NARCLiM: Downscaled climate projections to support adaptation in NSW and the ACT

Summary

Regional climate models with high spatial resolution can produce more detailed projections than coarse global models. Their output is therefore better matched to the needs of regional and local decision makers planning for adaptation.

NARCLiM, the New South Wales (NSW) and Australian Capital Territory (ACT) Regional Climate Modelling Project, developed regional climate projections for south-eastern Australia that can be used by the NSW and ACT governments as well as local councils, businesses, community groups, etc. to support adaptation planning. The project involves a range of partners including water authorities, state government agencies and the Climate Change Research Centre at the University of New South Wales.

NARCLiM is designed to provide straightforward access to information on future climate change from model projections. It provides raw model data, and also combines these data into useful climate statistics describing, for example, future fire weather hazard or extreme events such as flood risk.

In order to better account for regional climatic influences such as local topography, information from coarse resolution General Circulation Models (GCMs) which cover the whole world can be downscaled to finer-resolution regional and local projections. These finer resolution projections can help local and regional authorities as well as communities plan for climate change and develop adaptation actions.

In order to support adaptation decision makers in New South Wales (NSW) and the Australian Capital Territory (ACT), NARCLiM, the NSW and ACT Regional Climate Modelling Project, developed regional climate projections for south-eastern Australia. The NARCLiM projections were generated from four global climate models and dynamically downscaled using a regional climate model down to a scale of 10 km X 10 km. The GCMs utilized in this project were used by the Intergovernmental Panel on Climate Change (IPCC) for its Fourth Assessment Report.

Keywords

NARCLiM, climate projections, downscaling, NSW, ACT

Importantly, the regional model has been demonstrated to be effective in simulating temperature and rainfall in SE Australia and to provide a good representation of local topography and coastal processes. The scenarios are for IPCC's high emissions SRES A2 scenario which is similar to the more recent scenario RCP8.5. The models were run for three time periods: 1990 to 2009 (the baseline), 2020 to 2039 (near future), and 2060 to 2079 (far future). Figures 1 and 2 show some of the projections developed under this project.

An important consideration in delivering data has been to ensure that the information is easily accessible and easy to use. The NARCliM models generate data for more than 100 meteorological variables. Information for the most commonly used climate variables are available through the AdaptNSW website, some at an hourly resolution (see links below). The 11 variables are: temperature (hourly, daily maximum and minimum), precipitation, pressure, humidity, wind speed, evaporation, soil moisture, snow amount and sea surface temperature.

These data have been used by impact modellers to understand the impacts of climate change – for example by hydrologists to understand how streamflow and runoff might change in the future. Recently released reports include: Heatwaves, Urban Heat, Soil Properties, Soil Erosion, and Hydrology.

The climate projections have supported regional vulnerability assessments by the NSW Government, and these in turn have helped stakeholders to begin the process of adaptation.
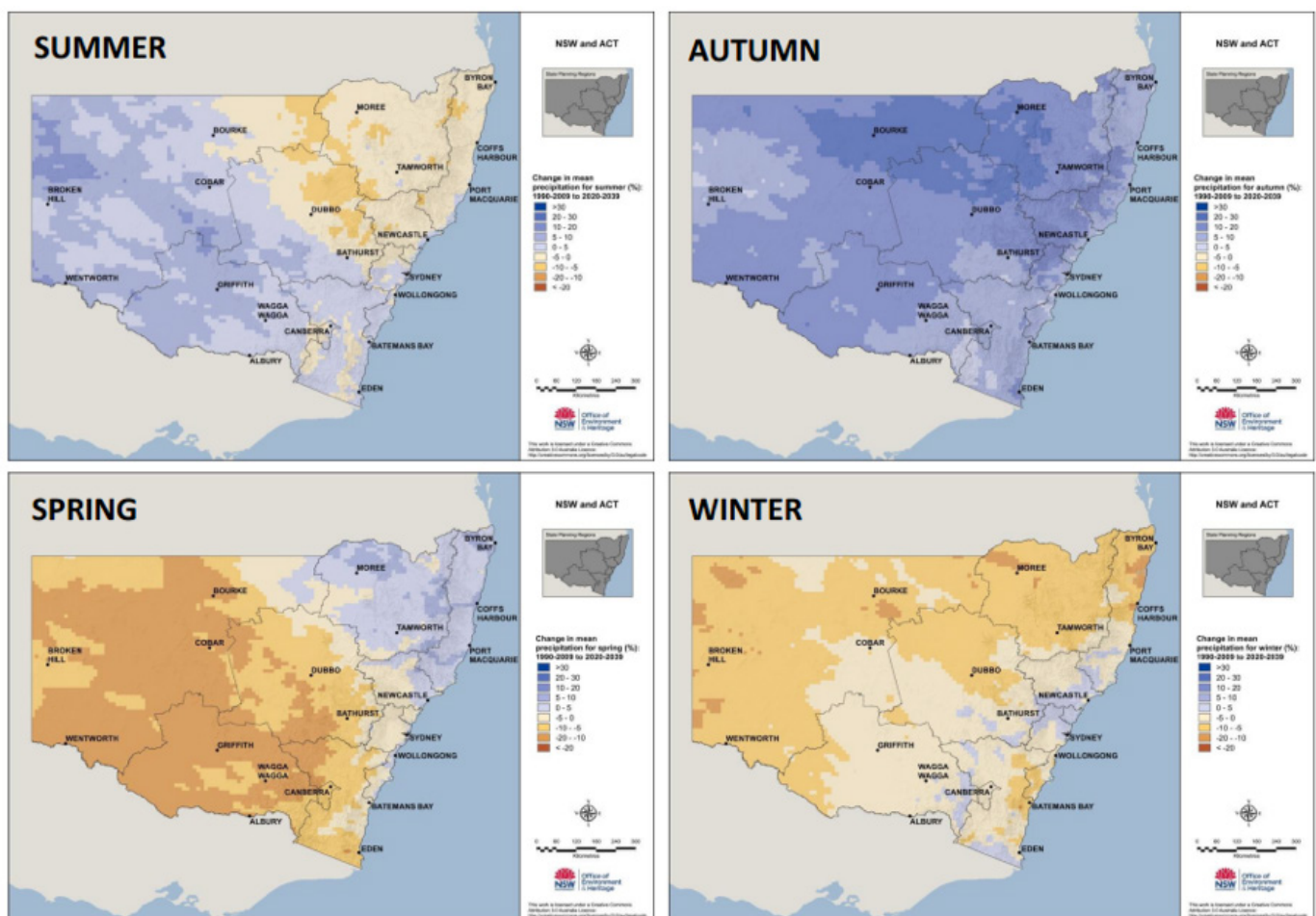

Figure 1: *Example of regional projection from NARCliM project. Percent change in seasonal rainfall in 2020-39. Source: © State of New South Wales and Office of Environment and Heritage 2016.*
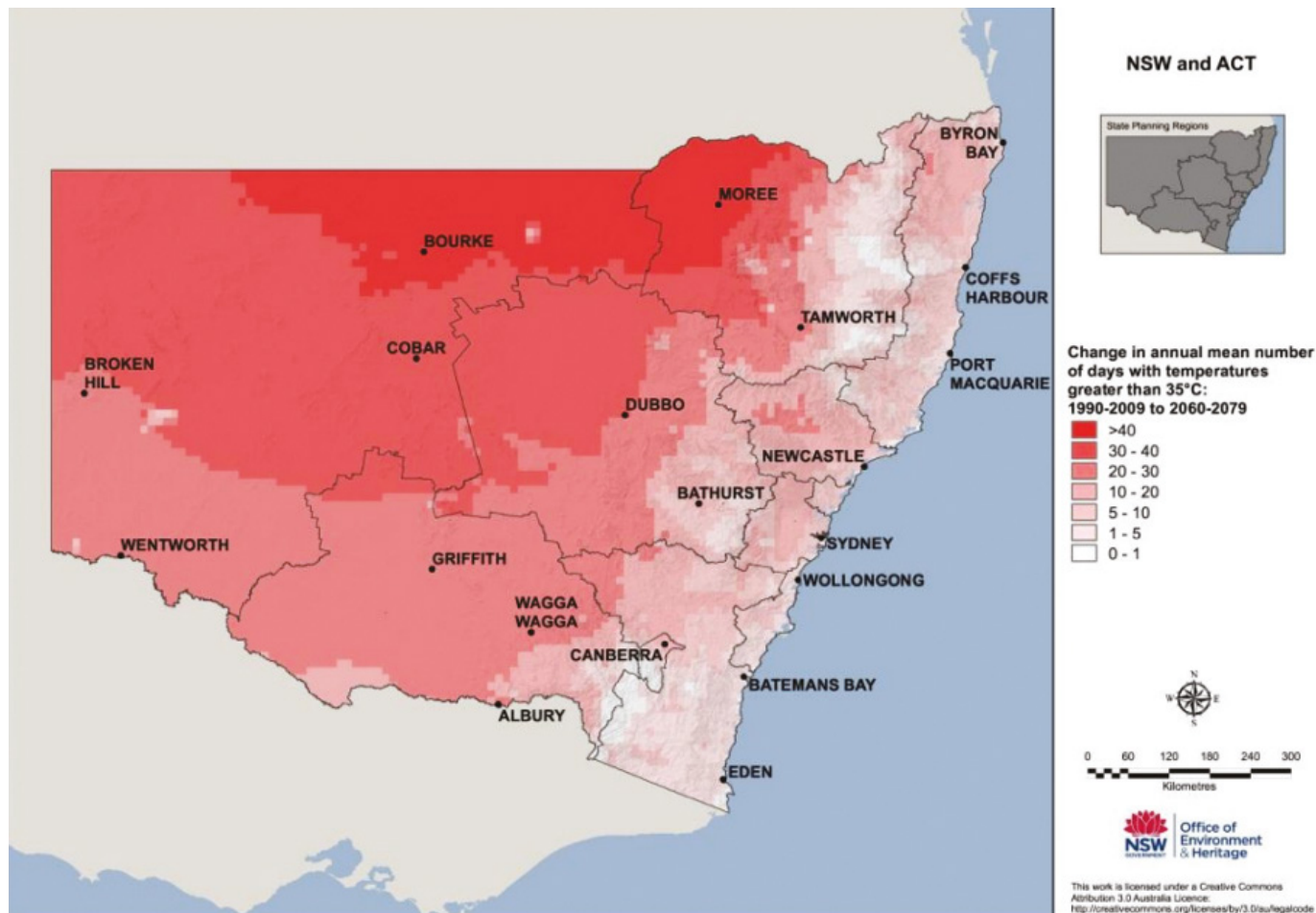
Figure 2: Example of regional projection from NARCliM project. Change in number of days above 35oC in 2060-79 compared to present day. Source: © State of New South Wales and Office of Environment and Heritage (2016).

The availability of more detailed climate projections has helped with the engagement process, although a challenge continues to be explaining the uncertainties associated with the data.

An important consideration for the team has been to ensure there is good engagement with other project teams doing downscaled modelling around Australia (e.g., CSIRO and BoM's Climate Change in Australia projections). This engagement helps to ensure consistency in output and that any anomalies are addressed. It can help to reduce confusion among users, and increases the likelihood that the information will be used.

Further reading

All links accessed 20 February 2017:

AdaptNSW website: www.climatechange.environment.nsw.gov.au/.

NARCliM climate projection data: www.climatechange.environment.nsw.gov.au/Climate-projections-for-NSW.

This Snapshot was prepared by the NCCARF CoastAdapt Development Team. Please cite as:
NCCARF, 2016: NARCLiM: Downscaled climate projections to support adaptation in NSW and the ACT. Snapshot for CoastAdapt, National Climate Change Adaptation Research Facility, Gold Coast.