International climate modeling groups are undertaking a set of climate change simulations that are part of the climate model experiment coordinated by the Coupled Model Intercomparison Project phase 5 (CMIP5). This modeling effort will inform the IPCC 5th Assessment Report (AR5). Simulations of climate change during the 21st Century are based on the new generation of emission scenarios developed by the research community (Moss et. al., 2010). The future conditions used in the climate modeling are based on four “Representative Concentration Pathways”.

This presentation will describe results from the ensemble of simulations using the CSIRO Mk3.6 climate model forced with the RCP emission scenarios. Climate change projection data was used to compute meteorological drought using the Standardized Precipitation Index (SPI) and climate extreme indices. The results of the analysis show a significant increase in the frequency of the extreme drought for many sub-tropical regions across the world. The results show a projected increase in aridity during the 21st Century over large parts of Australia, Africa, south-east Asia, southern Europe, the Middle East and Northern and Southern Americas. The results of analysis for projected changes in the extremely wet conditions during the 21st Century will be also presented. The presentation will conclude by addressing the role of dynamical changes in atmospheric circulation as the main driver of increased aridity in these regions throughout the 21st Century.