



The Roles of Climate Change and El Niño in the Record Low Rainfall in October 2015 in Tasmania, Australia

David Karoly (1,2), Mitchell Black (1), Michael Grose (3), and Andrew King (1)

(1) School of Earth Sciences and ARC Centre of Excellence for Climate System Science, University of Melbourne, Australia (dkaroly@unimelb.edu.au), (2) Currently at OUCE, University of Oxford, UK on sabbatical leave till July 2017, (3) CSIRO Climate Science Centre, Hobart, TAS, Australia

The island state of Tasmania, in southeast Australia, received record low average rainfall of 21 mm in October 2015, 17% of the 1961–90 normal. This had major impacts across the state, affecting agriculture and hydroelectric power generation and preconditioning the landscape for major bushfires the following summer. Rainfall in Tasmania is normally high throughout the year, with variations in Austral spring associated with mean sea level pressure (MSLP) and circulation variations due to El Niño, the Indian Ocean dipole (IOD), and the southern annular mode (SAM). Spring rainfall is declining and projected to decrease further in Tasmania

We have investigated the roles of anthropogenic climate change, the 2015/16 El Niño, and internal atmospheric variability on this record low October rainfall using observational data, regional climate simulations driven by specified sea surface temperatures (SSTs) from the weather@home Australia and New Zealand (w@h ANZ) project, and coupled climate model simulations from the Coupled Model Intercomparison Project phase 5.

Anthropogenic climate change and the strong El Niño in 2015 very likely increased the chances of breaking the previous record low rainfall in 1965. In terms of contributions to the magnitude of this rainfall deficit, internal atmospheric variability as indicated by the Pacific-South American MSLP pattern was likely the main contributor, with El Niño next and a smaller but significant contribution from anthropogenic climate change. In this case, it was the MSLP and circulation changes associated with anthropogenic climate change in the Southern Hemisphere middle and high latitudes and not the thermodynamic effects of anthropogenic climate change that contributed to this event.

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