

# Extracting Climate Data from Prism

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Here, I download climate data for each of the LTER sites from Prism and put it in a long format data frame.

First, load required packages

```
library(tidyverse)
library(stringr)
library(prism)
library(raster)
library(magrittr)
library(popler)
```

## Fetch Data

Prism has daily, monthly, or annual climate data. Climate measures are tmin, tmax, tmean, and ppt. Here, I've extracted monthly tmean and ppt for from 2000-2005.

```
# First, set a file path where prism data will be stored
# I recommend deleting contents this folder before downloading each new batch of data
options(prism.path = 'C:\\Users\\Shannon\\Documents\\F18 Topics in Ecology\\prism.path_monthly')

# Now, select the type and date range
get_prism_monthlys(type = 'tmean', years = 2000:2005, mo = 1:12, keepZip = F)
get_prism_monthlys(type = 'ppt', years = 2000:2005, mo = 1:12, keepZip = F)
```

## Process Data

First, stack raster data and extract coordinates

```
# Here, you'll need to specify which dataset to pull if you've downloaded multiple to the path.
mystack <- ls_prism_data() %>%
  prism_stack(.)

# Get project coordinates from raster stack
mycrs <- mystack@crs@proj4args
```

Now, make a dataframe of coordinates for each LTER site, put them in the same coordinate reference system (CRS) as the Prism data, and match them

```
# First, pull all LTER sites
all_studies <- popler::pplr_browse()

# Select just the lat/long and site ID columns and make a df
lter_sites <- all_studies %>%
  dplyr::select(lng_lter, lat_lter, lterid)

lter_sites <- as.data.frame(lter_sites)
```

```
# Convert these locations to format that can be matched to prism data
coordinates(lter_sites) <- c('lng_lter', 'lat_lter')
proj4string(lter_sites) <- CRS(mycrs)
```

## Tidy data

Wrangle data to long format with columns lat, long, site ID, time, and climate

```
# Extract data from raster
data <- data.frame(coordinates(lter_sites), lter_sites$lterid, extract(mystack, lter_sites))

# Reshape data. Col 1:3 are lat, long, and site ID. Col 4:ncol are climate data
# Column headers include date and climate type info
data <- data %>%
  gather(date, value, 4:ncol(data))

# Remove the extra info from the column header
data$date <- gsub('PRISM_', '', data$date) %>%
  gsub('stable_4kmM3_', '', .) %>%
  gsub('_bil', '', .)

# Split header into type, year, and month
data <- separate(data, 'date',
  into = c('type', 'YearMonth'),
  sep = '_')
data <- separate(data, 'YearMonth',
  into = c('year', 'month'),
  sep = 4)

# Rename columns and condense to one row per observation
data <- data %>%
  rename(lng = lng_lter, lat = lat_lter, lterid = lter_sites.lterid)

data <- unique(data)

# Order data
data <- data[order(data$lterid),]
```