Revision notes

- The comments to authors are in non-italicized text
- Response to comments and summary of revision by authors are in italics and blue color. All the page and line numbers shown in Revision notes are in agreement with the revised manuscript.
- The changes are highlighted in red color in the revised manuscript.

Comment 1: The distinction between atmospheric evaporative demand and atmospheric water demand is not entirely clear in the following sentence (Line 751): "Rising temperatures may prolong the growing season and increase atmospheric evaporative demand, thereby directly increasing atmospheric water demand and promoting the transfer of more water from the soil and vegetation into the air." The sentence would benefit from revision.

Response: *Thank you for this comment. We agree that the two expressions were redundant. In the new version, we have removed the "directly increasing atmospheric water demand and." The revised sentence is as follows: "Rising temperatures may prolong the growing season and increase atmospheric evaporative demand, thereby promoting the transfer of more water from the soil and vegetation to the atmosphere." This information can be found in Lines 754–756 in the new version.*

Comment 2: The manuscript assesses hydraulic risk and drought-induced mortality risk rather than direct survival outcomes. The statement that PT plantations may find it "more challenging to survive" (Line 643) should be revisited.

Response: *Thank you for your comment. In the new version, we have revised this statement to better align with the indicators assessed in this study. The revised sentence is as follows: "This suggests PT plantations in the western and northern parts of the study area may face greater constraints on carbon gain and increased hydraulic risks under future climate change." This information can be found in Lines 645–647 in the new version.*

Comment 3: Please conduct a final proofreading of the manuscript.

Response: *Thank you for this comment. We have carefully checked the entire manuscript and corrected several other minor issues in wording, notation, and terminology. The detailed revisions are listed below:*
(1) We have corrected the term APLK in the Abstract. In the new version, the revised term is as follows: "percentage loss of whole-plant hydraulic conductance (APLK)". This information can be found in Line 30 in the new version.

(2) We have revised the expression in Section 3.4 by correcting "under all scenario-management combinations" to "under all scenario–period combinations". This information can be found in Line 38 in the new version.

(3) We have revised the expression of (1–DMRP) in Section 2.6. In the new version, the revised sentence is as follows: "where (1–DMRP) represents the probability of avoiding drought-induced mortality". This information can be found in Line 407 in the new version.

(4) We have revised the expression about CWHRI in Section 2.6 by correcting "reflecting the reality that" to "reflecting the assumption that". In the new version, the revised sentence is as follows: "The multiplicative form ensures that as DMRP approaches 1 (certain mortality), CWHRI approaches zero regardless of NPP or ET, reflecting the assumption that trees experiencing drought-induced mortality no longer contribute to ecosystem functioning." This information can be found in Lines 409–412 in the new version.

(5) We have added a sentence in Section 2.7 to clarify the calculation of rRMSE for leaf water potential. Since the observed leaf water potential (Ψ_{md}) is negative by definition, the rRMSE for Ψ_{md} was calculated using the absolute value of the mean observed value as the denominator: "For leaf water potential (Ψ_{md}), rRMSE was calculated using the absolute mean observed value as the denominator." Using this calculation method, the final rRMSE values for Ψ_{md} are 7.42% for the calibration and 7.24% for the validation. Accordingly, we have revised the corresponding description in the caption of Fig. 2 and updated the rRMSE values annotated in Fig. 2. This information can be found in Lines 439–440, 452, 463 and 477 in the new version.

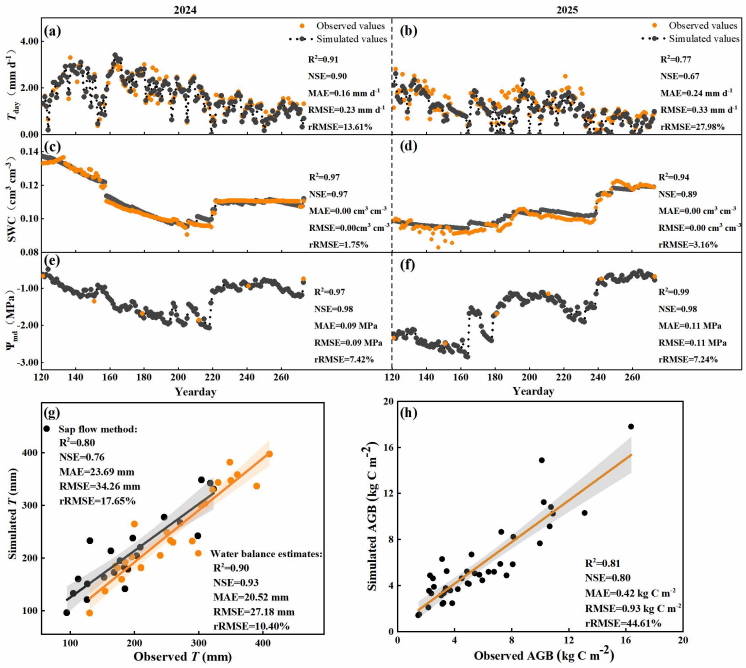


Figure 2. Comparison of simulated and observed values of daily transpiration (T_{day}), average soil water content (SWC) in the 0–500 cm soil profile, midday leaf water potential (Ψ_{md}), growing-season transpiration (T), and aboveground biomass (AGB) in Pinus tabuliformis Carrière plantations. (a), (c), and (e) show the calibration results (2024), while (b), (d), and (f) show the validation results (2025) for T_{day}, SWC, and Ψ_{md}, respectively. (g) shows the validation of growing-season transpiration (T) across multiple sites, with black and orange points representing observations obtained from the sap flow method and water balance estimates, respectively. (h) shows the validation of aboveground biomass (AGB).

(6) We have revised the statement in Section 3.5 to avoid overly definitive expressions by correcting "This indicates the growth of PT plantations will be retarded in the future and more susceptible to hydraulic failure and even death." to "This indicates that PT plantations may experience greater constraints on growth and increased risks of hydraulic failure and drought-induced mortality under future climate scenarios." This information can be found in Lines 637–639 in the new version.

(7) We have corrected the numerical statement in Section 4.1 by correcting "exceed 0.8" to "exceed 0.6", which is consistent with the results analysis in Section 3.1. This information can be found in Line 711 in the new version.

(8) We have revised the sentence about NPP in Section 4.2. In the new version, we have added the expression "except for the FFP under the SSP5–8.5 scenario." The revised sentence is as follows: "The results show that NPP in the study area will remain below the baseline level under future climate scenarios, except for the FFP under the SSP5–8.5 scenario." This information can be found in Lines 737–739 in the new version.

(9) We have revised the sentences in Section 4.2 by correcting "Precipitation, temperature, and carbon dioxide concentrations all significantly impact NPP. Previous studies show increasing precipitation..." to "Previous studies have shown that precipitation, temperature, and carbon dioxide concentrations all significantly impact NPP. Specifically, increasing precipitation..." This information can be found in Lines 739–740 in the new version.

(10) We have revised the sentences about NPP in Section 4.2. In the new version, we have added the word "most". The revised sentence is as follows: "Although NPP under most future climate scenarios will remain below the baseline level, it will increase progressively from the NFP to the FFP under all SSPs." This information can be found in Lines 746–748 in the new version.

(11) We have revised the sentence about the causes of the NPP increase in Section 4.2. In the new version, we have corrected "primarily due to" to "may be associated with", and "promote" to "may promote", to soften the causal tone. The revised sentence is as follows: "This upward trend may be associated with increasing precipitation and

atmospheric CO_2 concentrations, both of which may promote vegetation growth". This information can be found in Lines 748–750 in the new version.

(12) We have revised the sentence about the causes of the ET increase in Section 4.2. In the new version, we have corrected "will be mainly attributed to" to "may be associated with" to soften the causal tone. The revised sentence is as follows: "These changes may be associated with increasing precipitation and temperature." This information can be found in Lines 752–753 in the new version.

(13) We have revised the sentence about the synchronous increase in NPP, ET, and DMRP in Section 4.2. In the new version, we have corrected "may be attributed to" to "may be related to", and replaced the specific attribution to CO_2 fertilization with a more general description of the projected changes in precipitation, temperature, and atmospheric CO_2 concentrations. The revised sentence is as follows: "This phenomenon may be related to projected changes in precipitation, temperature, and atmospheric CO_2 concentrations, which may jointly influence vegetation productivity and water fluxes." This information can be found in Lines 774–776 in the new version.

(14) We have revised conclusion (2). In the new version, the revised sentences are as follows: "Compared with the baseline period, NPP is projected to decrease under most future climate scenarios and periods, except during the FFP under SSP5–8.5, when it is projected to exceed the baseline level. Spatially, NPP and ET both exhibit a southeast-to-northwest decreasing gradient." This information can be found in Lines 850–854 in the new version.

(15) We have revised the concluding statement in Section 5. In the new version, we have deleted "may overestimate future plantation persistence", and corrected "prioritizing hydraulic safety and tree survival in future plantation management" to "accounting for plant hydraulic risk when assessing future plantation sustainability under climate change" to align with the indicators assessed in this study. The revised sentence is as follows: "These findings highlight the importance of accounting for plant hydraulic risk when assessing future plantation sustainability under climate change." This information can be found in Lines 864–866 in the new version.