**Grass/shrub total herbaceous cover – best lambda model**

Tmean, prcpTempCorr, isothermality, annWatDef, sand, coarse, AWHC

**Grass/shrub shrub cover – 1se lambda model**

prcpTempCorr, isothermality, coarse, tmean, sand, AWHC, annWatDef

**Grass/shrub bare ground – 1se lambda model**

Prcp, isothermality, annWatDef, coarse, tmean, prcpTempCorr, sand

**Grass/shrub total tree cover – best lambda model**

Prcp, prcp\_seasonality, annWatDef, sand, AWHC, prcpTempCorr, prcpTempCorr\_anom

**Grass/shrub CAM cover – best lambda model**

Tmean, prcpTempCorr, isothermality, annWatDef, sand, AWHC, coarse

**Forest total herbaceous cover – best lambda model**

Tmean, prcp, prcp\_dry, isothermality, clay, sand, AWHC, prcip\_dry\_anom, prcpTempCorr, carbon, coarse

**Forest total tree cover – best lambda model**

Tmean, prcp, prcp\_dry, clay, AWHC, annWatDef\_anom, annWetDegDays\_anom, sand, isothermality, prcpTempCorr, coarse, carbon

**Forest shrub cover – best lambda model**

Tmean, prcp, prcp\_dry, prcpTempCorr, sand, coarse, isothermality, prcp\_dry\_anom, AWHC, carbon, clay

**Forest bare ground cover – best lambda model**

Tmean, prcp, prcp\_dry, isothermality, annWatDef, clay, sand, coarse, carbon, AWHC

**Forest cam cover – best lambda model**

Tmean, isothermality, coarse, AWHC, prcpTempCorr, prcp

**Unique predictors**

|  |  |  |  |
| --- | --- | --- | --- |
| **Predictor** | **units** | **Scaling** | **description** |
| Mean annual temperature – mean across previous 30 years | Degrees C. | (Tmean – 10.32994)/5.020431 | Mean across 30 years [mean across year(monthly mean temps.)] |
| Precipitation Temperature correlation – mean across previous 30 years | correlation | (prcpTempCorr + 0.1002) / 0.4113 | Mean across 30 years[correlation(each month’s tmax, each month’s tmin)] |
| Isothermality – mean across previous 30 years | unitless | (isothermality - 37.4115) / 5.283 | Mean across 30 years[(Mean of monthly (max temp - min temp))/(max temp. of warmest month – min. temp of coldest month) x 100] |
| Annual water deficit – mean across previous 30 years | mm of water/degrees C | (annWatDef - 81.8091) / 82.3426 | Mean across 30 years[ sum across year(monthly mean\*2 – monthly total precip)] \*Note: only sum monthly water deficit values that are >0 |
| Total annual precipitation – mean across previous 30 years | mm | (precip - 742.8552) / 534.1832 | Mean across 30 years(annual total precip) |
| Precipitation seasonality – mean across previous 30 years | mm | (precipSeasonality - 0.8537) / 0.2588 | Mean across 30 years (coefficient of variation of monthly total precip within a year) |
| Precipitation of the driest month – mean across previous 30 years | mm | (precipDriestMonth - 9.1611) / 12.4921 | Mean across 30 years (total precip of the driest month in the year) |
| Precipitation Temperature correlation – anomaly of mean across previous 3 years relative to the 30 year mean | correlation | (precipTempCorr\_anom - 0.0037) / 0.1396 | 30 year mean of precip temp corr. – 3 year mean of precip temp corr. |
| Precipitation of the driest month – anomaly of mean across previous 3 years relative to the 30 year mean | % difference | (precipDriestMonth\_anom - 0.0619) / 1.0568 | (30 year mean of precip of driest month – 3 year mean of precip of driest month)/ 30 year mean of precip of driest month |
| % Sand across the soil profile | % | (sand - 47.3713) / 17.1672 | Average % of sand across the soil profile, weighted by the width of each soil layer |
| % Coarse fragments across the soil profile | % | (coarse - 12.6309) / 11.3496 | Average % of coarse fragments across the soil profile, weighted by the width of each soil layer |
| Total soil available water holding capacity |  | (AWHC - 14.1547) / 5.2346 | Calculated via following code: soils <- rSOILWAT2::swSoils\_Layers(rSOILWAT2::sw\_exampleData)  p <- rSOILWAT2::ptf\_estimate( sand = soils[, sand\_frac], clay = soils[, clay\_frac], fcoarse = soils[, gravel\_content], swrc\_name = Campbell1974, ptf\_name = Cosby1984)  tmp <- rSOILWAT2::swrc\_swp\_to\_vwc( c(-1.5, -0.033), fcoarse = soils[, gravel\_content], swrc = list(name = Campbell1974, swrcp = p) )  awc <- diff(c(0, soils[, depth\_cm])) \* as.vector(diff(tmp)) |
| % Clay in the soil surface | % | (clay - 17.4992) / 8.4203 | % of clay in the first 3 cm of the soil profile |
| % organic matter in the soil surface | % | (carbon - 4.4195) / 7.1196 | % of organic matter in the first 3 cm of the soil profile |