April 22, 2015

Climate data processing:

**File name, format and explanation**

Climate.csv (the format will not change – it is the final, but every 7-10 days we will add some more rows, not columns). The met files contains daily historical data (1980-2014 on max and min temperature, radiation and rain from 2 locations, Ames and Sutherlands). Also it has actual data from 2015, from January 1 to june 25, 2015 approximately, for each location.

**Variables**

max-ames-h = maximum temperature in oC from Ames using historical data (1980-2014)

max-suth-h = maximum temperature in oC from Sutherland using historical data (1980-2014)

max-ames = maximum temperature in oC from Ames using actual data from 2015

max-suth = maximum temperature in oC from Sutherland using actual data from 2015

min-ames-h = minimum temperature in oC from Ames using historical data (1980-2014)

min-suth-h = minimum temperature in oC from Sutherland using historical data (1980-2014)

min-ames = minimum temperature in oC from Ames using actual data from 2015

min-suth = minimum temperature in oC from Sutherland using actual data from 2015

rad-ames-h = radiation in Mj/m2 from Ames using historical data (1980-2014)

rad-suth-h = radiation in Mj/m2 from Sutherland using historical data (1980-2014)

rad-ames = radiation in Mj/m2 from Ames using actual data from 2015

rad-suth = radiation in Mj/m2 from Sutherland using actual data from 2015

rain-ames-h = rain in mm from Ames using historical data (1980-2014)

rain-suth-h = rain in mm from Sutherland using historical data (1980-2014)

rain-ames = rain in mm from Ames using actual data from 2015

rain-suth = rain in mm from Sutherland using actual data from 2015

**Columns explanation**

Index = number of simulations (34 years \* 365 calendar days within a year; not needed; skip this)

Day = day of the year (1 to 366 or 365 depends). Note that the “day” is repeated several times within the file because this is how APSIM outputs data and do not want to spend time deleting extra columns. Just use column “B” to refer to historical years (1980-2014) and column “F” for the actual year (2015). In column “B” there are several cycles from 1 to 365, the first one refers to year 1980 and the last one to year 2014

**Units conversion**

Convert rain from mm to inches. [inches = 0.0393701 \* mm]

Convert max temperature from oC to F. [F = 32 + C\*9/5]

Convert min temperature from oC to F. [F = 32 + C\*9/5]

**Figures**

For each site, make 4 figures

Figure 1 = cumulative rain from April 1st to October 31st (see attached picture)

* Use the historical data to calculate median, 5 and 95% probabilities and shade
* **Projected are always the last 14 rows from “max-ames”, “max-suth”, “min-ames”, ….**
* Actual are the data in the e.g. “max-ames” minus the last 14 rows
* Calculate sums per month and % deviation from long term average. Tell R to output this in a table so we can copy and paste the information to the final destination.
* Make a nice legend and axes titles with units
* Note the x-axis in the graph should always start from April 1st and end Oct 31st. Start the accumulation of rain from April 1st and skip the extra data that I have in the csv.

Figure 2, 3 and 4 = max and min temperature and radiation

* The same story as above see attached figure
* Note: calculate “average max T”, “average min T” and “sum of radiation” per month and the corresponding deviation in % from the long term mean value. Output this in a table. Not sure if we should use median or average for the long term data.