

FROM BEN:

Hi Cat,

Really coming together now! Comments below

**Abstract:**

Line 17: “false springs” definition should be “late spring freezing events after budburst”, right? How damaging are freezes in the spring before this happens? This definition also more accurately captures the climate and biological aspects of this phenomenon, which is what this paper is really centered around.

Line 29: Change “, elevation...” to “. Elevation...” (i.e., start a new sentence

Final sentence, suggested change: “Our results suggest that considering multiple spatial and climatic factors is essential for predicting false spring risk, especially given how changes in risk vary across species.”

**Figure 2**

I like this new version. For Figure 2C, if I’m interpreting this correctly, the fact that the black dots are biased relatively to the observed distribution means the naïve model here (the simple regression) and inadequate? If so, I think this is a nice demonstration that the simple approach doesn’t work very well, which sets us up nicely for the rest of the analyses. However, this does not come through strongly in the text, so it would be good to add a few sentences to better highlight this result AND what it means.

Also on Figure 2-what do the black dots on the other panels mean? Like in 2B, how are you actually predicting the minimum temperature? Or are you just predicting the phenology, and THEN comparing against the minimum temperature between budburst and leafout? If so, I’m a little unclear how your probability of false spring risks predictions are so off, considering it looks like the minimum temperatures in 2B are nailed pretty well.

**Discussion**

Line 246: risk increased for early season species, right? Probably worthwhile clarifying.

Line 247: +4.0% across all species/sites aggregated together? What’s the range across species? Since we’re only dealing with 6 species, might be good to list the change across all of the them.

Line 260: “strength” “has”

Line 265: “aggravated”

Line 268: list species in parentheses that had increased risk. Do the same for later species with decreased risk.

Hi all,

I agree that the simple model results from 2C seem odd. I think something must be off here. Cat, can you double-check your work? It feels like maybe the intercept was wrong or such? Let me know if I can help (or try to).

Yes, this is much better! I think we should probably switch to 99 or 98% uncertainty intervals throughout the paper given how low our uncertainty is. Maybe then they will show up? If not I think we could add to the caption an indication of climate change effects that were NOT different at that level. So it could say something like 'Credible intervals were 98% and only overlapped for the probability of false spring for Fraxinus excelsior [I am making this up].' Or something like that.

FROM LIZZIE: (ouch)

I second Ben that this is great progress! The adjustment to the figures are a good idea and I think the new simple regressions are also helping pull together a very interesting and important piece of research. In particular, I really like the new title! But I am not sure that we yet have communicated its message to the reader. My related comments below:

- The abstract does not (for me) connect to the title. It focuses on species differences and says very little about drivers changing with climate change. The abstract needs to match the title more. I can see why this is hard though -- we have a lot to report, so I think we need to better organize how we report it (a little more on this below, but perhaps better to chat and strategize about how best to fully do it).

- I missed the distinction between the climate change main effect and \*the overall effect of climate change\* when you add up all the shifts in drivers. I think you probably have this in the ms and that I am missing this, but if I am then other readers will also and it seems a critical and important point. I think we need to restructure the results and discussion so the main messages are clear.

- I think we should think of organizing the results a little more

systematically. For example, when I look at Figure 3 -- one thing I notice is that only elevation and climate change main effects really vary by species dramatically; MST, NAO and distance to coast are more consistent, but this message does not come through in the results and discussion as much as we might want.

- I felt like there was a lot of repetition within the results and within the discussion. I think this could be because I did not fully follow what you were reporting and what you meant (I have a unending cold so may be extra slow!), so if we can chat sometime and review this it would help me.

- Remember to report the biology and not the stats. So avoid starting a sentences with 'simple regressions show' or saying 'the model shows' or 'effects of predictors varied.' It's hard! I slip up too, but I think this could be tightened up a lot.

- I suggest focusing -- in both your results and discussion -- on the drivers and how they change FIRST, and then the species second. I would put each in different subsections within each section. Given this, lines 161-7 and 173-184 could easily be merged. And lines 185-200 should go together with 211-224. We also need to be very consistent here in presenting the model equivalently across the results. So if you give log-odds for one variable before climate change you need to also give it as log-odds post climate change.

- Is the model false springs or false spring risk? These are different things and we need to use one term consistently. For example in lines 244-245 you say we find X sites will experience more false springs and then that Y sites will have lower risks of false springs. Thus, these results sound like they come from two different models, which they do not.

- I like the new model figure a lot, though I wonder if we should just show the (new!) black circles in the main model figure. And leave species differences to the other nice figures we have? Otherwise we're sort of showing them twice and perhaps confusing people when the two-interactions do not have species effects.

#### **More line edits:**

- lines 34-46 (paragraph 1) and 68-71 share a lot of similar info.

Let's try to get the info in lines 68-71 into the first paragraph.

- lines 62-67 could be trimmed and then mainly move to the methods (lines 103-105) I think.

- lines 86-87 are very repetitive with lines 97-98.

- I am still not 100% sure the equation is correct, can you give me a source you are working from for it so I can check?
- line 247 -- be careful of mentioning the 'European distribution' as we don't have data across the whole distribution and the wording here seems to suggest we do.
- line 270 -- is continentality in the model?

### **Smaller, but still important edits:**

- We should clearly specify parameter names and stick with them -- so space or spatial predictor, but not both (for example). This can happen clearly in the methods and be repeated once (if needed) in the results.
- If you needed to use Odyssey to fit the models you might mention it in the methods.
- Try to be a little more exact in a few places. (1) Avoid using the term 'around' for meaning an estimate or 'roughly' ... if you need this term it would be better to give uncertainty metrics parenthetically (but then you must do this everywhere) after you give a mean, but I think more you could probably skip it or find a more accurate way to say what you mean. (2) When you can say WHAT changed or HOW something changed, then do. For example, 'contributed' on line 30 of the abstract seems like it could be 'increased.'
- I think we should probably switch to 99 or 98% uncertainty intervals **throughout the paper given how low our uncertainty is.**
- em-dashes are a thing I love! And I think they should always be in LaTeX three hyphens and no spaces (so---then more writing).

### **For the supp:**

- Make sure the tables reporting models do so consistently.
- Italicize all species names.
- For reporting interactions the standard is an 'x' so please change all 'by' to 'x' when used in this way.
- Bernoulli is spelled as Bernouilli often in the supp. Please check supp and main text and fix.
- Check that all the parentheses close (I noticed a couple places in captions) where they don't.
- The 'results' section you have in the supp belongs in the main text and lines 69-74 actually belong in the main text methods section. I would put them right after the equation and have a clear paragraph on how you interpreted the model output (in the main text methods).

- I don't think phrasing in the captions and in lines 69-70 is clear (I am actually not sure what you mean in supp line 69-70). What we was to say is that AESHIP was the intercept and though I like trying to give more info on what that means I don't think the current phrasing works. Let's discuss a better option and for now just note what the intercept is.

- In the model tables please replace 'estimate' with something more exact -- is it mean or 50%?

As I said above, I think you probably have a lot of what \*I think\* is missing in the text already and I just need to see it better to help. So, let me know about talking this week or next. I know you have a talk coming up so happy to do whatever is your preference.