

# Bias Corrected and Downscaled WCRP CMIP3 Climate and Hydrology Projections

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## Summary

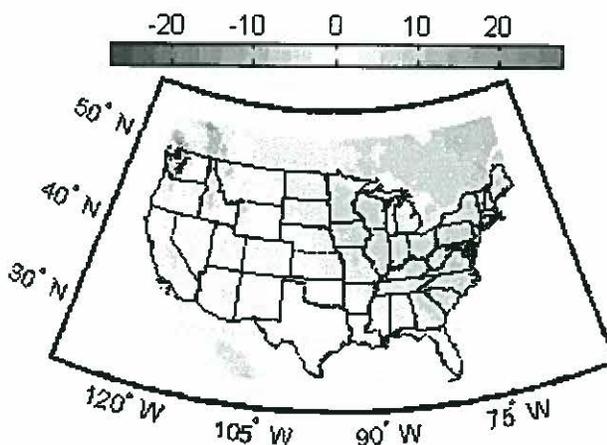
This archive contains fine spatial-resolution translations of:

- climate projections over the contiguous United States (U.S.) developed using two downscaling techniques (monthly BCSD Figure 1, and daily BCCA Figure 2), and
- hydrologic projections over the western U.S. (roughly the western U.S. Figure 3) corresponding to the monthly BCSD climate projections.

Archive content is based on global climate projections from the [World Climate Research Programme's \(WCRP's\) Coupled Model Intercomparison Project phase 3 \(CMIP3\)](#) multi-model dataset, which was referenced in the Intergovernmental Panel on Climate Change Fourth Assessment Report. Please see the "About" page for information on projection development, including the methodology to perform climate model bias-correction and spatial downscaling.

## Purpose

*Figure 1: BCSD CMIP3 Monthly Climate Analysis example - Median projected change in average-annual precipitation (cm/year), 2041-70 versus 1971-2000.*



*Figure 2. BCCA CMIP3 Daily Climate Analysis example - Calendar-day, ensemble-mean change in 20-year diurnal temperature range for three percentiles of diurnal range: 10th, 50th and 90th for the period pairs shown.*

The archive is meant to provide access to climate and hydrologic projections at spatial and temporal scales more relevant to some of the watershed and basin-scale decisions facing water managers and planners dealing with climate change. Such access permits several types of analyses, including:

- assessment of local to regional climate projection uncertainty.
- assessment of potential climate change impacts on natural and social systems (e.g., watershed hydrology, ecosystems, water and energy demands).
- risk-based exploration of planning and policy responses framed by potential climate changes exemplified by these projections.

### Archive History

November 2007: Archive additions include:

- 112 projections of monthly temperature and precipitation at 1/8d resolution over the contiguous U.S., developed using the "Bias-Correction Spatial Disaggregation" (BCSD) downscaling technique (see "About").

December 2010: Archive additions include

- gridded meteorological observations (see "About") used to guide the BCSD application, and
- the intermediate datasets developed during BCSD application (i.e. 2d regridded global climate projections over the contiguous U.S. (2d Raw) and bias-corrected versions of these projections (2d BC))

August 2011: Archive additions include

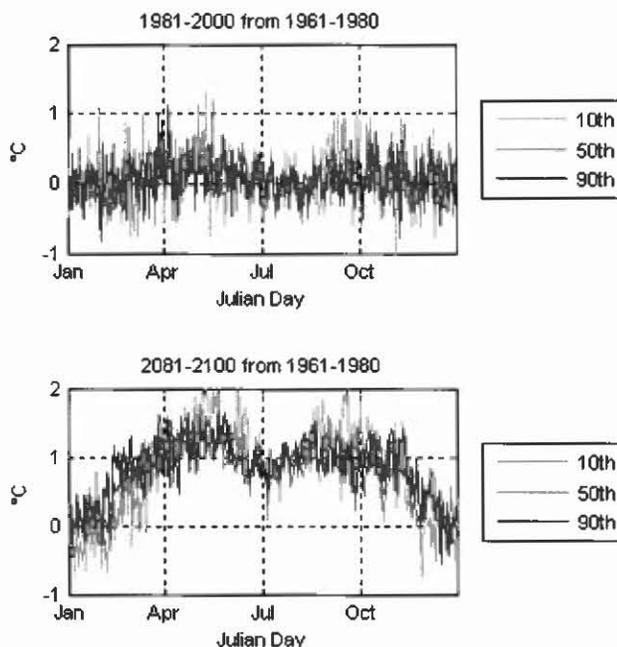
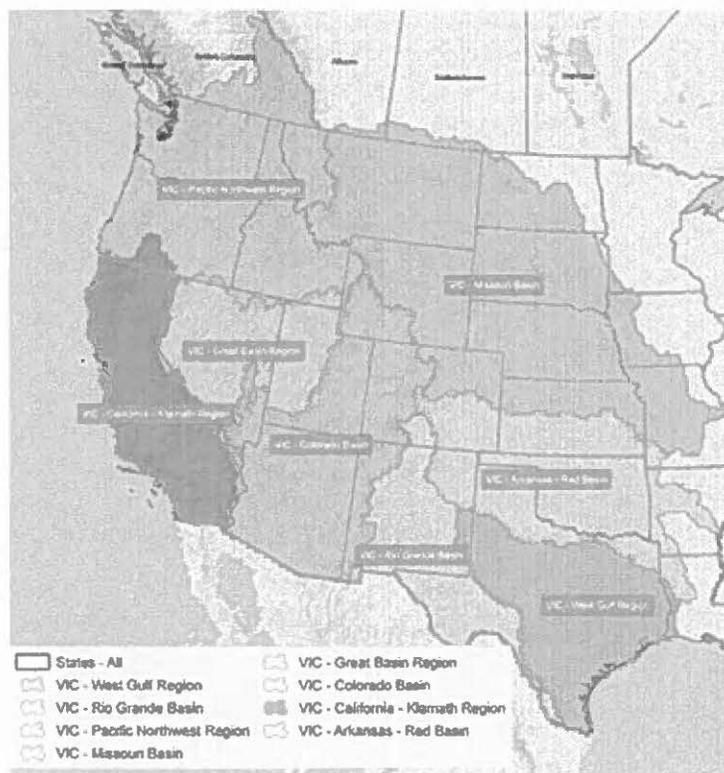


Figure 3. BCSD CMIP3 Hydrologic Projections - Geographic Extent of Hydrologic Modeling.



- 53 projections of daily minimum temperature, maximum temperature and precipitation at the same resolution as BCSD information, but developed using the "bias-Correction Constructed Analogs" technique (see "About"). New content is meant to support ecological studies requiring information on projected diurnal temperature range, and also flood-related studies concerned with daily precipitation patterns.
- 112 projections of monthly and daily hydrologic conditions associated with BCSD projections (see "About")

Through July 2011, this web-site has served projections to roughly 1000 users, collectively issued through approximately 11000 requests. Geographically, the requests have covered the contiguous U.S. and parts of southern Canada and northern Mexico.

## **Terms of Use**

These projections are being distributed to interested users for consideration in research to planning applications. Such applications may include any project carried out by an individual or organized by a university, a scientific institute, public agency, or private sector entity for research or planning purposes. Any decision to use these projections is at the interested user's discretion and subject to the Disclaimer provided below.

## **Disclaimer**

### Privacy and Legal Notice

These projections are being made available to provide immediate access for the convenience of interested persons. [Climate Central](#) (CC) [Lawrence Livermore National Laboratory](#) (LLNL), [Reclamation](#), [Santa Clara University](#) (SCU), [Scripps](#)

Institution of Oceanography (SIO), U.S. Army Corps of Engineers (USACE), U.S. Geological Survey (USGS), (i.e. Archive Collaborators) believe the information to be correct representations of potential high-resolution climate/hydrologic variations and changes subject to the limitations of the CMIP3 global climate simulations, and the downscaling methods and their limitations, as described elsewhere in this web site. However, human and mechanical errors remain possibilities. Therefore, Archive Collaborators do not guarantee the accuracy, completeness, timeliness, or correct sequencing of the information. Also, neither Archive Collaborators, nor any of the sources of the information shall be responsible for any errors or omissions, or for the use or results obtained from the use of this information.

### **Acknowledgements and Citation of these Projections**

Whenever you publish research based on projections from this archive, please include two acknowledgements:

1. First, acknowledge the superceding CMIP3 effort. The following is language suggested by the CMIP3 archive hosts at PCMDI: "*We acknowledge the modeling groups, the Program for Climate Model Diagnosis and Intercomparison (PCMDI) and the WCRP's Working Group on Coupled Modelling (WGCM) for their roles in making available the WCRP CMIP3 multi-model dataset. Support of this dataset is provided by the Office of Science, U.S. Department of Energy.*" PCMDI also requests that in first making reference to the projections from this archive, please first reference the CMIP3 dataset by including the phrase "*the World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project*

*phase 3 (CMIP3) multi-model dataset*". Subsequent references within the same publication might refer to the CMIP3 data with terms such as "*CMIP3 data*", "*the CMIP3 multi-model dataset*", "*the CMIP3 archive*", or the "*CMIP3 dataset*".

2. Second, generally acknowledge this archive as "Bias Corrected and Downscaled WCRP CMIP3 Climate Projections" archive at [http://gdo-dcp.ucllnl.org/downscaled\\_cmip3\\_projections/](http://gdo-dcp.ucllnl.org/downscaled_cmip3_projections/). To reference specific information in the archive, you also use the following references:
  - (for BCSD climate projections) Maurer, E. P., L. Brekke, T. Pruitt, and P. B. Duffy (2007), 'Fine-resolution climate projections enhance regional climate change impact studies', *Eos Trans. AGU*, *88(47)*, 504.
  - (for BCCA climate projections) Maurer, E.P., H.G. Hidalgo, T. Das, M.D. Dettinger, and D.R. Cayan, 2010, 'The utility of daily large-scale climate data in the assessment of climate change impacts on daily streamflow in California', *Hydrology and Earth System Sciences*, *14*, 1125-1138, doi:10.5194/hess-14-1125-2010.
  - (for BCSD hydrologic projections) Reclamation, 2011. 'West-Wide Climate Risk Assessments: Bias-Corrected and Spatially Downscaled Surface Water Projections', Technical Memorandum No. 86-68210-2011-01, prepared by the U.S.

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