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Supplement of

Evaluating 3 decades of precipitation in the Upper Colorado River basin from a high-resolution regional climate model

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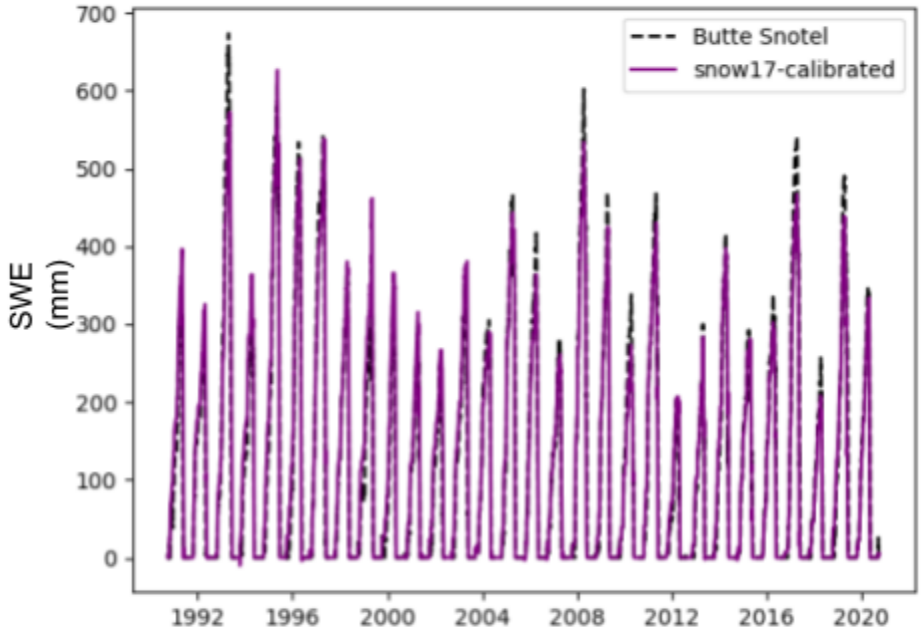
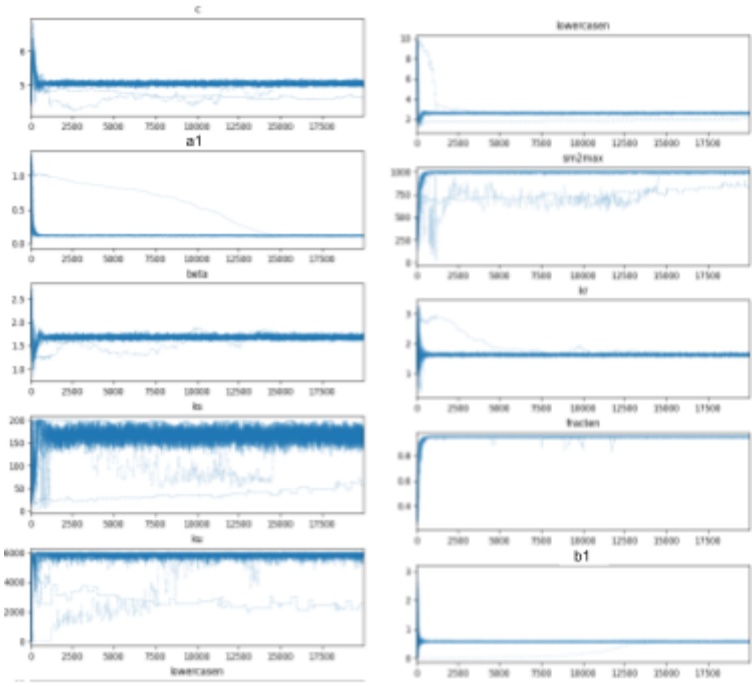
Supplementary Material

The following figure shows the SNOW-17 Model snow water equivalent values evaluated against Butte Snotel SWE. The SNOW-17 parameter values are tuned for this site and used across all elevation bands in the modeling framework.



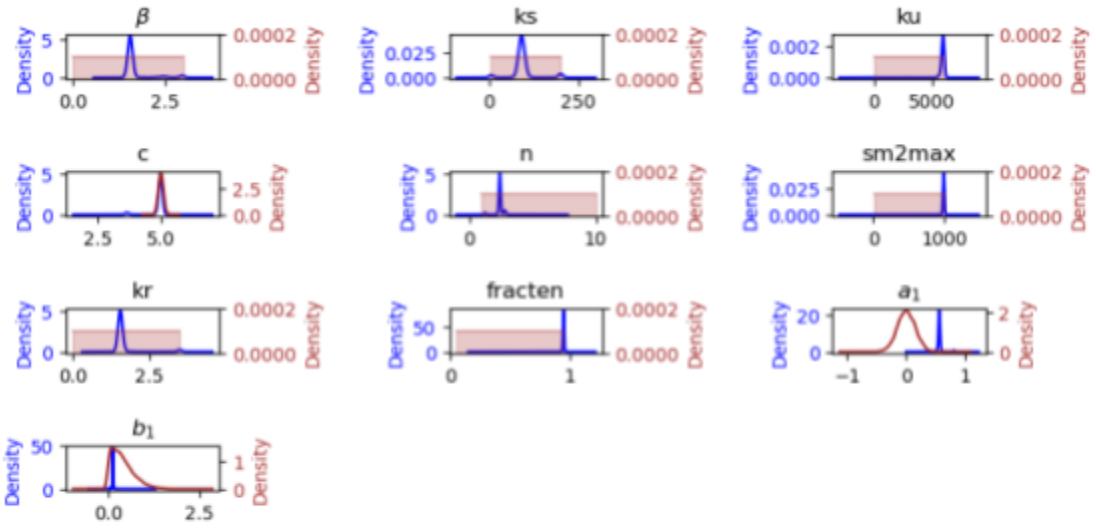
S1: Snow Water Equivalent (SWE) measured at the Butte Snotel site compared against the calibrated SNOW-17 model

The following plots provide additional information about the MCMC posterior parameter sampling methodology used in this study. Traceplots (Figure S2) show the iterations of the MCMC posterior sampling chains. Fourteen independent chains were used. Extending the burn in period for the MCMC sampling may reduce some of the variance in the posterior estimates.



S2: Example traceplots from MCMC sampling for longterm subsurface and error model parameters

The time-invariant subsurface and error model parameter posterior and priors from MCMC sampling are shown below in Figure S2. The KDE plots of the posteriors are produced using the KDE estimator function in the python “pandas” library. The parameters are described in the main text.



S3: Prior (red curves) and kernel density estimates of the posterior parameters from the MCMC sampling for the climatological subsurface parameters.

WRF v3.8.1 namelist.input

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start_month              = STARTMONTH, STARTMONTH,
start_day                = STARTDAY,   STARTDAY,
start_hour               = STARTHOUR,  STARTHOUR,
start_minute             = 00,         00,
start_second             = 00,         00,
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restart_interval         = RESTARTINTERVAL_MINS,
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/

&domains
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e_sn                     = 236,391,
e_vert                   = 50,       50,
p_top_requested          = 10000,
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num_metgrid_soil_levels  = 4,
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dy                       = 3000,     1000,
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parent_id                = 1,        1,
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j_parent_start           = 1,        47,
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target_hcfl              = 0.84,     0.84,
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ra_lw_physics            = 3,        3,
ra_sw_physics            = 3,        3,
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kvdif                   = 0,       0,
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specified               = .true.,  .false.,
nested                  = .false., .true.,
/

&grib2
/

&namelist_quilt
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nio_groups              = 1,
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