Tree growth is a fundamental and widely used term in plant science and ecology. The current study aimed to explore and explain tree ring width response to temperature and precipitation gradient over almost 2000 plots across a gradient of climatic conditions in the boreal forests of Sweden. The analysis revealed that in cold environments tree growth responds positively to an increase in the ambient temperature, while in “warm” environments, trees reduce growth due to an increase in ambient temperature. Additionally, soil moisture can mitigate reduction in tree growth in areas of high MAT. Overall, the analysis is well done and has an important value. However, as a whole, this study needs to strength and clarify the main message. I found some descriptions are too detailed, whereas some important steps were either ignored or provided with very little information. Therefore, I recommend this to be gone through a major revision. I explain my concerns in more detail below.

Major comments:

1. The ideas in introduction are leaping through one to another without a proper flow. Also, different terms were not consistent across the document, which makes this document very confusing. It begins with a description of the economic implications of tree growth, which is not the central focus of the study. Additionally, there is excessive use of the term “climate change” and occasional use of “global warming.” I recommend define the scope of what aspect of climate change is being investigated. This needs to be clearly defined, as “climate change” on its own is too vague.

   Terms like “high temperature” and “high/low soil moisture” are also imprecise and need to be quantified or clearly contextualized—what temperature or soil moisture levels are considered “high”? use the actual value or range of values. That will allow a more application result in other areas. Overall, this section failed to answer/ satisfy "why" it is important? Then, need more specific information about "why" this particular species?

Regarding the flow of the text: We will make an effort to improve flow and language.
Regarding the inconsistencies in the terms: We will work through the text and try to sort out any inconsistencies.
Regarding the description of economic implications: This is one of several ecosystem services that we mention in the introduction. As the reviewer later implies, it is important to explain why the study is important, and we believe that the early mention of ecosystem services that may be at risk by reduced tree growth should aid in producing such an explanation.
Regarding the terms “climate change and global warming”: We will change the text to clarify that it is changes in temperature and precipitation that are of interest to our study.
Regarding the “high”/”low” terms: We will add a section in the methods where we introduce our study area. Here, we will also define the temperature/precipitation ranges and how these have changed over time. By adding ranges of tested variables, it should be clear to the reader where on the scale high/low refers to. This can also be viewed in Figure 1. Soil moisture is not in a form that directly can be translated to standardized metrics such as volumetric soil moisture. We will clarify this in the methods when describing the soil moisture variable used in our study.
Regarding the “why is this important”: We are not sure what the reviewer refers to here. “Why” this study or “why” these species? In any case, we think it will be clearer in the revised version of the introduction where we in more details will explain the ecosystem services provided by the boreal forests and the importance that the studied tree species have for the delivery of these services.

2. The tree species (the core subject of the paper) are barely introduced. The introduction does not explain why these two species are meaningful. The introduction should describe their geographical distribution, ecological characteristics, and the typical range of temperature, VPD, and soil moisture conditions in which they thrive. It should also reference recent studies related to their responses to environmental stressors that are investigated here.

We do not agree that the tree species is the core subject of the study and therefore have not expanded on this more than the other subjects (i.e. local temperature and soil moisture conditions). However, we will add information (in the introduction) about why we hypothesize species differences in growth-climate responses. Furthermore, in the introduction as well as in a new paragraph on site description within the methods section, we will clarify that the studied tree species are the dominant species within our study area, which justifies the choice to focus our analyses on these specific tree species.

3. All the hypotheses refer to specific regions that are not even mentioned in the introduction, despite playing a central role in the study.

Regarding the hypotheses: This was an unfortunate use of the word region. What we mean are areas within our geographical range that experience specific conditions, for example, higher/lower temperature compared to other areas. We will rephrase these hypotheses to avoid such misunderstanding.

To ensure that readers understand the scope of our study area, we will also begin the methods section by explaining the geographical range of our study, as well as how some variables vary across our sites (provided ranges of e.g. mean temperature and length of snow period different parts of our study area). We believe that this will put the study region in a better context compared to other geographical areas.

4. There is a clear lack of background on previous research on the physiological responses of conifer trees to temperature and soil moisture. Key studies in the field—such as those by Wagner et al., 2021; Zweifel et al., 2006, Zweifel et al., 2021; Klein et al., 2014; Novick et al., 2024 —are notably absent and should be incorporated to establish the scientific context on trees physiological response to soil and atmospheric conditions.

We will add Wagner et al 2022 to the description on the physiological processes that cause droughts to affect trees. We will add Zweifel et al 2006 to the discussion on the lack of effects from soil moisture. We will add Klein et al 2014 to the introduction to extreme events linking drought conditions to mortality events. We will add Novick et al 2024 to the introduction regarding the negative effects of VPD and to the discussion on the interaction between rising temperature and soil moisture conditions.

5. H4 needs to be rewritten and detailed- how each species will respond to an increase/ decrease in ambient temperature? How will each species respond to an increase/decrease in soil moisture? And add a paragraph in the introduction that explains why you hypothesize for each species.

We will specify our hypothesis for each species and clarify how we expect them to respond to change along the gradients within our study area. In the introduction, we will also expand on

the reasoning behind why we expected differences between the species (they have different ecological niches).

6. In the method section, a brief sites descriptions was missing, more details, such as what the dominant tree species are, their approximate age, and overall environmental conditions. Snow? Solar radiation?

We will add a site description at the beginning of the methods section, including the dominant tree species, and environmental conditions (temperature, precipitation, snow cover).

7. In Figure 1B, the comparison between high and low soil moisture needs to be clearly defined. What thresholds or criteria were used to distinguish "high" from "low" soil moisture? And why not give the actual values of soil moisture (v/v %)?

The reviewer makes a good point and we will add a sentence in the figure text explaining the colour gradient (i.e. that yellow or "Low" indicates a 0-20% probability of the site being classified as "wet" based on the modelled data we use in this study). Unfortunately, we cannot provide actual values of soil moisture since the data we use is modelled based on an index that use topography and ground water data and produces values that correspond to a probability of being classified as "wet" in a categorical gradient. Details on this soil moisture index were unfortunately not included in the method section in the earlier version, but will be included in the revised version.

8. Regarding the calculation of the Standardized Precipitation-Evaporation Index (SPEI), the authors mention using net solar radiation based on latitude. However, cloud cover, which can significantly affect incoming radiation, is not addressed. Was this factor considered or accounted for in the calculations?

This is a good point. Although SPEI is often calculated with latitude as a proxy for radiation, regional differences in cloud cover can skew this calculation. However, in our region of study (Sweden), the irradiance measurements over the last 30 years from satellite data and meteorological stations suggest a relatively coherent drop in irradiance (kWh/m^2) with latitude, and we deemed that this variation would be of very limited importance for our results.

9. In the results section, I suggest adding a short description of the number of extreme events experienced by the trees during the study period. Were high-temperature extremes or low-precipitation events more frequent? Additionally, it would strengthen the results to quantify the reduction in RWI associated with extreme increases in temperature and extreme reductions in precipitation.

In this study, we have defined "extreme years" as the 10% highest temperature years (or 10% lowest precipitation years) similarly to the definition in Rammig et al 2015. Since our data on both temperature and precipitation have been modelled through 60 years, there are 6 extreme years in both cases for each site.
Regarding the quantification of RWI reduction, we have used "Resistance" values to show the reduction/increase in RWI during extreme years.

10. I recommend expanding the discussion on the threshold between atmospheric demand (VPD) and soil moisture availability. This would provide valuable ecological insight into species-specific sensitivities under climatic stress.

We will expand the section regarding the interaction between soil moisture and temperature (and VPD), mainly with information provided from the Novick et al 2024 review that the reviewer has suggested.