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| Title | NARCliM1.5 climate projections |
| Alternative title(s) | Regional climate projections |
| Abstract | **What is NARCliM?**<br><br>The New South Wales and Australian Regional Climate Modelling (NARCliM) project develops high-resolution regional climate projections that cover NSW and South-eastern Australia at a higher resolution and the Australasian continent and beyond at another resolution (named the NARCliM and CORDEX domains, respectively). Computer modelled climate projections are the best information we have available on our future climate. NARCliM has been designed to help government, industry and community in NSW and Australia plan for our future with robust regional and local scale data. The NARCliM project uses currently available global climate models (GCM) and greenhouse gas (GHG) emissions scenarios from the latest Coupled Model Intercomparison Project (CMIP) used in the IPCC reports and applies regional dynamical downscaling using the latest Weather Research and Forecasting model (WRF). NARCliM generates critical climate indices for a broad range of applications and climate change adaptation and risk analysis.<br><br>**NARCliM1.5**<br><br>An enhanced set of climate projections (NARCliM1.5) were released in 2020. NARCliM1.5 contains simulations from three CMIP5 GCMs and two RCMs and two GHG scenarios (RCP4.5 and RCP8.5). The simulated time period is continuous from 1951 to 2100. NARCliM1.5 has the same grid resolution as NARCliM1.0 – a 10 km grid for South-eastern Australia (NARCliM domain) nested within a 50 km grid for Australasia (CORDEX domain), and is useful for analysis of climate extremes, impact thresholds and stress testing.<br><br>The new projections offer enhancements to NARCliM1.0 (2014). These include: * Global climate models (GCMs) from the Coupled Model Intercomparison Project-5 (CMIP5) * Two future climate scenarios called Representative Concentration Pathways (RCPs) from CMIP5: RCP4.5 (some mitigation of greenhouse gas emissions); and RCP8.5 (very limited mitigation of greenhouse gas emissions) * A continuous time period of 1951 to 2100 * Daily, monthly and seasonal timesteps * Post-processed data of fifteen core variables and bias-corrected data for three variables and data. * Additionally, users can access two two ERA-Interim reanalysis forced simulations were run for 1979 to 2013.<br><br>NARCliM1.5 has been designed as a supplement to NARCliM1.0 in order to provide broader range of future climate variability. Users are required to review and agree to the Terms and Conditions of use. Further, users are strongly advised that NARCliM1.5 is not a replacement for NARCliM1.0, rather, NARCliM1.5 complements NARCliM1.0. Therefore, both sets of models should be used to capture the range of future climate variability for South-eastern Australia. Additional information about the data is available on the AdaptNSW website<br><br>**Model output**<br><br>For access to NARCliM1.5 climate projections data, please visit the NSW Climate Data Portal or the National Computational Infrastructure at ANU.<br>Additional variables useful for specialist analysis are available upon request. For more information, visit the AdaptNSW website, or contact us through the NARCliM Mailbox, narclim@environment.nsw.gov.au. |

## Resource locator

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| Data Quality Statement | Name: Data Quality Statement<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description:<br><br>Data quality statement for NARCliM1.5 data<br><br>Function: download |
| Introducing NARCliM1.5: Evaluating the Performance of Regional Climate | Name: Introducing NARCliM1.5: Evaluating the Performance of Regional Climate Projections for Southeast Australia for 1950–2100<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description: |

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| Projections for Southeast Australia for 1950–2100 | The NARCliM project contributes to the CORDEX initiative for Australasia. The first generation of NARCliM (N1.0) used CMIP3 global climate models (GCMs) and provided near and far future estimates of climate change across Australasia at 50-km and southeast Australia at 10-km resolution under a business-as-usual climate scenario. However, multiple sets of 20-year periods in N1.0 did not permit analysis of long-term, inter-annual to decadal trends across the 21st century. Feedback on user needs for regional climate information revealed the desire for multiple emission scenarios and use of newer CMIP5 GCMs for dynamical downscaling. These limitations led to development of the second iteration of NARCliM, namely NARCliM1.5 (N1.5). The N1.5 downscaling exercise uses CMIP5 GCMs and is temporally expanded to cover 150 years (1950–2100) for two future Representative Concentration Pathways (RCP4.5 and RCP8.5). N1.5 simulations remain at the 50-km and 10 km resolutions over the same domains as N1.0, thus producing an expanded and complementary data set for regional climate change. N1.5 simulations substantially improve over N1.0 in capturing the seasonal patterns and magnitudes of precipitation, including improvements in overall bias. Conversely, N1.5 shows similar results to N1.0 for maximum and minimum temperature, with no substantial improvement in overall bias. N1.5 projections project a hotter and drier future relative to N1.0. The combined N1.0 and N1.5 ensemble provides a wider spread of future climates more representative of that found in the full CMIP5 ensemble. Together, N1.0 and N1.5 ensembles provide an improved, more comprehensive data set for studying climate change.<br><br>Function: download |
| NARCliM1.5 climate variables | Name: NARCliM1.5 climate variables<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description:<br><br>List of variables generated for NARCliM1.5, alongside of NARCliM1.0. For more information on data availability, please visit the Climate Data Portal<br><br>Function: download |
| NARCliM1.5 reanalysis climate variables | Name: NARCliM1.5 reanalysis climate variables<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description:<br><br>This link will redirect you to the NSW Climate Data Portal, where you can browse and download reanalysed NARCliM1.5 climate variables.<br><br>Function: download |
| NARCliM1.5 Technical Methods Report | Name: NARCliM1.5 Technical Methods Report<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description:<br><br>Technical methods report for the development of NARCliM1.5<br><br>Function: download |
| NARCliM1.5 Quality Assurance Report | Name: NARCliM1.5 Quality Assurance Report<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description:<br><br>Quality Assurance Report for NARCliM1.5<br><br>Function: download |
| Terms and Conditions for NARCliM data | Name: Terms and Conditions for NARCliM data<br><br>Protocol: WWW:DOWNLOAD-1.0-http--download<br><br>Description:<br><br>Please read: covers the requirement of how to acknowledge and cite NARCliM in publications, data disclaimer, license and privacy.<br><br>Function: download |

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| **Unique resource identifier** | |
| Code | 02b203e6-c685-47e5-8c34-f2c8da027249 |
| **Presentation form** | Model digital |
| **Edition** | NARCliM1.5 |
| **Dataset language** | English |
| **Metadata standard** | |
| Name | ISO 19115 |
| Edition | 2016 |
| **Dataset URI** | https://www.planningportal.nsw.gov.au/opendata/dataset/02b203e6-c685-47e5-8c34-f2c8da027249 |
| **Purpose** | Meeting strategic requirements for regional climate data |
| **Status** | Under development |
| **Spatial representation type** | grid |
| **Spatial reference system** | |
| Code identifying the spatial reference system | 4283 |
| **Spatial resolution** | 10 km |
| **Additional information source** | **NARCliM output**<br>The NARCliM models generate data for more than 100 variables. The most commonly used variables are provided on the Climate Data Portal in multiple formats. These include:<br>• 2-metre temperature (hourly)<br>• Daily maximum 2-metre temperature<br>• Daily minimum 2-metre temperature<br>• Precipitation<br>• Surface pressure<br>• 2-metre specific humidity (hourly)<br>• 10-metre wind speed (hourly)<br>• Surface evaporation<br>• Soil moisture<br>• Radiation (upward and downward longwave, upward and downward short wave)<br>• Forest fire danger index (FFDI)<br>• Areal potential evapotranspiration (APET)<br>*For daily mean variables:*<br>• Mean is average within daily values time: point values 1hour |

- Max is maximum within daily values time: point values 1 hour
- Min is minimum within daily values time: point values 1 hour.
- Meantstep is average within daily values time: point values 300 second
- Maxtstep is maximum within daily values time: point values 300 second
- Mintstep is minimum within daily values time: point values 300 second

*For monthly mean variables:*

- Mean is average within monthly values time: point values 1hour
- Max is maximum within monthly values time: point values 1 hour
- Maxmean is mean of daily maximum within daily values: point value 1 hour
- Min is minimum within monthly values time: point values 1 hour
- Minmean is mean of daily minimum within daily values: point value 1 hour
- Meantstep is average within monthly values time: point values 300 second
- Maxtstep is maximum within monthly values time: point values 300 second
- Mintstep is minimum within monthly values time: point values 300 second

**Data licensing**



**Data disclaimer**



For all enquires, feedback and complaints relating to NARCliM data, please contact: narclim@environment.nsw.gov.au

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| Topic category | climatologyMeteorologyAtmosphere |

## Keyword set

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| keyword value | CLIMATE-AND-WEATHER<br>CLIMATE-AND-WEATHER-Climate-change |

Originating controlled vocabulary

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|---|---|
| Title | ANZLIC Search Words |
| Reference date | 2008-05-16 |

## Geographic location

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| NSW Place Name | South-eastern Australia |

## Vertical extent information

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| Minimum value | -100 |
| Maximum value | 2228 |

Coordinate reference system

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| Authority code | urn:ogc:def:cs:EPSG:: |
| Code identifying the coordinate reference system | 5711 |

## Temporal extent

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| Begin position | 1951-01-01 |
| End position | N/A |

## Dataset reference date

## Resource maintenance

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| Maintenance and update frequency | As needed |

Contact info

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| Contact position | Data Broker |
| Organisation name | NSW Department of Climate Change, Energy, the Environment and Water |
| Full postal address | NSW<br>Australia<br>data.broker@environment.nsw.gov.au |
| Telephone number | 131555 |
| Email address | data.broker@environment.nsw.gov.au |
| Web address | https://www.nsw.gov.au/departments-and-agencies/dcceew |
| Responsible party role | pointOfContact |

Lineage

NARCliM is an ensemble of six GCM combinations. Three Coupled Model Inter-comparison Project phase 5 (CMIP5) GCMs were dynamically downscaled to finer spatial and temporal scales using two RCMs. The NARCliM1.5 projections simulate a continuous period from 1951 (historical period) to 2100 (future). Reanalysis-forced simulations were performed from 1979 to 2013.

**General information**

Outputs from GCMs are used as the initial condition in the regional climate model. GCMs were selected based on their overall performance in representing large scale climate phenomena (e.g. El Nino patterns) and climate variability in widely used metrics (e.g. rainfall and temperature), based on an extensive literature review. The overall poor-performing GCMs were excluded. The remaining GCMs were ranked for independence. Finally, the independence ranking was combined with choosing a spread in temperature and rainfall projections for southeastern Australia.

The RCMs differ by their parameterisations of planetary boundary layer, land surface and cumulus physics, micro physics, and short and longwave radiation physics. The RCMs were selected from combinations of physics schemes, ranked on their distinct ability to capture temperature, precipitation, mean sea level pressure and winds, as well as their statistical independence.

The model output from the NARCliM six-member (NARCliM1.5), three-dimensional (longitude, latitude, height) ensemble was further processed into two-dimensional Coordinated Regional Climate Downscaling Experiment (CORDEX)-compliant files at various temporal resolutions from sub-daily to annual timescales. The postprocessed data was then interpolated onto a regular latitude-longitude grid from the native rotated pole grid that WRF uses. Temperature and precipitation outputs were bias-corrected which acts as an additional dataset available when assessing thresholds and non-linearities in the system. NARCliM data is in NetCDF format, however the Climate Data Portal provides data in a text-readable format.

The NARCliM models were simulated on the National Computational Infrastructure supercomputing facility. The CORDEX 50 km and NARCliM 10 km domains are run together in a one-way nesting set-up.

## Constraint set

Use constraints



Limitations on public access

Scope: dataset

DQ Completeness Commission

Effective date: 2020-12-31

Explanation: Excess datum in the dataset are projections of southern Queensland, eastern South Australia and all of Victoria.

**NARCliM Domain** (including the excess data)

- Grid Type: rotated pole
- Grid north pole: (147.63N, 60.31E)
- Grid corner (regular coordinates): (133.7271, -39.7919) (168.1256, -22.4710)

DQ Absolute External Positional Accuracy

Effective date: 2020-12-31

Explanation: Resolution is 10 km for the NARCliM domain and 50 km for the CORDEX domain.

## Responsible party

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|---|---|
| Contact position | Data Broker |
| Organisation name | NSW Department of Climate Change, Energy, the Environment and Water |
| Full postal address | NSW<br>Australia<br>data.broker@environment.nsw.gov.au |
| Telephone number | 131555 |
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| Web address | https://www.nsw.gov.au/departments-and-agencies/dcceew |
| Responsible party role | pointOfContact |

## Metadata point of contact

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| Contact position | Data Broker |
| Organisation name | NSW Department of Climate Change, Energy, the Environment and Water |
| Full postal address | NSW<br>Australia<br>data.broker@environment.nsw.gov.au |
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| Responsible party role | pointOfContact |

## Metadata date

2024-10-18T00:41:31.455007

## Metadata language