

CoringTreespotters Model notes

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Quick notes after meeting with Victor where we talked about preliminary steps of building a model to answer the question of how juvenile trees respond to climate change. I would like to approach this as a recruitment capacity of tree saplings and how their growth varies across years and how it's impacted by temperature and growing season length (or maybe not length... more on that below)

1 Come up with a model

What are my predictors?

We discussed which of the following would be the most relevant variable that relates to growth:

1. **Growing Degree Days (GDD)** which would be calculated between the budburst and budset date of each individual.
2. **Growing Season Length (GSL)** which could be calculated by:
 - (a) Subtracting budset DOY by budburst DOY or
 - (b) By taking the number of days of each year when the mean (or max/min) was above 5°C (or maybe the nb of consecutive days when the temperature was above 5 or something like that).

Preliminary model

$$\log(w_{i,t}) \sim \text{normal}(X, \sigma) \quad (1)$$

$$\alpha + \alpha_{sp[i]} + \beta_{sp[i]} X_{i,t} + \dots \quad (2)$$

What kind of pooling? Partial pooling since they are all within the same family?

2 Simulate data

I arbitrarily decided to sum up th GDD between 100 and 250 days for now in order to simplify data simulation.

yhat: combine the effects that I generated from the grand mean, the year, species and individual effect deviation effect from the mean, + error returns my yhat. That returns the observed outcome which is composed of multiple nested effects.

3 Set your priors

4 Run model on empirical data

5 Perform retrodictive checks using the model fit to your empirical data

6 Mis

Below I will be stating the obvious because I want to make sure I understand the notations and stuff. The steps will be notes and thoughts that I have when I code my model in R.