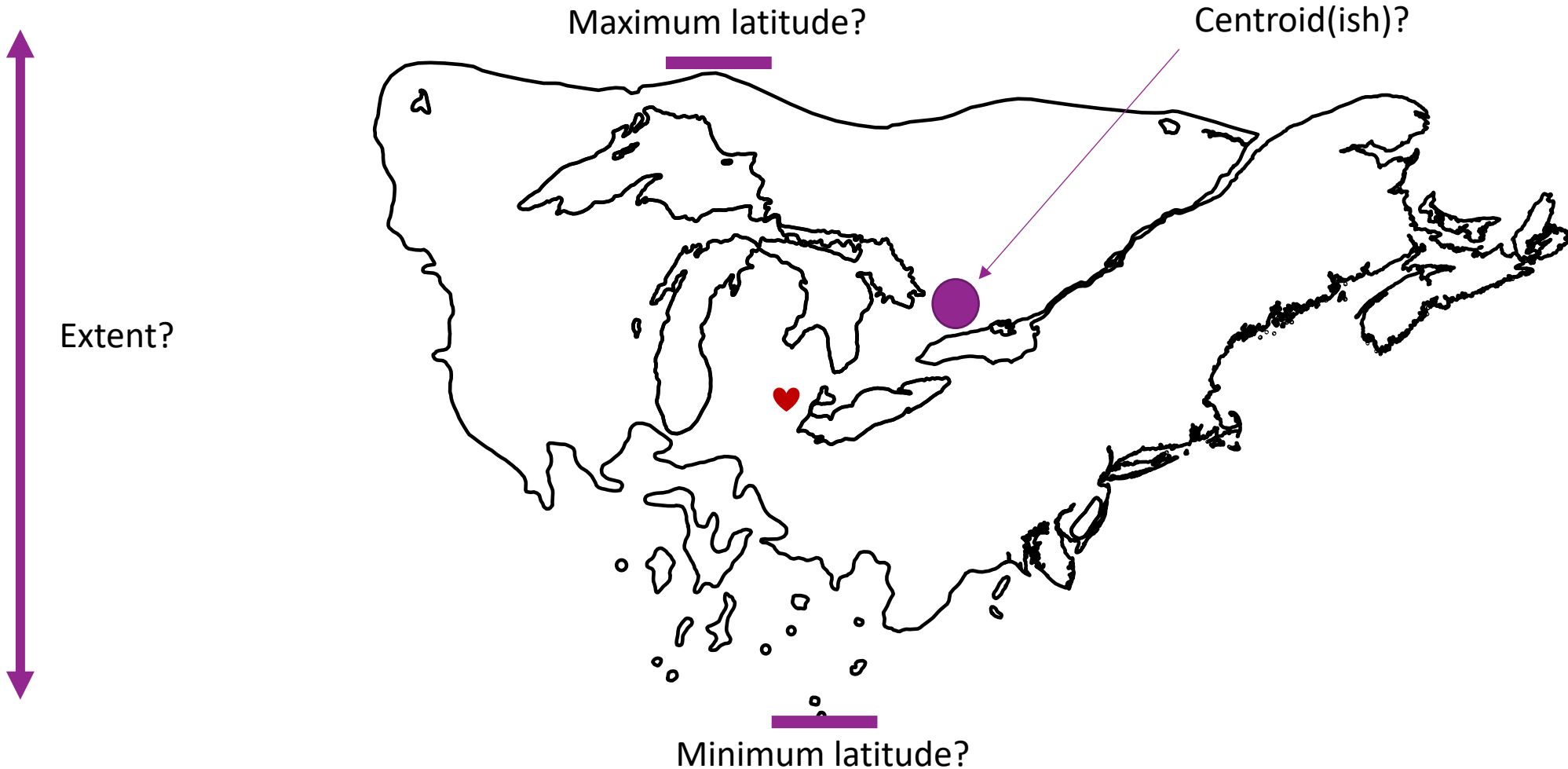


OSPREE: Ranges

Joint Modeling!

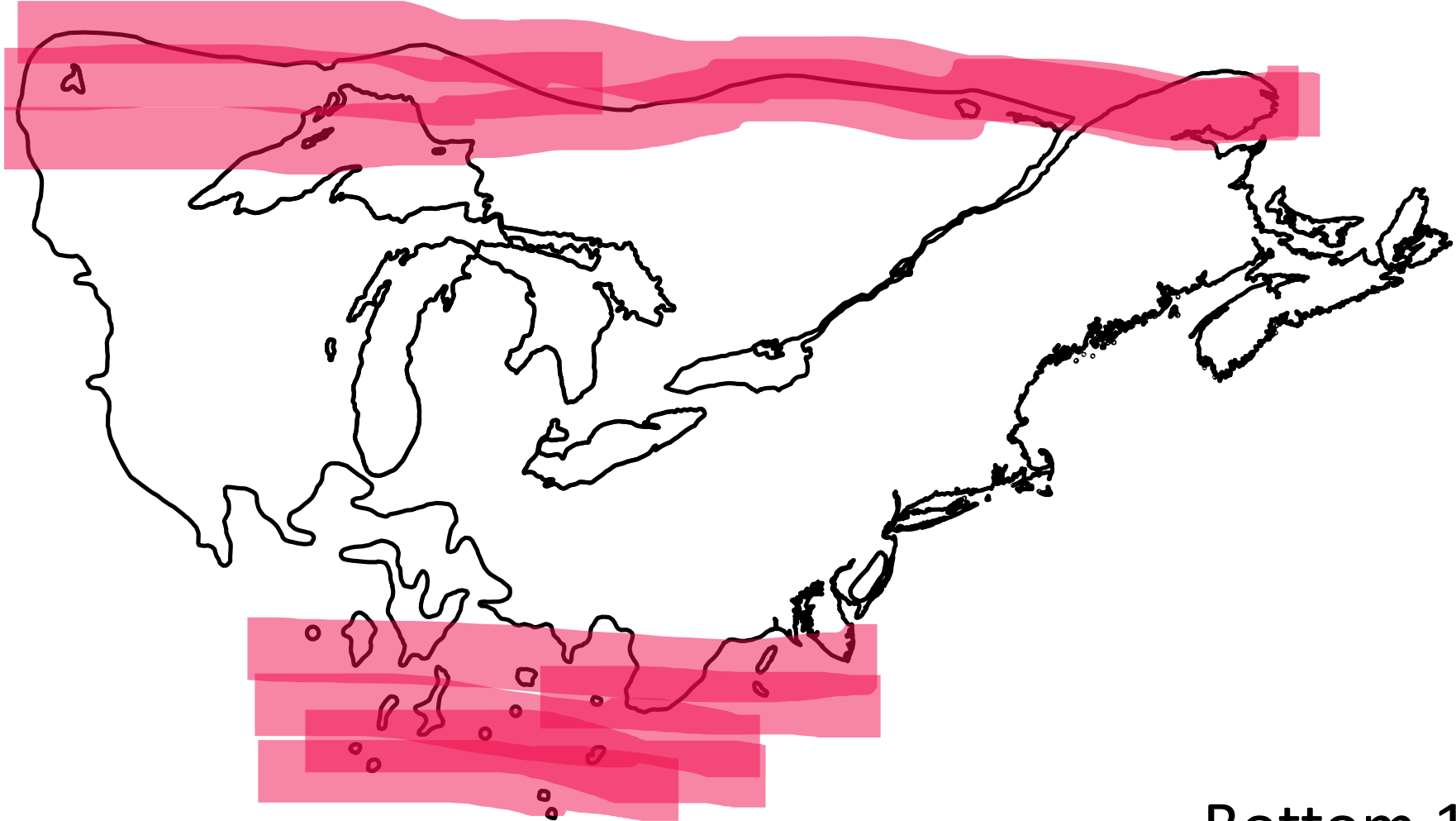
What spatial parameters drive cue use across species?



How about instead...

Top 10%?

(Please forgive me)



Bottom 10%?

Really simple
first part of
model:

```
data {  
  // Model of lat  
  int < lower = 1 > N; // Sample size for lat data  
  vector[N] mindat; // y min lat data  
  vector[N] maxdat; // y max lat data  
  int < lower = 1 > nsp; // number of random effect levels (species)  
  int < lower = 1, upper = nsp > species[N]; // id of random effect (species)  
}  
  
parameters{  
  // Model of lat  
  real <lower = 0> sigma_y; // overall variation across observations  
  real a_mins_sp[nsp]; // lower 10% of min latitudes per species  
  real a_maxs_sp[nsp]; // upper 10% of max latitudes per species  
}  
  
model{  
  real ymin[N];  
  real ymax[N];  
  
  ymin = a_mins_sp[species];  
  ymax = a_maxs_sp[species];  
  
  sigma_y ~ normal(0, 3);  
  
  // likelihood  
  mindat ~ normal(ymin, sigma_y);  
  maxdat ~ normal(ymax, sigma_y);  
}
```

Use
photoperiod
as an
example...

$$\hat{y}_{minlat,i} = \alpha_{minlat,sp[i]}$$

$$\hat{y}_{maxlat,i} = \alpha_{maxlat,sp[i]}$$

$$\alpha_{minlat,sp} \sim N(0, \sigma_{\alpha,minlat})$$

$$\alpha_{maxlat,sp} \sim N(0, \sigma_{\alpha,maxlat})$$

$$y_{mins} \sim N(\hat{y}_{mins}, \sigma_{mins,y})$$

$$y_{maxs} \sim N(\hat{y}_{maxs}, \sigma_{maxs,y})$$

$$\hat{y}_{photo,i} = \alpha_{photo,sp[i]} + \beta_{photomin_{sp[i]}} * P_i + \beta_{photomax_{sp[i]}} * P_i$$

$$\beta_{photomin_{sp}} = \alpha_{photomin_{sp}} + \beta_{minlatxphoto} * \alpha_{minlat,sp}$$

$$\beta_{photomax_{sp}} = \alpha_{photomax_{sp}} + \beta_{maxlatxphoto} * \alpha_{maxlat,sp}$$

$$\alpha_{photo,sp} \sim N(\mu_{\alpha,photo}, \sigma_{\alpha,photo})$$

$$\alpha_{photomin_{sp}} \sim N(\mu_{\alpha,photomin}, \sigma_{\alpha,photomin})$$

$$\alpha_{photomax_{sp}} \sim N(\mu_{\alpha,photomax}, \sigma_{\alpha,photomax})$$

$$y_{photo} \sim N(\hat{y}_{photo}, \sigma_{y,photo})$$