Patrick C. McGuire
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2-page CV: resume_PatrickCMcGuire_2pages

Summary:

I am a data geoscientist, a computational meteorologist, and a planetary scientist. I currently work in the field of land surface processes and climate, wherein I have been working on various software tools (JULES, SDGVM, AquaCrop, ILAMB, AutoAssess, and ESMValTool), as well as developing improved global soil-property maps, improved vegetation parametrization, and improved urban modeling. This work has included being in the Global Carbon Project, wherein I provided SDGVM model output data and ILAMB analyses as part of the TRENDY MIP. I also upgraded the SDGVM model to handle gross land-use transitions. Prior to my work in land surface processes and climate, I worked on using orbital remote sensing to make global maps of Mars with the Mars Express HRSC camera and the Mars Reconnaissance Orbiter CRISM hyperspectral imaging camera. In the Cyborg Astrobiologist project, I worked on computer vision, machine learning, novelty detection, and saliency mapping. In the past, I have worked on methane hydrates, carbon sequestration, climate science, robotics, computer vision, complex systems, neural networks, machine learning, adaptive optics for astronomy, and dark matter astrophysics. I have developed and taught courses in astronomy, planetary science, and climate science. In 2016, I organized a large internal symposium in the geosciences dept. at the Free Univ. of Berlin. From 2024-2026, I co-organized two large internal symposia in the Meteorology Department at the Univ. of Reading.

Educational Background:

Ph.D. (Physics: major in dark-matter particle astrophysics, minor in neural networks & complex systems), University of Arizona, May 1994.
B.A. (Physics and Mathematics), University of Chicago, June 1989, honors thesis: "The Measurement of High Solar Flux".

Primary Scientific Interests

Land Surface Processes & Climate Science; Crop Modeling; Global Carbon Budget; Mars, Planetary Science, & Astrobiology

Primary Technique Interests

High Performance Computing, Data Assimilation, Remote Sensing, Atmo. Correction of Orbital Imaging Data, Computer Vision, Machine Learning, Data Mining, AI for programming

Professional Employment:

Research:

2017-: Senior Research Fellow (2026-), Land Surface Processes Research Scientist (2025-2026), Land Surface Processes Computational Scientist (2017-2024); Dept. of

Meteorology (2017-), Dept. of Geography & Env. Science (2017-2019), & NCAS (2019-), U. of Reading, Reading, UK, with Pier Luigi Vidale, Grenville Lister, Emily Black, Tristan Quaife, Joy Singarayer, & Anne Verhoef.
Modeling land surface processes on several national supercomputers. Supporting the U. of Reading's community of land surface processes researchers. Working with land-modeling and climate/weather modeling software packages (JULES, SDGVM, AquaCrop, & the Met Office Unified Model) and model-evaluation software packages (ILAMB, AutoAssess, & ESMValTool) for local, regional, and global models. Analyzing rain-gauge data, CORDEX regional climate-model data, downscaled global climate-model CMIP data, and AquaCrop crop-model estimates in the Peruvian Andes for the CROPP project. Working on improving the parametrization of soils, vegetation, & urban landscapes in JULES. Working on data assimilation for soil physical properties for the EXPECT project. Working with the Sheffield Dynamic Global Vegetation Model (SDGVM) for the European Drought 2018 model-intercomparison project (MIP) and the TRENDY Global Carbon Budget MIP. With SDGVM model runs, co-authored a paper in Nature on evidence for a destabilizing land-sink for carbon. Developed SDGVM to use gross land-cover-change data. Co-organized two internal symposia (Research Away-Days) in 2024 & 2026 for the Department of Meteorology.

2008-2019: Research Consultant, Applied Physics Laboratory, Johns Hopkins U., CRISM Science Team, with Scott Murchie.
Developed atmospheric-correction software for global mosaicking of 72-band multispectral CRISM images of Mars.

2013-2016: Researcher (*Wissenschaftlicher Mitarbeiter*), Inst. for the Geological Sciences, Planetary Sciences and Remote Sensing Group, Freie U., Berlin, Germany, with Stephan van Gasselt.
Global and regional mosaicking of images of Mars acquired by the HRSC camera on-board the Mars Express orbiter. Created and organized 'The Afternoon Balloons' seminar series and the FUB Internal GeoSymposium. Published results of the Cyborg Astrobiologist's novelty-detection and computer-vision field tests.

2012-2013: Research Associate, Dept. of Chemical Engineering, West Virginia U., with Brian Anderson.
Modeled carbon-dioxide sequestration & natural-gas production in natural-gas hydrates at the Ignik Sikumi field site on the North Slope of Alaska.

2009-2011: (2010-2011: Senior Research Associate, 2009-2010: Research Scientist), Department of Geophysical Sciences, U. of Chicago, with David Archer.
Modeled the impact of global warming upon methane hydrates underneath the oceans.

2008-2010: Humboldt Research Fellow: Inst. for the Geological Sciences, Planetary Sciences and Remote Sensing Group, Freie U. and DLR, Berlin, Germany, with Gerhard Neukum.
Regional mapping of Mars with CRISM hyperspectral images. Managed the development and testing of the Cyborg Astrobiologist's novelty-detection computer-vision software.

2005-2008: Robert M. Walker Senior Research Fellow in Experimental Space Science, McDonnell Center for the Space Sciences, a joint center between the Dept. of Earth & Planetary Sciences & the Dept. of Physics, at Washington U. in St. Louis, in the Earth & Planetary Remote Sensing Lab, with Raymond Arvidson.
Developed atmospheric correction software for global mosaicking of 72-band

multispectral CRISM images of Mars. Remote sensing of minerals on Mars through mixture modeling of CRISM visible/near-infrared spectra. Helped to select a safe landing site for the Phoenix Mars Lander.

2002-2005: Ramon y Cajal Fellow, Center for Astrobiology (Robotics Lab & Transdisciplinary Lab), Madrid, Spain.
Created, developed, and published the Cyborg Astrobiologist project (a computer-vision project for teaching computers to find 'interesting' areas of geological outcrops in the field in real-time), working with a team of geologists and computer scientists. Worked on the development of the NEO graphical programming language.

2001-2002: Researcher (*Wissenschaftlicher Mitarbeiter*), Dept. of Computer Science, Technische Fakultät, U. Bielefeld, Germany, Neuroinformatics/Robotics Group, with Helge Ritter & Jochen Steil.
Systems engineering, integration, robustness improvements, and computer vision (CV) of the GRAVIS anthropomorphic robot, used for studying and improving human/machine cooperation. Maintained a CV system for tracking the motion of 5 fingertips in real-time. Modeled the dynamics of recurrent neural networks.

2000-2001: Researcher (*Wissenschaftlicher Mitarbeiter*) & scientific liaison between the research groups and the management; Zentrum für Interdisziplinäre Forschung (ZiF) (Center for Interdisc. Research), U. Bielefeld, Germany, Complex Sys. Research Year.
Performed research on applications of neural-network machine learning, as well as machine learning with support vector machines. The applications included: classification of images of galaxies, prediction of atmospheric turbulence for adaptive optics for astronomy, and prediction of the success or failure of surgery to combat epilepsy.

1996-2000: Post-doctoral Research Associate, Dept. of Astronomy, Steward Observatory, U. of Arizona, Center for Astronomical Adaptive Optics, with Michael Hart & Roger Angel.
Developed adaptive optics systems for infrared telescopes on Mt. Hopkins in southern Arizona. Developed a wavefront sensor camera for an adaptive optics system. Created and managed the Shimmulator optical system for off-mountain testing of an adaptive optics system. Helped to simultaneously measure laser guidestar brightness and laser output. Developed neural-network machine-learning techniques to predict atmospheric turbulence 5 milliseconds into the future. Worked on the first demonstration on a telescope of nulling interferometry. Helped to manage the Center for Astronomical Adaptive Optics, including grant-proposal writing, observing-run organization, and personnel selection/management.

1995-1998: Scientific Programmer, Science Applications International Corp. (SAIC), Tucson.

1994-1996: Senior Research Specialist, various departments at the U. of Arizona.

1993-1995: Independent research consultant for various clients in the finance industry.
Developed techniques to predict the stock, commodities, & options markets with neural networks, stochastic calculus, & wavelet transforms.

1989-1994: Graduate Research Fellow, Dept. of Physics, U. of Arizona, with Theodore Bowen & Johann Rafelski.
Performed dark-matter-particle (neutraCHAMPs & SIMPs) searches at mountain/balloon altitudes. Researched the dynamics of recurrent neural networks.

1988-1989: Undergraduate Research Assistant, Dept. of Physics, U. of Chicago, in the Solar Energy & Non-imaging Optics Group, with Roland Winston & Philip Gleckman. *Developed techniques to concentrate sunlight with secondary concentrators. Helped to develop a solar-powered laser.*

Teaching and/or Administrative:

2019 & 2021: Demonstrator (computer-lab tutor): NCAS Climate Modelling Summer School, Cambridge, UK.

2020-2021: Support for the CSSP Brazil ACCLIMATE project at the U. of Reading, for teaching Brazilian scientists how to access CMIP climate and weather data with ESMValTool.

2010-2011: Developed and taught the "Science of Sustainability" course (3 times) in the Leadership in Sustainability Management Certificate Program of the Graham School of Continuing Liberal and Professional Studies, U. of Chicago.

2008: Earth & Planetary Sciences Instructor, Washington U. in St. Louis. Taught the course "Earth's Atmosphere: Climate and Global Change".

2000-2001: Scientific liaison (*Verbindung*) between the research groups & the ZiF management; Zentrum für Interdisziplinäre Forschung (ZiF) (Center for Interdisciplinary Research), U. Bielefeld, Germany, Complex Systems Research Year.

1997-1999: Astronomy & Planetary Sciences Instructor, U. of Phoenix, Tucson Campus.

1998: Adjunct Astronomy Instructor, Pima Community College, Downtown Tucson Campus.

1985-1989: Teaching Assistant and/or Grader, Depts. of Physics & Mathematics, U. of Chicago.

Collaborations with named or formal-leadership roles:

2024-: named collaborator, EXPECT (Towards an integrated capability to EXplain and PrEdiCT regional climate changes) project.

2022-: named collaborator, SPLICE (Structure, Photosynthesis and Light In Canopy Environments) project.

2007-2011: PI/principal-convener for the "Exploring Mars for Habitability and Life" Grand Challenge proposal team (the Biosphere 2 Institute at the U. of Arizona).

2002-2014: PI for the Cyborg Astrobiologist project.

Selected Collaborations:

2023-: CROPP (Climate Resilience and fOod Production in Peru) project.

2021-: SP-MIP (Soil Parameter Model Intercomparison Project).

2019-: TRENDY Global Carbon Budget project for the years 2019, 2021, & 2023-2026.

2017-: NCAS at the U. of Reading

2017-: NCAS CMS (Computational Modelling Services) at the U. of Reading.

2017-: Land Surface Processes research cluster at the University of Reading.

2020-2024: CSSP China Next Generation Cities project.

2018-2024: JLMP (Joint Land Modelling Programme) project of the UK.

2018-2021: Cocoa and Climate group at the U. of Reading.

2020-2021: CSSP China ACCLIMATE (ACcess to Climate data) project.

2018-2021: CSSP Brazil PORCELAIN (PORtrayal of ChinesE Land Atmosphere INteractions) project.

2018-2020: LANDWISE (LAND Management in loWland catchments for

Integrated flood riSk rEduction) project.
2018-2020: CALIBRE agroforestry project.
2017-2024: TAMSAT (Tropical Applications of Meteorology using SATellite data and ground-based observations) group at the U. of Reading.
2005-2021: Mars Reconnaissance Orbiter's CRISM Science Team.
2005-: with Alexandra Bonnici, U. of Malta, for the Cyborg Astrobiologist project.
2002-: with Jens Ormö, Centro de Astrobiologia (Spain) for the Cyborg Astrobiologist project, the Sirente crater-field project, etc.
1989-: with Johann Rafelski, Dept. of Physics, U. of Arizona, for neural-network & dark-matter projects.
2013-2016: Mars Express's High Resolution Stereo Camera (HRSC) Science Team.
2013-2014: with Selby Cull-Hearth, Bryn Mawr College, for projs. using CRISM & HRSC data.
2007-2010: with Ted Roush, NASA Ames, for projects using CRISM data.
2002-2010: with Helge Ritter, Markus Oesker, Joerg Ontrup, Robert Haschke et al, Neuroinformatics Group, Computer Science Dept., Technische Fakultaet, U. of Bielefeld, Germany, for the NEO graphical-programming language project.
2000-2007: with Paul Steinhardt , Physics Dept., Princeton U., for a dark-matter particle project.
2002-2004: with Emily Lakdawalla, Planetary Society, Csaba Gyulai, Visionary Products, Inc. and with Jesus Martinez Frias & Jose Antonio Rodriguez Manfredi (Centro de Astrobiologia, Spain), for the Crater Gusev LEGO Mars station.
2000-2001: with Shaukat Goderya (now at Tarleton State University), Physics Dept., Illinois State U., for using neural networks & SVMs to classify galaxy images.
1999-2001: with Don McCarthy & Joannah Hinz, Steward Observatory, U. of Arizona, for a project to search for brown dwarfs as companions of high-proper-motion stars.
2000: with John W. Clark, Physics Department, Washington U. of St. Louis, and Larry Eisenman & Frank Gilliam, Dept. of Neurology, Washington U. of St. Louis, for a project to predict epilepsy-surgery success.
1996-2000: MMT adaptive optics collaboration.
1997-2000: with Ted Bowen & Abram Young, Dept. of Physics, U. of Arizona, for a project to detect the Cowan effect.
1990-1994: IMAX collaboration: NASA Goddard Space Flight Center, Caltech, New Mexico State U., U. of Siegen (Germany), U. of Arizona, for a balloon-altitude dark-matter-particle search.
1989-1992: CHAMP collaboration: Peter Halverson (UC Irvine), Ken Kendall, Delmar Barker, Ted Bowen, Burt Pifer, Travis Metcalfe, Jesus Pando, Deborah Nassif, Ronald Norton, and others, for a mountain-altitude dark-matter-particle search.

Honors and Fellowships:

SciVal top-five highly-cited author at U. of Reading, 167 citations/paper (24 papers), 2020-2026.
Top-three contestant, Weather Game (weather prediction contest), U. of Reading, Dept. of Meteorology: Autumn term 2021, 2nd place; Spring term 2022, 2nd place; Autumn term 2022, 3rd place; Spring term 2023, 2nd place; Autumn term 2023, 1st place in staff category; Spring term 2024, 1st place in staff category; Fall semester 2024, 3rd place; Spring semester 2025, 2nd place in staff category.
Outstanding Young Alumni Award, University High School, Normal, Illinois, 2012.
NASA Group Achievement Award, as a member of the external science team for the CRISM

hyperspectral imaging camera, on-board the Mars Reconnaissance Orbiter, 2011.
NASA Tech Brief Award for the New Technology Report (NTR):
"Using CTX image features to predict HiRISE-equivalent rock density",
with Navid Serrano, David Mayer, Raymond Arvidson, Andres Huertas, 2010.
Humboldt Research Fellowship, Alexander von Humboldt Foundation, Germany, 2008-2010.
Robert M. Walker Fellowship in Experimental Space Science, 2005-2008.
Ramon y Cajal Fellowship (in Spain), 2002-2005.
U.S. Department of Education/ NSF Pre-Doctoral Fellowship, 1989-1992.
University of Chicago *Little Red Schoolhouse* Editing Champion, 1989.
National Merit Scholarship, 1985-1989.
Valedictorian, University High School, Normal, Illinois, 1985.
Bausch & Lomb Science Citizenship Award & Thomas M. Barger Physics Award,
University High School, Normal, Illinois, 1985.
Fourth Place, Illinois ICTM Mathematics Competition, Pre-Calculus, 1985.
Member of Illinois State-Champion Team (from University High School) in the "Eco-Meet"
Ecology Competition, 1983.
Third Place, Illinois ICTM Mathematics Competition, Geometry, 1982.

Professional Society Membership & Professional Club Membership:
American Geophysical Union, American Physical Society, Sigma Xi (The Scientific Research Society), European Geophysical Union, Europlanet Society, International Soil Modeling Consortium, University of Reading Data Science Club (2020-2021), West Virginia University Energy Club (2012-2013)

Committee and Professional Service:
Proposal Reviewer:
French National Research Agency (ANR), 2023-2024.
Independent Research Fund Denmark, 2022.
Austrian Science Fund (FWF), 2021.
NASA Postdoctoral Program (NPP), NASA Earth Science Panels and
NASA Planetary Science Panels, 2010-.

Academic:
Mentor to Dionisa Joseph Mattam (volunteer intern from Nellika Ltd., Reading), 2023-.
Advisor for a project on "Machine learning model to predict wildfire burned area" by Nikita Agrawal (Whitney M. Young Magnet High School, Chicago), which was awarded a 3rd place grand award in the Earth and Environmental Science category at the 2023 Regeneron International Science & Engineering Fair (ISEF) (held in Dallas), 2023.
Co-advisor (with Javier Amezcua Espinosa) for undergraduate dissertation project by Benedict Hyland on "Martian dust storms", Dept. of Meteorology, U. of Reading, 2021-2022.
Member of the organizing team, NCAS Climate Modelling Summer School, (online) UK, 2021.
Graduate Committee, U. of Arizona Physics Dept., 1991-1993.

Seminar organization:
Co-organizer, Departmental Research Away-Day,
Dept. of Meteorology, U. of Reading, 2023-2026.

Assisted the organizers, Departmental seminars and Land-Surface seminars, Dept. of Meteorology, U. of Reading, 2018-.
Microblogger: 79th Annual Meeting of the Meteoritical Society (#MetSoc2016), Freie U. Berlin, 2016.
Principal Organizer, 'FUB Internal GeoSymposium' (FUB IGS), Dept. of Earth Sciences, Freie U. Berlin, 2015-2016.
Co-organizer, Seminars, Planetary Sciences & Remote Sensing Grp, Freie U. Berlin, 2013-2016.
Assisted the organizer, Colloquia, Inst. Of Geological Sciences, Freie U. Berlin, 2013-2016.
Principal Organizer, 'The Afternoon Balloons' seminar series, Dept. of Earth Sciences, Freie U. Berlin, 2014-2015.
Assisted the organizer, Colloquia, Dept. of Geophysical Sciences, U. of Chicago, 2009-2010.
Assisted the organizer, Colloquia, Earth and Planetary Sciences Dept., Washington U. in St. Louis, 2006-2008.
Seminars and Colloquia Committee, Centro de Astrobiologia, Madrid, 2004-2005.
Principal Organizer, Adaptive Optics Summer Seminar Series, Steward Observatory, U. of Arizona, 1999.

Editorial Board Member:
The Scientific World Journal (Geology area), 2012-.

Journal Referee:
Geoscientific Model Development (GMD), 2022-. *Water*, 2019-. *Atmosphere*, 2019-. *Applied Sciences*, 2019-. *Sensors*, 2019-. *Nature Geoscience*, 2018-. *Remote Sensing*, 2018-. *ISPRS International Journal of Geo-Information*, 2018-. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (J-STARS)*, 2017-. *IEEE Trans. On Human-Machine Systems*, 2016-. *Journal of Natural Gas Science & Engineering*, 2013-. *ISRN Geology*, 2012-. *Geological Society, London (GSL) Special Publication on 'Volcanism and Tectonism across the Solar System'*, 2013. *The Scientific World Journal* (Geology area), 2012-. *Science of the Total Environment*, 2010-. *Planetary and Space Science*, 2010-. *American Geophysical Union (AGU)* Journals, 2007-. *Astrobiology*, 2007-. *Physical Review* journals, 1998.

Working Groups:
Scientist/Engineer: Joint Land Modelling Programme (JLMP), 2018-.
Soil Parameter Model Intercomparison Project (SP-MIP), 2021-2023.
NCAS Environmental Sustainability Group, 2021-2023.
Phoenix Mars Lander Landing-site Working Group, 2006-2007.
Madrid Feria de la Ciencia Committee, Mars exhibit (Redrover, 3D Mars Images & Cyborg Astrobiologist), Centro de Astrobiologia, Madrid, 2003-2004.
Planetary Society "Red Rover Goes to Mars" Project, 2002-2004.
Mission Team for the Leonid Meteor-Observing Campaign aboard the Nov. 2002 NASA Transatlantic airplane, 2002-2004.
Lasers in Navigable Airspace Working Group, 1997-1999.

Computer Programming & Software Environment Skills

Languages: Python, R, Fortran, C/C++

Land-surface & climate modeling code bases: JULES, SDGVM, AquaCrop, Met Office Unified Model

Model-evaluation environments: ILAMB, AutoAssess, ESMValTool

Selected Local & International Press Coverage

June 2026: "The Real Scoreline reveals nations facing climate penalties", *University of Reading press release*, by O. Sirrell.

November 2025: "Fossil fuel CO2 emissions hit record high in 2025", *University of Reading press release*, by O. Sirrell.

November 2025: "Decarbonisation efforts are advancing, but they're outpaced by rising energy demands", *Nat'l Centre for Atmo. Science (NCAS) press release*, by H. Richardson.

January 2025: "World breaches 1.5C global warming target for first time in 2024", *Financial Times*, by A. Mooney, J. Tauschinski and S. Bernard

January 2025: "Uni of Reading updates climate stripes, reacts to news of Earth exceeding 1.5°C warming level for the first time", *Reading Today* and picked up in *Wokingham Today*, by J. Clothier,

January 2025: "Expert reaction: 2024 hottest year on record", *University of Reading press release*, by O. Sirrell.

December 2024: "University Of Reading study projects fossil fuel emissions up another 0.8% in 2024 @ 37.4 billion tons", in *Democratic Underground*.

December 2024: "From AI to Ice Sheets: How we advanced atmospheric science in 2024", *Nat'l Centre for Atmo. Science (NCAS) press release*.

November 2024: "Climate experts warn 'time running out' as CO2 emissions yet to peak", *Yahoo!News,* by R. Waugh.

November 2024: "The planet under threat of breakdown", in CounterPunch and picked up in *Dissident Voice*, by R. Hunziker.

November 2024: "Fossil fuel CO2 emissions increase again in 2024", *University of Reading press release*, by O. Sirrell.

December 2023: "Fossil CO2 emissions at record high in 2023, study shows", *University of Reading press release*, by O. Sirrell.

December 2023: "Carbon emissions have risen again in 2023, explains Dr Patrick McGuire" , *Nat'l Centre for Atmo. Science (NCAS) press release*, by H. Richardson & R. Woodfine.

March 2023: "Global ecosystems are at risk of losing carbon storage ability, study says", (featuring work led by *Marcos Fernández-Martínez*), in *Mongabay*, by M. Radwin.

February 2023: "Climate 'spiral' threatens land carbon stores – study" (featuring work led by *Marcos Fernández-Martínez*), *University of Reading press release*, by O. Sirrell.

November 2021: "Are global carbon emissions rebounding to pre-Covid levels? ", *National Centre for Atmospheric Science (NCAS) press release*, by H. Richardson.

November 2021: "Global carbon emissions rebound close to pre-covid levels", *University of Reading press release*, by P. Bryant.

November 2021: "The Global Carbon Project's TRENDY MIP, the 2018 European Drought MIP, the SDGVM Model, and me", *Department of Meteorology (University of Reading) informal blog article*, by P.C. McGuire.

June 2020: "Warm Springs Increase Risk of Severe Summer Droughts", *University of Reading*

press release, by P. Bryant.
December 2019: "Global carbon emissions increase but rate has slowed", *University of Reading press release*, by P. Bryant.
December 2019: "Slowdown in rising greenhouse gases does not negate the long-term trend, finds global carbon budget analysts", *National Centre for Atmospheric Science (NCAS) press release*, by H. Richardson.
May 2016: "Evidence of ice age at Martian north pole", (featuring work led by *Isaac Smith)* in *ScienceDaily.*
October 2014: "Vast glaciers carved out Martian Grand Canyon", (work led by *Selby Cull-Hearth*) in *New Scientist*, by J. Aron.
August 2014: "Mosaic image reveals Martian glory", in *BBConline*, by P. Rincon.
September 2013: "Future Space Robots Will Mimic Scientific Curiosity With Clever Cameras", in *Wired*, by A. Mann.
October 2010: "Graham School sprouts Green Business 101", in the *Chicago Maroon*, by W.Hu.
July 2010: "Making Smarter, Savvier Robots", in *Science*, by S. Kean.
January 2010: "Eye Robot", in the *University of Chicago Magazine*, by J. Kelly.
November 2009: "Spacesuits Turn Astronauts Into Cyborg Biologists", in *Wired*, by B. Keim.
May 2009: "Phonecams could boost hunt for life on Mars", in *New Scientist*, by J. Griggs.
July 2008: "Water 'widespread' on early Mars", work of the CRISM science team, in *BBConline*.
June 2005: "AI developed for Mars explorers", in *BBConline*, by P. Rincon.
June 2005: "Space suits with geology skills built in", in *New Scientist*.
November 2004: "Cyborg geologist explores Spain", in *Nature News Online*, by P. Ball.
March 2004: "Gafas 'inteligentes' para explorar el suelo marciano", in the Spanish newspaper *El Mundo*, by A. Diaz.
February 2004: "AI to help Martian exploration", in *BBConline*, by P. Rincon.
November 2002: "Científicos españoles 'vigilarán' las Leónidas con la NASA", in the Spanish newspaper *El Mundo*

Selected Presentations/Talks in past 7 years:
December 2026: Invited Seminar, "The TRENDY MIP and the Global Carbon Budget" (*TBD*), Geology Program, Department of Geography, Geology, and the Environment, Illinois State University, Normal, Illinois (in-person, *planned*).

January 2026: Seminar, "AI for programming", AI/LLM Breakout Session, 2nd Meteorology Department Research Away-Day, University of Reading, Reading, UK (in-person).

December 2025: Oral presentation and poster presentation, "ILAMB for the (annual) TRENDY MIP and the Global Carbon Budget", 5th ILAMB meeting, New Orleans (in-person).

September 2025: Two invited seminars, "ILAMB for TRENDYv14", for the TRENDYv14/GCB team (online).

September 2025: Seminar, "Quick update: Data assimilation of soil properties for the region of Europe", EXPECT Task 1.2 group meeting (online).

May 2025: Seminar, "Soil-moisture Data Assimilation in Europe for EXPECT",

EXPECT General Assembly (online). Updated version presented at the NCAS CMS group meeting (May 2025), Reading, UK (hybrid).

February 2025: Seminar, “Quick update: Data assimilation of soil properties for the region of Europe”, EXPECT Task 1.2 group meeting (online). Updated version presented at the NCAS CMS group meeting (March 2025), Reading, UK (hybrid).

November 2024: Seminar, “Quick summaries of some global-warming data & the Global Carbon Budget 2024”, NCAS CMS group meeting, Reading, UK (hybrid).

November 2024: Seminar, “Quick update: Data assimilation of soil properties for the region of Europe”, EXPECT Task 1.2 group meeting (online).

October 2024: Three invited seminars, “ILAMB for TRENDYv13 and for SDGVM model development”, two seminars for the TRENDYv13/GCB team (online), and one seminar for the NCAS CMS group meeting, Reading, UK (hybrid).

June 2024: Poster presentation and seminar, “Crop modelling with AquaCrop during climate change in the Ancash region of the Peruvian Andes”, poster at Met. Dept. Research Away-Day, Reading, UK; seminar for the CROPP Hydrology group meeting, Reading, UK (in-person).

June 2024: Seminar, “Running the Sheffield Dynamic Global Vegetation Model (SDGVM) for the Global Carbon Budget 2023”, NCAS CMS group meeting, Reading, UK (hybrid).

May 2024: Seminar, “Quick summaries of some global-warming data & the Global Carbon Budget 2023”, NCAS CMS group meeting, Reading, UK (hybrid).

April 2024: PICO presentation, “Crop modelling with AquaCrop during climate change in the Ancash region of the Peruvian Andes”, European Geophysical Union, Vienna (in-person).

October 2023: Seminar, “Crop modelling & climate-change analysis for valleys in the Peruvian Andes”, NCAS CMS group meeting, Reading, UK (hybrid).

December 2022: Poster presentation, "AMIP-style global soil simulations with JULES and the Unified Model: The role of soil hydraulics model, pedotransfer function, and basic soil property map", American Geophysical Union conference, Chicago, IL, USA.

November 2022: Invited colloquium, "Improving the representation of soils, plants, and cities in weather & climate models", Department of Physics, Illinois State University, Normal, IL, USA.

September 2022: Opening talk, "AMIP-style global soil simulations with JULES and the Unified Model: The role of soil hydraulics model, pedotransfer function, and basic soil property map", JULES Annual Meeting, Oxford, UK.

June 2021: Poster presentation, "Improving the global modeling of soils in JULES and the Unified Model: Updating from UM/HWSD to SoilGrids soil properties and from the Brooks &

Corey to the Van Genuchten soil-hydraulics model", *Land Atmosphere Interactions (AMERIFlux)* workshop (online).

May 2021: Poster presentation, "Improving the global modeling of soils in JULES and the Unified Model: Updating from UM/HWSD to SoilGrids soil properties and from the Brooks & Corey to the Van Genuchten soil-hydraulics model", *International Soil Modeling Consortium meeting* (online).

December 2020: Poster presentation, "Improving the global modeling of soils in JULES and the Unified Model: Updating from UM/HWSD to SoilGrids soil Ppoperties and from the Brooks & Corey to the Van Genuchten soil-hydraulics model", American Geophysical Union conference, San Francisco (mostly-online).

September 2020: Seminar, "Improving the global modeling of soils in JULES and the Unified Model: Updating from UM/HWSD to SoilGrids soil properties and from the Brooks & Corey to the Van Genuchten soil-hydraulics model", JULES Annual Science Meeting, UK (online).

April 2020: Seminar, "Development and evaluation of new Van Genuchten soil-properties ancillary files for JULES and the Unified Model", PRIMAVERA General Assembly (online).

January 2020: Lunchtime seminar, "Choose your own adventure in modeling land-atmosphere interactions", Geophysics Group, Institute of Geological Sciences, Freie Univ. Berlin, Germany.

August 2019: Invited colloquium, "Choose your own adventure in modeling land-atmosphere interactions", Korea Institute for Atmospheric Prediction Systems (KIAPS), Seoul, South Korea.

July 2019: Invited talk, "Using the CEDA JASMIN super-data-cluster for running JULES simulations and subsequent evaluation", JULES Annual Science Meeting 2019, Edinburgh, UK.

December 2018: Contributed talk, "Simulating global and local land surface processes with JULES on the CEDA JASMIN super-data-cluster", American Geophysical Union Fall meeting, Washington, DC, USA.

December 2018: Invited colloquium, "Land/atmosphere interactions on the Earth and Mars", Department of Physics and Department of Geography, Geology & the Environment, Illinois State University, Normal, Illinois, USA.

December 2018: Lunchtime seminar, "My career, 1985-present", Department of Geography, Geology & the Environment, Illinois State University, Normal, Illinois, USA.

November 2018: Invited colloquium, "Land/atmosphere interactions on the Earth and Mars", Department of Geology, Southern Illinois University, Carbondale, Illinois, USA.

Publication List for Patrick C. McGuire

Google Scholar citations: *(15 June 2026: Citations=16453, h-index=38, i10-index=76)*
(Below, the grouping is by refereed/unrefereed, with subject-matter sub-categories. For a chronological ordering without subject-matter sub-categories, go to this link.)

Refereed Publications *Total=71*

J = Journal Publication, Total=67
(Six (6) papers are 'in preparation' and six (6) have been 'submitted'. All of these are indicated and also prefixed by J'. These are not counted in the total listed above.)

Land Surface Processes and Climate Science

(*J'*) P.C. McGuire, T. Quaife, E. Dutra, A. Hurduc, and H.Rumbold, "Data assimilation of ESA CCI soil moisture into the JULES model over Europe." (*in preparation*).

(*J'*) P.C. McGuire, J.S. Singarayer, A.J. Wade, H.J.E. Rodda, N.P. Branch, D. Joseph Mattam, B. Rogers, J. Holder, F. Araujo-Ferreira, E. Capoen, A.A. Everhart, C. Florencio, F. Gonzalez, A. Herrera, K.J. Lane, F.M. Meddens, D. Santos Shupingahua, M.E. Timaná, and D. Walsh, "Crop modelling with AquaCrop during climate change in the Ancash region of the Peruvian Andes." (*in preparation*).

(*J'*) P.C. McGuire, P.L. Vidale, M.J. Best, D.H. Case, I. Dharssi, M.C. Duran Rojas, G.M.S. Lister, A. Martinez de la Torre, C. Montzka, O.V. Müller, V. Predoi, E. Robertson, M. Todt, A. Verhoef, and S.S. Wilson, "Development and evaluation of new van Genuchten soil-properties ancillary files for JULES and the Unified Model: I. Ancillary development and offline JULES validation." *Geoscientific Model Development* (*in preparation*).

(*J*26) Zishuan Wang, J. Wang, B. Poulter, G. Meyer, G. Hurtt, H. Zhou, L. Ma, P.C. McGuire, Q. Sun, W.Yuan, and X. Wang-Faivre, "Pronounced inter-model uncertainties in TRENDY-simulated terrestrial carbon sink responses to hydroclimatic extremes", *Environmental Research Letters* (2026, *accepted*).

(J') S. Boussetta, C. Albergel, G. Arduini, G. Balsamo, M. Best, E. Blyth, M. Choulga, P. Dueben, J.M. Edwards, P. McGuire, J. McNorton, N. Raoult, C. Rüdiger, B. Suetzl, E. Swinnen, and A. Verhoef. "Ancillary Data for Land Surface Modelling: Current Status and Future Perspectives from Modelling Needs to Data Providers Requirements", *Quarterly Journal of the Royal Meteorological Society* (2026, *submitted*).

(*J'*) P. Friedlingstein, M. O'Sullivan, M.W. Jones, R.M. Andrew, D.C.E. Bakker, J. Hauck, P. Landschützer, C. Le Quéré, H. Li, I.T. Luijkx, G.P. Peters, W. Peters, J. Pongratz, C. Schwingshackl, S. Sitch, J.G. Canadell, P. Ciais, K. Aas, S.R. Alin, P. Anthoni, L. Barbero, N.R. Bates, N. Bellouin, A. Benoit-Cattin, C.F. Berghoff, R. Bernardello, L. Bopp, I.B.M. Brasika, M.A. Chamberlain, N. Chandra, F. Chevallier, L.P. Chini, N.O. Collier, T.H. Colligan, M. Cronin, L. Djeutchouang, X. Dou, M.P. Enright, K. Enyo, M. Erb, W. Evans, R. A. Feely, L. Feng, D.J. Ford, A. Foster, F. Fransner, T. Gasser, M. Gehlen, T. Gkritzalis, J. Goncalves De Souza, G. Grassi, L. Gregor, N. Gruber, B. Guenet, Ö. Gürses, K. Harrington, I. Harris, J. Heinke, G.C. Hurtt, Y. Iida,

T. Ilyina, A. Ito, A.R. Jacobson, A.K. Jain, T. Jarníková, A. Jersild, F. Jiang, S.D. Jones, E. Kato, R.F. Keeling, K. Klein Goldewijk, J. Knauer, Y. Kong, J. Ivar Korsbakken, C. Koven, T. Kunimitsu, X. Lan, J. Liu, Z. Liu, Z. Liu, C. Lo Monaco, L. Ma, G. Marland, P.C. McGuire, G.A. McKinley, J. Melton, N. Monacci, E. Monier, E.J. Morgan, D.R. Munro, J.D. Müller, S.-I. Nakaoka, L.R. Nayagam, Y. Niwa, T. Nutzel, A. Olsen, A.M. Omar, N. Pan, S. Pandey, D. Pierrot, Z. Qin, P.A.G. Regnier, G. Rehder, L. Resplandy, A. Roobaert, T.M. Rosan, C. Rödenbeck, J. Schwinger, I. Skjelvan, T.L. Smallman, V. Spada, M.G. Sreeush, Q. Sun, A.J. Sutton, C. Sweeney, D. Swingedouw, R. Séférian, S. Takao, H. Tatebe, H. Tian, X. Tian, B. Tilbrook, H. Tsujino, F. Tubiello, E. van Ooijen, G. van der Werf, S.J. van de Velde, A. Walker, R. Wanninkhof, X. Yang, W. Yuan, X. Yue, and J. Zeng, "ESSD Global Carbon Budget 2025", *Earth System Science Data,* (2025, *submitted*).

(*J*25) P. Friedlingstein, M. O'Sullivan, M.W. Jones, R.M. Andrew, J. Hauck, P. Landschützer, C. Le Quéré, H. Li, I.T. Luijkx, A. Olsen, G.P. Peters, W. Peters, J. Pongratz, C. Schwingshackl, S. Sitch, J.G. Canadell, P. Ciais, R.B. Jackson, S.R. Alin, A. Arneth, V. Arora, N.R. Bates, M. Becker, N. Bellouin, C.F. Berghoff, H.C. Bittig, L. Bopp, P. Cadule, K. Campbell, M.A. Chamberlain, N. Chandra, F. Chevallier, L.P. Chini, T. Colligan, J. Decayeux, L. Djeutchouang, X. Dou, C. Duran Rojas, K. Enyo, W. Evans, A. Fay, R.A. Feely, D.J. Ford, A. Foster, T. Gasser, M. Gehlen, T. Gkritzalis, G. Grassi, L. Gregor, N. Gruber, Ö. Gürses, Ian Harris, M. Hefner, J. Heinke, G.C. Hurtt, Y. Iida, T. Ilyina, A.R. Jacobson, A. Jain, T. Jarníková, A. Jersild, F. Jiang, Z. Jin, E. Kato, R.F. Keeling, K. Klein Goldewijk, J. Knauer, J. Ivar Korsbakken, S.K. Lauvset, N. Lefèvre, Z. Liu, J. Liu, L. Ma, S. Maksyutov, G. Marland, N. Mayot, P.C. McGuire, N. Metzl, N.M. Monacci, E.J. Morgan, S.-I. Nakaoka, C. Neill, Y. Niwa, T. Nützel, L. Olivier, T. Ono, P.I. Palmer, D. Pierrot, Z. Qin, L. Resplandy, A. Roobaert, T.M. Rosan, C. Rödenbeck, J. Schwinger, T.L. Smallman, S. Smith, R. Sospedra-Alfonso, T. Steinhoff, Q. Sun, A.J. Sutton, R. Séférian, S. Takao, H. Tatebe, H. Tian, B. Tilbrook, O. Torres, E. Tourigny, H. Tsujino, F. Tubiello, G. van der Werf, R. Wanninkhof, X. Wang, D. Yang, X. Yang, Z. Yu,W. Yuan, X. Yue, S. Zaehle, N. Zeng, and J. Zeng, "ESSD Global Carbon Budget 2024", *Earth System Science Data,* 17, pp. 965–1039 (2025).

(*J*') Zihao Wang, J. Peñuelas, P. Ciais, J. Xiao, P. Franks, Y. Sun, S. Sitch, X. Li, N. Viovy, B. Wang, M. Wu, Z. Wang, J. Heinke, M. O'Sullivan, S. Falk, X. Yue, G. Meyer, D. Kennedy, X. Yang, J. Decayeux, Q. Sun, P. McGuire, Y. Liu, J. Han, Y. Ding, and H. Wang, "Satellite revealed global declines in vegetation canopy conductance beyond models", *Nature Communications* (2025, *submitted*).

(*J*') D. Ma, Q. Sun, W. Yuan, A. Arneth, P.C. McGuire, E. Kato, and Y. Zha. "Robust enhanced CO_2 fertilization effect at the global scale", *Nature Communications* (2025, *submitted*).

(*J*') M. Cuntz, S. Thober, A. Verhoef, Y. Zeng, A. Boone, A. Ducharne, S. Koirala, D.M. Lawrence, P.C. McGuire, C. Montzka, S. Tafasca, & L. Gudmundsson, "Surface runoff and soil evaporation dominate the sensitivity of land surface models to soil parameters", *PNAS* (2026, *submitted*).

(*J'*) E. Muñoz, H. Metzler, M. Fernández-Martínez, J.A. Nelson, M. O'Sullivan, S. Sitch, T. Nützel, J. Heinke, G. Hurtt, L. Ma, Q. Sun, P.C. McGuire, E. Kato, X. Yang, W. Yuan, and C.A. Sierra, "Temporal integration of terrestrial net carbon fluxes reveals multi-decadal carbon debts due to previous carbon legacies", *Tellus*, (2026, *submitted)*.

(*J'*) D. Hertwig, M. Todt, M. Best, S. Bohnenstengel, K. Harper, A. Hartley, C. Lamarche, P.C. McGuire, P.L. Vidale, and S. Grimmond, "A tale of three cities: Impact of land-cover representation on the urban surface energy balance." (*in preparation*).

(*J'*) M. Todt, P.L. Vidale, P.C. McGuire, and O.V. Müller. "A process-based assessment of irrigation in JULES land-only simulations over South and East Asia." (*in preparation*).

(*J'*) P.L. Vidale, P.C. McGuire, R.J. Oliver, M. Todt, L. Mercado, and O. Müller. "Developing new vegetation function capabilities in HadGEM3-GC31: the impact of vegetation acclimation on (contemporary) global climate." *Geoscientific Model Development* (*in preparation*).

(*J*24) O.V. Müller, P.C. McGuire, P.L. Vidale, and E. Hawkins, "River flow in the near future: a global perspective in the context of a high-emission climate change scenario", *Hydrology and Earth System Sciences (HESS),* 28*,* pp. 2179-2201 (2024).

(*J*23) P. Friedlingstein, M. O'Sullivan, M.W. Jones, R.M. Andrew, D.C.E. Bakker, J. Hauck, P. Landschützer, C. Le Quéré, I.T. Luijkx, G.P. Peters, W. Peters, J. Pongratz, C. Schwingshackl, S. Sitch, J.G. Canadell, P. Ciais, R.B. Jackson, S.R. Alin, P. Anthoni, L. Barbero, N.R. Bates, M. Becker, N. Bellouin, B. Decharme, L. Bopp, I.B.M. Brasika, P. Cadule, M.A. Chamberlain, N. Chandra, T.-T.-T. Chau, F. Chevallier, L.P. Chini, M. Cronin, X. Dou, K. Enyo, W. Evans, S. Falk, R.A. Feely, L. Feng, D. J. Ford, T. Gasser, J. Ghattas, T. Gkritzalis, G. Grassi, L. Gregor, N. Gruber, Ö. Gürses, I. Harris, M. Hefner, J. Heinke, R.A. Houghton, G.C. Hurtt, Y. Iida, T. Ilyina, A.R. Jacobson, A. Jain, T. Jarníková, A. Jersild, F. Jiang, Z. Jin, F. Joos, E. Kato, R.F. Keeling, D. Kennedy, K. Klein Goldewijk, J. Knauer, J. I. Korsbakken, A. Körtzinger, X. Lan, N. Lefèvre, H. Li, J. Liu, Z. Liu, L. Ma, G. Marland, N. Mayot, P.C. McGuire, G.A. McKinley, G. Meyer, E.J. Morgan, D.R. Munro, S.-I. Nakaoka, Y. Niwa, K.M. O'Brien, A. Olsen, A.M. Omar, T. Ono, M.E. Paulsen, D. Pierrot, K. Pocock, B. Poulter, C.M. Powis, G. Rehder, L. Resplandy, E. Robertson, C. Rödenbeck, T.M. Rosan, J. Schwinger, R. Séférian, T.L. Smallman, S.M. Smith, R. Sospedra-Alfonso, Q. Sun, A.J. Sutton, C. Sweeney, S. Takao, P.P. Tans, H. Tian, B. Tilbrook, H. Tsujino, F. Tubiello, G.R. van der Werf, E. van Ooijen, R. Wanninkhof, M. Watanabe, C. Wimart-Rousseau, D. Yang, X. Yang, W. Yuan, X. Yue, S. Zaehle, J. Zeng, and B. Zheng. "ESSD Global Carbon Budget 2023." *Earth System Science Data,* 15 (12), pp. 5301-5369 (2023).

(*J*22) M. Fernández-Martínez, J. Peñuelas, F. Chevallier, P. Ciais, M. Obersteiner, C. Rödenbeck, J. Sardans, S. Vicca, H. Yang, S. Sitch, P. Friedlingstein, V. Arora, D. Goll, A.K. Jain, D.L. Lombardozzi, P.C. McGuire, J. Nabel, and I.A. Janssens. "Diagnosing destabilisation risk in global land carbon sinks." *Nature,* 615, pp. 848–853 (2023).

(*J*21) H. Zhang, J. Bai, R. Sun, Y. Wang, Y. Pan, P.C. McGuire, and Z. Xiao, "Improved global gross primary productivity estimation by considering canopy nitrogen concentrations and multiple environmental factors", *Remote Sensing,* 15 (3), 698 (2023).

(*J*20) H.M. Badjana, A. Verhoef, H.L. Cloke, S. Julich, C. Camargos, S. Collins, P.C. McGuire, D. Macdonald, and J. Clark, "Can hydrological models represent natural flood management in groundwater dominated catchments?", *Journal of Flood Risk Management,* 16(3), e12912 (2023).

(*J*19) D. Bruhn, F. Newman, M. Hancock, P. Povlsen, M. Slot, S. Sitch, J. Drake, G.P. Weedon, D.B. Clark, M. Pagter, R.J. Ellis, M.G. Tjoelker, K.M. Andersen, Z. Restrepo Correa, P.C. McGuire, and L.M Mercado, "Nocturnal plant respiration is under strong non-temperature control", *Nature Communications*, 13, 5650 (2022).

(*J*18) B. Byrne, J. Liu, Y. Yi, A. Chatterjee, S. Basu, R. Cheng, R. Doughty, F. Chevallier, K.W. Bowman, N.C. Parazoo, D. Crisp, X. Li, J. Xiao, S. Sitch, B. Guenet, F. Deng, M.S. Johnson, S. Philip, P.C. McGuire, and C.E. Miller. "Multi-year observations reveal a larger than expected autumn respiration signal across northeast Eurasia." *Biogeosciences,* 19, pp. 4779–4799 (2022).

(*J*17) M. O'Sullivan, P. Friedlingstein, S. Sitch, P. Anthoni, A. Arneth, V.K. Arora, V. Bastrikov, B. Decharme, D.S. Goll, A.K. Jain, E. Kato, D. Kennedy, J. Knauer, S. Lienert, D. Lombardozzi, P.C. McGuire, J.R. Melton, J.E.M.S. Nabel, B. Poulter, R. Seferian, H. Tian, N. Vuichard, A.P. Walker, W. Yuan, X. Yue, and S. Zaehle, "Processes, drivers, and regions behind the historical net land carbon sink over the past six decades." *Nature Communications,* 13, 4781 (2022).

(*J*16) R.J. Oliver, L.M. Mercado, D.B. Clark, C. Huntingford, C. Taylor, P.L. Vidale, P. McGuire, M. Todt, S. Folwell, and S. Shamsudheen. "Improved representation of plant physiology in the JULES-vn5.6 land surface model: photosynthesis, stomatal conductance and thermal acclimation", *Geoscientific Model Development*, 15, pp. 5567–5592 (2022).

(*J*15) P. Friedlingstein, M.W. Jones, M. O'Sullivan, R.M. Andrew, D.C.E. Bakker, J. Hauck, C. Le Quéré, G.P. Peters, W. Peters, J. Pongratz, S. Sitch, J.G. Canadell, P. Ciais, R.B. Jackson, P. Anthoni, N.R. Bates, M. Becker, L. Bopp, T.T.T. Chau, F. Chevallier, L.P. Chini, M. Cronin, K.I. Currie, L. Djeutchouang, X. Dou, W. Evans, R.A. Feely, L. Feng, T. Gasser, D. Gilfillan, T. Gkritzalis, G. Grassi, L. Gregor, N. Gruber, Ö. Gürses, I. Harris, R.A. Houghton, G.C. Hurtt, Y. Iida, T. Ilyina, I.T. Luijkx, A. Jain, S.D. Jones, E. Kato, D. Kennedy, K.K. Goldewijk, J. Knauer, J.I. Korsbakken, A. Körtzinger, P. Landschützer, S.K. Lauvset, N. Lefèvre, S. Lienert, J. Liu, G. Marland, P.C. McGuire, J.R. Melton, D.R. Munro, J.E.M.S. Nabel, S.-I. Nakaoka, Y. Niwa, T. Ono, D. Pierrot, B. Poulter, G. Rehder, L. Resplandy, E. Robertson, M. Rocher, C. Rödenbeck, J. Schwinger, C. Schwingshackl, R. Séférian, A.J. Sutton, T. Tanhua, P.P. Tans, H. Tian, B. Tilbrook, F. Tubiello, G. van der Werf, N. Vuichard, R. Wanninkhof, A.J. Watson, D. Willis, A.J. Wiltshire, W. Yuan, C. Yue, X. Yue, S. Zaehle, and J. Zeng, "ESSD Global Carbon Budget 2021." *Earth System Science Data* (2021).

*(J*14*)* P.L. Vidale, G. Egea, P.C. McGuire, M. Todt, O. Müller, B. Balan Sarojini, and A. Verhoef. "On the treatment of soil water stress in GCM simulations of vegetation physiology." *Frontiers in Environmental Science,* 9 (2021).

*(J*13*)* Z. Chen, D.N. Huntzinger, J. Liu, S. Piao, X. Wang, S. Sitch, P. Friedlingstein, P. Anthoni, A. Arneth, V. Bastrikov, D.S. Goll, V. Haverd, A.K. Jain, E. Joetzjer, E. Kato, S. Lienert, D.L. Lombardozzi, P.C. McGuire, J.R. Melton, J.E.M.S. Nabel, J. Pongratz, B. Poulter, H. Tian, A.J. Wiltshire, S. Zaehle, and S.M. Miller, "Five years of variability in the global carbon cycle: comparing an estimate from the Orbiting Carbon Observatory-2 and process-based models", *Environmental Research Letters*, 16, 054041 (2021).

(*J*12) A. Bastos, R. Orth, M. Reichstein, P. Ciais, N. Viovy, S. Zaehle, P. Anthoni, A. Arneth, P. Gentine, E. Joetzjer, S. Lienert, T. Loughran, P.C. McGuire, J. Pongratz, and S. Sitch, "Vulnerability of European ecosystems to two compound dry and hot summers in 2018 and 2019", *Earth System Dynamics,* 12, pp. 1015-1035 (2021).

(*J*11) L. Teckentrup, M.G. De Kauwe, A.J. Pitman, D. Goll, V. Haverd, A.K. Jain, E. Joetzjer, E. Kato, S. Lienert, D. Lombardozzi, P.C. McGuire, J.R. Melton, J.E.M.S. Nabel, J. Pongratz, S. Sitch, A.P. Walker, and S. Zaehle, "Assessing the representation of the Australian carbon cycle in global vegetation models", *Biogeosciences,* 18, pp. 5639–5668 (2021).

(*J*10) Z. Chen, J. Liu, D. Henze, D. Huntzinger, K. Wells, S. Sitch, P. Friedlingstein, E. Joetzjer, V. Bastrikov, D. Goll, V. Haverd, A. Jain, E. Kato, S. Lienert, D. Lombardozzi, P. McGuire, J. Melton, J. Nabel, B. Poulter, H. Tian, A. Wiltshire, S. Zaehle, and S. Miller, "Linking global terrestrial CO2 fluxes and environmental drivers: inferences from the Orbiting Carbon Observatory 2 satellite and terrestrial biospheric models", *Atmospheric Chemistry and Physics*, 21 (9), pp. 6663-6680 (2021).

(*J*9) O.V. Müller, P.L. Vidale, B. Vannière, R. Schiemann, and P.C. McGuire, "Does the HadGEM3-GC3.1 GCM overestimate land precipitation at high resolution?: a constraint based on observed river discharge", *Journal of Hydrometeorology*, 22 (8), pp. 2131-2151 (2021).

(*J*8) D. Hertwig, M. Ng, S. Grimmond, P.L. Vidale, and P.C. McGuire, "High-resolution global climate simulations: Representation of cities", *International Journal of Climatology*, 41, pp. 3266-3285 (2021).

(*J*7) W.A Obermeier, J.E.M.S. Nabel, T. Loughran, K. Hartung, A. Bastos, F. Havermann, P. Anthoni, A. Arneth, D.S. Goll, S. Lienert, D. Lombardozzi, S. Luyssaert, P.C. McGuire, J.R. Melton, B. Poulter, S. Sitch, M. O'Sullivan, H. Tian, A. Walker, A.J. Wiltshire, S. Zaehle, and J. Pongratz, "Modelled land use and land cover change emissions -- A spatio-temporal comparison of different approaches", *Earth System Dynamics,* 12, pp. 635-670 (2021).

(*J*6) A.B. Harper, K.E. Williams, P.C. McGuire, M.C. Duran Rojas, D. Hemming, A. Verhoef, C. Huntingford, L. Rowland, T. Marthews, C. Breder Eller, C. Mathison, R.L.B. Nobrega, N. Gedney, P.L. Vidale, F. Otu-Larbi, D. Pandey, S. Garrigues, A. Wright, D. Slevin, M.G. De Kauwe, E. Blyth, J. Ardö, D. Bonal, N. Buchmann, B. Burban, K. Fuchs, A. de Grandcourt, I. Mammarella, L. Merbold, L. Montagnani, Y. Nouvellon, N. Restrepo-Coupe, and G. Wohlfahrt, "Improvement of modelling plant responses to low soil moisture in JULESvn4.9 and evaluation against flux tower measurements", *Geoscientific Model Development*, 14, pp. 3269–3294 (2021).

(*J*5) E. Black, E. Pinnington, C. Wainwright, F. Lahive, T. Quaife, R. Allan, P. Cook, A. Daymond, P. Hadley, P.C. McGuire, A. Verhoef, and P.L. Vidale, "Cocoa plant productivity in West Africa under climate change", *Environmental Research Letters* (2020).

(*J*4) A. Bastos, Z. Fu, P. Ciais, P. Friedlingstein, S. Sitch, J. Pongratz, U. Weber, M. Reichstein, P. Anthoni, A. Arneth, V. Haverd, A. Jain, E. Joetzjer, J. Knauer, S. Lienert, T. Loughran, P.C. McGuire, W. Obermeier, R.S. Padrón, H. Shi, H. Tian, N. Viovy, and S. Zaehle, "Impacts of extreme summers on European ecosystems: a comparative analysis of 2003, 2010 and 2018", *Philosophical Transactions of the Royal Society B*, 375, 20190507 (2020).

(*J*3) A. Bastos, P. Ciais, P. Friedlingstein, S. Sitch, J. Pongratz, L. Fan, J.-P. Wigneron, U. Weber, M. Reichstein, Z. Fu, P. Anthoni, A. Arneth, V. Haverd, A.K. Jain, E. Joetzjer, J. Knauer, S. Lienert, T. Loughran, P.C. McGuire, H. Tian, N. Viovy, and S. Zaehle, "Direct and seasonal legacy effects of the 2018 heatwave and drought on European ecosystem productivity", *Science Advances*, 6, 24, eaba2724 (2020).

(*J*2) P. Friedlingstein, M.W. Jones, M. O'Sullivan, R.M. Andrew, J. Hauck, G.P. Peters, W. Peters, J. Pongratz, S. Sitch, C. Le Quéré, D.C.E. Bakker, J.G. Canadell, P. Ciais, R. Jackson, P. Anthoni, L. Barbero, A. Bastos, V. Bastrikov, M. Becker, L. Bopp, E. Buitenhuis, N. Chandra, F. Chevallier, L.P. Chini, K.I. Currie, R.A. Feely, M. Gehlen, D. Gilfillan, T. Gkritzalis, D.S. Goll, N. Gruber, S. Gutekunst, I. Harris, V. Haverd, R.A. Houghton, G. Hurtt, T. Ilyina, A.K. Jain, E. Joetzjer, J.O. Kaplan, E. Kato, K. Klein Goldewijk, J.I. Korsbakken, P. Landschützer, S.K. Lauvset, N. Lefèvre, A. Lenton, S. Lienert, D. Lombardozzi, G. Marland, P.C. McGuire, J.R. Melton, N. Metzl, D.R. Munro, J.E.M.S. Nabel, S.-I. Nakaoka, C. Neill, A.M. Omar, T. Ono, A. Peregon, D. Pierrot, B. Poulter, G. Rehder, L. Resplandy, E. Robertson, C. Rödenbeck, R. Séférian, J. Schwinger, N. Smith, P.P. Tans, H. Tian, B. Tilbrook, F.N. Tubiello, G.R. van der Werf, A.J. Wiltshire, and S. Zaehle, "Global Carbon Budget 2019", *Earth System Science Data,* 11, pp. 1783-1838 (2019).

(*J*1) D. Hertwig, S. Grimmond, M.A. Hendry, B. Saunders, Z. Wang, M. Jeoffrion, P.L. Vidale, P.C. McGuire, S.I. Bohnenstengel, H.C. Ward, and S. Kotthaus, "Urban signals in high-resolution weather and climate simulations: The role of urban land-surface characterisation", *Theoretical and Applied Climatology* (2019).

Methane Hydrates and Climate Science

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Remote Sensing and/or Computer Vision

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Selected Unrefereed Publications *Number Selected=88 (out of 133 in total)*

Land-surface Processes and Climate Science

31) T. Quaife, N. Douglas, and P.C. McGuire, "Modelling SIF in the JULES Land Surface Model", *FLEX-Fluorescence Workshop Abstracts*, Bonn, Germany (2026, *accepted*).

30) T. Quaife, N. Douglas, and P.C. McGuire, "Modelling SIF in the JULES Land Surface Model", *European Geophysical Union Meeting Abstracts*, Vienna, Austria (2026, *accepted*).

29) T. Quaife, N. Douglas, and P.C. McGuire, "Modelling SIF in the JULES Land Surface Model", *American Geophysical Union Meeting Abstracts*, New Orleans, Louisiana (2025).

28) T. Quaife, N. Douglas, and P.C. McGuire, "JULES-SIF v1.0.0", *JULES Annual Meeting Abstracts*, Leicester, United Kingdom (2025).

27) S. Bartholomew, S. George, B. Lawrence, and P.C. McGuire, "Notes from 'New tools in weather and climate research' breakout session", University of Reading Meteorology Department Research Away-Day, Reading, United Kingdom (2024).

26) P.C. McGuire, J.S. Singarayer, A.J. Wade, H.J.E. Rodda, N.P. Branch, D. Joseph-Mattam, F. Araujo-Ferreira, E. Capoen, A. Everhart, C. Florencio, F. Gonzalez, A. Herrera, K.J. Lane, F.M. Meddens, D. Santos Shupingahua, M.E. Timaná, and D. Walsh, "Crop modelling with AquaCrop during climate change in the Ancash region of the Peruvian Andes", *European Geophysical Union Meeting Abstracts,* Vienna, Austria (2024).

25) J. Singarayer, R. Bailey, P. McGuire, F. Araujo-Ferreira, N. Branch, F. Gonzalez, D. Santos, D. Walsh, A. Herrera, A. Wade, H. Rodda, M. Timana, F. Meddens, and K. Lane, "An exploration of using large language models to integrate farmer behaviour into an agricultural systems model of the Peruvian Andes", *European Geophysical Union Meeting Abstracts,* Vienna, Austria (2024).

24) T. Quaife, M.A. Stretton, N. Douglas, and P.C. McGuire, "A Two-Stream Observation Operator for Solar Induced Fluorescence in Land Surface Models", *European Geophysical Union Meeting Abstracts,* Vienna, Austria (2024).

23) A. Verhoef, Y. Zeng, M. Cuntz, S. Thober, H. He, H. Liu, F. Vitart, L. Gudmundsson, and P.C. McGuire, "The role of soil hydraulic and thermal properties on the predictability of land-atmosphere interactions", Global Energy and Water Exchanges Open Science Conference (GEWEX OSC), Sapporo, Japan (2024).

22) O.V. Müller, P.C. McGuire, P.L. Vidale, and E. Hawkins, "Time of emergence of African rivers", *World Climate Research Programme Open Science Conference* (WCRP OSC), Rwanda (2023, *remotely*).

21) H.J.E. Rodda, A.J. Wade, N.P. Branch, J.S. Singarayer, and P.C. McGuire, "Water resource

adaptation to climate change in the Peruvian Andes: an integration of ancient pre-Hispanic and modern infrastructure water management", *New Zealand Hydrological Society Annual Conference Abstracts*, Auckland (2023).

20) M. Fernández-Martínez, J. Peñuelas, F. Chevallier, P. Ciais, M. Obersteiner, C. Rödenbeck, J. Sardans, S. Vicca, H. Yang, S. Sitch, P. Friedlingstein, V. Arora, D. Goll, A.K. Jain, D.L. Lombardozzi, P.C. McGuire, J. Nabel, and I.A. Janssens. "Is destabilisation risk increasing in land carbon sinks?", *European Geophysical Union Meeting Abstracts* (2023).

19) P.C. McGuire, P.L. Vidale, M.J. Best, D.H. Case, I. Dharssi, M.C. Duran Rojas, R.S. Hatcher, G.M.S. Lister, A. Martinez de la Torre, C. Montzka, O.V. Müller, V. Predoi, E. Robertson, M. Todt, A. Verhoef, S.S. Wilson "AMIP-style global soil simulations with JULES and the Unified Model: The role of soil hydraulics model, pedotransfer function, and basic soil property map", *American Geophysical Union Meeting Abstracts*, Chicago (2022).

18) P.C. McGuire, P.L. Vidale, M.J. Best, D.H. Case, I. Dharssi, M.C. Duran Rojas, R.S. Hatcher, G.M.S. Lister, A. Martinez de la Torre, C. Montzka, O.V. Müller, V. Predoi, E. Robertson, M. Todt, A. Verhoef, S.S. Wilson "AMIP-style global soil simulations with JULES and the Unified Model: The role of soil hydraulics model, pedotransfer function, and basic soil property map", *JULES Annual Meeting Abstracts*, Oxford (2022).

17) H.M. Badjana, A. Verhoef, H.L. Cloke, S. Julich, C. Camargos, S. Collins, P.C. McGuire, D. Macdonald, and J. Clark, "Modelling the natural flood management in medium scale lowland catchments in Thames Basin (UK)", *European Geophysical Union Meeting Abstracts* (2022).

16) A. Verhoef, Y. Zeng, M. Cuntz, L. Gudmundsson, S. Thober, P.C. McGuire, H. Bergner, A. Boone, A. Ducharne, R. Ellis, H. Kim, S. Koirala, D. Lawrence, K. Oleson, S. Swenson, S. Tafasca, P. de Vrese, S. Seneviratne, D. Or, and H. Vereecken, "Assessing the variability of soil temperatures in Land Surface Models using outputs from the Soil Parameter Model Intercomparison Project (SP-MIP)", *European Geophysical Union Meeting Abstracts* (2022).

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