

CLIMATE CHANGE RESEARCH CENTRE
ANNUAL REPORT

2025



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UNSW
Climate Change
Research Centre

OUR MISSION

CCRC HOUSES RESEARCH EXPERTISE IN THE KEY AREAS OF EARTH'S CLIMATE: ATMOSPHERIC, OCEANIC AND TERRESTRIAL PROCESSES. WE APPLY BASIC SCIENTIFIC PRINCIPLES TO PRESSING QUESTIONS ON CLIMATE DYNAMICS, GLOBAL CLIMATE CHANGE, AND EXTREMES OF WEATHER AND CLIMATE

RESEARCH HIGHLIGHTS

- Climate impacts of ENSO in Australia. <https://doi.org/10.1038/s43017-025-00747-x>
- The links between flash drought and bushfires. <http://dx.doi.org/10.1038/s43017-025-00675-w>
- Drivers of the extreme North Atlantic marine heatwave. <https://doi.org/10.1038/s41586-025-08903-5>
- Changes in hail in Australia with future warming. <https://doi.org/10.1029/2025GL117676>
- Quantifying climate impacts of individual fossil fuel projects. <https://doi.org/10.1038/s44168-025-00296-5>
- Substantial increases in future precipitation extremes. <https://doi.org/10.1038/s44304-025-00107-1>
- Drought Frequency, Intensity and Duration Over Australia. <https://doi.org/10.1002/joc.70058>
- Machine learning to better quantify climate impacts. <https://doi.org/10.1029/2024MS004668>
- Understanding pyrocumulonimbus in Australia. <https://doi.org/10.1038/s41598-025-22530-0>
- Ability of the deep ocean to continue to absorb carbon. <https://doi.org/10.1029/2025GL116799>

AWARDS & HONOURS

- Lisa Alexander: Copernicus Medal
- Lisa Alexander: Clarivate Highly Cited Authors
- Jason Evans: Clarivate Highly Cited Authors
- Negin Nazarian: Global Environmental Change Early Career Award from the American Geophysical Union (AGU)
- Alex Sen Gupta: Clarivate Highly Cited Authors

CONNECTIONS TO OTHER CENTRES

- CCRC hosts the UNSW node of the ARC Centre of Excellence for the Weather of the 21st Century
- CCRC hosts the Climate and Weather node of the NSW Bushfire and Natural Hazards Research Centre
- CCRC contributes to the National Environmental Science Program Climate Science Hub
- CCRC contributes to the ARC Antarctic Special Research Initiative
- CCRC has strong synergies with UNSW's Institute for Climate Risk and Response

RESEARCH OUTPUTS

134

Journal Articles

7

Book Chapters

94%

in SCIMAGO Q1 journals

18

Publications in *Nature*-family journals

TEACHING NEWS

RECORD ENROLMENTS IN OUR TWO ONLINE COURSES:

1305

enrolments in
CLIM1001/ GENS0401
(Introduction to
Climate Change)

455

enrolments in CLIM2002
(Risks and Impacts of a
Changing Climate)

PROMOTIONS

Dr Tim Raupach: Senior Lecturer

GRADUATIONS

PHD

Rachael Isphording
Sebastian McKenna
Ellie Ong

Valentina Ortiz Guzman
Katherine Quail
Elona Rey-Costa
Christina Schmidt
Tanya Singh
Nicholas Yeung
Xinyue Zhang

HONOURS STUDENTS

Ananya Anand
Ben Anthonisz
Ebony McNamara
Tom Schmaltz



CCRC Prize for the Best Student Paper

Michael Eabry



CCRC Prize for the Science Communication and Outreach

Matt Grant



John Church Student Culture Prize

James Berg

INTERNATIONAL LEADERSHIP

- For the IPCC 7th Assessment Report, eight CCRC current and former staff members were selected as Lead Authors (current: Laurie Menviel and Jason Evans; affiliated: Negin Nazarian, Melissa Hart, Sarah Perkins; alumni: Nicola Maher, Jatin Kala and Faye Cruz).
- Abramowitz: International Land Modelling Forum (ILMF) steering group; GEWEX GLASS Panel.
- Alexander: WCRP Joint Scientific Committee and co-leading WMO Expert Team on Climate Information for Decision-making; WMO task team for Extreme Heat indicators and indices; (WHO)/WMO working group in occupational health; liaison on International Union of Geodesy and Geophysics (IUGG) to WCRP; delegate for Australia on International Association of Meteorology and Atmospheric Sciences (IAMAS).
- Evans: Science Advisory Team of the Coordinated Climate Downscaling experiment (CORDEX); Science Steering Group on WCRP Global Energy and Water Exchanges (GEWEX); Lead Author of the IPCC Working Group 2 Assessment Report 7.
- Jucker: Scientific Steering Group of the WCRP core project Atmospheric Processes and their Role in Climate (APARC).
- Meissner: Global Ocean Oxygen Network (GO2NE) administered by IOC-UNESCO; German expert panel for their national excellence strategy (funded at 687M Euro per year); leadership team of PAGES C-SIDE working group; leadership team of PAGES PO2 working group.
- Menviel: Lead Author of the IPCC Assessment Report 7.
- Pitman: Ambassador of GEWEX; UK Meteorological Office's Strategic and Research Advisory Board; Member on Science Review and Advisory Group (SRAG); Met Office Hadley Centre Climate Programme (HCCP).
- Raupach and Prasad on Fresh Eyes on CMIP Steering group and model evaluation group.
- Sen Gupta: United Nations Association of Australia: Climate Change Panel; Panel member of CLIVAR Marine Heatwave Research Focus Group.
- Sherwood: co-leads the Safe Landing Climate Lighthouse Activity of the World Climate Research Programme (WCRP); Frontiers Planet Prize jury; ACP Crutzen Prize, jury member.

- Taschetto: CLIVAR Pacific Regional Panel, co-chair; Pacific Atmosphere Teleconnections in Warming Climate, co-chair; and Tropical Basin Interactions Research Foci, member.

NATIONAL LEADERSHIP

- Abramowitz: AMOS Priestly and Meyer Medal awards committee; Australian Museum's Climate Solutions Centre advisory board.
- Alexander: Fellow on Australian Meteorological and Oceanographic Society (AMOS); AMOS Morton and Zillmann Medal awards committee.
- Evans: NESP2 Climate Systems Hub leadership team; NSW Bushfire and Natural Hazards Climate and Weather Node lead; Coordinator on CORDEX-Australasia.
- Hutchinson: ACCESS-NRI earth system modelling group, co-chair.
- Meissner: Member on NSW EPA Climate Change Community and Environment Advisory Group.
- Menviel: ACCESS-NRI scientific steering committee.
- Pitman: NSW Government Net Zero Commissioner; Australian Academy of Science (AAS) National Committee for Earth System Science, chair; Australian Earth-System Simulator National Research Infrastructure (ACCESS-NRI) board; Terrestrial Ecosystem Network (TERN) science advisory committee; Australian Antarctic Science Council; National Environmental Science Program (NESP2) Climate Science Hub steering committee; Risk Frontiers advisory committee; Australian Standards Technical Committee on Sustainable Finance; EPA Climate Change Community and Environment Advisory Group.
- Sen Gupta: AAS National Committee for Earth System Science.
- Ukkola: ACCESS-NRI land working group, co-chair; Scientific advisory committee for the National Computational Merit Allocation Scheme (NCMAS).

EDITORIAL ROLES

- Alexander: Weather and Climate Extremes, Editorial Board Member; International Journal of Climatology, International Advisory Board; Climatic Change, Editorial Advisory Board.
- Evans: PLOS Climate, Section Editor.
- Jucker: Weather and Climate Dynamics, Editor.
- Meissner: Environmental Research Letters, Editorial Board; ERL Special Issue on Ocean Deoxygenation, Guest Editor.
- Menviel: Climate of the Past, Co-Editor-in-Chief and Editor.
- Pitman: Environmental Research: Climate, Editor.
- Sherwood: Science Magazine, Board of Review Editors.
- Taschetto: Journal of the Southern Hemisphere Earth System Science, Editor; Meteorology and Climate of the Southern Hemisphere, Editor; American Meteorological Society (AMS) - Special Collection on the 2014-2024 ENSO Decade, Organizer; Frontiers in Climate, Guest Editor; Frontiers in Earth Science, Review Editor.
- Ukkola: Journal of Advances in Modeling Earth Systems, Associate Editor.

VISITORS

- Dr Ashneel Chandra, University of Melbourne, Australia
- Dr Sophie Cravatte, LEGOS/IRD, New Caledonia
- Dr Leandro Diaz, University of Buenos Aires, Argentina
- Rosa Fenhall, University of Bristol, England
- Professor Katja Fennel, Dalhousie University, Canada
- Tommy Gatti, ACCESS NRI, Australia
- Simon Heselschwerdt, GERICS, Germany
- Siying Liu, Nanjing University, China
- Professor (Associate) Tomoki Miyakawa, University of Tokyo, Japan
- Dr Tom Mortlock, AON, Australia
- Dr Francesco Muschitiello, University of Cambridge, UK
- Dr Jan Polcher, Laboratoire de Meteorologie Dynamique, CNRS, IPSL, France
- Professor Ingo Richter, JAMSTEC, Japan
- Professor Olivia Romppainen-Martius, University of Bern, Switzerland
- Professor Detlef Stammer, Chair, WCRP Joint Scientific Committee, Switzerland
- Dr Caroline Ummenhofer, Woods Hole Oceanographic Institution, USA

ENGAGEMENT WITH INDUSTRY

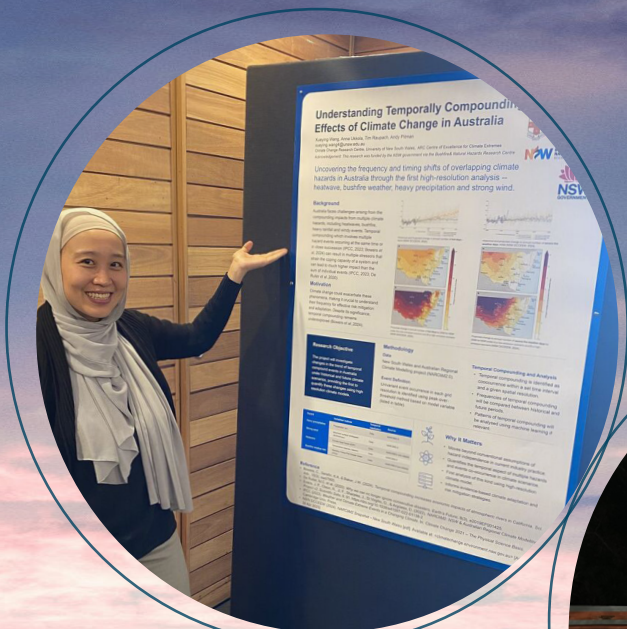
- Several staff members are CIs on the Institute for Climate Risk & Response that links our fundamental research with end users.
- Strong links to Aon with regular meetings. The Climate Advisory Council (Aon + CCRC) was established to address climate risks and best practices in Australia and in the region.
- Mortlock (Aon) and Pui (Commonwealth Bank) Adjunct Fellows.
- Two staff members on the Lethal Humidity Global Council, Minderoo Foundation (Sherwood, Meissner).
- Abramowitz on the Australian Museum's Climate Solutions Centre Advisory Group.
- Organized a Science-Industry workshop on severe convective storms in 2025 (107 attendees).
- Raupach and Jucker contributed to the AIG Severe Weather in a Changing Climate report (2025).
- Abramowitz on the advisory board for projection applications (XDI Climate Risk Engines Science Reference Panel).
- Pitman on the Australian Standards Technical Committee on Sustainable Finance.

ENGAGEMENT WITH GOVERNMENT

- CCRC leads the Weather and Climate Node (through the NSW Bushfire and Natural Hazards Research Centre) MPhil program to train students for jobs in government and industry (funded at 1.2M). Evans on leadership team, Jucker director. Six students enrolled in 2025.
- CCRC contributed to the National Environmental Science Program (NESP2) Climate Science Hub. Evans on Leadership Team. Pitman on Steering Committee.
- New ARC linkage grant with the NSW Department of Climate Change, Energy, the Environment and Water and the NSW State Emergency Service on rainfall –extremes (Evans, Raupach).
- ARC linkage grant with NSW Department of Climate Change, Energy, the Environment and Water and the Bureau of Meteorology on extreme wind gusts (Evans, Sherwood).
- Net zero commissioner (NSW government, Pitman).
- Science Advisory Board for the Terrestrial Ecosystem Research Infrastructure (Pitman).
- Australian Academy of Science National Committee for Earth System Sciences (Sen Gupta, Pitman)
- Australian Community Climate and Earth System Simulator National Research Infrastructure board (Pitman).
- Australian Antarctic Science Council (Pitman).
- NSW EPA Climate Change Community and Environment Advisory Group (Meissner).
- Several presentations to senior executives and ministers.
- Provided ongoing advice on hail and climate change in Australia to Tony Hirst at the Australian Climate Service (Raupach).

RESEARCH INCOME & FELLOWSHIPS

Grants (excluding the Australian Centre for Excellence in Antarctic Science and the ARC Centre of Excellence for the Weather of the 21st Century) totalled \$2.33M. CCRC hosted two ARC Future Fellows (Alexander and Sen Gupta) and three ARC DECRA Fellows (Ukkola, Hutchinson, Dikshit)



BNHRC MPhil student, Sylvia Wang, co designed research initiatives gathering



Prof. Jason Evans & A/Prof. Andrea Taschetto attending PanCLIVAR, Bali

MEDIA HIGHLIGHTS

- 32 online news and article publications, including The Guardian, Sydney Morning Herald, Yahoo News, The Independent (US & UK), The Australian, AAP, Cairns Post, Canberra Times, SBS News, ABC News, NewScientist, The Conversation, and AAP FactCheck.
- 9 radio interviews spanning ABC News Radio National, ABC News Queensland, 2BG Sydney, ABC Southern Queensland, ABC Southwest Victoria, Joy FM, as well as international outlets such as RFI (France) and RTBF (Belgium).
- 3 television news segments, ABC News, WIN News, and Channel 10 News+, highlighting the continued visibility and influence of CCRC research in public discourse.
- Future climate is likely to bring larger hailstones as the world warms, with considerable implications for insurance (multiple print, radio and television outlets): <https://www.abc.net.au/news/2025-07-29/hail-size-and-frequency-to-increase-with-climate-change/105584822>
 - Huge 30 degree heating event above Antarctica - 'sudden stratospheric warming' - and its implications for weather predictability in Australia (multiple print, radio and television outlets): https://www.youtube.com/watch?v=iYWjZEN1_w8

OUR VISION

THE CCRC'S VISION IS TO BE A WORLD-LEADING RESEARCH CENTRE IN CLIMATE SCIENCE,
EDUCATING AND ENABLING THE AUSTRALIAN AND GLOBAL COMMUNITY TO DEAL WITH
RISKS ASSOCIATED WITH CLIMATE VARIABILITY AND CLIMATE CHANGE