

Alice R. Paine PhD, MSc(R), BSc alice.paine@earth.ox.ac.uk https://www.researchgate.net/profile/Alice Paine3

SUMMARY

Mission Statement

To seek a better understanding of the relationship between volcanoes, the climate system, and the environment during the Quaternary.

Research - My scientific interests lie in volcanology, paleoclimatology, and paleoenvironmental science. My work to date has focussed on identifying and using geochemical proxies sourced from records such as stalagmites, ice cores, and lake sediments to refine timescales of local, regional, and global changes over the past 100,000 years of Earth's history. In the future, I will build on this work to gain a better understanding the mechanisms, processes, and feedbacks underpinning these signals.

Scientific Skills - Analysis of naturally occurring records by the following methods: LA-ICP-MS, coulometry, light & electron microscopy, minerogenic extraction (cryptotephra), sediment preparation & sampling, slide preparation, and atomic adsorption spectrometry. Additional skills include database construction, data/resource organisation, time management, and project management.

Computing Skills - MATLAB, R Studio, Microsoft Excel, ArcGIS, ArcMap, ERDAS IMAGINE©

Teaching - I have taught students of varying ages, educational backgrounds, and interests. My teaching delivery has ranged from small-group tutorials to lectures for >80 students, and covered a wide range of topics including volcanology, paleoenvironmental science, paleoclimatology, and career skills.

Science Communication - I have communicated scientific results and ideas to academics and general audiences through peer reviewed publications, scientific conferences, seminars, workshops, and social media. I am also co-founder of the ECR Reading-Rendezvous: an inclusive reading group to provide a platform for early-career researchers to network, share ideas, and learn new skills.

Languages - English (fluent), Spanish (basic)

EMPLOYMENT

Postdoctoral Researcher

University of Basel, CHE

Funded by SNSF Sinergia Project: "Holocene hydroclimate, drought dynamics and environmental changes recorded in multiple archives from SW Asia (MITRA)"

EDUCATION

DPhil Earth Sciences

University of Oxford, GBR

"Exploring the Quaternary mercury cycle" Supervisors: Prof. Tamsin A Mather, Prof. Stuart A Robinson, Prof. David M Pyle

MSc (Research) Earth Sciences University of Durham, GBR

2020-2024

2024 – present

2019-2020

Iniversity of Leeds, GBR	
Class II, Division i)	
A-Levels	
Calder VI	
eography (A*), Psychology (A*), English Literature (A), Extended Project Qualification (A)	
WARDS: Headteacher's Award, Academic Excellence in Geography	

AWARDS

YGS Fearnsides Award

Yorkshire Geological Society Awarded in collaboration with Durham University (UK) and Ludwig Maximilian University of Munich (Germany) Project Title: "Experimental validation of rapid SO2 scavenging during large volcanic eruptions"

European Research Council Scholarship

University of Oxford

Awarded under ERC Consolidator Grant V-ECHO (2019-2024) Project Title: "Revealing hidden volcanic triggers for global environmental change events in Earth's geological past using mercury (Hg)" (PI: Prof. Tamsin A Mather)

RUNNER UP - Geoff Brown Prize

Volcanic and Magmatic Studies Group (VMSG) Conference 2022 Awarded as an honourable mention for 'Best Student Poster' Poster Title: "Why lacustrine mercury reconstructions might not be good records of large volcanic eruptions".

PUBLICATIONS

- 1. Paine, A.R., Baldini, J.U.L., Ünal-İmer, E., Wadsworth, F.B., Iveson, A.A., Humphreys, M.C.S., Brown, R.J., Müller, W., Ottley, C. Abrupt climate change at the MIS 5/4 transition recorded in a speleothem from the Eastern Mediterranean. Quaternary Science Reviews 339: 108841 https://doi.org/10.1016/j.quascirev.2024.108841
- 2. Paine, A.R., Fendley, I.M., Frieling, J., Mather, T.A., Lacey, J.H., Wagner, B., Robinson, S.A., Pyle, D.M., Francke, A., Them, T.R., Panagiotopoulos, K. (2024) Mercury records covering the past 90 kyr from lakes Prespa and Ohrid, SE Europe. Biogeosciences 21(2): 531-556
- 3. Baldini, J.U.L., Brown, R.J., Wadsworth, F.B., Paine, A.R., Campbell, J., Green, C., Mawdsley, N., Baldini, L.M. New Laacher See eruption date potentially compromised by magmatic carbon dioxide. Nature 619: E1-E2 https://www.nature.com/articles/s41586-023-05965-1
- 4. Paine, A.R., Wadsworth, F.B., Baldini, J.U.L. (2021) Super-eruption doublet at a climate transition. Communications: Earth & Environment 2: 219 https://www.nature.com/articles/s43247-021-00293-6
- 5. Paine, A.R., Baldini, J.U.L., Wadsworth, F.B., Lechleitner, F.A., Baldini, L.M., Brown, R.J., Müller, W., Hercman, H., Gąsiorowski, M., Stefaniak, K., Socha, P., Sobczyk, A., Kasprzak, M. (2021) The trace-element composition of a Polish stalagmite: Implications for the use of speleothems as a record of explosive volcanism. Chemical Geology 570: 120157 https://doi.org/10.1016/j.chemgeo.2021.120157

IN REVIEW

1. Paine, A.R., Frieling, J., Shanahan, T.M., Mather, T.A., McKay, N., Robinson, S.A., Pyle, D.M., Fendley, I.M., Kiely, R., Gosling, W.D., New evidence for millennia-scale interactions between Hg cycling and hydroclimate from Lake Bosumtwi, Ghana. Climate of the Past Discussions. https://doi.org/10.5194/egusphere-2024-2123

BSc (Hons) Geography Ur

2020 - 2023

2023

2022



2016-2019

2014-2016



- 1. Wadsworth, F.B., Vasseur, J., Llewellin, E. W., **Paine, A.R.,** Marshall, L., Casas, A.S., Suzuki, Y.J., Hick, B., Foster, A., Buckland, H.M., Dingwell, D.B., Anagnostopoulos, I., Delmelle, P., Baldini, J.U.L., Morgan, A., Lavalleé, Y., Hughes, E., Renggli, C. Syn-eruptive high temperature sulfur scrubbing can reduce the climate impacts of volcanic eruptions. *Science Advances*.
- Kiely, R.E., Paine, A.R., McMichael, C.H., Gosling, W.D. Heat, Hydroclimate & Herbivory: A Late-Pleistocene Record of Environmental Change from Tropical Western Africa. *Quaternary International Special Issue: Mapping Ancient Africa*

IN PREP

- 1. **Paine, A.R**., Frieling, J., Wagner, B., Francke, A., Lacey, J.H., Mather, T.A., Robinson, S.A., Pyle, D.M. One million years of mercury cycling in Lake Ohrid. *Nature Geoscience.*
- 2. **Paine, A.R.**, Wadsworth, F.B. EVMAC: a resource for characterisation of explosive eruption dynamics. *Journal of Applied Volcanology.*

TEACHING

Guest Lecturer – Department of Earth Sciences, University of Durham	2023
Course: BSc Climate Science	
Module: Atmospheric Circulation and Dynamics (Level 3)	
Delivery: 1 x 1 hour lectures + 1 x 2 hour practical class	
Guest Lecturer – School of Geography, University of Leeds	2022
Course: BSc Physical Geography/Geology	
Module: GEOG1055: Environmental Change: Past, Present, and Future (Level 1)	
Delivery: 4 x 1 hour lectures	
Tutor – Department of Earth Sciences University of Oxford	2020–Present
Course: BSc Farth Sciences	2020 1100011
Module: Volcanology & Janeous Petrogenesis (Level 3)	
Delivery: 1 hour tutorials, exam question feedback	
Teaching Assistant – Department of Earth Sciences, University of Durham	2019–2020
Course: MSc Earth Sciences/BSc Geology/BSc Geoscience	
Module: Earth Materials (Level 1), Earth System & Climate (Level 3)	
Delivery: 1-2 hour practical classes	
Teaching Assistant – Calder High School	2016–2017
Course: GCSE Geography, A-Level Geography, A-Level Psychology	
Delivery: 1-2 hour classes	

ACADEMIC SUPERVISION

Miss Ruth Kiely – MSc (Research) – University of Amsterdam	2021–2023
Thesis Title: "Reconstructing Fire Severity and Intensity in Tropical West Africa during the Quaternary"	
Miss Amy Morgan – BSc – University of Durham	2022–2023
Thesis Title: "How certain are we about the timing of major climate change events in the late Pleistocene?"	

SERVICE & LEADERSHIP

SCIENTIFIC PUBLISHING

- Journal Reviewer – Communications Earth & Environment, Chemical Geology, Geophysical Research Letters, Science Advances

RESEARCH GROUPS

- Centre for Observation and Modelling of Earthquakes, Volcanoes and Tectonics (2020 - Present) - Volcanology & Igneous Petrology, University of Oxford (2020 - Present)

- Volcanology, Durham University (2019-2020)

ENGAGEMENT IN SCIENCE

ICDP MEME Project

Workshop Member

The main objective of the MEME project is to gain insights into the mode, tempo and dynamic of the Plio-Quaternary evolution of different domains and components of the Earth system, by drilling sediments deposited in the Fucino Basin (Central Apennines, Italy). The project will explore different spatial and temporal scales of change, and will extend an independent-dated (40Ar/39Ar) lacustrine record back to ~5 Ma.

Global Volcanic Risk Alliance

Early Career Researcher representative

VolcanoAid is a non-profit organisation in the early stages of formulation, led by Dr Michael Cassidy and Dr Lara Mani. VolcanoAid seeks to support schemes to identify dangerous and neglected volcanoes, to empower and aid local volcanologists to provide early warnings for eruptions, to increase community preparedness around volcanoes, and to lobby at the international level for sustained investment and global coordination of volcanic early warning and response (https://www.volcanoaid.org/home).

ECR Volcanology Reading-Rendezvous Co-founder and committee member

The ECR Volcanology R-R was formed to provide an accessible, inclusive, and diverse platform for undergraduates, postdoctoral researchers, and early-career faculty members to discuss novel topics in volcanology, and in turn promote the open exchange of knowledge and ideas in physical volcanology, igneous geochemistry, petrology, volcano geophysics and related subjects.

#AskaGeo

Listed Scientist

#AskAGeo is an online hub that links students and teachers with professional geoscientists working all over the world on a variety of topics to facilitate connections between schools and geoscientists, orchestrate outreach sessions, and provide subject support.

Skype-a-Scientist

Listed Scientist

Skype-a-Scientist gives classrooms, families, libraries, and scout troops the opportunity to meet and interview active academics and scientists, through use of video conferencing and virtual meeting software.

Secondary School visits

I have been invited to speak at a range of secondary schools across the UK, with the aim of improving awareness of careers in science to younger students. Recent examples include 2 x 1-hour 'Q&A-style' talks for Year 7, 8, and 10 students at Waingels College (Wokingham, UK), and 1 x 1-hour guest lesson for Year 10 and 11 students at Brighouse High School, West Yorkshire.

Community Event organisation

I was recently involved in organisation of a workshop run by the MPLS STORC project in Barton, Oxford. Working with Barton Community Association, the project aims to create weekly, science-themed workshops for students aged ~14-16.

INVITED TALKS

*keynote

2024

- Pal(a)eoPERCS (Pal(a)eo EaRly Career Seminar Series), Virtual 0 Talk Title: "Exploring the Quaternary mercury cycle"
- School of Geography, University of Liverpool 0 Talk Title: "Exploring the Quaternary mercury cycle"





2023 - present

2021-present

2020-present

2021 - 2022

2022

2020-2021



2023

- School of Archaeology, University of Oxford Talk Title: "Volcanism, climate, and environmental change during the Late Pleistocene"
- PAGES Volcanic Impacts on Climate and Society 5th Workshop, University of Bern* Talk Title: "Volcanism, climate, and environmental change during the Late Pleistocene"

2022

- Glaciology Research Group, University of Leeds Talk Title: "Is volcanism the missing trigger of millennial-scale climate change during the Late Pleistocene?"
- Durham Volcanology Group, University of Durham Talk Title: "Sniffing out global volcanic fingerprints using mercury in Quaternary sediment records"

2021

- SPELEOTOLIA Project, Online International Workshop by Marie S. Curie* Talk Title: "Speleothem records of explosive volcanism: current applications & future prospects"
- School of Archaeology, University of Oxford Talk Title: "Speleothem records of explosive volcanism: current applications & future prospects"

2020

- o Northern Bridge Creative Arts Research Network Talk Title: "The Artistic Scientist: the ways in which creativity and artistic practice can supplement, and enhance, scientific research"
- Durham Volcanology Group, University of Durham Talk Title: "Quaternary volcanic signatures in high-resolution stalagmite trace element datasets"
- EGU GMPV ECR Committee, European Geosciences Union Talk Title: "Quaternary volcanic signatures in high-resolution stalagmite trace element datasets".

CONFERENCE PRESENTATIONS

2023

- Paine, A.R., Gosling, W.D., Fendley, I.M., Frieling, J., Mather, T.A., Shanahan, T.M., McKay, N., Robinson, S.A., Pyle, D.M., Kiely, R. (2022) Does hydroclimate drive mercury fluxes in Lake Bosumtwi, Ghana? *XXI INQUA Congress*, 14-20 July 2023
- Vasseur, J., Wadsworth, F.B., Paine, A.R., Dingwell, D.B. (2023) Hot volcanic ash filters eruptive SO₂ during hot transport in conduits and the lower plume: A predictive model with implications for the climate impacts of volcanic eruptions. *EGU General Assembly* (EGU23-11407) <u>https://doi.org/10.5194/egusphere-egu23-11407</u>

2022

- Paine, A.R., Fendley, I.M., Frieling, J., Mather, T.A., Lacey, J.H., Pyle, D.M., Robinson, S.A., Wagner, B., Them II, T.R., Panagiotopoulos, K. (2022) Mercury cycling since 90 ka recorded in lacustrine sediments from SE Europe. [PP55C-0483] presented at 2022 AGU Fall Meeting
- Paine, A.R., Vasseur, J., Wadsworth, F.B., Dingwell, D.B. (2022) Hot volcanic ash filters eruptive SO₂ within 100 seconds of transport: A predictive model with implications for the climate impacts of volcanic eruptions [A15H-1329] presented at 2022 AGU Fall Meeting

- Paine, A.R., Fendley, I.M., Frieling, J., Mather, T.A., Lacey, J.H., Pyle, D.M., Robinson, S.A., Wagner, B., Them II, T.R., Panagiotopoulos, K. (2022) Sniffing out global volcanic fingerprints using mercury in Quaternary sediment records. Presented at the Centre for Observation and Modelling of Earthquakes, Volcanoes and Tectonics (COMET) Annual Meeting, 4 July
- Paine, A.R., Fendley, I.M., Frieling, J., Mather, T.A., Lacey, J.H., Pyle, D.M., Robinson, S.A., Wagner, B., Them II, T.R. (2022) Why lacustrine mercury reconstructions might not be good records of large volcanic eruptions. VMSG Conference Abstracts, 2022. <u>https://vmsg.org.uk/wp-content/uploads/2022/01/vVMSG2022_abstract-volume.pdf</u> (p. 81)
- Paine, A.R., Wadsworth, F.B., Mather, T.A., Pyle, D.M., Baldini, J.U.L., Pausata, F.S.R., Condron, A., Brown, R.J. (2022) The case for volcanism as a major driver of Last Glacial millennial-scale climate change. VMSG Conference Abstracts, 2022. <u>https://vmsg.org.uk/wp-content/uploads/2022/01/vVMSG2022_abstract-volume.pdf</u> (p. 80)

2021

 Paine, A.R., Baldini, J.U.L., Ünal-İmer, E., Wadsworth, F.B., Brown, R.J., Carolin, S.A., Iveson, A.A., Müller, W., Verniers, T. (2021) Did the 74ka Toba eruption cause aridity in the Eastern Mediterranean over millennia? *VMSG Conference Abstracts*, 2021.

https://www.geolsoc.org.uk/~/media/shared/documents/events/2021/VMSG%20ABSTRACT%20BOOK.pdf (p. 18)

2020

 Paine, A.R., Swindles, G.T. (2020) Identification of Holocene tephra in the Northern Pennines, UK. VMSG Conference Abstracts, 2020. <u>https://vmsg.org.uk/wp-content/uploads/2020/01/Abstract_Volume_Plym2020.pdf</u> (p. 87)

2019

 Paine, A.R., Swindles, G.T. (2019) Identification of Volcanic Ash in Great Britain: Novel perceptions of global volcanism and modern risk assessment. *International Conference of Undergraduate Research, Leeds.* https://www.icurportal.com/wp-content/uploads/7289-uow-icur-programme-2019-online.pdf

OTHER RESEARCH EXPERIENCE

Fieldwork – I have been an active member of several field trips and expeditions. I have led trips for my own research (e.g., peat coring at Walton Moss in August & October 2018), and also been part of larger teams on collaborative efforts (e.g., geomorphological, and fluvial study in the Ödenwinkelkees Valley, Salzburg in 2016) and reconnaissance trips (e.g., sedimentary observation and sampling at St. Audrie's Bay, Somerset in 2022).

CO-CURRICULAR INTERESTS

Hiking

I thrive in the natural environment, and readily seek out opportunities to explore new and interesting landscapes by foot. Notable trips have included:

- Italy (2023) Bay of Naples, Mount Vesuvius
- Iceland (2018/19) Þingvellir National Park, Snæfellsnes peninsula, Solheimajökull
- La Palma (2019, 2022) Cumbre Vieja
- Lanzarote (2016, 2019) Parque Nacional del Timanfaya
- Tenerife (2020, 2022, 2023) Parque Nacional del Teide
- Wales, UK (2019) Snowdonia



- Cumbria, UK (2017, 2018) - Helvellyn, Scafell Pike

Sports

I am currently a part-time CrossFit athlete, with my training is currently programmed and overseen by Gritstone CrossFit (<u>https://gritstonecrossfit.co.uk/</u>). Prior to my CrossFit career, I engaged in a variety of sports including strength & conditioning, netball, rounders, and swimming. For 14 years prior to my undergraduate degree, I was heavily involved in equestrian sports, with a

particular focus on show jumping and dressage. I am also a Level 2 and Level 3 qualified personal trainer and gym instructor.

Art

I am a freelance artist, specialising in pencil portraiture. I am the founder of Alice Paine Pencil Art: a small freelance art business offering commission-based works for a wide range of customers across the UK, Europe, USA, and Australia/New Zealand.

www.facebook.com/apaineart

NON-ACADEMIC EMPLOYMENT

Community & Social Media Manager	2021 – Present
Propane Business - <u>https://propane-business.com</u>	
Freelance Artist/Founder	2 009 – Present
Alice Paine Pencil Art - www.facebook.com/alicepaineart	
Personal Trainer & Gym Instructor	2019
Ascend Personal Training, Elland - <u>www.ascendpersonaltraining.co.uk/</u>	
Personal Trainer & Gym Instructor	2017 – 2018
To The Max Fitness, Hebden Bridge - www.tothemaxfitness.co.uk	
Shop Assistant & Copywriter	2017 – 2018
Predator Nutrition, Leeds - https://www.predatornutrition.com	

QUALIFICATIONS

- UK Driving Licence
- Level 2 Gym Instructor
- Level 3 Personal Trainer, with additional qualifications in: Indoor & Outdoor Cycling, Indoor & Outdoor Circuits, and Exercise Referral

REFERENCES

- Prof. Tamsin A Mather (*PhD supervisor*) Department of Earth Sciences, University of Oxford, Oxford, UK <u>tamsin.mather@earth.ox.ac.uk</u>
- Prof. James U L Baldini (MSc supervisor)
 Department of Earth Sciences, University of Durham, Durham, UK
 james.baldini@durham.ac.uk

- Dr Fabian Wadsworth (collaborator)
 Department of Earth Sciences, University of Durham, Durham, UK fabian.b.wadsworth@durham.ac.uk
- Prof Bernd Wagner (collaborator) Institute of Geology and Mineralogy, University of Cologne, Germany wagnerb@uni-koeln.de
- Prof Francesco Pausata (collaborator)
 Department of Earth and Atmospheric Sciences, Université du Québec à Montréal (UQAM), Canada pausata.francesco@uqam.ca
- Dr Yusef El-Sobky (non-academic employment) Propane Business yusef@propanefitness.com