Understanding past and future extreme events and their causes

Tuesday 16 April 2019, 2:30-3:30 pm (AEST)
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Climate extremes such as heatwaves, floods and droughts have huge impacts on Australia's communities and natural and economic resources. These events are influenced by large-scale climate features, such as the El Niño–Southern Oscillation, and by changes in the climate due to human activities. Understanding the drivers that are responsible for the extremity of these events allows managers of a range of systems, such as ecosystems, urban planning and water resources, to better plan for and respond to current and future extreme events.

But as the climate continues to warm, can we expect these extreme events to become increasingly frequent and severe?

The field of event attribution science can reveal the contribution from human-caused changes in the climate of a particular observed extreme climate event. It does this by connecting an observed extreme event to one or several drivers, and quantifies their respective contribution. Attribution studies can be successfully applied to events that are generally broad-scale in both space (e.g. all of NSW) and time (from a few weeks to a few months long). Previous attribution studies have shown that abnormally high temperatures and associated extreme weather is indeed related to human activities. In Australia, for example, human-caused climate change has been found to have substantially increased the likelihood of the record-breaking Australian summer of 2013, increasing the chances of the record hot summer by more than five times. Climate change has also been found to have at least doubled the likelihood of the northern Europe heatwave in 2018.

The Earth Systems and Climate Change Hub is supporting the development of a new style of event attribution method that allows attribution statements to be made *before* an extreme event occurs. The method uses a dynamical seasonal forecast system and has been applied to sub-seasonal forecasts of extreme heat across Australia in spring 2014 and 2015, the record wet Murray Darling Basin spring of 2016, an extensive frost period in south-west WA in 2016, and a period of extreme fire weather across eastern Australia in February 2017.

In this webinar, Dr Pandora Hope from the Bureau of Meteorology will provide an overview of the latest extreme event attribution science, discuss results from a number of case studies across Australia and hint at where future research might lead.
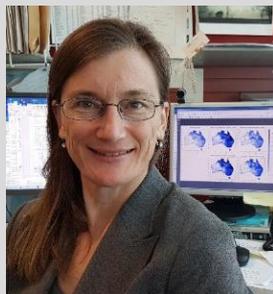
Dr Pandora Hope is a principle research scientist at the Bureau of Meteorology and the lead chief investigator of the Earth Systems and Climate Change Hub Project 2.2 *Enhancing Australia's capacity to manage climate variability and climate extremes in a changing climate*. She has over two decades of experience researching Australia's variable climate, with a particular focus on southern Australia's rainfall trends. She has been working with a great team of researchers to extend the field of attribution science for the last five years. Dr Hope is also leading an international team to describe the range of attribution methods for the sixth assessment report of the Intergovernmental Panel on Climate Change (IPCC), due out in 2021.

The Earth Systems and Climate Change Hub science webinars are open to anyone interested in finding out more about the Hub's research (noting that the content may assume some understanding of climate change science and the fields being discussed).