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Bias-corrected and downscaled WCRP CMIP3 climate projections: Helping resource managers incorporate global climate science into local planning activities

Levi Brekke[†]; Michael Dettinger; Phillip Duffy; Edwin Maurer; Tom Pruitt; Bridget Thrasher
[†] DOI Bureau of Reclamation, USA
Leading author: lbrekke@usbr.gov

Archive collaborators have worked since 2007 to build user capacity to utilize WCRP CMIP3 information in resource vulnerability and adaptation assessments. Archive activities have focused on developing downscaled translations of a large ensemble of CMIP3 projections over the contiguous U.S., with the goal of supporting risk-based adaptation planning and assessment. The archive was originally designed to serve monthly downscaled CMIP3 climate projection information developed using the Bias-Correction Spatial Disaggregation (BCSD) technique from Wood et al. (2002). Since 2007, the archive has served information requests from roughly 800 users in relation to various water and environmental resource assessments conducted in the public, private and academic sector. Recent efforts have focused on expanding the archive, first to serve daily CMIP3 information, and eventually to serve monthly and daily downscaled CMIP5 information. The daily downscaled CMIP3 information utilizes a new empirical technique that is better-positioned than monthly BCSD to inform climate change vulnerability assessments on ecosystems and storm/flood frequency. The new technique combines bias-correction from BCSD with a constructed analogs approach (CA) for spatial downscaling, and is applied to the daily solutions from CMIP3 simulations. These combined steps are referred to as BCCA. A recent methods intercomparison (Maurer et al. 2010, HESS,14:1125-1139) shows that BCCA outperforms CA and the archive's current underlying methodology (BCSD, Wood et al. 2002) when applied to NCEP/NCAR Reanalysis. The technique yields projections of daily minimum and maximum temperature, which permits projecting changes in diurnal temperature and associated impacts on ecosystem function and watershed evapotranspiration, as well as daily precipitation, which permits assessment of storm and possibly flood frequency (to the extent that these phenomena depend on interarrival characteristics daily to multi-day precipitation). Presentation will highlight collaborators' experiences interacting with archive users, responding to their needs, and helping to usher the use of CMIP3 and associated downscaled information into vulnerability and adaptation assessments. The following is a summary of archive contents and attributes. -- Space: NLDAS domain, 1/8∫ resolution -- Time, BCSD: monthly, 1950-2099 -- Time, BCCA: daily, 1961-2000, 2045-2064, and 2080-2099 -- Variables, BCSD: mean air temperature and precipitation -- Variables, BCCA: minimum and maximum temperature and precipitation