Rethinking False Spring Risk: Submission Questions

What is the scientific question you are addressing?

With climate change, there is growing interest in false spring events, which can affect both plant performance and survival. By better understanding the influence of known spatial and climatic factors for predicting false spring risk, we will be able to advance forecasting in the field.

What is/are the key finding(s) that answers this question?

False spring risk is influenced by multiple climatic and geographic factors, all of which must be incorporated into models to best predict spatiotemporal, species-specific shifts in false springs. Some factors are better at predicting risk than others, however it is essential to include all factors, which contribute to an individual's risk of false spring and also increase the prediction accuracy of the overall model. We found there is a heightened risk of false springs with climate change, which could in turn, have escalating impacts on plant community dynamics and further amplify climatic shifts.

Why is this work important and timely?

Recent studies have documented how climate change is reshaping false springs, with cascading ecological and economic impacts but few studies agree on how false spring risk will shift with climate change. New models, such as ours, are essential to predict the effects of climate change on false spring risk across different spatial and climatic regimes.

Does your paper fall within the scope of GCB; what biological AND global change aspects does it address?

The manuscript will unravel the effects of multiple spatial and climatic factors on false spring risk in the face of climate change. We found that false spring events consistently increased with climate change across species, which could have cascading effects on temperate forest communities across Central Europe.

What are the three most recently published papers that are relevant to this question?

Ma, Q., Huang, J.G., Hänninen, H. & Berninger, F. (2018) Divergent trends in the risk of spring frost damage to trees in europe with recent warming. *Global Change Biology* **0**

Liu, Q., Piao, S., Janssens, I.A., Fu, Y., Peng, S., Lian, X., Ciais, P., Myneni, R.B., Peñuelas, J. & Wang, T. (2018) Extension of the growing season increases vegetation exposure to frost. *Nature Communications* **9**

Vitasse, Y., Schneider, L., Rixen, C., Christen, D. & Rebetez, M. (2018) Increase in the risk of exposure of forest and fruit trees to spring frosts at higher elevations in Switzerland over the last four decades. *Agricultural and Forest Meteorology* **248**, 60 – 69

If you listed non-preferred reviewers, please provide a justification for each.

N/A

If your manuscript does not conform to author or formatting guidelines (e.g. exceeding word limit), please provide a justification.

N/A

References

Liu, Q., Piao, S., Janssens, I.A., Fu, Y., Peng, S., Lian, X., Ciais, P., Myneni, R.B., Peñuelas, J. & Wang, T. (2018) Extension of the growing season increases vegetation exposure to frost. *Nature Communications* **9**.

Ma, Q., Huang, J.G., Hänninen, H. & Berninger, F. (2018) Divergent trends in the risk of spring frost damage to trees in europe with recent warming. *Global Change Biology* **0**.

Vitasse, Y., Schneider, L., Rixen, C., Christen, D. & Rebetez, M. (2018) Increase in the risk of exposure of forest and fruit trees to spring frosts at higher elevations in Switzerland over the last four decades. *Agricultural and Forest Meteorology* **248**, 60 – 69.