

Professor Ian Fairchild PhD

Professor of Geosystems

[School of Geography, Earth and Environmental Sciences \(/schools/gees/index.aspx\)](/schools/gees/index.aspx)

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About

Ian Fairchild is a geoscientist with broad interests in the geochemistry of the Earth's surface, climate change and Quaternary and Neoproterozoic earth history. He employs this breadth of knowledge in teaching, in public outreach, and professional activities such as examining and research assessment. He is equally at home in the field and the laboratory with a wealth of experience in glacial environments, caves, rock successions and at national and international geochemical research facilities.

Qualifications

- BSc University of Nottingham
- PhD University of Nottingham

Biography

Ian is a Chartered Geologist and a former Fellow of the Royal Geographical Society. His research on geochemical aspects of earth surface processes and systems commenced in 1990 and has encompassed climatic, glacial, karstic and experimental themes, complementing a longer-standing interest in carbonates and ice ages in deep time. His academic career started with undergraduate study of geology at Nottingham (BSc 1974) before undertaking research on sedimentology of Scottish metasediments (PhD 1978). During his PhD studies he took up a demonstratorship at Cambridge in January 1977 before being appointed lecturer in Sedimentology at Birmingham in June 1980. After promotion to Senior Lecturer in 1993, he moved to Keele University in January 1996 as Professor of Earth Surface Processes. He was successively a Head of Department (1998-2001) and Dean of the Faculty of Natural Sciences and member of the University's senior management team (2001-2003) at Keele.

He returned to the University of Birmingham in September 2003 as Professor of Physical Geography and became retitled Professor of Geosystems in 2010 reflecting his change of academic leadership responsibilities. Ian has been the Chief Editor of the *Journal of the Geological Society* (1996-2000) and an Editor of *Reviews of Geophysics* (2005-2010). He has much experience with the Natural Environmental Research Council and was a member of the sub-panel for Earth Systems and Environmental Sciences in the Research Excellence Framework 2014. He was Head of the School of Geography, Earth and Environmental Sciences at Birmingham for the calendar years 2012 and 2013. He currently works part-time.

Teaching

Ian has taught on a range of modules in undergraduate and postgraduate programmes in geography, earth sciences and environmental sciences and on the . He is able to illustrate a large proportion of his lectures with examples taken from his research experience on modern environments and carries this through to advising undergraduates on their own field-based projects.

He teaches half of the Year 2 module on Geomorphological Processes in which he deals with karstic, coastal and glacial environments as well as methods of dating landscape change and also teaches the first half of the Year 2 module on Reconstructing Quaternary Environments in which he focuses on the nature of Quaternary archives. Both physical geography and geology-geography students populate these modules. Ian overviews Quaternary science as part of a Year 3 module on Climates of the Past available to both geography and earth science programmes. Ian supervises geology and physical geography dissertations and MSci projects.

Postgraduate supervision

Ian Fairchild has supervised 33 research students and post-docs who have successfully completed their projects. Current research students are listed below:

- **Rosemary Dartnall** (<http://www.birmingham.ac.uk/schools/gees/people/dr-students/dartnall-rosemary.aspx>) (started PhD studies, October 2011) Geology of the Gwna Melange

Overseas students:

Pilar Aliaga	For PhD	2010-	Mexican government	Rare earth elements in speleothems External member of thesis advisory committee, National University of Mexico. Pily visited Birmingham for 4 months in 2012.
Robert Klaebe	For PhD	2012-	Australian government	Chemistry of Neoproterozoic carbonates. University of Adelaide

Research

Research groups

- Geosystems
- Water Sciences

Research interests

- **Speleothems and Climate Change** (</research/activity/geosystems/themes/speleothem.aspx>), especially the development of palaeoclimate proxies and the understanding of karst processes including their hydrology. See also www.speleothemscience.info (<http://www.speleothemscience.info>)
- Glaciation and carbonates in deep time - The Cryogenian. See **GAINS project** (<http://www.birmingham.ac.uk/research/activity/geosystems/projects/gains2010/index.aspx>)
- Aqueous Geochemistry in relation to weathering reactions and hydrology in glacial and riverine environments (Iceland, Himalayas).
- Experimental studies of mineral-water interactions

For an overview see Ian's **Inaugural lecture (18 May 2004): Caves, Climate, CO₂ and Civilization (PDF - 3.94MB)** (</Documents/college-les/gees/staff/fairchild-inaugural.pdf>)

Current / recent research

- 2014-15 co-investigator of Australian Research Council grant "To what extent does fire affect karst processes? Burning questions for fire management"
- 2014-16 co-investigator of NERC standard grant SCENT (Soil Carbon Export revealed using Novel Tracers on multiple timescales), led by Dr. Rebecca Bartlett
- 2011-14 co-investigator of Australian Research Council grant Were abrupt changes in the Precambrian global carbon cycle the trigger for animal appearance and radiation on Earth?
- 2010-2013 **Glacial Activity in Neoproterozoic Svalbard (GAINS)** (</research/activity/geosystems/projects/gains2010/index.aspx>) Principal investigator and project leader of a project funded by a NERC standard grant involving five UK and eight overseas institutions
- 2010-2011 *Interrogating trees as archives of environmental sulphur variability*
Co-investigator of a NERC small grant led by Dr. Peter Wynn of Lancaster University
- 2010-2012 *Palaeoenvironmental change and hominid migration in Australia*
Investigator of this NERC standard grant led by Dr. Alison Blyth of the Open University
- 2009-2012 *A calibrated climate record from Gibraltar speleothem: the instrumental era, the Holocene and the last interglacial*
Co-investigator of NERC standard grant, Professor David Matthey of Royal Holloway
- 2009-2011 *Last millennium climate reconstruction in Ethiopia using multiple stalagmite parameters*
Co-investigator of NERC standard grant. Led by [Dr. Martin Widmann](/staff/profiles/gees/widmann-martin.aspx) (Birmingham). Project originally led by Professor Andy Baker (now University of New South Wales). Also co-investigator of NERC isoe facility project entitled *Early Human migration out of Ethiopia: stalagmite isoe evidence of a climatic forcing during 130-160 ka*.
- 2009-2010 *Activating the speleothem archives*
Leverhulme Study Abroad Fellowship
- 2009-2010 *Elemental Signals in Karst: from Soil to Speleothem*
Principal Investigator of NERC small grant. Co-investigators [Professor Jamie Lead](/staff/profiles/gees/lead-jamie.aspx) (Birmingham) and Dr. Hao Zhang (Lancaster)
- 2009 NERC radiocarbon allocation *Atmospheric carbon sequestration in hyperalkaline speleothems*
- 2008-2010 Supervisor of Marie Curie Fellow, Dr David Domínguez-Villar (EU Marie Curie Fellowship), *PROCAVET: Proxies from cave deposits: testing their sensitivity using the current period of global change*
- 2008 NERC ion microprobe facility grant: *Annual sulphate cycles in an Alpine speleothem: winter temperature proxy*
- 2005-2009 **Atmospheric forcing of sulphate in speleothem carbonate** (</research/activity/geosystems/projects/atmosphericforcing.aspx>) Principal Investigator of NERC standard grant, co-I Dr. Andy Baker (Birmingham) and Dr. Neil Loader (Swansea) with Dr. Peter Thomas (Keele) and Dr. Jonathan Lagueard (MMU) as additional collaborators. Post-docs Dr. Peter Wynn (now Lancaster University), Ms Anna de Momi. Associated European Synchrotron Facility grant: High-resolution elemental variability in stalagmites: new archive of atmospheric chemistry changes; Nuffield Foundation undergraduate bursary grant Incorporation of sulphate into calcite crystals and several associated grants from NERC ICP facility allocation.
- 2003-2007 **Atlantic Seaboard Climatic Reconstructions Including Bounding Errors (Ascribe)** (<http://www.gees.bham.ac.uk/research/projects/ascribe/index.shtml>)
PI and project leader of NERC standard grant

Other activities

Voting Member of the Cryogenian sub-commission of the International Commission on Stratigraphy

Publications

Zalasiewicz, J., Waters, C.N., Williams, M., Barnosky, A.D., Cearreta, A., Crutzen, P., Ellis, E., **Fairchild, I.J.**, Grinevald, J., Leinfelder, R., McNeill, J., Poirier, C., Richter, D., Steffen, W., Vidas, D., Wagnreich, M. & Zhisheng, A. 2015 When did the Anthropocene begin? A mid-twentieth century boundary level is stratigraphically optimal. *Quaternary International* <http://dx.doi.org/10.1016/j.quaint.2014.11.045> (<http://dx.doi.org/10.1016/j.quaint.2014.11.045>)

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Hartland, A., **Fairchild, I.J.**, Müller, W. & Domínguez-Villar, D. 2014 Preservation of colloid-metal complexes in a modern hyperalkaline stalagmite: implications for speleothem trace element geochemistry. *Geochimica et Cosmochimica Acta*, 128, 29-43.

Fairchild, I.J. & Frisia, S. 2014 Definition of the Anthropocene: a view from the underworld. In: Waters, C., Zalaciewicz, J., Williams, M., Ellis, M.A. & Snelling A. et al. (eds.) *A Stratigraphical Basis for the Anthropocene*. Geological Society Special Publication 395, 239-254.

Fleming, E.J., Lovell, H., Stevenson, C.T.E., Petronis, M.S., Benn, D.I., Hambrey, M.J. & **Fairchild, I.J.** 2013 Magnetic fabrics in basal ice as an indicator of the dynamics of a polythermal, surge-type glacier. *Journal of Geophysical Research – Earth Surface Processes*, 118, 2263-2278.

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Anderson, R.P., **Fairchild, I.J.**, Tosca, N.J. & Knoll, A.H. 2013 Microstructures in metasedimentary rocks from the Neoproterozoic Bonahaven Formation, Scotland: Microconcretions, microtektites, or microfossils? *Precambrian Research*, 233, 59-72.

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Arnaud, E. & **Fairchild, I.J.** 2011 The Port Askaig Formation, Dalradian Supergroup, Scotland In: Arnaud, E., Halverson, G. P. & Shields-Zhou, G. (eds) *The Geological Record of Neoproterozoic glaciations. Geological Society of London, Memoir*, 36, 635-642.

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Frisia, S., **Fairchild, I.J.**, Fohlmeister, J., Miorandi, R. Spötl, C. & Borsato, A. 2011 Carbon mass-balance modelling and carbon isotope exchange processes in dynamic caves. *Geochimica Cosmochimica Acta*, 75, 380-400.

Domínguez-Villar, D., **Fairchild, I.J.**, Carrasco, R.M., Pedraza, J. & Baker A. 2010 The effect of visitors in a touristic cave and the resulting constraints on natural thermal conditions for palaeoclimate studies (Eagle Cave, central Spain). *Acta Carsologica*, 39, 491-502.

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Fairchild, I.J., Spötl, C., Frisia, S., Borsato, A., Susini, J., Wynn, P.M., Cauzid, J. & EIMF 2010 Petrology and geochemistry of annually laminated stalagmites from an Alpine cave (Obir, Austria): seasonal cave physiology. In: Pedley, H.M. & Rogerson, M. (eds) Tufas and Speleothems: Unravelling the Microbial and Physical Controls. *Geological Society, London, Special Publication*, 336, 295-321.

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Expertise

Climate change past and present; limestone and water supply in limestone areas; caves and their deposits; water quality

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