Geophysical Research Abstracts
Vol. 12, EGU2010-13824, 2010
EGU General Assembly 2010

Measuring the Impacts of Climate Change on Tasmanian Rivers Using Outputs from Dynamically Downscaled Global Climate Models

James Bennett (1,2), Fiona Ling (2), Stuart Corney (1), Greg Holz (1), Michael Grose (1), Chris White (1), David Post (3), Bryce Graham (4), Nathan Bindoff (5,6)

(1) Antarctic Climate and Ecosystem Cooperative Research Centre, University of Tasmania, Hobart, Australia (james.bennett@hydro.com.au), (2) Hydro Tasmania Consulting, Hobart, Australia, (3) CSIRO Land and Water, Black Mountain, Australia, (4) Tasmanian Department of Primary Industry Parks Water and Environment, Hobart, Australia, (5) Centre for Australian Climate and Weather Research, CSIRO Marine and Atmospheric Research, Aspendale, Australia, (6) Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Australia

There have been numerous recent studies of the effects of climate change on Australian Rivers. These studies typically use outputs from Global Climate Models (GCMs) to perturb historical rainfall and evapotranspiration data. The perturbed data are then fed into hydrological models to measure the impacts of climate change on runoff and river systems. In this method rainfall events occur exactly as often as in the historical record – only the magnitude of events changes. This may mask effects on runoff caused by changes in the timing or duration of rainfall events due to climate change.

Dynamically-downscaled climate data produced by the Climate Futures for Tasmania (CFT) project give high spatial resolution (0.1 o) climate projections up to 2100. Outputs from dynamically-downscaled climate allow changes in the timing and duration of rainfall events due to changes in the underlying climate processes. CFT climate model outputs have been bias-adjusted to mimic the statistical properties (e.g. daily rainfall quantities, of the observed records from 1961-2007. This data-set admits the possibility of using climate projections as direct inputs to hydrological models to measure the consequent effects on runoff and river flow in Tasmania.

Statewide Hydrological models developed by CSIRO for the Tasmania Sustainable Yields (TasSY) project were used to process climate projections produced for the CFT project at a daily timestep. The result is the most spatially and temporally detailed set of projected river flows for Tasmania to 2100. It is one of the most comprehensive climate-change hydrology studies in Australia.

This paper details the methods used to mate dynamically downscaled model outputs as inputs to the TasSY hydrological models. Results of projected river flows in Tasmania to 2100 are presented.