

Peer Review Plan

Comparing Downscaled LOCA and BCSD CMIP5 Climate and Hydrology Projections

Date:

November 15, 2019

Originating office:

Bureau of Reclamation, Research and Development Office, in coordination with US Army Corps of Engineers Climate Preparedness and Resilience Program

Reclamation roles:

Director or delegated manager: Levi Brekke, Chief, Research and Development Office, Bureau of Reclamation

Peer Review Lead: Kenneth Nowak, Water Availability Research Coordinator, Research and Development Office, Bureau of Reclamation

Subject and Purpose:

Global climate models (GCMs) simulate the interaction of the atmosphere, oceans, and land surface to project likely conditions over future decades, based on specified input. To accomplish this, the model domain is discretized into grid cells, the size of which varies by climate model, but is generally now on the order of 100km or more on a side in order for the models to run calculations for the Earth out to the year 2100. This spatial resolution can present challenges (e.g. poorly resolves complex terrain) to realistically simulating atmospheric and land surface processes in areas smaller than the GCM grid cells, and their interactions. Downscaling refers to the process of further spatially resolving climate model output in smaller domains at finer scales to overcome the challenges of using GCM native scale solutions. Downscaled future climate outputs can be made more relevant and useful for applications such as water management and planning when they are used as inputs hydrology models for simulating local changes in the hydrologic cycle as a function of specific scenarios of changed climate.

The Localized Constructed Analogs (LOCA) downscaling method (Pierce et al., 2014) was implemented in 2015 for 97 Coupled Model Intercomparison Project Phase 5 (CMIP5) climate projections. These projections and their LOCA downscaled results are hosted on a Lawrence Livermore National Lab (LLNL) archive (<https://gdo-dcp.ucllnl.org>; hereafter GDO site) which is collaboratively supported by Reclamation, US Army Corps of Engineers, LLNL, Scripps Institution of Oceanography, Santa Clara, University, the National Center for Atmospheric Research, and others. The implementation of the LOCA method for those projections and the resultant 1/16-degree data are documented and compared with results from other downscaling methods for the same 97 CMIP5 projections via a technical memo available on the GDO site.

To further enhance the relevance of the LOCA downscaled data for applications such as water resources planning, the downscaled data were used to drive the Variable Infiltration Capacity (VIC) hydrology model to produce detailed hydrologic information for the Contiguous United States. The results of this effort are documented in the title referenced technical memo (hereafter tech memo), which includes comparisons with VIC forced with BCSD CMIP5 projections. The purpose of the tech memo is to document the process used to develop the LOCA CMIP5 VIC

simulations, to provide an overview of the results, and to offer a high-level comparison of the results with the BCSO CMIP5 VIC data. The tech memo will be posted to the GDO site as part of the LOCA CMIP5 VIC data release process. The tech memo is not intended to offer specific guidance on use or to quantify which dataset is “better”.

Impact of Dissemination:

LOCA CMIP5 downscaled data were used in the Fourth National Climate Assessment, released in November 2018. This use, coupled with LOCA’s fine spatial resolution (LOCA is 1/16 degree resolution while many previous downscaled products were 1/8 degree), has helped to “popularize” the LOCA CMIP5 dataset for use in studies and planning activities. Accordingly, it is anticipated that the LOCA CMIP5 VIC simulations will garner considerable attention when released. As the tech memo will accompany the release of the LOCA CMIP5 VIC simulations, it is likely to be a well-used and highly cited resource.

Based on this, the tech memo has been deemed to meet the definition of influential scientific information, requiring peer review, as defined by Office of Management and Budget Final Information Quality Bulletin for Peer Review (70 FR 2664-2677) and Reclamation Manual Peer Review of Scientific Information and Assessments Policy (CMP P14). This peer review will be conducted as an external peer review, complemented by internal review.

Peer Review Scope:

The aspect of the tech memo that is subject to peer review is the structure of the comparison between BCSO CMIP5 VIC and LOCA CMIP5 VIC simulations. The LOCA and BCSO downscaling methods are not the subject to this peer review; they are sufficiently reviewed and documented in peer-reviewed scientific publications. Further, datasets used in those downscaling methods are also not themselves the subject to this peer review; they also have been sufficiently reviewed and documented in peer-reviewed scientific publications.

Peer reviewers will be asked to provide responses relative to the following questions:

Question 1. To what extent do the evaluations in the tech memo provide an appropriate high-level characterization for the purpose of describing differences in outputs between the datasets?

Question 2. How clear and convincing is the conclusion that many of the differences between outputs in the two datasets can be traced back to the different observational training data sets used for the different downscaling techniques?

Timing of Review:

The review period is expected to be November 15-December 15, 2019. The final Peer Review Report is expected to be available on the U.S. Bureau of Reclamation Peer Review public website (<http://www.usbr.gov/main/qoi/peeragenda.html>) by December 31, 2019. No time deferrals are involved.

Methodology of Review:

Review will be conducted by invited individuals with relevant expertise and experience. The review process will begin with an orientation webinar for reviewers that will include authors of the tech memo. The identities of the reviewers will be disclosed in the final Peer Review Report. Review findings/comments will not be attributed to the individual reviewer. There will not be opportunity for public participation in this peer review.

Number of Peer Reviewers:

It is anticipated that 3-4 invited peer reviewers will be utilized.

Reviewer Selection Process:

The peer reviewers will have expertise in one or more of the following areas: hydrology modeling, downscaling, and water resources planning. Peer reviewers may have familiarity with the effort to produce the LOCA CMIP5 VIC simulations and/or the tech memo development but will not have had direct involvement with either. Selection of peer reviewers will be made by the Reclamation office responsible for this product in consultation with the U.S. Army Corps of Engineers office which partnered in production of the underlying datasets and the tech memo. The public will not be asked to nominate reviewers.

Delivery of findings:

The peer review team members will each submit a report of their findings to the Peer Review Lead by the end of the review period. At a minimum, their report will include responses to the above specified questions, an overview of their findings and recommendations, and a list of any specific comments. The report will be provided digitally to the Peer Review Lead.

Response to Peer Review:

At the conclusion of receiving peer review comments, the Peer Review Lead will submit a final Peer Review Report to Reclamation's peer review website (<http://www.usbr.gov/main/qoi/peeragenda.html>), which will summarize the findings of the peer review and list the comments provided by the reviewers, as well as Reclamation's response to the comment, actions the agency will undertake regarding the comment, and reasons the agency believes those actions will satisfy any key concerns or recommendations.

Federal Register Notice:

Federal Register notices will not be provided announcing the formation of a peer review team and completion of the final report.

Applicability of the Federal Advisory Committee Act (FACA):

This peer review is not subject to the Federal Advisory Committee Act (FACA) because the review does not involve open meetings or committee chartering and reviewers are being asked to provide individual reviews on the subject matter. Reclamation is not seeking consensus advice from the reviewers as a group.

Agency contact:

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