

Robbie Mallett

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CAREER TRAJECTORY

UiT The Arctic University of Norway

Postdoctoral Research Fellow

Earth Observation Group

December 2023 – Present

University of Manitoba

Postdoctoral Research Fellow

Centre for Earth Observation Science

January 2023 – November 2023

University College London

PhD Polar Climate Science

Centre for Polar Observation and Modelling

September 2018 – December 2022

University College London

MSc Climate Change

Geography Dept.

October 2017 – September 2018

University of Oxford

BA Physics, Christ Church

Physics Dept.

October 2012 – July 2016

ACADEMIC PUBLICATIONS

- Duffey, A., **Mallett, R.D.C.**, Irvine, P., Tsamados, M. and Stroeve, J. (2023). ESD Ideas: Arctic Amplification's Contribution to Breaches of the Paris Agreement. *Earth System Dynamics*, 14, 1165–1169.
- Willatt, R., Stroeve, J. C., Nandan, V., Newman, T., **Mallett, R.D.C.**, Hendricks, S., ... & Oggier, M. (2023). Retrieval of Snow Depth on Arctic Sea Ice From Surface-Based, Polarimetric, Dual-Frequency Radar Altimetry. *Geophysical Research Letters*, 50(20)..
- de Rijke-Thomas, C., Landy, J., **Mallett, R.D.C.**, Willatt, R., Tsamados, M. and King, J. (2023). Airborne investigation of quasi-specular Ku-band radar scattering for satellite altimetry over snow-covered Arctic sea ice. *IEEE Transactions on Geoscience and Remote Sensing*.
- Nandan, V., Willatt, R., **Mallett, R.D.C.**, Stroeve, J., Geldsetzer, T., Scharien, R., ... & Hoppmann, M. (2023). Wind redistribution of snow impacts the Ka- and Ku-band radar signatures of Arctic sea ice. *The Cryosphere*, 17(6), 2211-2229.
- Nab, C., **Mallett, R.D.C.**, Gregory, W., Landy, J.C., Lawrence, I., Willatt, R. Stroeve, J. and Tsamados, M. (2023). Synoptic variability in satellite altimeter-derived radar freeboard of Arctic sea ice. *Geophysical Research Letters*, 50(2).
- **Mallett, R.D.C.** and Maslin, M. (2022). Setting climate deadlines could be counterproductive. *Nature*, 612 (7940) 404.
- Cornish, S.B., Johnson, H., **Mallett, R.D.C.**, Dorr, J., Kostov, Y., Richards, A.E. (2022). Rise and fall of sea ice production in the Arctic Ocean's ice factories. *Nature Communications* 13.1, 1-13.
- **Mallett, R.D.C.**, Stroeve, J.C., Tsamados, M., Willatt, R., Newman, T., Nandan, V., Landy, J.C., Itkin, P., Oggier, M., Jaggi, M. and Perovich, D.K. (2022). Sub-kilometre scale distribution of snow depth on Arctic sea ice from Soviet drifting stations. *Journal of Glaciology*, 1-13.
- Stroeve, J., Nandan, V., Willatt, R. ... **Mallett, R.D.C.** ... & Schneebeil, M. (2022). Rain-on-Snow (ROS) Understudied in Sea Ice Remote Sensing: A Multi-Sensor Analysis of ROS during MOSAiC. *The Cryosphere*, 16(10), 4223-4250.
- Rabe, B., Heuzé, C., Regnery, J., ... **Mallett, R.D.C.** ... Zhu, J. (2022). Overview of the MOSAiC expedition: Physical oceanography. *Elementa: Science of the Anthropocene*, 10(1).
- **Mallett, R.D.C.** (2022). Snow observations from Arctic Ocean Soviet drifting stations: legacy and new directions. Doctoral thesis, University College London.

- **Mallett, R.D.C.**, Stroeve, J.C., Cornish, S.B., Crawford, A.D., Lukovich, J. V., Serreze, M.C., Barrett, A.P., Meier, W.N., Heorton, H.D.B.S., & Tsamados, M. (2021). Record winter winds in 2020/21 drove exceptional Arctic sea ice transport. *Communications Earth & Environment*, 2(1), 1-6.
- **Mallett, R.D.C.**, Stroeve, J.C., Tsamados, M., Landy, J.C., Willatt, R., Nandan, V., & Liston, G.E. (2021). Faster decline and higher variability in the sea ice thickness of the marginal Arctic seas when accounting for dynamic snow cover. *The Cryosphere*, 15(5), 2429-2450.
- **Mallett, R.D.C.** (2021). Snow structure with the snow crystal card. *Nature Reviews Earth & Environment*, 2(3), 165-165.
- **Mallett, R.D.C.** (2021). Book review on: A Field Guide to Snow. *The Cryosphere*, 15(3), 1453-1454.
- **Mallett, R.D.C.**, Lawrence, I.R., Stroeve, J.C., Landy, J.C., & Tsamados, M. (2020). Brief communication: Conventional assumptions involving the speed of radar waves in snow introduce systematic underestimates to sea ice thickness and seasonal growth rate estimates. *The Cryosphere*, 14(1), 251-260.
- Stroeve, J., Liston, G. E., Buzzard, S., Zhou, L., **Mallett, R.D.C.**, Barrett, A., ... & Stewart, J. S. (2020). A Lagrangian Snow-Evolution System for Sea Ice Applications (SnowModel-LG): Part II-Analyses. *Journal of Geophysical Research: Oceans*, e2019JC015900.
- Stroeve, J., Nandan, V., Willatt, R., Tonboe, R., Hendricks, S., Ricker, R., Mead, J., **Mallett, R.D.C.** ... and Tsamados, M. 2020. Surface-Based Ku- and Ka-band Polarimetric Radar for Sea Ice Studies. *The Cryosphere*, 14(12), 4405-4426
- Spooner, P.T., Thornalley, D.J., Oppo, D.W., Fox, A.D., Radionovskaya, S., Rose, N.L., **Mallett, R.D.C.**, Cooper, E. and Roberts, J.M., 2020. Exceptional 20th century ocean circulation in the Northeast Atlantic. *Geophysical Research Letters*, 47(10), p.e2020GL087577.

SELECTED INTERNATIONAL PARTICIPATION

- | | |
|---|----------------|
| UN Climate Change Conference (COP28) <i>Dubai, United Arab Emirates</i> | Dec 2023 |
| <ul style="list-style-type: none"> • Expert Reviewer for 2023 <i>State of the Cryosphere</i> Report • Talks on Arctic Amplification and the DEFIANT 2023 Overwintering Campaign | |
| DEFIANT Overwintering Field Campaign <i>Rothera Research Station, Antarctica</i> | Mar - Oct 2023 |
| <ul style="list-style-type: none"> • Seven month winter field campaign on sea ice and glacial ice in collaboration with British Antarctic Survey • Main instruments: Ku/Ka-band radar, laser scanner, hyperspectral radiometers, snow micropenetrometer | |
| UN Climate Change Conference (COP27) <i>Sharm El Sheikh, Egypt</i> | Nov 2022 |
| <ul style="list-style-type: none"> • Helped spearhead the release of the 2022 <i>State of the Cryosphere</i> Report • Participated in panels with NGOs such as the Clean Arctic Alliance and the Inuit Circumpolar Council | |
| Clivar CMIP6 Workshop <i>Copenhagen, Denmark</i> | Oct 2022 |
| <ul style="list-style-type: none"> • 10-day World Meteorological Organisation sponsored 'Bootcamp' on CMIP6 climate model data • Compared field-observations with modelled strength of atmospheric boundary layer inversions | |
| BEPSII Sea Ice Field School <i>Cambridge Bay, Canada</i> | May 2022 |
| <ul style="list-style-type: none"> • 10 day field-based course on biogeochemical cycling in sea ice • Training in under-ice light measurement, sea ice coring and snow pit analysis | |
| DEFIANT Field Campaign <i>RV Polarstern, Weddell Sea, Antarctica</i> | Mar/Apr 2022 |
| <ul style="list-style-type: none"> • Radar measurements and physical sampling of snow on Antarctic sea ice • Assisting with deployment of an ice tethered upper-ocean profiler and regular CTD casts | |
| Churchill Field Campaign <i>Hudson Bay, Canada</i> | December 2021 |
| <ul style="list-style-type: none"> • Dual-frequency radar measurements of young sea ice • Sampling of snow depth, density, salinity. Additional sampling of tundra and lake ice | |

UN Climate Change Conference (COP26) | *Glasgow, UK*

November 2021

- Representing UCL, ICCI and working at the Cryosphere Pavilion
- Managing speakers, engaging with the public and media, and compèring panel sessions.
- Two talks: sea ice - permafrost connections with Gustaf Hugelius (Bolin Centre), and sea ice change and projections with Walt Meier (NSIDC).

SERF Experiments | *CEOS, University of Manitoba, Canada*

February 2020

- A series of experiments at the outdoor Sea-ice Environmental Research Facility (SERF).
- Investigation of radar interactions with snow on sea ice using Ku- and C-band scatterometers
- In-situ sampling and characterisation of snow and ice and lab-based salinity analysis

6th Winter Snow Science School | *Col du Lautaret, French Alps*

February 2020

- Field training for in-situ scientific measurement of snow
- Instruments used: SMP, DUFISSS, Denoth-meter, NIR photography and traditional grain profiling
- Extended project comparing results from two detailed snowpits to output from Météo France model

MOSAIC Leg 1A | *RV Akademik Fedorov, Arctic Ocean*

Sept/Oct 2019

- Six weeks aboard RV Akademik Fedorov establishing distributed instrument network
- First two weeks in transit to the sea ice were dedicated to an interdisciplinary summer school.
- Two weeks in the sea ice were spent preparing and deploying instruments on the sea ice.
- Final two weeks in transit to Tromsø were dedicated to outreach and media training.

Safe and Effective Polar Fieldwork | *Ny-Ålesund, Svalbard & BAS, Cambridge, UK*

August 2019

- Ten days at the NERC Arctic station in Ny-Ålesund, three in Cambridge.
- Training in small boats, on glacier travel, and polar bear safety.

Polar Modelling Workshop | *NCAR, Boulder CO, USA*

August 2019

- Week one was based around research with the CESM2 Earth System Model
- Week two was focused on polar modelling (e.g. using CICE)

ICESat-2 Hack Week | *University of Washington, Seattle, USA*

June 2019

- Training in using the geolocated photon and segment elevation products (ATL03, ATL07).
- Additional training on cloud computing with AWS and PANGEO and version control with Git
- Led a team in a project of my own design evaluating of the IS2 blowing snow detection algorithm.

ISSI Working Group on Antarctic Snow and Sea Ice Thickness | *Bern, Switzerland*

May 2019

- A meeting of twelve sea ice experts funded and hosted International Space Science Institute
- I participated as part of the ISSI Early Career Scientist scheme

OUTREACH AND IMPACT

A number of media articles aimed at the general public have featured me and my work:

Radio and Podcasting

- The Antarctic: The untold climate story of the season. What in the World, BBC World Service
- PM with Evan Davies, BBC Radio 4
- Times Radio Breakfast
- Polar Bears, Ice Cracks, And Isolation: Scientists Drift Across The Arctic Ocean, NPR
- Young Researchers Feel Excitement And Sadness To See Arctic Ice That May Disappear, NPR
- Sea Ice Is Thinning. But It's Hard To Keep Track, Climate MET Podcast
- Research From Antarctic to Arctic, and the BEPSII Field School, BEPSII Sea Ice Podcast

Television

- Sky News, September 2021
- Polar Ice May Be Melting Twice as Fast as Once Thought, Inside Edition
- BBC World News, September 2023
- Antarctic winter sea ice hits 'extreme' record low — The World

Print

- Several print publications covered my 2021 paper in The Cryosphere. The following is a subset of the coverage:
 - Arctic sea ice thinning twice as fast as thought, study finds, The Guardian
 - Coastal Arctic Sea Ice Is Thinning Faster Than Previously Thought, Scientific American
 - Some Arctic sea ice is thinning twice as fast as previously thought, New Scientist
- I contributed to several media reports on the launch of *the 2022 State of the Cryosphere Report*:
 - World faces ‘terminal’ loss of Arctic sea ice during summers, report warns, The Guardian
 - COP27: Loss of Arctic summer sea ice ‘inevitable’ within 30 years, Reuters
- Media coverage was also generated from my 2021 paper in Communications Earth & Environment:
 - Record-breaking winter winds have blown old Arctic sea ice into the melt zone, The Conversation (republished by Arctic Today, Royal Geographical Society, WWF Arctic Programme).
 - When Wild Weather Blew Old Sea Ice South, Eos
 - Record-breaking winter winds have blown large swathes of old Arctic sea ice into warmer waters, Mail Online
- World faces ‘terminal’ loss of Arctic sea ice during summers, report warns, The Guardian
- COP27: Loss of Arctic summer sea ice ‘inevitable’ within 30 years, Reuters
- Arctic Sea Ice Hits Annual Low, but It’s Not as Low as Recent Years, New York Times
- Researchers express alarm as Arctic multiyear sea ice hits record low, Monga Bay
- To study the Arctic, scientists leave a CO2 footprint, E&E News
- Learning on the Job: UK graduate students join the largest Arctic expedition in history, NERC Arctic Office
- Hacking ICESat-2, NASA Center for Climate Simulation
- Russell Group universities recieved £60m from fossil fuel sector, The Independent
- Green Seas: At COP27, a bid to lift shipping’s black carbon emissions up the agenda, TradeWinds
- Feeling the heat in Antarctica: the urgency of sea ice research, British Antarctic Survey Blog
- UM scientists see record shattering Antarctic sea ice conditions first-hand, UM Today

Educational

- EO from Space: The Cryosphere. I appeared in and contributed video footage, interviews and technical advice to this ESA online course.
- I have written several Wikipedia pages, including the original articles for Earth Models of Intermediate Complexity, the CICE sea ice model, the Atlantic Meridional Overturning Circulation, and the MOSAiC Expedition.