**To do list for climwin V 0.0.2**

General

* Cross validation comes up with slightly different best windows each time?
* Update testthat() code
* Update examples
* Vignette
* Videos?

Coding

For version 2:

1. Integrate manywin into climatewin, rename STAT->STATS, FUNC->FUNCS, Xvar->Xvars
2. Rename temporary->climate
3. Put base packages into namespace
4. In helpfile crosswin we need to add plotcor(cross) to the example code and also for autowin
5. **~~Speedup CMatrix build code (remove match() function). URGENT THIS IS CAUSING HUGE SPEED ISSUES. Match function is 2.7x slower than which function.~~**
   1. This is now fixed but only for days, still needs work for weeks and months.
   2. Also needs to be fixed for Xvar2
6. Make Remove function: WindowOutputNew<-Remove(WindowOutput, min=10, duration=7), cuts of output that has windows shorter than 7 days and is more than 10 days ago. This can then be plotted in plotall().
7. In crosswin give an option to look at correlation between two different stats (i.e. correlation b/w min rain and mean temperature). In crosswin STAT-> STATS=c(“mean”, “Min”)
8. Do not allow use of “I” and “LOG” FUNC when negative values are present and do not allow stat=slope with FUNC=I or LOG. Give warning (by checking if Xvar is positive always) and suggest to add a constant to all values of Xvar before running climatewin, however this does not work for Slope (people just use quadratic).
9. Test coxph models, RMARK.
10. ~~When there are NA values and CMISSING = FALSE, we need a print out that tells you which dates are the problem, this can be very hard to debug data~~
    1. Now returns an object ‘Missing’ that contains all dates where Xvar is NA. However, this can return irrelevant dates that aren’t actually used in the CMatrix.

For later(?):

1. Include GAM/splines in weigthwin, email Steve Ellner.
2. How can you deal with overdispersed data? (quasipoisson/binomial cannot use AIC, QAIC may work, but might require a rework? Or perhaps, if QAIC gives the same result as AIC when data is regularly dispersed, QAIC can be used as the standard metric of model strength instead?). The alternative is too allow people to choose their own metric to optimize, AICc, QAICc, BIC, -2LL, etc. and make this into a function argument, drawback is that not all metrics will work with all type of models, so need error messages to warn people.
3. We should build in the Wgmean and Wgdev function and make it into an argument to be able to separate the within year/site variation from the among year. However, the Wgdev and Wgmean function has to be done for all time windows seperately. Note that the Wgdec and Wgmean seperation does not work for windows of length 1 of course! Does the seperation also require the year random effect to be in the model? Yes, probably(?)
4. We should build in d the seasonal (de)trend function to allow for the seperation of within and between year or site effects
5. Include possibility for parallel processing?
6. Time estimator (a big problem is that in Windows the system timer is rounded to the nearest 10ms!! <- NOT GOOD ENOUGH! Not sure if we can overcome this issue as it’s a system issue. In Unix the system timer is much more precise)).

Done

1. Integrate cvwin into climatewin, make a new base function
2. Estimate time taken (n \* (n + 1))/2 where n = furthest – closest + 1
3. Lme4 issues. The best model gives the right output. I get different warnings: Rank deficiency is due to the structure of the dataset, so issue could be related to dataset But it seems like error is before the progress bar start running, so could the problem be in the baseline model? (CHECK IS SOLVED)
4. Growing degree days (“gdd20”), with variable cut off point and chill days, also combination of chill and gdd
5. Error: if there are other parameter in the baseline model, in windowoutput it takes the first coef and not that of temporary!

Plotting

* Create a new plotting code to show cross-validation for best model(?)
* Best plot uses mean values (±SE) when plotting large datasets?

DONE:

* ~~Best model plot doesn’t take additional factors into account.~~
* ~~Put a large title on the facet plot so we know which plot is for which model~~
* ~~Print median climate window values on boxplots.~~