**BurnArea\_GAM\_Obs\_Forecasting\_Ziter\_validation\_PDSImod\_PCA\_higherPeakSWE.R**

Calculate best-fit and leave-one-year-out skill for 100-member ensemble using PDSI drought conditions with other antecedent climate conditions over a domain using the 150mm peak SWE threshold

**BurnArea\_GAM\_Obs\_Forecasting\_Ziter\_validation\_PDSImod\_PCA.R**

Calculate best-fit and leave-one-year-out skill for 100-member ensemble using PDSI drought conditions with other antecedent climate conditions over a domain using the 100mm peak SWE threshold

**BurnArea\_GAM\_Obs\_Forecasting\_Ziter\_validation\_SWEImod\_PCA\_higherPeakSWE.R**

Calculate best-fit and leave-one-year-out skill for 100-member ensemble using snow drought conditions with other antecedent climate conditions over a domain using the 150mm peak SWE threshold

**BurnArea\_GAM\_Obs\_Forecasting\_Ziter\_validation\_SWEImod\_PCA\_lowerPeakSWE.R**

Calculate best-fit and leave-one-year-out skill for 100-member ensemble using snow drought conditions with other antecedent climate conditions over a domain using the 50mm peak SWE threshold

**BurnArea\_GAM\_Obs\_Forecasting\_Ziter\_validation\_SWEImod\_PCA\_SummerVars.R**

Calculate best-fit and leave-one-year-out skill for 100-member ensemble using PDSI drought conditions with other antecedent and in-year fire season climate conditions over a domain using the 100mm peak SWE threshold

**BurnArea\_GAM\_Obs\_Forecasting\_Ziter\_validation\_SWEImod\_PCA.R**

Calculate best-fit and leave-one-year-out skill for 100-member ensemble using snow drought conditions with other antecedent climate conditions over a domain using the 100mm peak SWE threshold

**Convert\_MTBS\_to\_Grid.m**

Bring MTBS fire shapes to MODIS burned area 500-m grid

**Decrease\_April1\_SWE\_NoahMP.m**

Create state/restart files for Noah-MP simulation that impose a 30% increase and decrease to April 1 SWE from a reference Noah-MP simulation

**export\_MCD64A1\_timeseries.m**

create monthly burned area files from MCD64A1 observed burned area

**extract\_modelout\_1layer\_daily\_DecrSWE\_cheyenne.m**

extract daily time series of outputs from the Noah-MP simulation corresponding with a 30% decrease in April 1 SWE

**extract\_modelout\_1layer\_daily\_IncrSWE\_cheyenne.m**

extract daily time series of outputs from the Noah-MP simulation corresponding with a 30% increase in April 1 SWE

**extract\_modelout\_1layer\_daily\_reference\_cheyenne.m**

extract daily time series of outputs from the baseline/reference Noah-MP simulation

**Fire\_Frequency\_By\_Month.m**

Create boxplots plot burned area by each month, where boxplot variability is from variability across different years

**Get\_Covariates\_and\_BA\_forecast\_1984\_2020\_peakSWE\_higher.m**

Create annual time series of burned area and climate predictors from 1984-2020 for each elevation bin to be used in generalized additive model construction. Resulting outputs correspond with the domain using the 150 mm peak SWE threshold.

**Get\_Covariates\_and\_BA\_forecast\_1984\_2020\_peakSWE\_lower.m**

Create annual time series of burned area and climate predictors from 1984-2020 for each elevation bin to be used in generalized additive model construction. Resulting outputs correspond with the domain using the 50 mm peak SWE threshold.

**Get\_Covariates\_and\_BA\_forecast\_1984\_2020.m**

Create annual time series of burned area and climate predictors from 1984-2020 for each elevation bin to be used in generalized additive model construction. Resulting outputs correspond with the domain using the 100 mm peak SWE threshold.

**Get\_Monthly\_PDSI\_from\_PRISM.m**

Calculate monthly PDSI from PRISM precipitation and temperature

**Get\_UA\_Annual\_Peak\_SWE.m**

Get annual peak SWE from the UA SWE product

**Get\_UA\_Total\_Spring\_SWE.m**

Get cumulative SWE from the UA SWE product (used in SWEI calculation performed by Get\_Covariates\_and\_BA\_forecast\_1984\_2020\*.m)

**nearestneighbour.m**

Matlab function to nearest neighbor match two spatial grids

**NN\_NLDAS\_to\_BAgrid.m**

Nearest neighbor match NLDAS-2 grid to the MODIS 500 m grid

**NN\_UA\_and\_PRISM\_to\_BAgrid.m**

Nearest neighbor match UA-SWE grid to the MODIS 500 m grid

**Plot\_Domain\_for\_Obs\_Analysis.m**

Plot burned fraction spatial distribution and scatter plot of domain burned area vs. total western US burned area used in the study domain figure.

**Plot\_NoahMP\_April1SWE\_Experiment.m**

Plot time series from the Noah-MP experimentation analyzing how perturbations in April 1 SWE effect summer drought conditions

**plot\_Obs\_forecast\_BA\_1984\_2020\_PDSImod\_PCA\_higherSWE.m**

Plot time series and scatter plots comparing simulated and observed burned area for the region corresponding with a 150mm peak SWE threshold. Simulations are from GAMs that use PDSI drought conditions with other antecedent predictors.

**plot\_Obs\_forecast\_BA\_1984\_2020\_PDSImod\_PCA.m**

Plot time series and scatter plots comparing simulated and observed burned area for the region corresponding with a 100mm peak SWE threshold. Simulations are from GAMs that use PDSI drought conditions with other antecedent predictors.

**plot\_Obs\_forecast\_BA\_1984\_2020\_SWEImod\_PCA\_HigherPeakSWE.m**

Plot time series and scatter plots comparing simulated and observed burned area for the region corresponding with a 150mm peak SWE threshold. Simulations are from GAMs that use snow drought conditions with other antecedent predictors.

**plot\_Obs\_forecast\_BA\_1984\_2020\_SWEImod\_PCA\_LowerPeakSWE.m**

Plot time series and scatter plots comparing simulated and observed burned area for the region corresponding with a 50mm peak SWE threshold. Simulations are from GAMs that use snow drought conditions with other antecedent predictors.

**plot\_Obs\_forecast\_BA\_1984\_2020\_SWEImod\_PCA\_SummerVars.m**

Plot time series and scatter plots comparing simulated and observed burned area for the region corresponding with a 100mm peak SWE threshold. Simulations are from GAMs that use snow drought conditions with other antecedent and in-year fire season predictors.

**plot\_Obs\_forecast\_BA\_1984\_2020\_SWEImod\_PCA.m**

Plot time series and scatter plots comparing simulated and observed burned area for the region corresponding with a 100mm peak SWE threshold. Simulations are from GAMs that use snow drought conditions with other antecedent predictors.

**Plot\_Predictor\_Sensitivities\_PCA\_ensemble\_higherPeakSWE.m**

Plot importance of antecedent predictor figures corresponding to the domain using the 150 mm peak SWE threshold.

**Plot\_Predictor\_Sensitivities\_PCA\_ensemble\_lowerPeakSWE.m**

Plot importance of antecedent predictor figures corresponding to the domain using the 50 mm peak SWE threshold.

**Plot\_Predictor\_Sensitivities\_PCA\_ensemble.m**

Plot importance of antecedent predictor figures corresponding to the domain using the 100 mm peak SWE threshold.

**plot\_scatter\_of\_covariates.m**

plot scatter plots of predictors and burned area on an annual time scale

**Report\_Npredictor\_Table.m**

Plot Taylor skill score based on leave-one-year-out cross validation for 100-model ensemble for models using 2-11 predictors. Used to select optimal number of predictors.

**Select\_BestMod\_Zbins\_ObsAnalysis\_PDSI\_higherPeakSWE.R**

Select best 100-member ensemble for GAMs using PDSI drought conditions with other antecedent predictors corresponding to the domain using the 150 mm peak SWE threshold.

**Select\_BestMod\_Zbins\_ObsAnalysis\_PDSI\_PCA\_skillTable.R**

Calculate and export leave-one-year-out Taylor skill scores for 100-member GAM ensembles using 2-11 predicotrs. Used in Report\_Npredictor\_Table.m. Domain corresponds with the 100 mm peak SWE threshold. Models use PDSI drought conditions with other antecedent predictors.

**Select\_BestMod\_Zbins\_ObsAnalysis\_PDSI\_PCA.R**

Select best 100-member ensemble for GAMs using PDSI drought conditions with other antecedent predictors corresponding to the domain using the 100 mm peak SWE threshold.

**Select\_BestMod\_Zbins\_ObsAnalysis\_SnowDrought\_higherPeakSWE.R**

Select best 100-member ensemble for GAMs using snow drought conditions with other antecedent predictors corresponding to the domain using the 150 mm peak SWE threshold.

**Select\_BestMod\_Zbins\_ObsAnalysis\_SnowDrought\_lowerPeakSWE.R**

Select best 100-member ensemble for GAMs using snow drought conditions with other antecedent predictors corresponding to the domain using the 50 mm peak SWE threshold.

**Select\_BestMod\_Zbins\_ObsAnalysis\_SnowDrought\_PCA\_skillTable.R**

Calculate and export leave-one-year-out Taylor skill scores for 100-member GAM ensembles using 2-11 predictors. Used in Report\_Npredictor\_Table.m. Domain corresponds with the 100 mm peak SWE threshold. Models use snow drought conditions with other antecedent predictors.

**Select\_BestMod\_Zbins\_ObsAnalysis\_SnowDrought\_PCA\_SummerVars.R**

Select best 100-member ensemble for GAMs using snow drought conditions with other antecedent and year-of fire season predictors corresponding to the domain using the 100 mm peak SWE threshold.

**Select\_BestMod\_Zbins\_ObsAnalysis\_SnowDrought\_PCA.R**

Select best 100-member ensemble for GAMs using snow drought conditions with other antecedent predictors corresponding to the domain using the 100 mm peak SWE threshold.

**SnowDrought\_BestMod\_Zbins\_ObsAnalysis\_PredictorSensitivity\_PCA\_higherPeakSWE.R**

Perform leave-one-column-out (LOCO) analysis for GAMs using snow drought conditions with other antecedent predictors over the domain using the 150 mm peak SWE threshold.

**SnowDrought\_BestMod\_Zbins\_ObsAnalysis\_PredictorSensitivity\_PCA\_lowerPeakSWE.R**

Perform leave-one-column-out (LOCO) analysis for GAMs using snow drought conditions with other antecedent predictors over the domain using the 50 mm peak SWE threshold.

**SnowDrought\_BestMod\_Zbins\_ObsAnalysis\_PredictorSensitivity\_PCA.R**

Perform leave-one-column-out (LOCO) analysis for GAMs using snow drought conditions with other antecedent predictors over the domain using the 100 mm peak SWE threshold.