

Dr GEORGIA MELODIE HOLE

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PERSONAL PROFILE

I am a biogeoscientist specialising in climate and environmental change in physical, geochemical and biological contexts. My experience spans statistical analyses of environmental and climate data, paleo-environmental reconstruction including via ocean sediments and tree rings, co-production of knowledge with indigenous communities, and additional interests in science communication and outreach.

EDUCATION

UNIVERSITY OF OXFORD

PhD - NERC DTP DPhil in Environmental Research. School of Geography and the Environment. Supervisor: Professor Marc Macias-Fauria.

Thesis title: *Driftwood as a tool for investigation of Holocene Pan-Arctic Sea Ice Dynamics*.

I developed reconstructions of climate and Arctic sea ice extent and dynamics throughout the Holocene, utilising driftwood as a novel proxy. Methods included Arctic fieldwork, dendrochronological, microanatomical, and radiogenic isotope analyses, large dataset collation and analysis, and managing international collaborations. I published three papers from this work, with [one](#) recently cited in Peter Frankopan's book *The Earth Transformed*; as an example of "some of the most exciting advances in the way we understand climate."

IMPERIAL COLLEGE LONDON

Geology & Geophysics MSci - Department of Earth Sciences and Engineering. First-Class degree with honours. Supervisor: Professor Tina van de Flierdt.

MSci Thesis title: *The Provenance fingerprint of early Oligocene Antarctic Glaciation*.

Topics included climate dynamics, structural geology, geomorphology, fluid dynamics, remote sensing and GIS, applied geophysics, geochemistry, applied mathematics, and science communication. Mineralogical Association Prize (Student Award for Excellence in Mineralogy).

Mapping Award (Best Geological Map, Undergraduate Field Course, Urra, Spain).

EMPLOYMENT

Postdoctoral Research Associate, Durham University (March 2025-present)

Within the Horizon Europe project *Past to Future - towards fully paleo-informed climate projections*, I am compiling and synthesising sea ice proxy records into reconstructions of past sea ice configurations. Collated and new data will feed into Earth System Models to deliver improved climate model tuning and evaluation, which is essential for accurately predicting future trajectories of sea ice decline and the cascading impacts on climate, ecosystems and societies globally.

Postdoctoral Research Fellow, Anglia Ruskin University; Visiting Scholar, University of Cambridge (January 2023 – January 2025) – Within the UKRI-funded project [Beavers and socio-ecological Resilience in Inuit Nunangat](#), I worked closely with Inuvialuit communities and organisations to investigate the northward expansion of beavers in the Canadian Arctic, developing novel dendrochronological and remote sensing methods to characterise this environmental change and its socioecological consequences.

Research Coordinator & Communicator, Nature-based Solutions Initiative, University of Oxford (July 2021-December 2022) – I managed and produced translation of research into

dissemination materials (example [news item](#), [newsletter](#), [policy briefing](#), and [social media content](#)). I contributed to securing £50,000 of research grants, led communications management including at COP26, and led planning of the international NbS Conference 2022.

NERC Undergraduate Research Experience Placement – National Oceanography Centre, Southampton (2012) – I worked within a project investigating ice-rafted debris provenance using laser ablation lead (Pb) isotope analyses of ice-rafted feldspar grains. This contributed to new findings on the Pliocene onset of major northern hemisphere glaciation.

Undergraduate Research Opportunities Program (UROP), UCL, 2011 – I assisted on a research project on the [dynamics of sediment flux to the continental margin through the Paleocene–Eocene Thermal Maximum](#) including sample collection in northern Spain and bulk sediment grain size analysis.

RESEARCH SKILLS

- Data processing, cleaning, and analysis via statistical modelling in R.
- Dendrochronological and wood microanatomical analyses.
- High-latitude fieldwork experience, including logistics and protocol planning, remote sensing data gathering, and building and deploying environmental sensors.
- Geospatial data handling and analysis in ArcGIS, QGIS.
- Geochemical analysis, including provenance tracers ϵNd , Pb, Sr.
- Version control and codebase co-development via Git.
- Collaboration with international partners, including indigenous communities.
- Grant writing.
- Outreach, engagement and dissemination.

PUBLICATIONS

- **Hole, G. M.**, Büntgen, U., Buchwal, A., Rees, W.G., Wheeler, H.C., (2026). [Blue rings reveal thermal thresholds of wood formation in Low Arctic tundra shrubs](#). *Scientific Reports*.
- **Hole, G. M.**, Büntgen, U., Wang, Y., DeVries, B., Rees, G., & Wheeler, H. C. (2026). [Dendrochronology and remote sensing reveal beaver occupancy and colonization dynamics in an expanding Arctic population](#). *Ecosphere*, 17(3), e70557.
- **Hole, G. M.**, Sinclair, D., & Macias-Fauria, M. (2022). [Dropped in the Ocean – \$^{87}\text{Sr}/^{86}\text{Sr}\$ as a provenance tool for ice-rafted Arctic driftwood](#). *Palaeogeography, Palaeoclimatology, Palaeoecology*, 110856.
- **Hole, G. M.** (2021). [Driftwood as a tool for investigation of Holocene pan-Arctic sea ice dynamics \[PhD thesis\]](#). University of Oxford.
- **Hole, G. M.**, Rawson, T., Farnsworth, W. R., Schomacker, A., Ingólfsson, Ó., & Macias-Fauria, M. (2021). [A Driftwood-Based Record of Arctic Sea Ice During the Last 500 Years From Northern Svalbard Reveals Sea Ice Dynamics in the Arctic Ocean and Arctic Peripheral Seas](#). *J. Geophys. Res. Oceans*, 126(10), e2021JC017563.
- **Hole, G. M.**, and Macias-Fauria M (2017), [Out of the woods: Driftwood insights into Holocene pan-Arctic sea ice dynamics](#), *J. Geophys. Res. Oceans*, **122**, 7612–7629.
- Bailey I, **Hole GM**, Foster GL, Wilson PA, Storey CD, Trueman CN, Raymo ME (2013), [An alternative suggestion for the Pliocene onset of major northern hemisphere glaciation based on the geochemical provenance of North Atlantic Ocean ice-rafted debris](#), *Quaternary Science Reviews*, **75**, 181-194.

MEDIA COVERAGE

- Va Deelen, G. (30/6/2026). How beavers gnawed their way into the Arctic. *Eos*, 107, <https://doi.org/10.1029/2026EO260209>.

- Strauss, M. (14/5/2026). [‘Time stamps’ in shrubs show when beavers began invading Canadian Arctic](#). *Mongabay* [news article].
- Verma, J.T. (23/4/2026) [The Great Bite North - Beavers, moving to higher latitudes, gnaw away at an Arctic way of life](#). *The Globe and Mail* [news article].
- Nathan, M. (26/3/2026) [March research news from the Ecological Society of America](#). *ESA News Release* [Press Release].
- CBC (5/11/2025). [The Nature of Things: Beavers from Above](#). *CBC TV*. [broadcast documentary].
- [Ancient driftwood tracks 500 years of Arctic warming and sea ice](#). (9/10/2021). *AGU Newsroom*. [Press release].
- Hagemann, H. (28/12/2017). [Driftwood reveals ancient Arctic currents and sea-ice levels](#). *Earth*. [magazine].
- Lipuma, L. (20/9/2017). [Tracking driftwood gives researchers insight into past Arctic Ocean changes](#). *AGU Geospace*. [blog].

CONFERENCE ABSTRACTS

- **Hole, G. M.**, Kjær, H. A., Andreasen, N., and McClymont, E.: Defining the States and Variability of Sea Ice via Marine Proxy Data Synthesis, *EGU General Assembly 2026*, Vienna, Austria, 3–8 May 2026, EGU26-13232, <https://doi.org/10.5194/egusphere-egu26-13232>, 2026.
- **Hole, G.** & Macias-Fauria, M. (2018). Driftwood insights into Holocene pan-Arctic sea ice dynamics. *SCAR-IASC Open Science Conference*, Davos, Switzerland (abstract published in conference proceedings).
- **Hole, G.**, Macias-Fauria, M., & Porcelli, D. (2017). Out of the Woods — Driftwood Provenance as a Proxy for Holocene Arctic Sea Ice Dynamics. *Annual Goldschmidt Conference*, 1665. <https://ui.adsabs.harvard.edu/abs/2017gold.conf.1665H>.
- Huck, C. E., van de Flierdt, T., Bohaty, S. M., Roehl, U., **Hole, G. M.**, & Lee, G. (2014). “The Middle Man” - Nd Isotope Signatures of Marine Sediments as a Provenance Tool to Reconstruct Oligocene Ice Sheet Instability in the Wilkes Subglacial Basin, East Antarctica. *AGU Fall Meeting Abstracts*, 2014, PP21A-1304. <https://ui.adsabs.harvard.edu/abs/2014AGUFMPP21A1304H>.

REPORTS

- Phoenix, G., Harding, M., ..., **Hole, G.**, ... & Wookey, P. (2026). *UK Arctic Terrestrial Research: Towards International Polar Year 2032/33 and Beyond: Research Strengths, Priorities and Implementation* [report]. The NERC Arctic Office.

SCIENCE WRITING

- **Hole, G.M.** [Book review: The Story of Earth's Climate in 25 Discoveries: How Scientists Found the Connections Between Climate and Life - Donald R. Prothero](#). *Geoscientist Magazine*. 27/11/2025.
- **Hole, G.** [End to summer sea ice predicted by 2050 in new report](#). *Medium*. 18/11/ 2022.
- **Hole, G.** [Nature-based Solutions - the offsets and trade-offs in a changing landscape](#). *Medium*, 30/5/2022.
- **Hole, G.** [Small Mercies in Ocean Microplastic Pollution](#). *Medium*, 19/08/ 2020.
- **Hole, G.M.** (2011) [Post-modern rock-pooling](#), *Mediaview, Geology Today*, **27**, 82–95(2011).

GRANTS, FELLOWSHIPS AND FUNDING

- Research Development Fund (awarded), Department of Geography, Durham University (£3400).
- Agnese Haury Visiting Scholar Fellowship (awarded), Laboratory of Tree-Ring Research, University of Arizona. (\$4500). Scheduled Sep-Dec 2026.
- Reserve Candidate, Fulbright All-Disciplines Award (UK–US Fulbright Commission), 2026/27.

- RENKEI Early Career Researcher Delegate, UK–Japan Workshop, British Council/Durham University (£2,700), 2026.
- Contributor, NERC ‘Economics of Biodiversity Synthesis’ grant (£50,000), 2021.
- NERC PhD studentship, 2014–2019.
- NERC Extraordinary Funding (£2,000), 2018.
- Graduate Travel Award, Hertford College, Oxford (2017: £300. 2015: (£200).

CONFERENCE ACTIVITY

- Co-convenor, session for XXII INQUA Congress (2027): “Arctic Climate Change: From past histories to future trajectories”.
- Oral and poster presentations at:
 - UK Arctic Science Conference (2015, 2017, 2023, 2025). UK Antarctic Science Conference (2026).
 - Goldschmidt Conference (2017).
 - POLAR Conference (2018).
 - CINUK Annual Science Meeting (2023).
 - British Organic Geochemical Society (2025).
 - EGU General Assembly (2026)

INVITED TALKS

- RENKEI UK-Japan Collaboration Lab, Tohoku University (2026).
- Scott Polar Research Institute, Arctic Research Seminar (2024).
- Open University, School of Environment, Earth and Ecosystem Sciences Seminar (2024).

ACADEMIC SERVICE

- Peer reviewer for leading publications/grants including *Nature Geoscience* and the *NWO Talent Programme, Dutch Research Council*.
- Organising committee member for Horizon Europe P2F project workshops.

TEACHING

- Lecturer, ‘Reconstructing Environmental Change’ (Undergraduate), Department of Geography, Durham University, 2026.
- Tutor, Popular Science Writing, University of Oxford, 2018.
- Tutor, Ecological Survey Techniques, University of Oxford, 2017.
- Tutor, High Latitude Quaternary Environmental Change, University of Oxford, 2016.

PROFESSIONAL TRAINING AND WORKSHOPS

- Contributor, NERC Arctic Office workshop and report: “UK Arctic Terrestrial Research: Towards IPY 2032/33”, 2026.
- Contributor, NERC Arctic Office workshop and report: “UK Arctic Ocean and Coastal Research for IPY5”, 2025.
- CryoSkills (NERC-funded field course, Norway), April 2024.
- Arctic Late Quaternary Glacial and Marine Environmental History (AG-848), UNIS, 2016.
- NERC/MathStat CPD: Dynamical Systems in Environmental Science (R-based modelling), 2016.
- Wood Anatomy & Tree-Ring Ecology, Klosters, Switzerland, 2015.
- Engaging Research (Open University/BBC Media Unit), participant 2015; tutor 2016.