

## **Predicting Water Availability in a Changing Climate**

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Future water availability will be driven by changes in climate and precipitation patterns, changes in climate-water relationship and changes in dominant land surface processes in a warmer and higher CO<sub>2</sub> environment. The changes to future water availability and its temporal characteristics and spatial distribution have important implications for local, regional and global water and food security. Predictions of water availability are needed to guide planning to share the limited freshwater resources between people, industry, agriculture and the environment. This paper will present the current state-of-science in predicting future water availability, from simple rules of thumb to integrated climate, downscaling and hydrological modelling. The paper will discuss modelling efforts, as well as theoretical understanding of changes to large scale circulation patterns, regional climate and dominant hydrologic processes in a warmer and higher CO<sub>2</sub> climate. The paper will also discuss the main sources of uncertainty and key research efforts to reduce the range of projections of future water availability. Using continental Australia as an example, the paper will describe how future water availability projections are used to guide the significant water reforms that are now happening across the country.