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Examining the vulnerability of Australian eucalypts to future drought-induced tree mortality

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Australia is the driest inhabited continent. Annual rainfall is low and is accompanied by marked inter-annual variability, leading to multi-year droughts. Climate change is expected to alter the frequency, magnitude, and intensity of future droughts, with potentially major environmental and socio-economic consequences for Australia. However, Australian vegetation is well adapted to extended dry periods, thus, the likelihood of drought-induced mortality in the future depends both on the severity of future drought events and inherent vegetation resilience. Here, we used the Community Atmosphere Biosphere Land Exchange (CABLE) land surface model, coupled with a stomatal optimisation scheme, to examine the projected impact of future drought for 24 Eucalyptus species. We forced CABLE with future climate from four global climate models (MIROC, ECHAM, CCCMA, and CSIRO) dynamically downscaled by three regional climate models. We separated the impact of climate change (e.g. increasing VPD, precipitation variability) from rising CO₂ (increasing water use-efficiency) to provide the first assessment of future drought risk to Australian trees.