Australian Centre for Sustainable Catchments
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AN APPLICATION OF DEMERIT POINT APPROACH OF MOST SUITABLE CLIMATE MODELS TO CHARACTERISE THE POTENTIAL CLIMATE CHANGE IMPACT ON REGIONAL AUSTRALIA

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BACKGROUND

The combination of climate variability and long-term climate change is having, and will potentially have, large impacts on rainfall and river flows in regional Australia. However, regional climatic factors such as the El Niño/Southern Oscillation may also exacerbate or otherwise ameliorate the impact of the global climatic system in the regional Australia, creating uncertainties.

In order to accommodate for regional influences, thereby reducing uncertainties, we have adopted a ***demerit points approach***, developed by Suppiah et al. (2007), to select the appropriate climate models that are both relevant for a geographical region, especially in their ability to reproduce aspects of the regions key ***climatic drivers***. The *demerit points approach* provides one point for a root mean square error greater than two or a pattern correlation less than 0.8 in any given season. In this, there are a high number of demerit points allocated for models that do not reproduce observed rainfall and temperature patterns in regional Australia as well as a total appraisal of the allocation of demerit points across a wider range of indicators.

The ***demerit points approach*** has been successfully applied to regional Australia, mainly in south east Queensland and Tasmania. Overall, the models output suggest considerable decrease in autumn/winter/spring rainfall and runoff, an annual decline in rainfall and runoff. However, models suggest potential for an increase in core summer rainfall and an increase in December-March runoff, especially in the southern regions of Queensland.

2010

General Circulation Model Selection
Using Demerit Point Approach based on Regional Climate Predictors
(ECHAM5, HADGEM1, GFDLCM2.0, GFDLCM2.1, CCSM3)

Regional Climate Predictors
eg. ENSO, MJO, STR, IPO

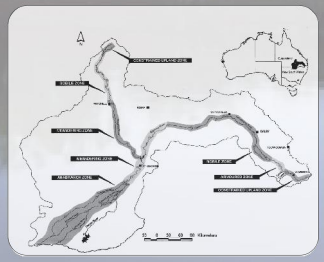
Historical Climate Predictants
eg. SLP, SP, TAS, PRES, RADN, ET

Empirical-Statistical Downscaling
Using relevant local predictors and regional climate predictors while maintaining original modelled statistical distribution (PDF)
(Benestad, 2007)

Hydrologic Modelling
Using lumped conceptual rainfall-runoff models'
eg. SimHyd, Sacramento

Statistical Analysis

Regional Scale



Reservoir Operation Model

Crop Model ↔ **Economic Model**

(Wiring aspects of the flow diagram after M. Ward, 2007)

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