. 11th International Workshop on Sea Ice Modelling, Assimilation, Observations, Predictions and Verification. Oslo, Norway. March 21-23, 2023.
6. **P. Letournel**, C. Listowski, **M. Bocquet**, A. Le Pichon, **A. Farchi**, J. Vergoz, and M. De carlo *Evaluating atmospheric models in the stratosphere using oceanic infrasound ambient noise*. EGU General Assembly 2023. (Virtual Presentation). Vienna, Austria. April 23-28, 2023. [online]

7. C. Burgard, N. C. Jourdain, P. Mathiot, R. Smith, R. Schäfer, J. Caillet, **T. S. Finn**, and J.E. Johnson. *Emulating present and future simulations of melt rates at the base of Antarctic ice shelves with neural networks*. OCEAN:ICE workshop. Copenhagen, Denmark. May 25, 2023. [Online]
8. **E. Launay**, V. Hergault, **M. Bocquet**, **J. Dumont Le Brazidec**, and **Y. Roustan**. *Inverse modelling for the atmospheric dispersion of large-scale urban smoke plumes*. International Technical Meeting On Air Pollution Modeling And Its Application 2023. Chapel Hill, North Carolina, U.S.A. May 22-26, 2023.
9. **M. Bocquet**, **A. Farchi** et al. *Bayesian online algorithms for learning data-driven models of chaotic dynamics*. FoCM2023: Foundations of Computational Mathematics. Workshop "Mathematical Foundations of Data Assimilation and Inverse Problems". Paris, France. June 12-14, 2023. [invited]
10. M. Bonavita, S. Massart, P. Laloyaux, M. Chrust, **A. Farchi**, **M. Bocquet**. *Improving models with Data Assimilation and Machine Learning*. WCRP Workshop on Improving climate models and projections using observation. MIT, Cambridge MA, USA. June 12-14, 2023.
11. C. Burgard, N. C. Jourdain, P. Mathiot, R. Smith, R. Schäfer, J. Caillet, **T. S. Finn**, J. E. Johnson. *Parameterising melt rates at the base of Antarctic ice shelves – what is there...* OPEN workshop. Paris, France. June 15, 2023.
12. **A. Farchi**, M. Chrust, **M. Bocquet**, P. Laloyaux, M. Bonavita. *Online model error correction with neural networks – Towards an implementation in the ECMWF data assimilation system*. SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS23). Bergen, Norway. June 19-22, 2023. [invited]
13. **T. S. Finn**, **C. Durand**, **A. Farchi**, **M. Bocquet**, Y. Chen, A. Carrassi, and V. Dansereau. *Deep learning model error corrections for subgrid-scale dynamics*. SASIP General Meeting. Bergen, Norway. June 27-30 2023.
14. **C. Durand**, **T. S. Finn**, **A. Farchi**, **M. Bocquet**, and Einar Ólason. *Deep learning for surrogate modelling of neXtSIM*. SASIP General Meeting. Bergen, Norway. June 27-30 2023.
15. **J. Dumont Le Brazidec**, **P. Vanderbecken**, **A. Farchi**, **M. Bocquet**, and G. Broquet *Towards the inversion of plumes from power plants and industrial sites in satellite CO2 images using deep neural networks*. IWGGMS. Paris, France. July 2-4, 2023.
16. A. Carrassi, L. Bertino, **M. Bocquet**, J. Brajard, Y. Chen, S. Driscoll, **C. Durand**, **A. Farchi**, **T. Finn**, C. Jones, and I. Pasmans. *Using machine learning, data assimilation and their combination to improve a new generation of Arctic sea-ice models*. Workshop on MLDADS at ICCS 202. Prague, Czech Republic. July 3-5, 2023.
17. **M. Bocquet**, **A. Farchi** et al. *Bayesian online algorithms for learning data-driven models of chaotic dynamics*. IUGG 2023, Symposium M34: Data Assimilation and Machine Learning in Earth Systems Modeling, Berlin, Germany. July 11-20, 2023. [invited]
18. **T. Finn**, **C. Durand**, **A. Farchi**, **M. Bocquet**, Y. Chen, A. Carrassi, V. Dansereau, and E. Ólason. *Hybrid modelling with deep learning for improved sea-ice forecasting*. IUGG 2023, Symposium C13: Data Driven Cryospheric Sciences: Machine Learning, Data Assimilation and Inverse Methods for the Cryosphere, Berlin, Germany. July 11-20, 2023.



19. **T. Finn, C. Durand, A. Farchi, and M. Bocquet.** *Deep reinforcement learning of model error corrections.* IUGG 2023, Symposium M34: Data Assimilation and Machine Learning in Earth Systems Modeling, Berlin, Germany. July 11-20, 2023.
20. **A. Farchi, M. Chrust, M. Bocquet, P. Laloyaux, and M. Bonavita.** *Online model error correction with neural networks – Towards an implementation in the ECMWF data assimilation system.* CRiSM Workshop on "Fusing Simulation with Data Science, University of Warwick, United Kingdom. July 17-19, 2023. [invited]
21. **M. Bocquet, A. Farchi, T. S. Finn, C. Durand, et al.** *AI and weather forecasting: What's left for the meteorologists?* Opening ceremony of the Mathematisches Institut für Maschinelles Lernen und Data Science, Die Katholische Universität Eichstätt-Ingolstadt (KU) University, Ingolstadt, Germany. July 24-26, 2023. [keynote speaker, invited]
22. **M. Lannes, N. Coulombel and Y. Rouston.** *An integrated road traffic-emissions-CTM model chain to assess urban air quality at the street level for the Paris region.* 11th MAT-Sim User Meeting. Zurich, Switzerland. September 5, 2023.
23. **C. Durand, T. S. Finn, A. Farchi, M. Bocquet, and Einar Ólason.** *Deep learning for surrogate modelling of neXtSIM.* SASIP midterm review meeting. Grenoble, France. October 2-3, 2023.
24. **T. S. Finn, C. Durand, A. Farchi, M. Bocquet, Y. Cheng, A. Carrassi, and V. Dansereau.** *Deep learning of subgrid-scale parametrisations for sea-ice models.* SASIP midterm review meeting. Grenoble, France. October 2-3, 2023.
25. S. Driscoll, A. Carrassi, **M. Bocquet, L. Bertino, J. Brajard, and E. Olason.** *Using machine learning to emulate thermodynamic sea ice processes.* SASIP midterm review meeting. Grenoble, France. October 2-3, 2023.
26. **A. Farchi, M. Chrust, M. Bocquet, P. Laloyaux, and M. Bonavita.** *Model error correction with data assimilation and machine learning: from theory to the ECMWF forecasting system.* International Symposium on Data Assimilation. Bologna, Italy. October 16-20, 2023. [invited, keynote speaker]
27. Y. Chen, P. Smith, A. Carrassi, I. Pasmans, L. Bertino, **M. Bocquet, T. S. Finn, P. Ramal, and V. Dansereau.** *Multivariate state and parameter estimation with data assimilation on sea ice models using a Maxwell-Elasto-Brittle rheology.* International Symposium on Data Assimilation. Bologna, Italy. October 16-20, 2023.
28. **J. Dumont Le Brazidec, P. Vanderbecken, A. Farchi, M. Bocquet, and G. Broquet** *Towards the inversion of plumes from power plants and industrial sites in satellite CO2 images using deep neural networks.* International Symposium on Data Assimilation. Bologna, Italy. October 16-20, 2023.
29. **M. Bocquet, P. J. Vanderbecken, A. Farchi, J. Dumont Le Brazidec, and Y. Rouston.** *Bridging traditional data assimilation and optimal transport.* International Symposium on Data Assimilation. Bologna, Italy. October 16-20, 2023.
30. M. Chrust, **A. Farchi, M. Bonavita, P. Laloyaux, and M. Bocquet.** *Hybrid Data Assimilation - Machine Learning for Model Error Estimation and Correction: application to the ECMWF IFS model.* International Symposium on Data Assimilation. Bologna, Italy. October 16-20, 2023.



31. Y. Chen, S. Cheng, A. Carrassi, A. Aydođdu, P. Smith, I. Pasmans, L. Bertino, **M. Bocquet**, **T. S. Finn**, V. Dansereau, and P. Rampal. *Application of data assimilation to neXtSIM: a sea ice model using novel Maxwell-Elasto-Brittle rheology*. Guest Lecture at the University of Bologna. Bologna, Italy. October 26, 2023. [invited]
32. C. Burgard, N. C. Jourdain, P. Mathiot, R. Smith, R. Schäfer, J. Caillet, **T. S. Finn**, and J.E. Johnson. *AI and ice-sheet-ocean interactions – where are we?* AIAI Kick-Off Workshop. Grenoble, France. November 29, 2023.
33. M. Chrust, **A. Farchi**, M. Bonavita, P. Laloyaux, and **M. Bocquet**. *Hybrid Data Assimilation - Machine Learning for Model Error Estimation and Correction: application to the ECMWF IFS model*. Virtual NEMO Machine Learning Working Group meeting. December 1, 2023. [online]
34. **Z. Wang**, F. Couvidat, **K. Sartelet**. *Investigating Anthropogenic Emission Mitigation Effects on Biogenic SOA Formation using Simplified and GENOA-Generated Mechanisms in 3-D Modeling*, International Aerosol Modeling Algorithms Conference, 6-8 December 2023, Davis, United States of America [invited]
35. **K. Sartelet** et al. *Multi-scale modelling of air quality over cities*, Univ. Tokyo, Japan, 21 July 2023. [invited]
36. **K. Sartelet** et al. (2023). *Street-in-Grid modelling for multi-pollutants*. International conference on CMAS Asia Pacific, Saitama, Japan, 17-21 July 2023. [invited]
37. **K. Sartelet**, G. Hoek, E. Athanasopoulou, D. Bousiotis, F. Dugay, R. Harrison, J. Hofman, A. Ilie, J. Kerckhoffs, **L. Lugon**, D. Nicolae, **S. Park**, F. Pope, C. Talianu, M. Valari, M. Vanpoppel, J. Vasilescu and J. Zhong. *Urban mapping of nanoparticles and other pollutants, coupled with regional modelling tools and citizen's science*, RI-Urbans 2nd Science Meeting, 18-19 October 2023, Delft
38. E. Kostenidou, B. Marques, B. Temime-Roussel, Y. Liu, B. Vansevenant, **K. Sartelet**, B. D'Anna. *Photo-oxidation of EURO 5 gasoline vehicle emissions: Chemical composition and gas-to-particle phase partitioning*. European Aerosol Conference, Malaga (Spain), 3- 8 Septber 2023.
39. B. Marques, E. Kostenidou, B. Temime-Roussel, L. Fine, C. Ferronato, B. Vansevenant, Y. Liu, **K. Sartelet**, B. D'Anna. *New aftertreatment devices of diesel and gasoline Euro6 vehicles: impact on primary emissions and secondary aerosol formation*. European Aerosol Conference, Malaga (Spain), 3-8 September 2023.
40. **Y. Kim**, **T. Sarica**, **L. Lugon**, **B. Charradi**, **Y. Rouston**, **K. Sartelet**. *Multi-scale modelling of urban air pollution: an updated Street-in-Grid model by implementing the aerosol model SSH-aerosol*. International conference on CMAS Asia Pacific, Saitama, Japan, 17- 21 July 2023.
41. **L. Lugon**, **S. Park**, **Y. Kim**, **A. Squarcioni**, **Y. Rouston**, **K. Sartelet**. *Multi-scale simulations with a street-level resolution: application in Paris*. International conference on CMAS Asia Pacific, Saitama, Japan, 17-21 July 2023.
42. F. Couvidat, **K. Sartelet**, **Z. Wang**, **L. Lugon**, **Y. Kim**, M. Valari, A. Guion, P. Messina, *Progress and future developments on aerosol modeling*, Workshop CHIMERE, Sorbonne Université Campus, Paris, 22-23 June 2023

43. **A. Maison, L Lugon, M Valari, S Park, C Di Biagio, A Gratien, J-E Petit, J Vigneron, A Tuzet, K Sartelet.** *Bottom-up inventory of tree biogenic emissions over Paris city and impact on urban air quality.* Workshop CHIMERE, Sorbonne Université Campus, Paris, 22- 23 June 2023.
44. **S. Park, L. Lugon, Y. Kim, M. Valari, C. Di Biagio, A. Gratien, L. Di Antonio, O. Fa- vez, J.- E. Petit, V. Ghersi, A. Baudic, F. Dugay, J. Vigneron, O. Sanchez, K. Sartelet.** *Black-carbon modelling over Paris city using CHIMERE/MUNICH.* Workshop CHI- MERE, Sorbonne Uni- versité Campus, Paris, 22-23 June 2023.
45. **Z. Wang, F. Couvidat, K. Sartelet.** *Investigating the Impact of NOx Emissions on Seco- ndary Organic Aerosol Formation Using Semi-Explicit and Implicit Mechanisms in 3-D Air Quality Modeling,* Workshop CHIMERE, Sorbonne Université Campus, Paris, 22-23 June 2023.
46. **A. Squarcioni, M. Valari, Y. Roustan, F. Dugay, Y. Kim, L. Lugon, K. Sartelet, J. Vi- gneron.** *Comparison of street-level atmospheric pollutant concentrations simulated with a subgrid- scale against a street-network model.* Workshop CHIMERE, Sorbonne Université Campus, Paris, 22-23 June 2023.
47. **K Sartelet, Y. Kim, F. Couvidat, M. Merkel, T. Petäjä, J. Sciare, A Wiedensohler.** *Modé- lisation des particules ultrafines en zone urbaine. Ateliers de Modélisation de l'Atmos- phère,* Centre International de Conférences de Météo-France, Toulouse, 9-11 Mai 2023.
48. **B D'Anna, B. Marques, K. Sartelet, E. Kostenidou, B. Temime-Roussel, C. Di Giorgio.** *Modern road transport is still an important source of primary and secondary particles in urban areas.* Ateliers de Modélisation de l'Atmosphère, Centre International de Confé- rences de Météo- France, Toulouse, 9-11 Mai 2023.
49. **A Maison, L Lugon, M. Valari, S. Park, C. Di Biagio, A Gratien, J-E Petit, J Vigneron, A Tuzet et K Sartelet.** *Impact des émissions biogéniques des arbres urbains sur la composi- tion des particules à Paris.* Ateliers de Modélisation de l'Atmosphère, Centre International de Confé- rences de Météo-France, Toulouse, 9-11 Mai 2023.
50. **Z Wang, K Sartelet, F Couvidat.** *Influence des réductions des émissions de NOx sur la forma- tion des aérosols biogéniques : dépendance au mécanisme chimique.* Ateliers de Modélisation de l'Atmosphère, Centre International de Conférences de Météo-France, Toulouse, 9-11 Mai 2023.
51. **K. Sartelet et al.** *Street-in-Grid modelling for multi-pollutants.* The Joint 3rd Street-in- Grid and Urban Air Quality Modeling Symposium and the 4th Street-in-Grid Model Training Work- shop, Champs-sur-Marne, France, 6-10 March 2023.
52. **T Sarica, A Maison, Y Roustan, M Ketznel, S Solvang Jensen, Y Kim, K Sartelet.** *De- velopment of the street-network model MUNICH: Introduction of concentration heteroge- neities in the street.* The Joint 3rd Street-in-Grid and Urban Air Quality Modeling Sympo- sium and the 4th Street-in-Grid Model Training Workshop, Champs-sur-Marne, France, 6- 10 March 2023.
53. **A Maison, A Squarcioni, Y Kim, A Tuzet, K Sartelet.** *Modelling the impacts of urban trees on air quality in streets.* The Joint 3rd Street-in-Grid and Urban Air Quality Model- ing Sym- posium and the 4th Street-in-Grid Model Training Workshop, Champs-sur-Marne, France, 6- 10 March 2023.

54. **L Lugon** et al., *Effect of vehicle fleet composition and mobility on outdoor population exposure: A street resolution analysis in Paris*. The Joint 3rd Street-in-Grid and Urban Air Quality Modeling Symposium and the 4th Street-in-Grid Model Training Workshop, Champs-sur-Marne, France, 6-10 March 2023.
55. C Lin, R Ooka, H Kikumoto, C Flageul, **Y Kim, Y Wang, A Maison, Y Zhang, K Sartelet** *Large-eddy simulations on pollutant reduction effect of hedge- and solid barriers in an idealized street canyon*. The Joint 3rd Street-in-Grid and Urban Air Quality Modeling Symposium and the 4th Street-in-Grid Model Training Workshop, Champs-sur-Marne, France, 6-10 March 2023.
56. C. Lin, **Y. Wang**, R. Ooka, C. Flageul **Y. Kim**, H. Kikumoto, **Z. Wang, K. Sartelet**, *RANS simulation of street-scale pollutant dispersion by coupling chemical reaction, aerosol dynamics, and CFD*. The Joint 3rd Street-in-Grid and Urban Air Quality Modeling Symposium and the 4th Street-in-Grid Model Training Workshop, Champs-sur-Marne, France, 6-10 March 2023.
57. **A. Squarcioni**, M. Valari, **Y. Roustan**, F. Dugay, **Y. Kim, L. Lugon, K. Sartelet**, J. Vigneron *Comparison of street-level atmospheric pollutant concentrations simulated with a subgrid-scale against a street-network model*. European Geosciences Union General Assembly, Vienna, Austria, 23-28 April 2023

## International conference poster presentations

1. **T. Finn, C. Durand, A. Farchi, M. Bocquet**, Y. Cheng, A. Carrassi, and V. Dansereau. *Deep learning of subgrid-scale parametrisations for sea-ice models*. 11th International Workshop on Sea Ice Modelling, Assimilation, Observations, Predictions and Verification. Oslo, Norway. March 21-23, 2023.
2. Y. Chen, P. Smith, A. Carrassi, I. Pasmans, L. Bertino, **M. Bocquet, T. Finn**, P. Rampal, and V. Dansereau. *Observation impact on the multi-variate state and parameter estimation of Maxwell-Elasto-Brittle rheology model*. 11th International Workshop on Sea Ice Modelling, Assimilation, Observations, Predictions and Verification. Oslo, Norway. March 21-23, 2023.
3. **C. Durand, T. S. Finn, A. Farchi, M. Bocquet**, and Einar Ólason. *Deep learning for surrogate modelling of neXtSIM*. EGU General Assembly 2022. Vienna, Austria. April 23-28, 2023.
4. C. Burgard, N. C. Jourdain, P. Mathiot, R. Smith, R. Schäfer, J. Caillet, **T. S. Finn**, and J.E. Johnson. *Parameterising melt at the base of Antarctic ice shelves with a feedforward neural network*. EGU General Assembly 2023. Vienna, Austria. April 23-28, 2023.
5. **E. Launay**, V. Hergault, **M. Bocquet, J. Dumont Le Brazidec**, and **Y. Roustan**. *Characterisation of large-scale urban fire emissions by inverse modelling*. EGU General Assembly 2023. Vienna, Austria. April 23-28, 2023.
6. C. Burgard, N. C. Jourdain, P. Mathiot, R. Smith, R. Schäfer, J. Caillet, **T. S. Finn**, and J.E. Johnson. *Parameterising present and future melt at the base of Antarctic ice shelves with deep learning*. Forum for Research into Ice Shelf Processes (FRISP 2023). Stalheim, Norway. June 19-22, 2023.
7. **P. Vanderbecken, J. Dumont Le Brazidec, A. Farchi, M. Bocquet, Y. Roustan**, E. Pottier and G. Broquet. *How can we assimilate plume images according to Wasserstein metric?* IWGGMS. Paris, France. July 2-4, 2023.

8. **M. Lannes**, N. Coulombel and **Y. Roustan**. *Air quality assessment at the street level: sensitivity analysis of a road traffic-emissions-CTM model chain for the Paris region*. 25th Transport and Air Pollution conference. Gothenborg, Sweden. September 25-29, 2023.
9. S. Driscoll, A. Carrassi, J. Brajard, L. Bertino, **M. Bocquet**, and E. Olason. *Data driven emulation of sea ice albedo and melt ponds*. *International Symposium on Data Assimilation*. Bologna, Italy. October 16-20, 2023.
10. **C. Durand**, **T. S. Finn**, **A. Farchi**, **M. Bocquet**, and Einar Ólason. *Deep learning for surrogate modeling to facilitate data assimilation in sea-ice models*. *International Symposium on Data Assimilation*. Bologna, Italy. October 16-20, 2023.
11. **T. S. Finn**, **L. Disson**, **C. Durand**, **A. Farchi**, and **M. Bocquet**. *Generating ensembles from single realizations with denoising diffusion models*. *International Symposium on Data Assimilation*. Bologna, Italy. October 16-20, 2023.
12. **J. Dumont Le Brazidec**, **P. Vanderbecken**, **A. Farchi**, **M. Bocquet**, and G. Broquet *Towards the inversion of plumes from power plants and industrial sites in satellite CO2 images using deep neural networks*. CoCO2 General Meeting Wageningen, Netherlands. November 20-22, 2023.
13. **K. Sartelet**, **Z. Wang**, **V. Lannuque**, F. Couvidat, **T. Sarica**. *3-D Simulations of toluene SOA formation at regional and street scales*, *International Aerosol Modeling Algorithms Conference*, 6-8 December 2023, Davis, United States of America
14. Puga Freitas, R., Claude, A., **Maison, A.**, Leitao, L., Repellin, A., Nadam, P., Kalalian, C., Boissard, C., Gros, V., **Sartelet, K.**, Tuzet, A., and Leymarie, J. *Drought effect on urban plane tree ecophysiology and its isoprene emissions*, *EGU General Assembly 2023*, Vienna, Austria, 24–28 Apr 2023, EGU23-13401, <https://doi.org/10.5194/egusphere-egu23-13401>, 2023.
15. **Squarcioni, A.**, Valari, M., **Roustan, Y.**, Dugay, F., **Kim, Y.**, **Lugon, L.**, **Sartelet, K.**, and Vigneron, J. *Comparison of street-level atmospheric pollutant concentrations simulated with a subgrid-scale against a street-network model*, *EGU General Assembly 2023*, Vienna, Austria, 24–28 Apr 2023, EGU23-5882, <https://doi.org/10.5194/egusphere-egu23-5882>, 2023.

## National conference oral presentations

1. **J. Dumont Le Brazidec**, **P. Vanderbecken**, **A. Farchi**, **M. Bocquet**, and G. Broquet *Towards the inversion of plumes from power plants and industrial sites in satellite CO2 images using deep neural networks*. SAMA day. ENS, Paris, France. May 26, 2023.
2. **P. Vanderbecken**, **J. Dumont Le Brazidec**, **A. Farchi**, **M. Bocquet**, **Y. Roustan**, E. Potier and G. Broquet. *How can we assimilate geoscientific data according to Wasserstein metric?* SAMA day. ENS, Paris, France. May 26, 2023.
3. **C. Durand**, **T. Finn**, **A. Farchi**, **M. Bocquet**, and Einar Ólason. *Deep learning for surrogate modelling of neXtSIM*. SAMA day. ENS Paris, France. May 26, 2023.
4. **P. Vanderbecken**, **J. Dumont Le Brazidec**, **A. Farchi**, **M. Bocquet**, **Y. Roustan**, E. Potier and G. Broquet. *How can we assimilate plume images using Wasserstein distance?* LEFEMANU. Paris, France. June 20-22, 2023.
5. **J. Dumont Le Brazidec**, **P. Vanderbecken**, **A. Farchi**, **M. Bocquet**, and G. Broquet *Towards the inversion of plumes from power plants and industrial sites in satellite CO2 images using deep neural networks*. Journées Géostatistiques. Fontainebleau, France. September, 6-8, 2023.

6. Y. Chen, P. Smith, A. Carrassi, I. Pasmans, L. Bertino, **M. Bocquet**, **T. S. Finn**, P. Ram-pal, and V. Dansereau. *Multivariate state and parameter estimation with data assimilation on sea ice models using a Maxwell-Elasto-Brittle rheology*. The National Centre for Earth Observation (NCEO) conference. Leeds, UK. September 11-13, 2023.
7. **M. Bocquet**, **A. Farchi** et al. *IA et prévision numérique du temps : que reste-t-il aux météorologistes ?* GdR défi-théo-climat -- Colloque prévisibilité et points de bascule en géosciences. October 3, 2023. [invited]
8. V. Gros, **K. Sartelet**. *Impact of sTress on uRban trEEs and on city air quality*, colloque PRIME-QUAL « Pollution de l'air en ville : de nouvelles connaissances pour réduire les émissions et les expositions », Paris, France, 26 September 2023. [invited]
9. **K. Sartelet** *Rôle de l'ammoniac dans la formation des particules ultrafines. Limites des paramétrisations actuelles*. Atelier Composair sur l'ammoniac, IPSL, Jussieu, Paris, 5 septembre 2023.
10. **K. Sartelet** et al. *Représentation de la qualité de l'air en zone urbaine et évolutions*. Atelier Atmosphère, Climat et environnements urbains, Paris - Sorbonne université (Jussieu), 8-9 juin 2023.

## Summer/winter schools

- **M. Bocquet**, **A. Farchi** et al. *Lecture 1: Principles of geophysical data assimilation. Lecture 2: Combining data assimilation and machine learning: Machine learning and the geosciences*. TDMA 2023 : Traitement des données massives et apprentissage – Applications en géophysique, écologie et SHS. Grenoble, France. June 5-9, 2023. [invited]
- **A. Farchi** and **M. Bocquet**. *TD: Introduction to surrogate modelling in the geosciences*. TDMA 2023 : Traitement des données massives et apprentissage – Applications en géophysique, écologie et SHS. Grenoble, France. June 5-9, 2023. [invited]
- **P. Letournel**, C. Listowski, **M. Bocquet**, A. Le Pichon, **A. Farchi**, and J. Vergoz. *Evaluating and improving numerical weather prediction models using ambient oceanic atmospheric noise*. École d'été : 'Modélisation des vagues WaveWatchIII. Brest, France. April 04-07, 2023.
- **L. Lugon** *Lecture 1: Atmospheric chemistry modeling. Lecture 2: Atmospheric aerosols. Lecture 3: Air Quality model introduction* ERCA 2024: European Research Course on the Atmosphere. Grenoble, France. January 30-February 01, 2023. [invited]

## Committee activities

### Editorial boards

- **M. Bocquet**, Associate Editor, "Quarterly Journal of the Royal Meteorological Society"
- **M. Bocquet**, Associate Editor, "Foundations of Data Science", journal of the AIMS.
- **M. Bocquet**, Guest Editor, for the special collection *Combined machine learning and data assimilation for the atmosphere and ocean sciences* in "Quarterly Journal of the Royal Meteorological Society"
- **M. Bocquet**, Associate Editor for the topic *Dynamical Systems* in "Frontiers in Applied Mathematics and Statistics"

- **K. Sartelet**, Editor for the special issue *Air quality research at street level*, inter-journal “Atmos. Chem. Phys.” and “Geosci. Mod. Dev.”.
- **K. Sartelet**, Editorial board for the journal “Atmosphere”.

### Conference organisation

- **M. Bocquet**, et al. Co-organisation of the 5-day workshop "Mathematical Approaches of Atmospheric Constituents Data Assimilation and Inverse Modeling". Banff, Canada. March 19-24, 2023.
- **K. Sartelet** Co-organisation of the conference IAMA (International Aerosol Modeling Algorithms Conference, UC Davis US, 6-8 December 2023)
- **K. Sartelet** Co-organisation of the conference CMAS Asia (Saitama, Japan, July 2023)
- **K. Sartelet, Y. Kim, Y. Roustan, L. Lugon** Co-organisation of the conference Street-in- Grid (*SinG*) Modeling Symposium and Model Training Workshop (Champs sur Marne, March 2023)

### Conference session chairing

- **A. Farchi**. Chair of the *machine learning session*. Workshop "Mathematical Approaches of Atmospheric Constituents Data Assimilation and Inverse Modeling". Banff, Canada. March 19-24, 2023.
- **M. Bocquet**. Chair of *Novel mathematical ideas in Data Assimilation II*. International Symposium on Data Assimilation. Bologna, Italy. October 16-20, 2023.
- **K. Sartelet**. Chair of session « Development, Application, and Reduction of Gas- and/or Particle-Phase Chemical Mechanisms for Aerosol Predictions », IAMA conference, UC Davis, US, 6-8 décembre 2023
- **K. Sartelet**. Chair of session « Local Scale Air Quality Modeling », SinG Modelling Symposium, Champs sur Marne, France, 6-10 March 2023

### Scientific committees

- **M. Bocquet**, Scientific committee, European Center for Scientific Computing (CERFACS).
- **M. Bocquet**, Prix André Prud'Homme Committee of the Meteorology and Climate Society.
- **M. Bocquet**, Bureau member of SAMA (Statistique pour l'Analyse, la Modélisation et l'Assimilation) of Institut Pierre-Simon Laplace Institute (IPSL).
- **M. Bocquet**, Membre du conseil scientifique du GdR "Défis théoriques pour les sciences du climat"
- **K. Sartelet**, member of the Scientific Committee “Arbres et climat”, Ville de Paris.
- **K. Sartelet**, member of the Scientific Committee “The Earth Observation Center”, IPSL.



- J. Cuesta, V. Gros, **K. Sartelet**, co-Chair of the IPSL theme on Atmospheric Composition and Air Quality
- A. Elessa Etuman, **L. Lugon**, L. Marelle, **K. Sartelet**, M. Valari, animation of the IPSL working group on Atmospheric Composition Modelling
- **K. Sartelet**, Member of the OSU-EFLUVE board as representative of the college A called "university professors and assimilated personnel ».
- **Y. Roustan**, Member of the OSU-EFLUVE board as representative of the college B called "other teachers and researchers and assimilated personnel ».

### Thesis committees

- **M. Bocquet**, Rapporteur, PhD, Quentin Febvre, "Apprentissage profond pour l'altimétrie satellitaire océanique : spécificités et implications pratiques". IMT Atlantique, France. December 21, 2023.
- **K. Sartelet**, Reviewer, President of jury, PhD, Hasna Chebaicheb, "Étude des sources des particules fines sur différents sites français à partir de jeux de données pluriannuels à haute résolution temporelle", IMT Nord Europe, Douai, 22 December 2023.
- **K. Sartelet**, Rapporteur, PhD, Sarah Tinorua, "Mesures et modélisation à l'échelle régionale du carbone suie dans l'atmosphère", CNRM, Toulouse, 23 Novembre 2023
- **K. Sartelet**, PhD director, Alice Maison, "Modélisation des impacts des arbres sur la qualité de l'air de l'échelle de la rue à la ville", École des Ponts ParisTech, 28 November 2023.
- **K. Sartelet**, PhD director, Thibaud Sarica, "Modélisation de l'impact du trafic routier sur les concentrations de polluants en zone urbaine", École des Ponts ParisTech, 8 June 2023.
- **K. Sartelet**, PhD director, Yunyi Wang, "Estimations de la qualité de l'air à des échelles locales tenant compte des émissions de polluants intérieurs et extérieurs", École des Ponts ParisTech, 30 May 2023.
- **K. Sartelet**, PhD director, Zhizhao Wang, "Influence of anthropogenic emissions on organic aerosol formation depending on the physico-chemical characteristics of the environment", École des Ponts ParisTech, 4 May 2023.
- **Y. Roustan**, PhD co-advisor, Thibaud Sarica, "Modélisation de l'impact du trafic routier sur les concentrations de polluants en zone urbaine", École des Ponts ParisTech, 8 June 2023.
- **Y. Roustan**, PhD co-advisor, Jerry Jose, "Can we characterize the climate in an environment chamber ?", École des Ponts ParisTech, 22 March 2023.
- **Y. Roustan**, Reviewer, Youness El-Quartassy, "Vers l'utilisation d'ensembles météorologiques pour la dispersion à courte distance de radionucléides en cas de rejets accidentels dans l'atmosphère : propagation des incertitudes et comparaison à des mesures radiologiques dans l'environnement", CNRM, Toulouse, 8 December 2023.



## HdR committees

- **M. Bocquet**, Rapporteur, HdR, Ehouarn Simon, "Quelques contributions à l'assimilation de données : des moindres carrés non-linéaires pondérés en grande dimension, applications en océanographie". INP Toulouse, France. November 28, 2023.
- **Y. Roustan**, Rapporteur, HdR, Patrick Armand, "Modélisation et simulation de la dispersion atmosphérique à haute résolution dans l'environnement complexe proche : travaux de recherches et perspectives opérationnelles". École Centrale de Lyon, France. Mars 17, 2023.

## Teaching

### École des Ponts and affiliated masters

- **M. Bocquet** and **A. Farchi**. Introduction to Data Assimilation, Master MOCIS et WAPE Num2.2 and ADOMO (École des Ponts ParisTech)
- **K. Sartelet**, (teaching, responsible) 2nd year ENPC courses on "Atmospheric Environment and Air Quality" ("Ville Environnement Transport" Department, 13 x 2.5 hours)).
- **K. Sartelet**, (teaching) course on "Urban Air Quality" in the 2nd year set of courses on "Challenges, science and tools for the transition of cities and territories" ("Ville Environnement Transport" Department, 2.5 hours).
- **K. Sartelet**, (teaching) Radiation, visibility and stratospheric ozone in "Atmospheric Environments" 2nd year ENPC
- **K. Sartelet**, (teaching) Photochemistry in "Atmospheric Environments" 2nd year ENPC
- **K. Sartelet**, (teaching) Particles 1 "Atmospheric Environments" 2nd year ENPC
- **K. Sartelet**, (teaching) Health effects and regulations in "Atmospheric Environments" 2nd year ENPC
- **K. Sartelet**, (teaching) Coordinator of "Atmospheric Environments" courses POLU1 2nd year ENPC
- **K. Kim**, TP on air-quality modelling in "Atmospheric Environments" course 2nd year ENPC
- **L. Lugon**, Air quality modelling Introduction, ERCA school (European Research Course on Atmospheres) - 3h course Doctoral training UGA
- **L. Lugon**, Atmospheric chemistry modelling, ERCA school (European Research Course on Atmospheres) - 3h course Doctoral training UGA
- **L. Lugon**, Atmospheric aerosols, ERCA school (European Research Course on Atmospheres) - 3h course Doctoral training UGA
- **M. Ferrand**, Mécanique des fluides incompressibles – 1, 2nd year ENPC
- **M. Ferrand**, Mécanique des fluides incompressibles – 2, 2nd year ENPC
- **M. Ferrand**, Simulation numérique de l'aérodynamique et de la qualité de l'air en milieu urbain, 2nd year ENPC
- **Y. Roustan** (co-coordinator and teaching), Transport externalities, Master TraDD, 6 hours.

## Other schools and masters

- **K. Sartelet**, (teaching) Modélisation numérique des particules, M2 AIR du master Risque et Environnement, parcours Sciences et Génies de l'Environnement (Université de Paris - Université Paris Est Créteil – École des Ponts ParisTech, 3 hours).
- **K. Sartelet**, (teaching) Course on “Modelling Urban Pollution” in the Master “Urban Environment”, École Centrale de Nantes (14 hours)
- **M. Ferrand**, Cours de Mécanique des Fluides – 2, M2FESup Génie civil Ecole Normale Supérieure Paris Saclay
- **Y. Roustan** (coordinator and teaching) Modélisation numérique, M2 AIR du master Risque et Environnement, parcours Sciences et Génies de l'Environnement (Université de Paris - Université Paris Est Créteil – École des Ponts ParisTech, 6 hours).
- **Y. Roustan** (coordinator and teaching) Qualité de l'air et santé, 3rd year ENPC, 6 hours.
- **Y. Roustan** (teaching) Méthodologies scientifiques comparées, Master sciences politiques « Transformations socio-environnementales », 2 hours.

## Outreach

### École des Ponts ParisTech

- **M. Bocquet** and **A. Farchi**. École des Ponts ParisTech, October 26, 2023. Journée de lancement de la 3ème édition de TRANSITIONS : Modèles et données pour l'environnement. Table ronde sur le Climat.
- J Cuesta, V Gros, **K Sartelet**. *Atmospheric Composition and Air Quality*. Science Advisory Board, IPSL, Palaiseau France, 28 June 2023.

## Defended theses and HDR (CEREA)

- 20/12/2023 – **E. Launay**, Modélisation inverse pour la dispersion atmosphérique de polluants suite à un incendie de grande ampleur à l'échelle urbaine, ENPC, Université Paris-Est
- 28/11/2023 - **A. Maison**, Modélisation des impacts des arbres sur la qualité de l'air de l'échelle de la rue à la ville, ENPC, Université Paris-Est
- 08/06/2023 - **Thibaud Sarica**, Modélisation de l'impact du trafic routier sur les concentrations de polluants en zone urbaine, ENPC, Université Paris-Est
- 30/05/2023 – **Yunyi Wang**, Estimations de la qualité de l'air à l'échelle locale en tenant compte des émissions de polluants intérieurs et extérieurs Air quality estimations at local scale accounting for indoor and outdoor pollutants emission, ENPC, Université Paris-Est
- 04/05/2023 – **Zhizhao Wang**, Influence des émissions anthropiques sur la formation d'aérosol organique en fonction des caractéristiques physico-chimiques de l'environnement Influence of anthropogenic emissions on organic aerosol formation depending on the physico-chemical characteristics of the environment
- 22/03/2023 – **Jerry Josse**, Independent and joint multifractal characterization of atmospheric variability in real and controlled environments

## Prize, honours, outstanding grants

- **K. Sartelet**, July 2023, Medal from the Institute of Industrial Science, University of Tokyo.