°CICERO
Center for International Climate Research

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SUMMARY

I am a climate scientist with background in meteorology and atmospheric chemistry and core expertise on the distribution and processing of short-lived climate forcers in the atmosphere and their climate effects. The climate impact of aviation has been a long-term research topic, with particular focus on global and regional effects of non-CO_2 aircraft emissions and emission metrics. My research spans from validation of detailed processes in models using observations, to overarching questions of human-induced climate change with implications for policymaking and society. I am also an experienced science disseminator, with numerous media contributions and regular popular science and scientific talks. I have 63 peer-reviewed publications and have led and co-authored several commissioned reports. I am a contributing author to Chapters 1 and 6 of the Sixth Assessment Report (AR6) of the IPCC and to the 2020 UNEP Emission Gap Report Chapter 5, and participant in the IPCC Scoping Meeting for a Methodology Report on Short-lived Climate Forcers (SLCFs).

PROFESSIONAL EXPERIENCE

Project management - selected grants:

- *"The role of anthropogenic dust in the present and future climate system"*, RCN (young research talent grant) (PI) (2022-2026)
- *"Aviation in a low-carbon society (AVIATE)"*, RCN (WP leader) (2020-2026)
- *"Heterogeneous Climate Forcing: Linking Regional Perturbations to Climate Implications Across Multiple Scales"*, Centre for Advanced Study, Norwegian Academy of Science and Letters (co-PI) (2023/2024)
- *"Climate relevant interactions and feedbacks: the key role of sea ice and snow in the polar and global climate system"*, EU H2020 (CICERO PI, lead: FMI) (2021-2025)
- "*Advancing the Science for Aviation and Climate (ACACIA)*", EU H2020 (participant) (2020-2024)
- *"Arctic Community Resilience to Boreal Environmental change: Assessing Risks from fire and disease"*, RCN/Belmont Forum (WP leader) (2020-2024)
- *"Regional Climate impacts of Aviation"*, US Federal Aviation Administration (PI) (2015-2018)
- *"Aviation Climate Change Research Initiative (ACCRI)"*, US Federal Aviation Administration (participant) (2010-2013)

Scientific community:

- Member of the Aviation Non-CO_2 Expert Network (ANCEN)
- Member of ICARP IV (Fourth International Conference on Arctic Research Planning) Research Priority Team (RPT) 2024/2025
- Board member of Nordic Society for Aerosol Research (NOSA)
- Steering committee member of Pollution in the Arctic: Climate, Society and Environment (PACES) project

Supervision:

- Adele Zaini, PhD student, CICERO/University of Oslo

Mobility:

- Research visit, National Institute for Environmental Studies (NIES), Tsukuba, Japan (March 2016)
- Research stay, NOAA ESRL, Boulder, CO, USA (March – May 2012)

EDUCATION

- 2014: PhD, Meteorology and Oceanography, Department of Geosciences, University of Oslo, Norway
- 2008: MSc, Meteorology and Oceanography, Department of Geosciences, University of Oslo, Norway

SELECTED PUBLICATIONS

Cohen Y., Hauglustaine D., Bellouin N., Lund M.T., Matthes S., Skowron A., Thor R., Bundke U., Petzold A., Rohs S., Thouret V., Zahn A., and Ziereis H., Multi-model assessment of climatologies in the upper troposphere–lower stratosphere using the IAGOS data. *In preparation.*

Klenner, J., Lund, M.T., Muri, H., Strømman, A.H., Emission location affects impacts on atmosphere and climate from alternative fuels for Norwegian domestic aviation. *Submitted.*

Klenner, J., Lund, M.T., Muri, H., Strømman, A.H. (2024) Combining fleet-wide AviTeam aviation emission modelling with LCA perspectives for alternative fuel impact assessment. *Environ. Sci. Technology*.

Samset, B.H., Zhou, C., Fuglestvedt, J.S., Lund, M.T., Marotzke, J., Zelinka, M.D. (2023). Steady global surface warming from 1973 to 2022 but increased warming rate after 1990. *Commun Earth Environ* **4**, 400,

Wilcox, L. J., Allen, R. J., Samset, B. H., Bollasina, M. A., Griffiths, P. T., Keeble, J. M., Lund, M. T., Makkonen, R., Merikanto, J., O'Donnell, D., Paynter, D. J., Persad, G. G., Rumbold, S. T., Takemura, T., Tsigaridis, K., Undorf, S., and Westervelt, D. M. (2023) The Regional Aerosol Model Intercomparison Project (RAMIP), Geosci. Model Dev., 16, 4451–4479.

Lund, M. T., Nordling, K., Gjelsvik, A., Samset, B.H. (2023) The influence of variability on fire weather conditions in high latitude regions under present and future global warming. *Environmental Research Communications* **5**(6): 065016.

Lund, M. T., Myhre, G., Skeie, R. B., Samset, B. H., and Klimont, Z. (2023) Implications of differences between recent anthropogenic aerosol emission inventories for diagnosed AOD and radiative forcing from 1990 to 2019, Atmos. Chem. Phys., 23, 6647–6662.

Fuglestvedt, J., Lund, M. T., Kallbekken, S., Samset, B. H., & Lee, D. S. (2023). A “greenhouse gas balance” for aviation in line with the Paris Agreement. *WIREs Climate Change*, e839.

Persad, G., Samset, B.H., Wilcox, L.J., Allen, R.J., Bollasina, M.A., Booth, B.B., Bonfils, C., Crocker, T., Joshi, M., Lund, M.T., Marvel, K., Merikanto, J., Nordling, K., Undorf, S., van Vuuren, D.P., Westervelt, D.M., Zhao, A. (2023). "Rapidly evolving aerosol emissions are a dangerous omission from near-term climate risk assessments." *Environmental Research: Climate* 2(3): 032001.

Samset, B.H., Zhou, C., Fuglestvedt, J.S., Lund, M.T., Marotzke, J., Zelinka, D. (2022) Earlier emergence of a temperature response to mitigation by filtering annual variability. *Nat Commun* **13,** 1578

Bright, R. M. and Lund, M. T.: CO2-equivalence metrics for surface albedo change based on the radiative forcing concept: A critical review, *Atmos. Chem. Phys*., 21, 9887–9907

Lee, D. S., Fahey, D.W., Skowron, A., Allen, M.R., Burkhardt, U., Chen, Q., Doherty, S.J., Freeman, S., Forster, P.M., Fuglestvedt, J., Gettleman, A., De Leon, R.R., Lim, L.L., Lund, M.T., Millar, R.J., Owen, B., Penner, J.E., Pitari, G., Prather, M.J., Sausen, R., Wilcox, L.J. (2021) The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018. *Atmospheric Environment*. 244, 117834

Lund, M. T., Aamaas, B., Stjern, C. W., Klimont, Z., Berntsen, T. K., and Samset, B. H. (2020) A continued role of Short-Lived Climate Forcers under the Shared Socioeconomic Pathways, *Earth Syst. Dynam.,* 11, 977–993
Lund, M. T., Myhre, G., and Samset, B. H. (2019). Anthropogenic aerosol forcing under the Shared Socioeconomic Pathways, *Atmos. Chem. Phys.,* 19, 13827–13839

Tanaka, K., Lund, M.T., Aamaas, B. and Berntsen, T. (2018) Climate effects of non-compliant Volkswagen diesel cars, Environmental Research Letters, 13(4), 044020.

Lund, M. T., Aamaas, B., Berntsen, T., Bock, L., Burkhardt, U., Fuglestvedt, J. S., and Shine, K. P. (2017). Emission metrics for quantifying regional climate impacts of aviation, Earth Syst. Dynam., 8, 547-563.

Brasseur G. P., M. Gupta, B.E. Anderson, S. Balasubramanian, S. Barrett, D. Duda, G. Fleming, P.M. Forster, J.S. Fuglestvedt, A. Gettelman, R.N. Halthore, S.D. Jacob, M.Z. Jacobson, A. Khodayari, K.-N. Liou, M.T. Lund, R.C. Miake-Lye, P. Minnis, S. Olsen, J.E. Penner, R. Prinn, U. Schumann, H.B. Selkirk, A. Sokolov, N. Unger, P. Wolfe, H.-W. Wong, D.J. Wuebbles, B. Yi, P. Yang & C. Zhou (2016). Impact of Aviation on Climate: FAA's Aviation Climate Change Research Initiative (ACCRI) Phase II. Bulletin of the American Meteorological Society, 97(4): pp. 561-583

SELECTED REPORTS

UNEP (2020). Emissions Gap Report 2020. Chapter 5 Bridging the gap – the role of international shipping and aviation. EGR20 (1).pdf

Arrowsmith S., Lee D. S., Owen B., Faber J., van Wijngaarden L., Boucher O., Celikel A., Deransy R., Fuglestvedt J., Laukia J., Lund M. T, Sausen R., Schaefer M., Skowron A., Stromatas S. and Watt A. (2020) Updated analysis of the non-CO2 climate impacts of aviation and potential policy measures pursuant to the EU Emissions Trading System Directive Article 30(4). European Union Aviation Safety (EASA), MOVE/E1/SER/2019-475/SI2.81706, Koln.

Lund, M.T., C.W. Stjern, B.H. Samset, B. Aamaas, S. Kallbekken (2018) Near- and long-term global warming of current emissions. https://brage.bibsys.no/xmlui/handle/11250/2576659)

AMAP (2015) Black carbon and ozone as Arctic climate forcers. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. vii + 116 pp