climate extremes

ARC centre of excellence

What can the ARC Centre for Climate Extremes offer governments?

What is the ARC Centre of Excellence for Climate Extremes?

The ARC Centre of Excellence for Climate Extremes (CLEX) exists to transform our understanding of events such as heatwaves, droughts and storms. We conduct world-class research into the processes within the climate system that cause climate extremes and contribute to improving the computer models that are used to predict them.

The behaviour of many types of climate extremes varies from year to year, decade to decade and on even longer time scales. Some types of climate extremes are changing as our climate changes. Climate variability and climate change are therefore important aspects of CLEX science.

CLEX is a consortium of UNSW, Monash University, the University of Melbourne, the University of Tasmania and the Australian National University. It is funded by the Australian Research Council (ARC) for the period 2017-2024, with co-investment from the partner universities and a range of other organisations.

CLEX has 18 Chief Investigators, senior academics from the five CLEX universities. These include Prof Andy Pitman (UNSW), the Director of the Centre, and Prof Todd Lane (University of Melbourne), the Deputy Director. The Chief Investigators supervise a team of around 15 postdoctoral researchers and close to 100 postgraduate students.

CLEX has a Knowledge Brokerage Team to help us interact with government agencies and private companies. It can be reached by email via **clex@unsw.edu.au.**

What we offer governments

CLEX conducts blue-sky research focused on answering fundamental science questions about climate extremes. We complement other organisations and initiatives that provide climate information services to the Australian community, such as the Bureau of Meteorology, CSIRO, the National Environmental Science Program Earth Systems and Climate Change Hub, Climate Futures and Risk Frontiers. Where our funded activities align with the needs of government, we can offer:

1) Efficient access to world class climate research

CLEX is a convenient point of contact for climate science related to climate extremes, climate variability and climate change undertaken by the five CLEX universities. We can also link government with the expertise of our Australian and international collaborators.

2) Briefings

CLEX researchers frequently provide briefings or workshops on the latest developments in climate science to all levels of government, including to ministers and senior public servants.

3) Documents for policymakers

CLEX makes its science accessible to policymakers through briefing notes. We welcome suggestions for briefing notes and opportunities to co-produce other documents with government.

4) Climate data

Data is central to CLEX science and for governments assessing climate risk. We can help government access and use climate datasets, including very large datasets. We have significant experience of collaborating to generate, deliver, interpret and communicate data.

5) Research collaborations

We have significant experience of collaborating to deliver societally-relevant science that leads to a better understanding of climate extremes. ARC Linkage projects can help us to meet needs of governments that cannot be met via our existing funding.

6) Education

We provide training in scientific research and associated technical and communication skills. We can arrange tailored training and placements within CLEX for public servants and welcome opportunities to collaborate on teaching undergraduate students.

7) A pool of scientific talent

Our PhD students and early career researchers have research, analysis and communications skills. They move on to positions in universities, government agencies and private companies and often undertake placements in these organisations while they are with us.

Our staff work with government

Data underpinning climate projections for NSW

CLEX staff are collaborating on large climate model datasets with the NSW Government. In the past, these datasets underpinned climate change projections for NSW and assessments of climate change impacts as part of the AdaptNSW initiative.

Schools Weather and Air Quality (SWAQ) project

CLEX researchers lead a citizen science project funded by the Australian Government as part of its Inspiring Australia - Citizen Engagement Programme. We are working with academic and private sector partners to improve urban air quality measurements around Sydney by placing air quality sensors in schools.

Extreme indices

Leveraging funding from the Australian Government, CLEX staff have been working with government agencies overseas to develop and disseminate extreme indices. These help researchers understand how temperature and precipitation extremes are changing over time. They also help actuaries to inform risk assessors, policymakers and the general public about our changing climate.

WeatheX

CLEX staff led the development of the WeatheX mobile phone app. The app allows the public to report hail, strong winds, tornadoes and flooding, providing data that can be used to assess the severity of extreme weather events in real-time. We have assembled a consortium of government, private sector and academic organisations to fund and guide the further development of the app.

East Coast Lows

CLEX researchers addressed an urgent national priority to better understand East Coast Lows and how they may change in the future. As part of the NSW Government's Eastern Seaboard Climate Change Initiative, CLEX researchers contributed to public workshops, government-commissioned reports and visualisations of East Coast Lows.

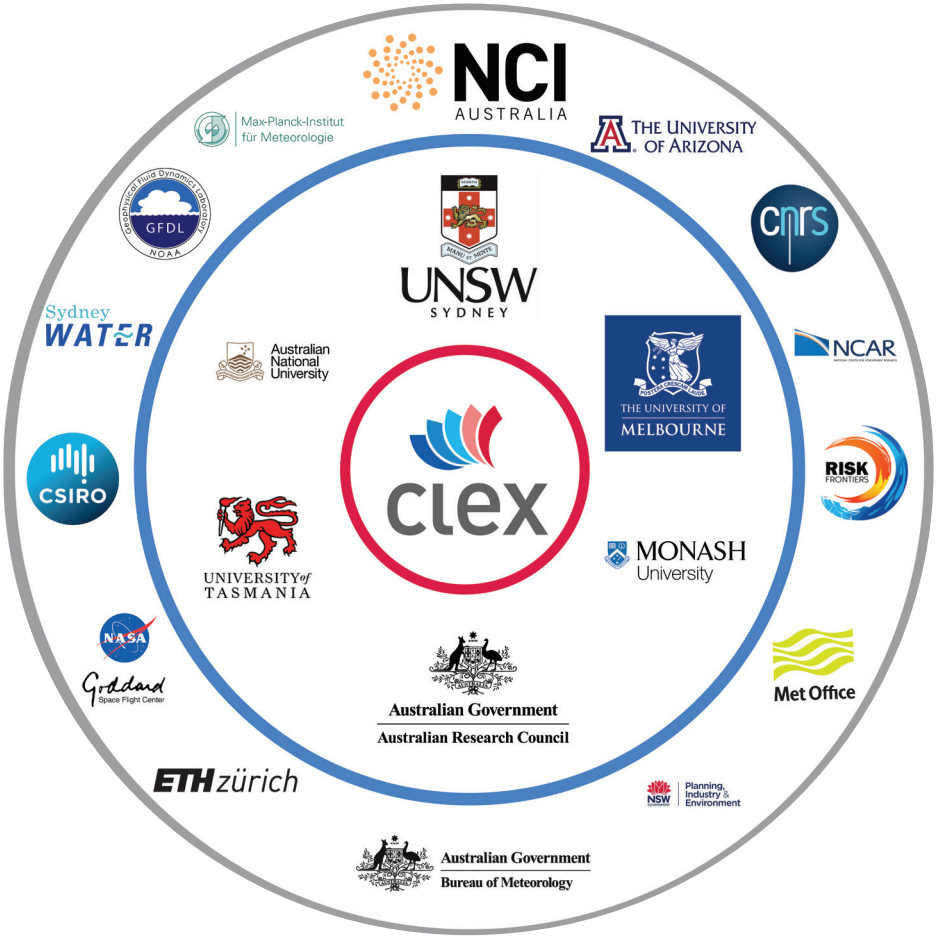
Fire modelling

CLEX researchers worked with the Bureau of Meteorology to incorporate a fire spread model into a weather forecasting model. The new system accounts for the effects of fire on the weather (i.e. the simulated fire can affect the atmosphere and create its own weather). The model is now being used by the Bureau of Meteorology for fire weather research.

Northwest cloudbands

Northwest cloudbands are bands of continuous cloud that stretch from northwest to southeast Australia. They can bring widespread rain to parts of the country. CLEX researchers, with funding from the Victorian Government, have developed an automatic way of identifying the cloudbands in satellite images. This shows that days affected by cloudbands have been becoming more frequent.

Our partners



CLEX works closely with partner institutions that help us to undertake outstanding science and contribute to improving predictions of climate extremes. Our international partners include some of the world's foremost climate research institutions. Our Australian partners include the Bureau of Meteorology, CSIRO, NSW Government Department of Planning, Industry and Environment and Risk Frontiers.