

## ***Interactive comment on “Ideas and perspectives: New research examples of autumnal climate change ecology” by Ulf Büntgen and Paul J. Krusic***

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This perspectives article highlights three innovative approaches to study seasonal ecosystem responses to climate change. The authors emphasize the need to better understand autumnal and hibernal processes that have so far remained less studied compared to vernal phenology. Seasonality in ecosystem processes is a timely topic and I agree that “diversity and creativity in future studies” (l. 87) are needed to address it.

General comments:

C1

The manuscript reads well, but I have a hard time fully grasping its message. The call for studies on ecosystem processes in autumn and winter is in itself not new. By framing the manuscript around this topic, the authors mostly second earlier papers, e.g. by Gallinat or Williams (as cited), that have advertised the same issues in more detail. This is unfortunate, because the research examples provided in sections 1-3 are innovative and this novelty is somewhat lost in a known framework.

My main suggestion is to de-emphasize the “autumn-winter message” and instead emphasize the merits of creative research approaches to tackle the full seasonality in climate change impacts. The three examples (animal habitat range, xylogenesis, and mushroom phenology) are not limited to the autumn season, but can provide valuable information for other seasons as well. Such information can nicely complement widely established data streams, such as CO<sub>2</sub>-flux measurements or remotely sensed observations of vegetation dynamics. The paper would then advocate (even stronger than it does already) for the integration of a series of complementary (and so far underused) data sources to really understand the phenology and dynamics of ecosystems and how they respond to climate change. The authors could provide a list of possible such resources (including the ones in sections 1-3 and others) that would be inspiring and useful for researchers.

Specific comments:

l. 39: The “full annual cycle” of what? Do you mean seasonal migration here?

l. 47: I suggest replacing “micro-anatomy” with “cell-level measurements”

l. 48: I suggest adding . . . “favorable” autumn conditions . . .

l. 54: A link to productivity could be drawn here via wood density. Favorable autumn conditions may result in denser wood also earlier in the annual ring (Franceschini et al. 2012, Holzforschung) and thus more biomass per volume.

L. 94-97: This statement deserves a reference.

C2

L. 107-108: This sentence basically summarizes my main suggestion (above) and could be somehow reflected in the title of the paper.

L. 108-111: The authors have not talked about mechanistic modeling earlier in the text and this ending feels very detached from the rest of the manuscript. I suggest either removing this statement or then making modeling a more inherent part of the paper.

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