Glossary

A list of frequently used terms throughout the AdaptNSW website

Term	Description
baseline	A period within the historical data set that can be used as a basis for comparison with the future climate projections.
biases	No climate model can simulate the observed climate perfectly. The degree of difference between a model's simulation of the climate and the observed climate is termed 'bias', which can be thought of as error.
bias correction	The process of reducing the bias from a dataset produced by a climate model. This is done by comparing modelled data for a historical period, with measured climate records, and adjusting the modelled data until the data aligns as closely as possible with these measurements. The bias correction process occurs after the post-processing of climate model outputs.
climate model	A sophisticated algorithm governed by the laws of physics that can produce simulations of the Earth's climate, including the atmosphere, ocean, land and ice. They can be used to recreate past climate or future climate, e.g., to explore the possible effects of environmental changes such as increased greenhouse gas concentrations.
climate model data	All data produced by a climate model is referred to as 'climate model data'.
climate projections	The data produced by a climate model that show how climate variables, such as rainfall, temperature and humidity, are likely to change under future greenhouse gas scenarios. Projections do not give the probability of a certain climate occurring, they simulate changes we are likely to experience if that climate occurs.
climate variables	The different factors that make up our climate, such as temperature, precipitation, pressure, humidity and wind speed. NARCliM generates data for a wide variety of different climate variables.
Climate Risk Ready Guide	A practical guide for the NSW Government sector to assess and manage climate change risks, developed by the NSW Government. The guide provides a consistent, state-wide approach for local governments to achieve low-carbon/net zero emissions and climate-resilient communities. See here for further details: NSW Government's local government climate readiness tool
Coupled Model Intercomparison Project (CMIP)	A project originally developed by the Working Group on Coupled Modelling (WGCM) of the World Climate Research Programme (WCRP) to compare climate projections and assess model performance. CMIP and its associated data infrastructure are used by the Intergovernmental Panel on Climate Change and other international and national climate assessments. CMIP develops and governs the emission scenarios applied to climate models that are run according to this framework.

Coordinated Regional Downscaling Experiment (CORDEX)	A program by World Climate Research Programme to develop an improved framework for generating regional-scale climate projections for impact assessment and adaptation studies. NARCliM data are developed following the CORDEX methodology that specifies the domain characteristics and required outputs to contribute to the CORDEX initiative.
downscaling	The technical process of producing higher resolution regional climate data from global climate models. Here the terms refer to climate modelling that produces finer scaler data through either statistical or dynamical downscaling.
dynamical downscaling	A method of downscaling where regional climate models use global climate model data as an input to generate higher resolution regional climate projections. NARCliM uses this dynamical downscaling method. Dynamical downscaling involves taking a GCM and using it as an input for an RCM. The RCM uses physical principles to determine how the climate system behaves across a particular region, and then produces regional-scale climate data based on the GCM data. The RCM downscales the large-scale climate patterns of the GCM to the smaller area of interest at a finer scale resolution. Because RCMs are built on physical principles, similar to a GCM, dynamical downscaling allows for changes in the relationship between large-scale climate drivers and local climates (unlike statistical downscaling). While RCMs are complex enough to simulate climates over small areas, it is much more resource intensive. See below for a description of the other form (not used in the NARCliM project) of downscaling, namely 'statistical downscaling'.
emissions scenarios	Different concentrations of atmospheric greenhouse gases that we may experience in the future, based on different human actions (pathways). The emission scenarios associated with the IPCC Fourth, Fifth and Sixth Assessment Reports are the SRES (used in NARCliM1.0), RCP (used in NARCliM1.5), and SSP (used in NARCliM2.0) scenarios, as described further down in this table. More information on climate scenarios, in particular the development of the latest SSPs, can be found here. The scenarios are defined below in the remainder of this table.
global climate models (GCMs)	Computer models that capture scientific understanding of how the Earth's complex climate system works, and can simulate our future climate, based on a range of different greenhouse gas concentrations captured in emissions scenarios. GCMs usually provide climate data at a resolution of 100km to 300km and have global coverage.
hindcast data	Climate model data simulated for historical time periods. Hindcast data, also referred to as 'historical data', are often used to assess how well a climate model simulates the observed climate and informs our understanding of climate model bias.

Intergovernmental Panel on Climate Change (IPCC)	The United Nations independent body for assessing the science related to climate change.
model ensemble	A model ensemble refers to output from multiple climate models and could also include multiple simulations from a single model. Each ensemble contains members, which is the output from each RCM simulation, with each climate scenario representation from an RCM being a single ensemble member. For example, the NARCliM1.5 RCP8.5 scenario would be an ensemble with 6 members (3 GCMs, 2 RCMS). In NARCliM2.0, each emission scenario (SSP1-2.6, SSP2-4.5, SSP3-7.0) is a different ensemble, each with 10 members (i.e., 10 RCM/GCM combinations).
NARCliM	The NSW & Australian Regional Climate Modelling (NARCliM) project is a regional climate modelling initiative led by NSW Government. It uses RCMs (forced by GCMs) to create high resolution hindcast data and climate projections for NSW.
NARCliM domain	Dynamically downscaled regional climate projections covering south-east Australia, at a 10km spatial resolution for NARCliM1.0 and NARCliM1.5, and to 4km for NARCliM2.0.
NARCliM climate hindcasts and projections data	The regional climate model outputs of the NARCliM project. Data are produced for a range of climate variables for both plausible future (projections) and past (hindcasts) climates.
plausible future climates	Future climates that could *potentially* occur in response to human activity including population change, urbanisation, technological innovation, economic activity and other land use changes. It is not possible to assign a specific likelihood to any future climate.
regional climate models (RCMs)	Computer models that simulate our climate on a regional scale. These produce data at a higher spatial resolution than GCMs.
Representative Concentration Pathways (RCPs)	Emissions scenarios adopted by the IPCC Fifth Assessment Report reflecting 4 pathways. The scenario trajectories are based on the level of greenhouse gases in the atmosphere, per year to 2100.
regional climate projections	Data produced by a regional climate model that show how different climate variables, such as rainfall and temperature, may change under certain future greenhouse gas concentrations captured in emissions scenarios. Regional climate projections are usually produced at a resolution of 50km or less (global climate projections are usually at a resolution of 100 to 300km). Climate projections are not predictions or forecasts as they are based on future emission and radiative forcing assumptions rather than relying on the past climate state.
resolution	The level of spatial detail offered by a climate model. The resolution refers to the size of the grid cells used in the model; for example, a resolution of 100 km means the grid cells of the model each cover an area of

	approximately 100km by 100km. Resolution is sometimes referred to as 'scale'.
Special Report on Emissions Scenarios (SRES)	Emissions scenarios adopted by the IPCC Fourth Assessment Report. These scenarios, presented as 4 different narrative storylines, reflect greenhouse gas concentration trajectories based on future developments of the factors that influence emissions.
Shared Socioeconomic Pathways (SSPs)	Emissions scenarios adopted by the IPCC Sixth Assessment Report. The SSPs describe emissions scenarios of projected global changes up to 2100, with 5 narratives describing broad socioeconomic trends that could shape future society, as well as global developments leading to different challenges for mitigation and adaptation to climate change.
statistical downscaling	Statistical downscaling uses the existing relationships between local climate observations and large-scale climate features. It applies these relationships to GCMs to downscale the projections data using relatively low computing resources. However, this method assumes that the relationships between large-scale climate variables and local climates will not change in the future – which is not certain.
uncertainty	Uncertainty in climate modelling exists from the model itself and its inputs. In this case, the uncertainty we focus on is the degree to which climate models cannot provide climate projections that are completely accurate. This is because it is impossible to exactly reproduce Earth's climate, and because we don't know what level of emissions (e.g., RCP scenarios) we will have, and exactly how our climate will be affected. Uncertainty is not exclusive to climate models and climate adaptation but is inherent in all computer modelling of the Earth's complex biophysical processes. This is because we only have a limited understanding of how to mathematically represent nature and the complex interactions that occur within the climate system.