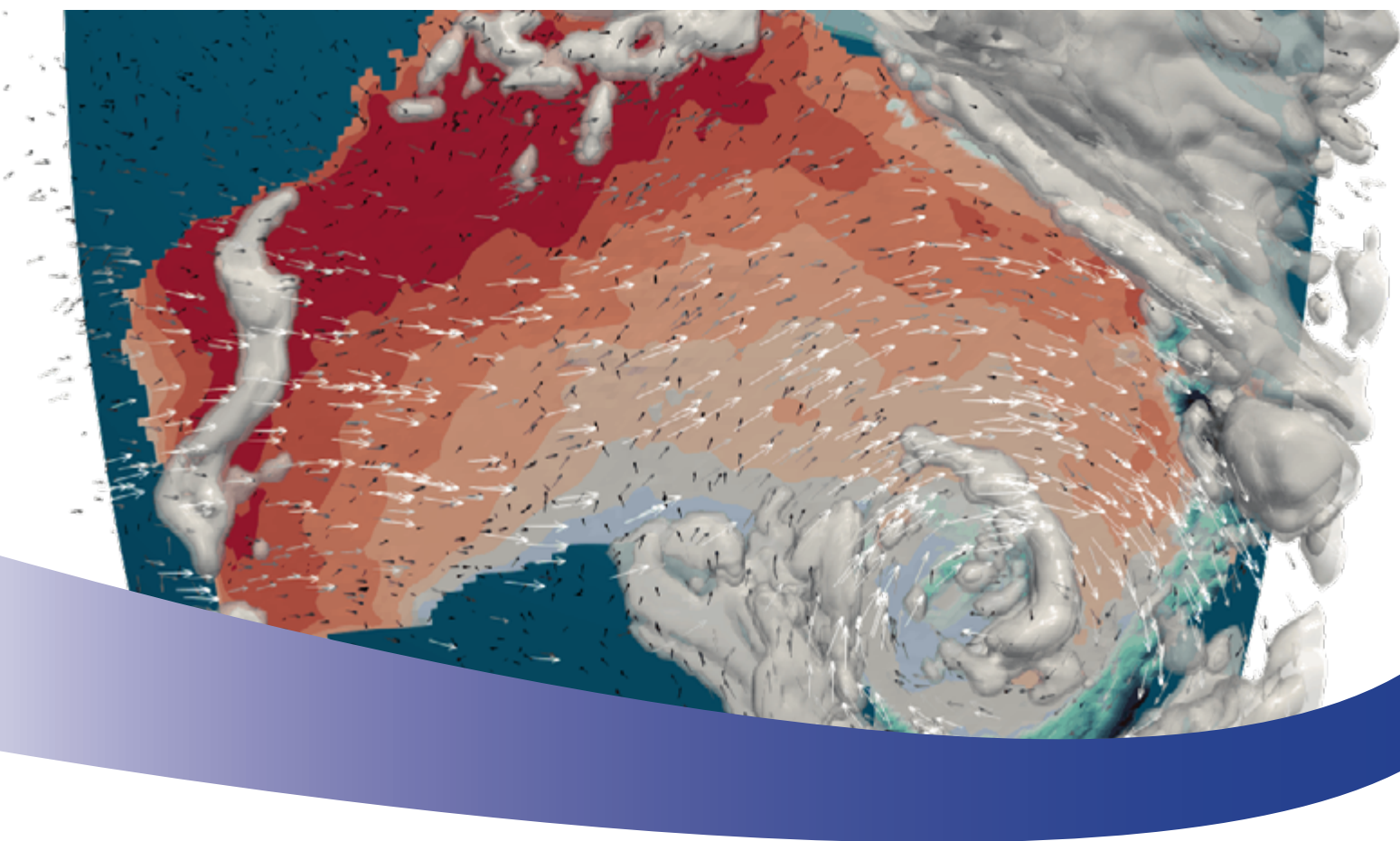




**climate extremes**

ARC centre of excellence



## ARC Centre of Excellence for Climate Extremes Annual Report 2019 at a glance





The Australian Research Council Centre of Excellence for Climate Extremes (CLEX) was established in 2017 to understand the processes causing climate extremes, build this understanding into the Australian prediction systems, and improve our capability to predict future extremes.

#### Transformative national collaboration

Partnership between the University of New South Wales, Monash University, the Australian National University, the University of Melbourne, the University of Tasmania, Bureau of Meteorology, CSIRO, New South Wales Department of Planning, Industry and Environment.

#### Transformative international collaboration

Collaboration with ETH Zurich, the Geophysical Fluid Dynamics Laboratory (USA), the Centre National de la Recherche Scientifique (France), Max-Planck Institute for Meteorology (Germany), NASA-Goddard Space Flight Center (USA), National Center for Atmospheric Research (USA), the UK Meteorological Office and the University of Arizona (USA)

#### Engagement and Impact

Our Knowledge Brokerage team works with the Earth Systems and Climate Change Hub of the National Environmental Science Programme, Risk Frontiers and Sydney Water and other stakeholders to translate our science into impact.

#### Strong impact on media

- >30,500 users of our website
- > 93,000 page views of our website
- 225 stories in national and international media
- 664 new twitter followers
- Increase in facebook followers
- Co-led media training across Centres of Excellence

#### World class publications

- 138 journal papers published in the highest quality journals
- 20 papers in Nature/Science family journals
- 15 papers in Geophysical Research Letters/Environmental Research Letters
- 59% of all papers in journals with impact factors > 4,
- 18% of all papers in journals with impact factors >10
- 10 data sets and 5 software modules published

#### Outstanding environment for students and early career researchers

- A large and successful winter school
- Technical training delivered
- A professional development workshop on developing a research profile
- Successful science paper writing workshops
- 10 students completed their degrees
- Our students were authors on 13 journal articles, 11 as first author
- 20 undergraduate students awarded undergraduate research scholarships.

#### Leadership roles in the Intergovernmental Panel on Climate Change and World Ozone Depletion Assessment

- Jason Evans: Lead Author on the Special-Report on Climate Change and Land.
- Nerilie Abram and Nathan Bindoff: leading in the IPCC Special Report on Oceans and Cryosphere Change
- Julie Arblaster: significant role World Ozone Depletion Assessment

#### World class research

- Robust results from comparing 27 CMIP-5 models to determine how extreme rainfall may change in a warming climate
- Coordination of international model evaluation initiatives for extreme rainfall
- Supporting the creation of the Australian Operational Weather Radar data set
- Occurrence of marine heatwaves show a dramatic increase over the past century
- Conditions supporting firestorms (pyrocumulonimbus) found to increase in climate projections for south-east Australia
- Springtime Antarctic stratosphere winds shown to impact early summer heat and in dry extremes over Australia
- New understanding on how vegetation responds to increased atmospheric CO<sub>2</sub>
- Using coral palaeoclimate records spanning 400 years showed, recent El Niño events have become stronger and more diverse
- Discovery that pantropical interactions are important for climate prediction
- Sensitivity of marine heatwaves to ocean model resolution examined
- Rapid warming of the Southern Hemisphere since 2005 shown to be a combination of human influence and climate variability

#### An outstanding work environment

- Strong focus on equity and diversity
- Panel Pledge signed by Chief investigators
- Career Development Award for Women and Other Underrepresented Groups.
- 53% of students, early career and senior researchers are women
- Manon Sabot and Sanaa Hobeichi won the UNSW President's Award for embracing Diversity as part of the Women in Maths & Science Champions group

#### World class research requiring scale and collaboration

- Extreme rainfall research led by Lisa Alexander (<https://doi.org/10.1088/1748-9326/ab51b6>)
- Marine heatwaves research led by Neil Holbrook (<https://doi.org/10.1038/s41467-019-10206-z>)
- Ocean model development led by Andrew Kiss (<https://doi.org/10.5194/gmd-2019-106>)

#### Award winning

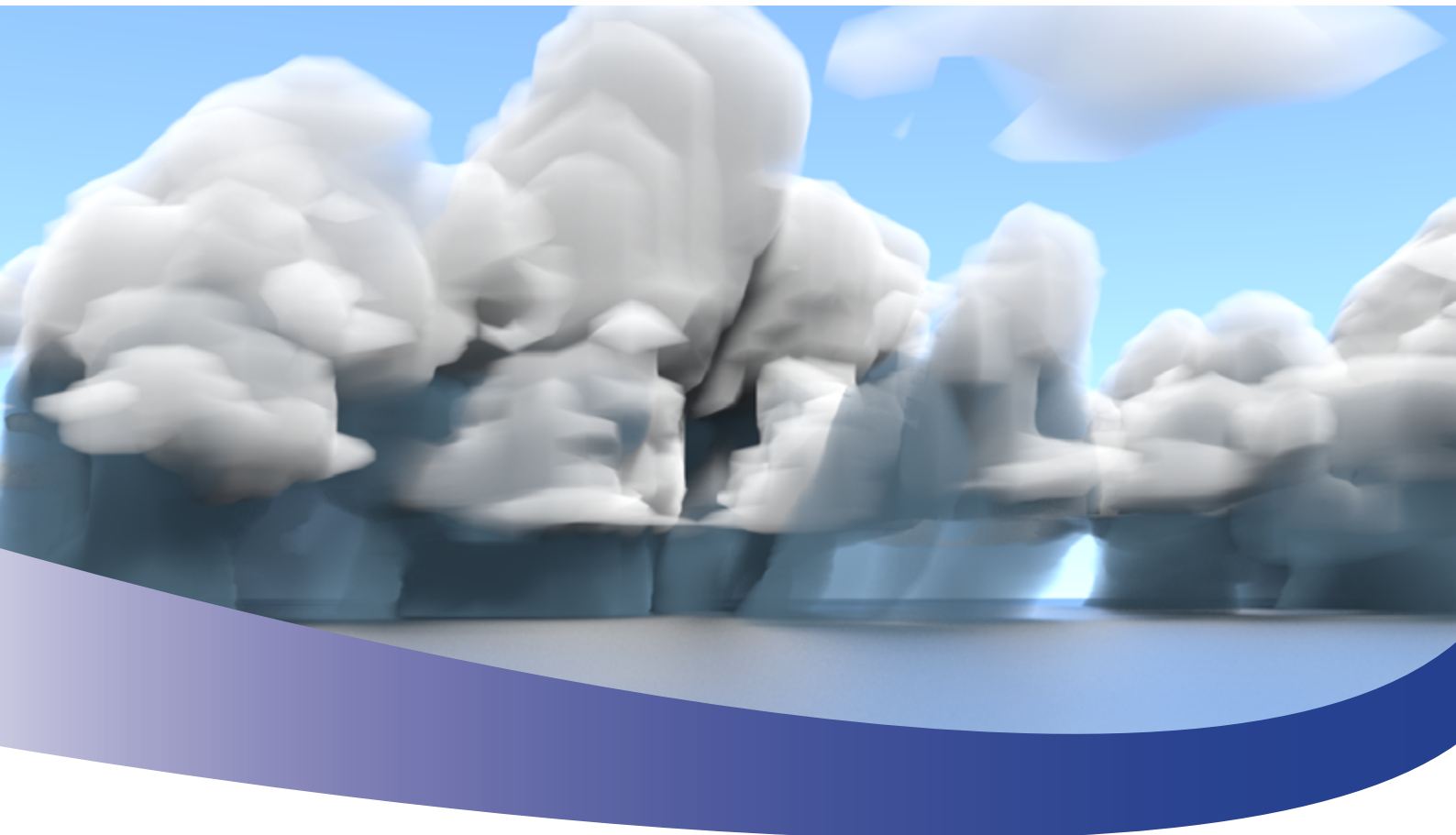
- Australian Academy of Science Dorothy Hill Medal: Menviel
- Tall Poppy Awards: Meyer
- Fellows of AMOS: Alexander, Lane
- AMOS Medals, major awards: Abram, Gergis, Jakob, King, Morrison, Nicholls, Purich, Vreugdenhil
- Superstars of STEM: Ashcroft,
- DECRA winners: Meyer, Ukkola
- Royal Society of NSW James Cook Medal, England
- Royal Society of Victoria's Medal for Excellence in Scientific Research (Pitman)
- Order of Australia (AO) Pitman

#### Exceptional Infrastructure

- Strong partnership with the National Computational Infrastructure Facility
- Strong engagement with Bureau of Meteorology and CSIRO and the National Computational Infrastructure facility to deliver the Australian Community Climate and Earth System Simulator initiative
- New data sets linked with climate change (CMIP6), reanalyses (ERA-5), energy and water cycles made available



Australian Government  
Australian Research Council



Link to the full 2019 Annual Report  
[www.climateextremes.org.au/clex-annual-report-2019/](http://www.climateextremes.org.au/clex-annual-report-2019/)

Link to the full list of publications  
[www.climateextremes.org.au/publications/](http://www.climateextremes.org.au/publications/)

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