Tropical forests in the Americas are changing too slowly to track climate change

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Abstract: Understanding the capacity of forests to adapt to climate change is of pivotal importance for conservation science, yet this is still widely unknown. This knowledge gap is particularly acute in high biodiversity tropical forests. Here we examine how tropical forests of the Americas have shifted community traits composition in recent decades as a response to changes in climate. Based on historical trait-climate relationships we found that, overall, the studied functional traits show shifts of less than 8% of the expected shift given observed changes in climate. However, the recruit assemblage shows shifts of 21% relative to climate change expectation. The most diverse forests on Earth are changing in functional trait composition, but at a rate that is fundamentally insufficient to track climate change.

One-Sentence Summary: The trait composition of tropical forests in the Americas is changing but not fast enough to keep track of climate change.

Main Text

Forest responses to human-driven perturbations, such as climate change, will largely determine the diversity and function of the terrestrial biosphere through this century and beyond. Tropical forests in the Americas host the greatest concentration of tree species in the world (*1*), including six key biodiversity hotspots (*2*) and half of Earth's most intact tropical forests (*3*). In the face of threats from climate change and continuing loss in area and integrity (*3, 4, 5, 6*), it is both critical and urgent to understand the ability of these complex systems to adapt to change and survive.

Within tropical American forests (referring to all forests encompassing continental areas from Brazil to Mexico), lowland forests provide relatively homogenous climatic conditions over large areas, potentially allowing the existence of common functional adaptations over large spatial extents. In contrast, across mountain forests climatic conditions tend to change rapidly in space, potentially facilitating rapid turnover of functional adaptations to local environmental conditions. In Amazonia, changes in precipitation patterns and more frequent droughts have led to an increase in the recruitment of dry-affiliated species (xerophilization) (*7*). In the Andes, rising temperatures have led to increasing abundances of species tolerant to higher temperature (thermophilization) (*8*). Across Mesoamerica it is expected that climate change will cause an expansion of tropical dry forests to higher elevations (over 200 m above current average elevation) (*9*). However, tree species may be unable to shift their distribution fast enough to track their climatic niche, given their slow demography (e.g. growth and recruitment), the prevalence of dispersal limitation (*10*) and different environmental tolerances at different life stages *(11)*. All these limitations would increase the vulnerability of tree species to climate change across tropical American forests. For instance, in higher latitudes recent work has shown large range contractions of tree species rather than range expansions or shifts (*12*). Changes in climate across the tropical Americas are expected to become stronger, with some scenarios projecting temperature increases of up to ~4°C and precipitation reductions close to 20% by 2100 (*13, 14, 15*). This would likely increase the vulnerability of current tree species assemblages as they would face climates they have not previously experienced (*16*), potentially selecting for no-analog future plant communities (*17*).

Functional traits mediate species responses to environmental change, impacting plant performance and species distributions (18*, 19, 20*). These morphological, structural, chemical, and phenological characteristics tend to show consistent relationships with climate and soil conditions (*21*). Recent work has shown positive relationships between mean annual temperature and leaf area, specific leaf area, leaf nitrogen, wood density and leaf thickness (*22*) depicting plant functional adaptations to local environmental conditions. Other work has detected a negative relationship with elevation for specific leaf area and leaf nitrogen, potentially as adaptation to cooler environments with lower nutrient availability (22). Hence, these traits are tightly linked to the capacity of species to respond to environmental changes. For instance having large area can increase leaf temperature due to higher solar absorption, while smaller leaves dissipate heat more effectively and help avoid water losses. Plants with lower specific leaf area, i.e. with thicker and tougher leaves, tend to be more resistant to drought as these can better resist water loss. High wood density is tighly related to increased resistance to cavitation which can increase their capacity to survive droughts. Therefore, a trait-based approach provides a promising framework for predicting the impacts of climate change and resilience across forest ecosystems (*19, 23, 24*).

It is still unclear how shifts in the abundance and distribution of species translate into changes in the functional trait composition, and what functional changes have occurred through the last half century as a response to the onset of a warmer, drier and more variable climate across the tropical Americas. Moreover, it is unknown if forest-level functional shifts are more attributable to differential growth among the surviving trees than to the addition (i.e. recruitment) or removal (i.e. mortality) of trees to the assemblage. It is also uncertain if these functional shifts match the direction of climate change, and if so, whether the rate of functional trait change keeps pace with climate change or lags behind. Understanding the

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above will allow the quantification of the present, and likely future, capacity of forest to adapt to a changing climate and to uncover which functional trait characteristics may confer forests higher adaptation capacity to a changing climate.

Here, we address these knowledge gaps by analysing 415 long-term forest plot sites monitored over more than 40 years (1980 - 2021). This dataset includes information on the identity, size, recruitment and mortality of >250,000 individual trees across the tropics from Mexico to southern Brazil. Our effort spans relatively undisturbed forests from the lowland tropics (hereafter forest plots <700 m elevation) to pre-montane and montane zones (>700 m elevation; henceforth referred to as montane) from the Andes to subtropical fringes (Fig. 1; data S1). These forests are distributed along a wide range of climatic and soil conditions (Fig. 1B) and have experienced strong changes in climate over the past decades (Fig. 1C). We combine this monitoring and analysis of changes in the plant community composition with measurements of 12 plant functional traits that are potentially involved in responses to a changing climate. These include photosynthetic capacity (A_{sat}), leaf chemistry (content of carbon: C, nitrogen: N and phosphorus: P), leaf area (Area), specific leaf area (SLA), leaf fresh mass (FM), leaf thickness (“Thickness”), abundance of deciduous species (DE), adult maximum height (H_{max}), wood density (WD) and seed mass (SM) (table S1). Tree functional trait data were obtained for several plots from local field collections carried out by collaborators (*25, 26, 27*), the Global Ecosystems Monitoring network (GEM; gem.tropicalforests.ox.ac.uk) (*28*), and ForestPlots (www.ForestPlots.net) (*29*) in addition to databases from BIEN (bien.nceas.ucsb.edu), TRY (www.try-db.org) (*30*) and Díaz et al. (*19, 31*).

We first investigate long-term plant trait-environment relationships to understand how climate drives trait distributions in tropical forests of the Americas and if these relationships are consistent across lowland and montane forests. We expect temperature and water availability to be the main drivers of plant trait distributions, with warmer and drier areas facilitating the dominance of more conservative trait syndromes (e.g. smaller and thicker leaves, higher wood density, lower photosynthetic capacity) in comparison to warm and wetter areas *(32, 33)*. Moreover, we expect trait-environment relationships to differ between lowland and montane forests given the different climatic ranges of these forest types.

We then examine how and where lowland and montane tropical American forests have shifted in their functional trait composition due to changes in the plant community taxonomic composition over the last four decades. We do this by analysing the annual rate of change (Δr) of the trait community-weighted mean (CWM) for all forests (lowland and montane together) and for lowland and montane forest separately. Because of the long lifespan of tropical trees (*34*) and their slow turnover, we performed this analysis at the full community level and separately for the recruiting (‘recruit’), mortality (‘fatality’), and surviving (here onwards ‘survivor’) assemblages (Fig. 2). Analysing changes at the full community level (involving all trees >10 cm DBH alive) allows us to understand how communities are changing in their trait CWM given tree growth, survival and recruitment together. Analysing the survivor (change in CWM given by growth) assemblage alone will allow gaining insights into potentially more resistant trait values, while analyses for the fatality assemblages will identify potentially less resistant trait values. The recruit community will impact the full community level trait composition dependent on their basal area and will provide information on potentially better adapted trait values to the current climate that allow them to recruit into the community, as well as indicate the possible composition of future forests.

We further analysed if observed changes in trait composition have been enough to track climate change to date by comparing observed and expected trait changes based on historical trait-environment relationships (see materials and methods *(35)*). This climate change tracking analysis was carried out for the full community, survivor and recruit assemblages but not for the fatality assemblage because these individuals will not contribute to future change (Fig. 2).

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Given exposure to a drying and warming climate, we could reasonably expect increased abundance of species exhibiting more drought-tolerance traits (i.e. in the ‘slow’ section of the plant economics spectrum) (*36*), such as high wood density (e.g. to prevent cavitation) (*37*) and smaller, thicker leaves (e.g. for lower evapotranspiration and reduced radiation exposure) *(38)*. However, it’s also possible that increasing drought will drive a shift toward drought-avoidance traits, notably deciduousness (often associated with more acquisitive leaves) (*32, 39*). Seed traits play a pivotal role in the reproduction and dispersal capacity of species (*40*). Under an unstable, warming and drying climate, we might expect species with smaller wind-dispersed seeds to increase in abundance *(41)*. This is because wind-dispersed seeds, which are more common in drier and more seasonal biomes, tend to be smaller than animal-dispersed seeds (*42*). However, other factors, such as wind and fire disturbance, defaunation of frugivorous seed-dispersing mammals and birds, may disrupt the expected trends in seed traits as these drive more strongly their shifts at short time scales than a changing climate (*43*). If migration is an important component of species response to climate change, we would also expect montane forests to show stronger functional responses than lowland forests given their more varied climatic conditions at shorter distances (*8, 33*), which make it potentially easier to migrate to a favorable climate than in the lowlands (*44, 45, 46, 47*). In montane forests, nutrient availability (e.g., N:P ratios) can vary significantly along altitudinal gradients due to substantial changes in temperature and water availability (*48*). As a result, we expect strong functional responses to soil nutrient availability across these elevation gradients.

We expect that, given the long lifespan of tropical trees and rapid pace of recent climate change, forests will show ecological inertia, so that changes in functional composition lag behind changes in climate. We expect the full community and survivor assemblages to show slower change given their change is largely dependent on tree growth, which is a slow process among tropical forests trees. The recruit and fatality assemblages may show faster and larger community trait responses as they are less dependent on growth and more dependent on local climate conditions.

Long-term trait-environment relationships

To evaluate long-term (1980-2021) trait-climate relationships across tropical American forests, we used data from 415 forest plots (mean plot size 0.88 [min: 0.12, max: 25] ha and 5.7 [min: 2, max: 41] censuses per plot), for which we extracted climate (*49*) and soil *(50)* data for their sampling years. As species’ contributions to ecosystem processes likely depend on their relative abundances (*51*), we calculated the community-weighted mean of each plant functional trait (table S1) for each plot based on the relative basal area of the species and their trait value (hereafter “community functional traits”). The trait values were obtained from the sources mentioned above (*19, 25, 26, 27*, *28*, *29*, *30, 31*). We then modelled each community functional trait as a function of the additive effects of relevant and largely uncorrelated climatic drivers of species distributions (Fig. S1), i.e., the mean annual values of temperature (T_{mean}), vapour pressure deficit (VPD_{mean}) (*52*), maximum climatic water deficit ($MCWD_{mean}$) (*53*) and standardised precipitation-evapotranspiration index ($SPEI_{12}$) (*54*), each one of these interacting with forest type (lowland or montane). As soil characteristics can impact plant distributions (*24*), we included cation exchange capacity (CEC), pH, and the percentage of clay and sand for each plot location in the models (see materials and methods *(35)*). We accounted for differences in the number of censuses, plot size and census time per vegetation plot and for the potential spatial autocorrelation.

Several community functional traits show consistent relationships with climate across forest type (table S2; Fig. S2), with temperature showing some of the strongest effects driving plant trait distributions across lowland and montane forests (Fig. 3). As expected, an increase in temperature (T_{mean}) across space is associated with an increase in community-mean leaf area and seed mass, and a decrease in photosynthetic capacity, specific leaf area, and the proportion of deciduous species across lowland and montane forests. Moreover, an increase in water stress ($MCWD_{mean}$) is associated with decreases in specific

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leaf area and adult maximum height for both forest types (table S2; Fig. S2). This represents an increase in the conservative trait strategy linked to more extreme conditions.

However, the relationship with temperature is not consistent across lowland and montane forests for leaf chemistry (leaf carbon, nitrogen and phosphorus content), wood density, adult maximum height, leaf fresh mass or leaf thickness (Fig. 3). An increase in water stress ($MCWD_{mean}$) is associated with an increase in photosynthetic capacity, leaf nitrogen content, leaf area and wood density across lowland forests but decreases in montane forests (table S2; Fig. S2). The increase in these leaf traits in drier forests could be associated with the high photosynthetic rates generally attained by deciduous species over the growing season (*55, 56*) and the fact that lower adult maximum height and higher wood density tend to correlate with higher resistance to lethally low levels of soil moisture availability (*57*). However, consistent climatic relationships across both forest types are not apparent for the other traits analysed (table S2; Fig. S2). One plausible explanation is that this reflects their different position along the climatic gradient (i.e. temperature and precipitation), with lowlands occupying areas with more homogeneous climate conditions across large spatial extents in comparison to montane forests, which span a large range of climates across smaller spatial extents.

Changes in trait composition across time

We next asked if and how the functional trait composition of tropical American forests has shifted, and how much of this can be explained by observed changes in climate over the past 40 years. We first calculated the community-weighted mean (CWM) of each plant functional trait for each vegetation census available for full community assemblage, and separately for the survivor (individuals that are alive in two subsequent censuses, e.g. from census one to census two), recruit (individuals not present in the previous census and recruited in the subsequent census) and fatality (individuals alive in previous census but dead in the subsequent census) assemblages. We define the recruit assemblage as individuals that passed the threshold of 10 cm DBH between one census and the next. Then we calculated their yearly rate of change across time. We tested if the changes in trait CWM differed from zero across all vegetation plots, with plots separated into lowland and montane forests. We calculated the Highest Density Interval (HDI) containing the 95% most probable effect values and considered it significant when the HDI did not overlap 0. We then investigated whether the observed shifts in trait CWM differed significantly between lowland and montane forests. For shorthand and readability, all mention of mean traits and shifts below refer to CWM trait values.

When considering all plots together for the full community assemblage, we found that seven out of the 12 traits analysed exhibited significant changes in their CWM values (Fig. S3; see Fig. 4 for trait changes across assemblages). Only leaf nitrogen, fresh mass, specific leaf area, seed mass and wood density did not show significant shifts across time (table S3; Fig. S4). The survivor assemblage showed the same pattern of community trait changes (table S3; Fig. 5) as the full community assemblage, with the main differences being a significant decrease in leaf fresh mass in the lowlands for the survivor assemblage. Hence, hereafter we focus on the results from the survivor, recruit and fatality assemblages. Overall, we found larger variation in trait CWM across space (i.e. with geographical variation in climate) than across time. For the community traits with significant changes for the survivor assemblage, we found an average increase in photosynthetic capacity of 0.0023 $\mu mol\ m^{-2}\ s^{-1}\ year^{-1}$ (HDI-low and HDI-high: 0.0007, 0.0038), leaf carbon content 0.0011% $year^{-1}$(0.0004, 0.0019), phosphorus 1.6×10^{-5}% $year^{-1}$ (5.7×10^{-6}, 2.7×10^{-5}), the abundance of deciduous species 0.03 % $year^{-1}$ (0.01, 0.05) and adult maximum height 0.006 m $year^{-1}$ (0.002, 0.009), while community leaf area decreased on average -0.03 $cm^2\ year^{-1}$ (-0.06, -0.007) and leaf thickness decreased -0.05 mm $year^{-1}$ (-0.08, -0.02) (Fig. 5; table S3). In the lowland forests, we detected significant trait changes for six (increasing: photosynthetic capacity, leaf carbon content, adult maximum height and abundance of deciduous species; decreasing: leaf area and fresh mass) out of the 12 traits analysed (table S3; Fig. 5).

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Montane forests showed significant, but rather small, increases in leaf carbon, phosphorus and the abundance of deciduous species (table S3; Fig. 5).

The recruit assemblage experienced significant changes for seven traits, with six showing decreases, i.e. leaf carbon content -0.014% $year^{-1}$ (-0.02, -0.001; in montane forests), leaf nitrogen content -0.002% $year^{-1}$ (-0.004, -0.0002), leaf thickness -0.04 mm $year^{-1}$(-0.08, -0.01), deciduousness -0.17 % $year^{-1}$ (-0.33, -0.02), adult maximum height (-0.03 m $year^{-1}$ [-0.07, -0.003], and WD: -0.0007 g cm^3 $year^{-1}$). The leaf fresh mass of recruits increased on average 0.04 g $year^{-1}$ (0.006, 0.08; Fig. 5; table S3). For the fatality assemblage, only the CWM of leaf nitrogen content -0.004 % $year^{-1}$ (-0.007, -0.001; montane forests), leaf fresh mass, -0.02 g $year^{-1}$ (-0.05, -0.0003) and seed mass -17.7mg $year^{-1}$ (-29.9, -5.7) in lowland forests experienced significant declines (Fig. 5; table S3).

To help identify the underlying climatic drivers of forest functional change, we used multivariate linear models to estimate the yearly change (Δ*r*; i.e. from first to last census) in the trait values (CWM) as a function of the yearly rate of climate change in temperature (T_r), maximum climatic water deficit ($MCWD_r$), standardised precipitation-evapotranspiration ($_r$) and vapour pressure deficit (VPD_r), each one of these interacting with forest type, and accounted for soil characteristics by including in the models the CEC, pH, clay and sand content (maps in Fig. S3 to Fig. S8). Our results for the full community assemblage, survivor and for recruit and fatality assemblages (table S4) demonstrate the role of climate, specifically temperature and water availability, as a determinant of trait shifts across the forests, and show the differences in response between lowland and montane forests (table S4). Our mapped model predictions (maps in Fig. S3 to Fig. S8) depict in a spatially explicit way areas where stable CWM trait values (light yellow and light blue), their increases (darker blue) or decreases (yellow to red) are predicted to have occurred across tropical American forests with some of the strongest CWM trait shifts predicted across forests in Amazonia.

Can tropical American forest functional composition track climate change?

We next examined whether the observed community trait changes are sufficient to maintain expected trait-environment relationships for the full community, the survivor, and the recruit assemblages, based on spatial relationships between traits and climate. We expected recruitment to be more sensitive to climate change as the full community is dominated by the demographic inertia of established adult trees. To quantify the trait changes that would be necessary for forest communities to track predicted climate change, we first quantified the relationship between community traits and environment before most anthropogenic climate changes occurred (1980-2005; i.e., as baseline CWM trait-environment relationships). We took our observed trait-climate relationships (built with the 1980-2005 period data; table S5) and used them to predict the trait CWM to the 1980-2005 climate conditions plus the observed changes in climate across the study sites for the full time period (the last 40 years). This allowed us to predict the CWM trait values that the forests would have if they fully tracked recent climate change, assuming that trait-climate relationships are similar across space and time (table S6 and table S7). The ratio between the observed and the expected changes (for the full and the recruit assemblages) indicates how closely these forest traits are tracking our climate equilibrium predictions based on community changes alone (Fig. 6).

Our results show that for all measured traits of the survivor and full community assemblages, the community trait composition is not changing sufficiently to track climate change, with most changes being rather small and unlikely to represent important impacts on ecosystem functioning. However, the recruit community shows the largest shifts (Fig. 4, Fig. 6; results for all assemblages are in Fig. S9). At the region-wide scale for the survivor assemblages, all traits show less than 8% for lowland forests and 4% for montane forest of the change required to track climate. For the full community assemblage, all traits show less than 6% of the climate-predicted shifts in the expected direction for lowland forests and 7% for montane forest of the expected change (Fig. S9; table S6 and table S7). Several traits show very little change or even modest changes in the opposite direction to those expected (Fig. 6A and Fig. 6B). We detected larger community trait shifts in the recruit assemblages of an average 21.8% of the change required for lowland forests and 17.5% for montane forests when only traits shifting in the expected direction are considered. When both, shifts in the expected direction and in opposite direction, are considered, the recruit assemblage shows an average shift of 11.4% for lowland and -0.67% for mountain forests (Fig. 6C and Fig. 6D; table S6 and table S7). In lowland forests, community mean wood density appears to be changing fast enough in the recruit assemblages to track climate change expectation. Overall, we see some evidence of how the recruit forest assemblages of lowland and montane forests are shifting their community traits, often for different sets of community mean trait values, in response to climate change. However, for most traits even the recruit community does not seem to be changing quickly enough to track climate change. More significant community trait shifts have occurred in lowland than in montane forests, which is consistent with a more rapidly drying climate in lowland forests (Fig. 5; table S3).

Discussion

Overall, we find that 1) trait-environment relationships are similar for most of the studied traits across lowland and montane tropical American forests; 2) lowland forests show significant and larger changes in more community traits analysed than montane forests; 3) across the forests and for the full community and survivor assemblages, the abundance of deciduous species is increasing, with accompanying increases in leaf photosynthetic capacity and decreases in leaf area and leaf thickness, yet the recruit communities in the lowland forests have on average decreased in the abundance of deciduous species, leaf nitrogen content and wood density; and 4) crucially, for the full tree community and survivor assemblages most of these traits are changing at only a fraction of the rate required to maintain equilibrium with climate. Notably, the recruit communities show the best tracking of a changing climate.

The community trait shifts were similar for the survivor and full community assemblages and, although significant in several cases, these have been rather small over the past 40 years. In general, such community trait changes differed from those of the recruit and fatality assemblages. This is likely because the trait shift responses of the survivor and full community assemblages are dominated by large individuals that continued growing throughout the study period. Another potential explanation is that the survivor and full community assemblages, along with their concurrent functional trait composition, are still able to withstand the observed changes in climate. The survivor and full community assemblages have shifted towards more deciduous communities with higher photosynthetic capacity, leaf chemistry and adult maximum height. At the same time, we uncover a general decrease in leaf thickness for the survivor and recruit assemblages. Temporal increases in VPD have potentially favoured increases in the proportion of deciduous species, especially across montane forests, and increases in MCWD partially explain decreases in leaf thickness. Overall, deciduous species tend to have acquisitive leaf traits with higher leaf nitrogen and phosphorus, photosynthetic capacity and photosynthetic nitrogen-use efficiency, especially under water stress (*58)*, than evergreen species (*59, 60*). The pattern observed across tropical American forests could be attributable to leguminous nitrogen-fixing species that dominate in dry forests which are often deciduous and with higher photosynthetic nitrogen-use efficiency (*61*). This is consistent with a previous report for West African tropical forests, where increasing drought stress co-occurred with an increased abundance of deciduous species, and where changes in deciduousness explained changes in other morphological, structural and leaf chemistry traits (*56*). The abundance of deciduous species may be limited by soil fertility (*62*) in areas such as in south-eastern Amazonia (more so the Guiana Shield), where short-lived deciduous leaf construction is a too-costly strategy. Thus, increase in deciduousness is expected to be one adaptation strategy, especially in dry tropical forests with more seasonal precipitation regimes and nutrient rich soils than wetter tropical forests.

There is a mismatch in trait responses to climate change between the recruit assemblage and both the full community and survivor assemblages. This mismatch is most pronounced with respect to the abundance of deciduous species, leaf carbon, and adult maximum height. With increasing temperatures and reduced water availability, we expected an increase in abundance of deciduous species to also be reflected in the recruit assemblage (*56*). However, the decline in abundance of deciduous species in the recruit assemblage indicates potential shifts in phenological strategies towards more conservative strategies in response to increasing temperatures or altered precipitation patterns. The recruit assemblages also select for lower leaf carbon and species with shorter adult maximum heights. This finding suggests a decoupling in trait space between the functional trait characteristics of the mature forests we see in the present, and the possible future functional composition of tropical American forests. The selection for low leaf nitrogen in the recruit and fatality assemblages raises the question of whether and to what extent such recruit assemblages with low leaf nitrogen content will be able to survive to larger adult sizes (e.g. *58, 63*), especially across montane forests where there is a stronger mismatch. Such a decoupling in trait space between the recruit and survivor assemblages could potentially indicate the slow beginnings of forest-level adjustment to new climatic conditions, which is likely to impact the functioning of tropical forest ecosystems (*64*). We did not find a significant selection against deciduous species in the fatality assemblage. This suggests that a combination of drought avoidance and drought resistance strategies (*38*) could both be playing an important role as means of adaptation to a warming climate across lowland and montane tropical forests.

Other factors may be promoting the observed change in community-mean traits, such as species interactions and defaunation, the latter being a potentially important driver of changes in dispersal traits across time *(65)*. Some wetter regions (e.g., central Amazonia) show slight increases in seed mass for the full community (Fig. S4 D), with the fatality assemblage showing significant declines in individuals with smaller seeds in the lowlands (Fig. 5). However, drier regions (e.g., southern and eastern fringes of Amazonia) and montane forests show a slight predicted decline in seed mass (Fig. S4 D). These changes may be an indicator of defaunation pressure (*66*) as spatial predictions of decreases in seed mass broadly match spatial patterns of high defaunation (*67*), especially in those more accessible areas of Mesoamerica, and both south and eastern Brazil. They could also be driven by climatic factors as the observed changes are consistent with a shift from endozoochory (animal dispersal) to anemochory (wind dispersal), with the latter exhibiting smaller seeds than those dispersed by animals and being more prevalent in drier biomes *(42)*. Including other relevant traits, such as those related to hydraulics and thermal tolerance, and considering ecological interactions could further bring new evidence of these potential forest adjustments to a changing climate.

The survivor, full community and recruit assemblages often show more changes in traits in lowland than montane forest. Lowland forests are highly dynamic and harbour a high functional trait diversity that potentially allows for selection from a wider pool of trait values under climate stress. There has been a larger increase in atmospheric VPD in lowland forests than in montane forests, caused by more pronounced increases in temperature over the last 40 years, which could partially explain the shift of a larger number of community functional traits in lowland than montane forests (*68*). Larger increases in VPD and more severe droughts appear to have modified the community composition of lowland forests more strongly than that of montane forest, towards a set of species better adapted to drier and hotter conditions, which could be due to the mortality of more vulnerable species (*52*). Recent work across sites in the Amazon and Andes also suggest an important impact of increasing temperatures and declines in water availability on tree trait composition (*69*). We investigated the impact of macroclimate on the changes in functional trait composition of tropical forests. However, such macroclimate conditions may not directly mirror the microclimatic conditions found under the forest canopy such as temperature (*70*). This is of particular importance when investigating the effects of a changing climate, especially on the recruit assemblages, which tend to occupy the space below the canopies of the older larger trees. Ultimately, such microclimatic conditions may play an important role for determining the responses of understorey plants to a changing climate (*71, 72, 73*) and therefore on the rate of change in community trait composition of the recruit assemblages. Hence, microclimatic conditions at the plot level may partly explain the differences in trait shifts between the full community and survivor assemblages and the recruit assemblages.

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It would mechanistically be expected that increasing drought would cause plant communities to shift to species with higher wood density and thicker leaves or that the abundance of deciduous species would increase across time. Such coordinated changes may not readily happen in the community as it is whole phenotypes that are changing, i.e. particular combinations of traits, rather than isolated traits. Moreover, coordination of different strategies could allow for alternative adaptations to the same drivers. For example, drier conditions might encourage deciduousness combined with low wood density and thin leaves (drought avoidance), or evergreenness combined with high wood density and thicker leaves (drought tolerance). The favoured combination(s) may depend on forest seasonality patterns and soil nutrients. Furthermore, not all trait combinations may be present in any given regional species pool, even in species-rich biomes, which may limit the shifts in community traits that can occur at any given time as a response to environmental change. Other factors may also contribute to trait shifts or a lack thereof across forest communities, such as soil conditions (*74*), biotic interactions (e.g., animal-plant interactions) (*75*) and wind disturbance (*76*). Our analyses represent community-wide responses mainly based on trait information at the species and genus level; traits may also express intraspecific plasticity that we are unable to assess here given the scale and multidecadal nature of the study. Some traits may show more or less plasticity than others and species intraspecific variation may contribute to adaptation to a changing climate (*77, 78)*. Overall, there is a lack of knowledge and data on the extent to which intraspecific trait variation plays a role in the adaptation of tree communities to a changing climate across the tropics. Here, we analysed only a set of relevant plant functional traits without adding information on intraspecific trait variation. Further research could focus on understanding responses of tree communities to climate change, including as much as possible information on intraspecific trait variation, and analysing other relevant traits. These could be hydraulic and thermal tolerance traits, which at the moment are not widely available for across tropical American forests.

In conclusion, we find that overall changes in community trait composition are leading to small shifts amounting to only ~10% of the expectation given climate change. These shifts are primarily driven by variation in growth rates of existing trees, rather than by recruitment or tree mortality. However, we observed larger changes for the recruit assemblage, directionally tracking climate at an average of 21%, which can potentially contribute to keeping these forests closer to, although still far from the equilibrium with climate. Trees are long-lived organisms with slow turnover rates compared to the rate of climate change and this partly explains the differences observed in community trait shifts between the full community and those of the recruit assemblages. There are specific areas where there seems to be a larger lag in forest responses to climate changes, especially in the Maya forest in Mesoamerica (*79*), and both the Atlantic forest and the southern Amazon forest in Brazil (*80*), which have become increasingly fragmented over time. Consequently, impacts of other disturbances across these regions, such as habitat fragmentation and in general a more constrained physical environment, may be impacting the capacity of forests to adjust to new climate conditions (*44, 81*). Our analysis demonstrates that tree community composition is shifting to track climate change, but that the overwhelming onus would have to be on within-species variability and trait plasticity (*82, 83*) to adequately track climate change. However, the changes in climate are likely to be too fast for adaptive phenotypic plasticity to keep track, especially in environments with low climatic heterogeneity (*82, 83*). Hence it is overwhelmingly likely that tree species composition and functional properties of tropical American forests (and probably all tropical forests) are increasingly out of equilibrium with local climate. Such disequilibrium almost certainly increases vulnerability to a further changing climate.

Summary of methods

Understanding trait CWM-Climate relationships and the effects of climate change for driving trait CWM changes

To understand the current trait-climate relationships across forests of the tropical Americas, for each plant trait we modelled the trait CWM as a function of climatic and soil covariates, with each one of the climatic variables interacting with forest type (lowland or montane) (here onwards referred to these models as M1)**.** We next analysed the climatic drivers of shifts in each functional trait given observed changes in climate over the past 40 years for the full community and survivor assemblages, for the recruit community and fatality community. The fatality community is defined as those individuals of a plot who were alive in a previous census but dead in the following census. We calculated the temporal changes in trait CWM at the plot level as the annual rate of change to standardise for a different time between censuses for different plots. We then modelled the Δ*r* CWM trait as a function of *r* of the climatic variables described above, each one of these interacting with forest type and also included the soil characteristics (hereafter referred to these models as M2).

Understanding shifts in trait CWM

We used the annual rate of change (Δ*r*) of the trait CWM of the full, survivor, recruit and fatality community assemblages to investigate if the rate of trait changes for the overall forests (lowland and montane together), for the lowland forests alone and the montane forest alone, was significantly different from 0. We did the same to understand if there were important differences between the rate of change between lowland and montane forests. To this end we carried out a Bayesian version of a typical T-test analysis using Bayesian estimation (*84, 85*). As above, here we calculated the HDI containing the 95% most probable effect values and considered a result significant when the HDI did not overlap 0.

Understanding if forest community traits are tracking climate changes.

The process outlined below was carried out for the full community, the survivor and recruit assemblages only as the fatality ones are not tracking climate. We first built the same type of statistical models as M1 but using only plot and climatic data from between 1980 and 2005, including also the soil variables (from now on called M1.1). We used the M1.1 Trait-Environment statistical models and obtained predictions of the trait CWM to a new set of climatic conditions composed of the 1980-2005 climate plus the observed climate yearly rate of change across the study period (here onwards M2). We then calculated the difference between the trait CWM obtained with the M1.1 and M2 models to obtain the expected trait CWM change. Lastly, we compared the expected trait CWM calculated above with the observed Δ*r* CWM trait. This allowed us to understand the expected shift in mean trait values given the 1980-2005 trait-climate relationship in comparison to the observed trait changes across time (i.e., from 1980-2021). We tested for significant difference between observed and expected community trait changes using using Bayesian estimation (*84, 85*). We also created map predictions of the 1980-2005 M1.1 trait-climate model across tropical American forests by predicting this model to a climate change scenario that was composed of the observed climate (1980-2005) plus the yearly rate change observed. We then subtracted the original map predictions (those made with the M1.1 models without changes in climate conditions) to obtain the expected CWM trait changes at the pixel level (in the map) for across forests in tropical America. Then we calculated the ratio of the observed, i.e., spatial predictions of the trait changes observed across time (from M2 models), versus expected and converted to percentage change relative to the 1980-2005 condition to understand if and to what extent the observed trait changes are tracking (values above zero) or not (values of zero) the expected changes given the observed changes in climate or shifting in opposite direction than expected (values below zero).

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Acknowledgements

We thank the following networks for access for long-term plot data and plant trait data: RAINFOR (Amazon Forest Inventory Network, rainfor.org), GEM (Global Ecosystems Monitoring network, gem.tropicalforests.ox.ac.uk), and MONAFOR (forestales.ujed.mx/monafor) networks, as well as the ForestPlots.net metanetwork (data request 109 and 184). We also thank the Herbarium of the Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional campus Durango (CIIDIR), the botanical experts in the CIIDIR and the local support of Ejidos and Comunidades in Mexico. The authors also thank the following individuals for contributing data and who played key roles at different stages from data collection and curation to delivery: Alberto Vicentini, Alejandro Araujo-Murakami, Alexander Parada Gutierrez, Antonio Peña Cruz, Antonio S. Lima, Armando Torres-Lezama, Aurélie Dourdain, Benoit Burban, Casimiro Mendoza, Damien Catchpole, Darcy Galiano Cabrera, David Howard Neill Asanza, Douglas Morton, Eduardo Hase, Ezequiel Chavez, Freddy Ramirez Arevalo, Gabriel Damasco, Gabriela Lopez-Gonzalez, Guillermo Bañares de Dios, Hans Buttgenbach Verde, Irina Mendoza Polo, James Richardson, James Singh, John Lleigue, José Luís Camargo, Juliana Stropp, Julien Engel, Julio Serrano, Karina Melgaço, Leandro Ferreira, Luis Gustavo Canesi Ferreira, Luisa Fernanda Duque, Luzmila Arroyo, Marielos Peña-Claros, Marc Steininger, Marcos Salgado Vital, Maria Carmozina Araújo, Marisol Toledo, Massiel Corrales Medina, Mathias Tobler, Michel Baisie, Natalino Silva, Pascal Petronelli, Patricia Alvarez Loayza, Percy Núñez Vargas, Peter van der Hout, Pétrus Naisso, Raimunda Oliveira de Araújo, Raquel Thomas, Rene Boot, René Guillén Villaroel, Roderick Zagt, Samaria Murakami, Timothy Killeen, Victor Chama Moscoso, Vincent Bezard, Wemo Betian, Wendeson Castro, Yhan Soto Shareva, Yuri Tomas Huilca Aedo. We thank these contributors who are no longer with us - Nallarett Davila Cardozo, Terry Erwin, Alwyn Gentry, Sandra Patiño and Jean-Pierre Veillon.

Funding: J.A.-G. was funded by the Natural Environment Research Council under the Independent Research Fellowship (NERC; NE/T011084/1) and the Oxford University John Fell Fund (10667). Global traits collection and traits analyses under GEM were funded by ERC Advanced Investigator Award (GEM-TRAIT: 321131) to Y.M. under the European Union's Seventh Framework Programme (FP7/2007–2013) with additional support from NERC grant NE/D014174/1 and NE/J022616/1 for traits work in Peru, NERC grant ECOFOR (NE/K016385/1) for traits work in Santarem. Plot inventories in Peru were supported by funding from the US National Science Foundation Long-Term Research in Environmental Biology program (LTREB; DEB 1754647) and the Gordon and Betty Moore Foundation Andes–Amazon Program. Plot inventories in Nova Xavantina (Brazil) were supported by the National Council for Scientific and Technological Development (CNPq) PQ1 grants to B.H.M. and B.S.M (311027/2019-9 and 303492/2022-8), the Long-Term Ecological Research Program (PELD), processes 441244/2016–5 and 441572/2020-0, and the Foundation of Research Support of Mato Grosso (FAPEMAT), Project ReFlor, processes 589267/2016 and PELD/FAPEMAT 0346321/2021. S.D. acknowledges support from CONICET, Universidad Nacional de Córdoba and Red Federal de Alto Impacto CONATURAR (2023-102072649-APN-MCT) Argentina, and the Oxford Martin School. C.A.J. acknowledges support from the Brazilian National Research Council/CNPq (PELD process 403710/2012–0), NERC and the State of São Paulo Research Foundation/FAPESP as part of the projects Functional Gradient, PELD/BIOTA and ECOFOR (processes 2003/12595-7, 2012/51509-8 and 2012/51872-5, within the BIOTA/FAPESP Program—The Biodiversity Virtual Institute (www.biota.org.br); COTEC/IF 002.766/2013 and 010.631/2013 permits. B.S.M. was

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supported by the CNPq/PELD projects (number 441244/2016-5 and number 441572/2020-0) and CAPES (number 136277/2017-0). M.S. acknowledges funding for Andes Biodiversity and Ecosystem Research Group (ABERG) plot network from the US National Science Foundation (NSF) Long-Term Research in Environmental Biology (LTREB) 1754647, the Gordon and Betty Moore Foundation's Andes to Amazon Initiative and RAINFOR. E.B, J.B. and Y.M. acknowledge the support from NERC under projects NE/K016431/1 and NE/S01084X/1. Y.M. is supported by the Frank Jackson Foundation and the Leverhulme Trust. The MONAFOR network in Mexico has been funded by several projects highlighting those by the National Forestry Commission (CONAFOR), and the Council of Science and Technology of the State of Durango (COCYTED).

Funding:

Natural Environment Research Council grant NE/T011084/1(JAG)

Natural Environment Research Council grant NE/S011811/1 (DG)

Natural Environment Research Council grant NE/D014174/1 (YM)

Natural Environment Research Council grant NE/J022616/1 (YM)

Natural Environment Research Council grant NE/K016385/1 (YM)

Natural Environment Research Council grant NE/K016431/1 (EB, JB, YM)

Natural Environment Research Council grant NE/S01084X/1 (EB, JB, YM)

National Forestry Commission (CONAFOR), and the Council of Science and Technology of the State of Durango (COCYTED) grant MONAFOR (JCR)

US National Science Foundation Long-Term Research in Environmental Biology program (LTREB) grant DEB 1754647 (MS)

Oxford University John Fell Fund grant 10667 (JAG)

ERC Advanced Investigator Award grant GEM-TRAIT: 321131 (YM)

Gordon and Betty Moore Foundation Andes–Amazon Program (YM)

National Council for Scientific and Technological Development (CNPq) PQ1 grant 311027/2019-9 (BHM and BSM)

National Council for Scientific and Technological Development (CNPq) PQ1 grant 303492/2022-8 (BHM and BSM)

Long Term Ecological Research Program (PELD) grant 441244/2016–5 (BHM and BSM)

Long Term Ecological Research Program (PELD) grant 441572/2020-0 (BHM and BSM)

Foundation of Research Support of Mato Grosso (FAPEMAT), Project ReFlor, grant 589267/2016 (BHM and BSM)

Foundation of Research Support of Mato Grosso (FAPEMAT), Project ReFlor, grant PELD/FAPEMAT 0346321/2021 (BHM and BSM)

CONICET, Universidad Nacional de Córdoba and Ministerio de Ciencia, Técnica e Innovación, Argentina (SD)

Brazilian National Research Council/CNPq PELD grant 403710/2012–0 (CAJ)

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Natural Environment Research and the State of São Paulo Research Foundation/FAPESP

PELD/BIOTA and ECOFOR grants 2003/12595-7 (CAJ)

Natural Environment Research and the State of São Paulo Research Foundation/FAPESP

PELD/BIOTA and ECOFOR grants 2012/51509-8 (CAJ)

Natural Environment Research and the State of São Paulo Research Foundation/FAPESP

PELD/BIOTA and ECOFOR grants 2012/51872-5 (CAJ)

COTEC/IF 002.766/2013 and 010.631/2013 grants

CNPq/PELD grants 441244/2016-5 (BSM)

CNPq/PELD grants 441572/2020-0 (BSM)

CAPES grant 136277/2017-0 (BSM)

Andes Biodiversity and Ecosystem Research Group (ABERG) plot network from the US National Science Foundation (NSF) Long-Term Research in Environmental Biology (LTREB) 1754647 (MS)

Gordon and Betty Moore Foundation's Andes to Amazon Initiative and RAINFOR (MS)

Frank Jackson Foundation (YM)

Author contributions:

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Methodology: JAG, SD, YM, SR

General Project lead: JAG

Forest and Traits networks leads: JCR, YM, OP

Data gathering: All co-authors

Data management: JAG, AL, OP, GP

Writing – original draft: JAG

Writing – review & editing: All co-authors

Competing interests: Authors declare that they have no competing interests.

Data availability

The vegetation census and plant functional traits data that support the findings of this study are available from gem.tropicalforests.ox.ac.uk *(28)*, www.ForestPlots.net *(29),* and their other original sources. Given data sovereignty from the original data owners raw data on vegetation censuses across time are not publicly available but can be requested by contacting all researchers through the ForestPlots *(30)* data request protocol described in forestplots.net/en/join-forestplots/working-with-data. Raw climate data can be accessed through the TerraClimate database *(49)*. The

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SPEI data can be obtained from the SPEI database (*86*). The computer code used to reproduce the main findings in this manuscript *(87)* and the plot level processed data *(88)* are archived in the Zenodo repository (zenodo.org).

Supplementary Materials

Materials and Methods

Figs. S1 to S11

Tables S1 to S7

References *(35, 89-98)*

Figure legends

Fig. 1. Study area showing the distribution and number of vegetation plots sampled across time (A), principal component analysis (PC1, PC2 and PC3) depicting the climate and soil chemistry and texture space available in the study area (T_{mean}: mean air temperature, MCWD: maximum climatic water deficit, $SPEI_{12}$: standardised precipitation-evapotranspiration index, VPD: vapour pressure deficit, CEC: soil cation exchange capacity, soil pH, sand and clay amount) and the location of the sampling plots in the environmental space (B), and change in climate conditions (1980-1990 vs 2010-2020) in the plot network (C). In B) PC1 is mainly loaded by the maximum climatic water deficit (MCWD: -0.527) and Vapour Pressure Deficit (VPD: -0.515), PC2 by air temperature (T_{mean}: -0.465) and soil cation exchange capacity (CEC: 0.524) and PC3 by soil clay % (-0.535) and soil sand % (0.486). In C) the vertical dotted lines indicate zero change. Brown colours depict increases in temperature, drier conditions (for MCWD and VPD) or increased drought intensity (for SPEI: standardised precipitation evapotranspiration index). Blue colours depict an increase in water availability. In MCWD larger positive values indicate higher water stress. Climate data was derived from the TerraClimate project (*49*) and soil data from SoilGrids.org (*50*).

Fig. 2. Conceptual figure depicting the analysed mechanisms for change in community trait composition across the study area. Tree individuals that are alive and have a diameter at breast height equal or above 10 cm are part of the full community assemblage. Across time, there can be changes in the community trait composition due to growth of the surviving tree individuals (Survivor assemblage) given their increase in basal area (top right). Other mechanisms for changing community trait composition across time are the recruitment (Recruit assemblage) of new individuals (middle right) and the death (Fatality assemblage) of individuals in the community.

Fig. 3. The relationship between community-mean plant traits and temperature. Trait-environment relationships for mean annual temperature (T_{mean}) across the vegetation plots. Thick blue (for lowland forests) and yellow (for montane forests) lines show the average trait response to the climatic variable, with gray-shaded lines show 700 random draws from the model posterior distribution representing the variability of the expected model fit. Trait-environment relationships for maximum climatic water deficit ($MCWD_{mean}$), vapour pressure deficit (VPD_{mean}) and standardised precipitation-evapotranspiration index ($SPEI_{mean}$) are shown in Figure S2. For full statistical multivariate model results see table S2**.** A_{sat}: photosynthetic capacity at light-saturation, C: leaf carbon content, N: leaf nitrogen content, P: leaf phosphorus content, Area: leaf area, Fresh mass: leaf fresh mass, SLA: specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: wood density, Seed mass: mass of the seed.

Fig. 4. The analysed Survivor (top panel), Recruit (middle panel), and Fatality (bottom panel) assemblages in the study. In each panel, the highlighted vegetation represents the specific assemblage under analysis. Each panel provides a summary of observed changes

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in community traits and the percentage of climate tracking by each assemblage, with exception of the Fatality assemblage for which climate tracking is not possible.

Fig. 5. Estimated changes in mean community functional trait values across time for tropical American forests. All traits with their spatial prediction maps are shown in Figs. S3 to S8. A) Changes in trait community-weighted mean (CWM) for leaf photosynthetic capacity and leaf chemistry traits, B) for leaf morphology and structural traits and C) for tree phenology and structural traits. Each panel shows the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in table S3 for all forests together and only for lowland or montane forests for the survivor (blue), recuit (green) and fatality (gray) assemblages. Significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. A_{sat}: photosynthetic capacity at light saturation, C: leaf carbon content, N: leaf nitrogen content, P: leaf phosphorus content, Area: leaf area, Fresh mass: leaf fresh mass, SLA: specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: wood density, Seed mass: mass of the seed.

Fig. 6. Tracking of trait community weighted mean (CWM) for the survivor (A, B) and recruit (C, D) assemblages in lowland (A, C) and montane (B, D) forests given the observed changes in climate across the sampling plots. The X axis shows the ratio of changes in trait CWM, based on actual trait CWM changes observed at the plot level through time, versus expected changes in trait CWM, based on spatial climate-trait relationships given observed changes in climate. Positive values (black bars) indicate that observed and predicted changes are both positive or both negative and, hence, are going into the same direction, whereas negative values (grey bars) indicate that observed and predicted changes are going in opposite directions. A ratio of change value of one would indicate perfect tracking. The Y axis shows the traits sorted by the change ratio amount (see full statistical details in table S6 and table S7). Values of zero and close to zero represent no or slight trait shifts. A_{sat}: photosynthetic capacity at light saturation, C: leaf carbon content, N: leaf nitrogen content, P: leaf phosphorus content, Area: leaf area, Fresh mass: leaf fresh mass, SLA: Specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: wood density, Seed mass: weight of the seed.

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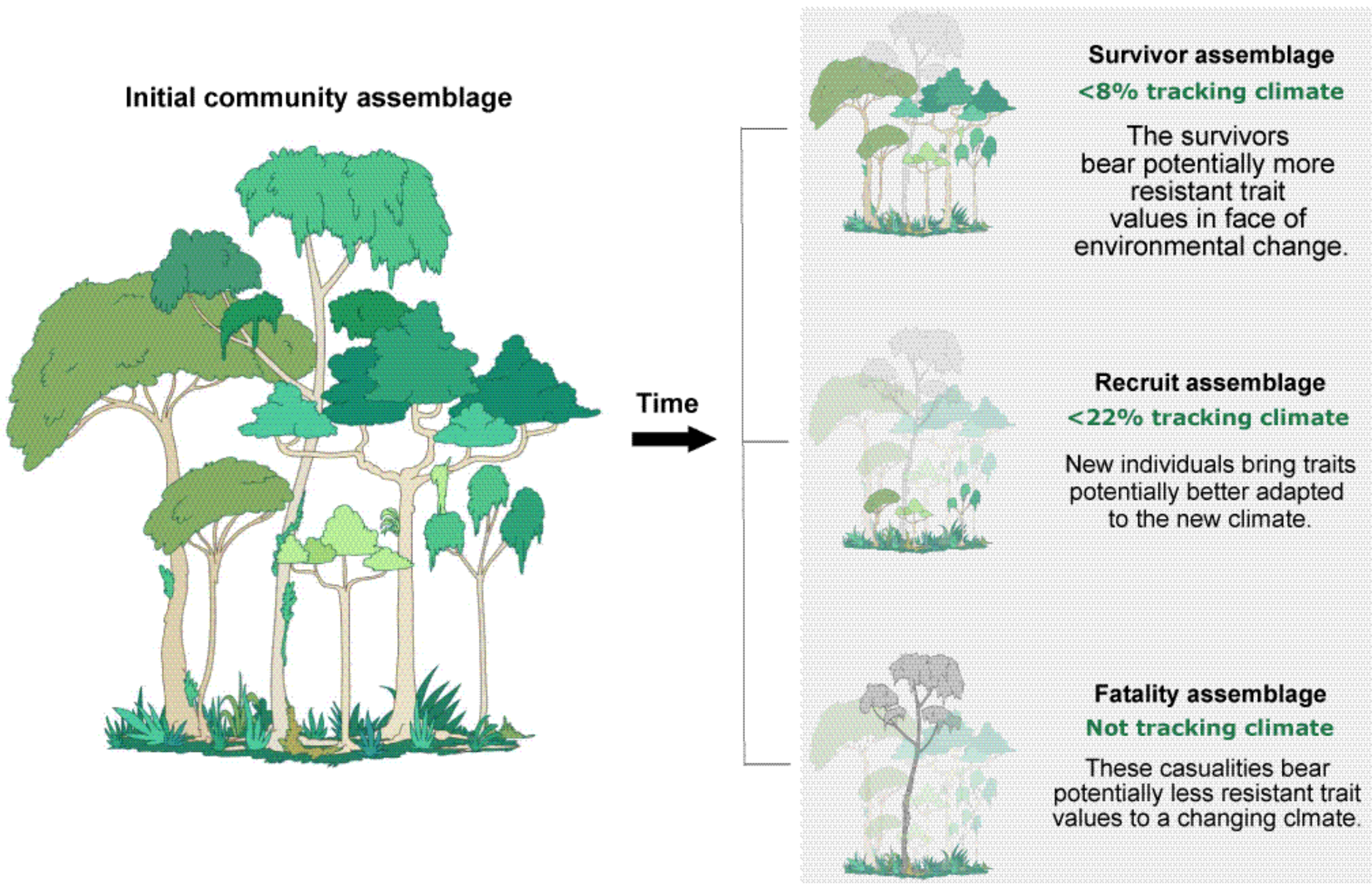
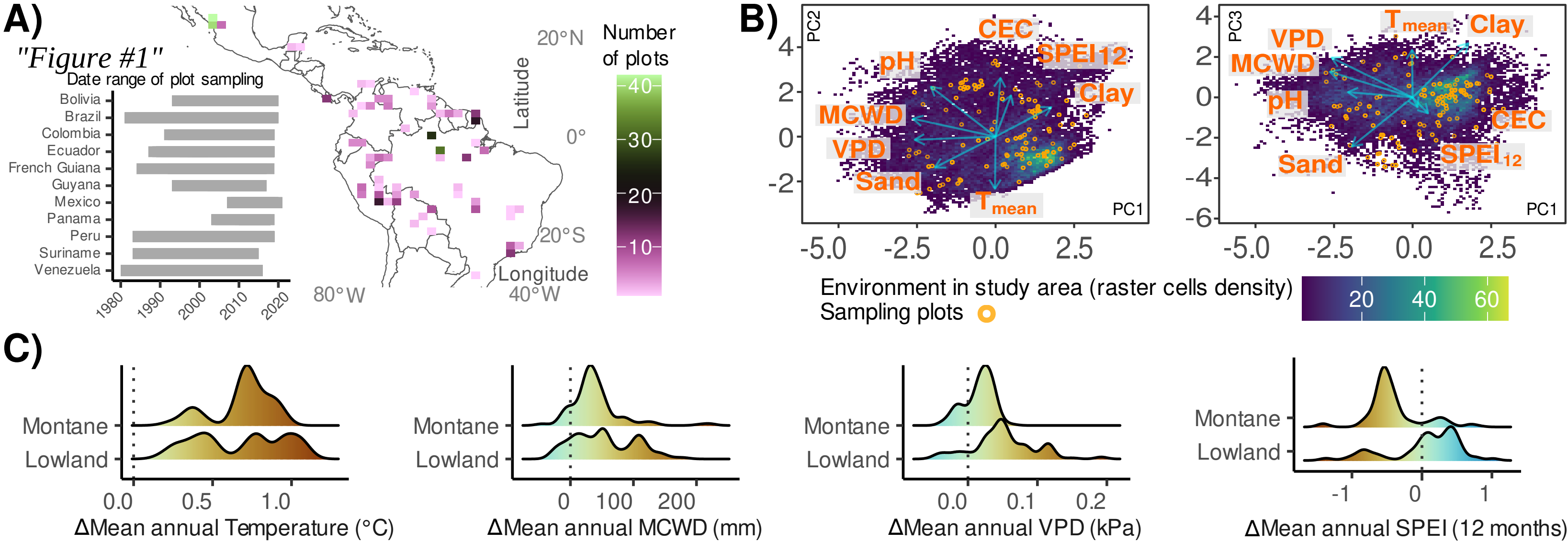
"Figure #0"

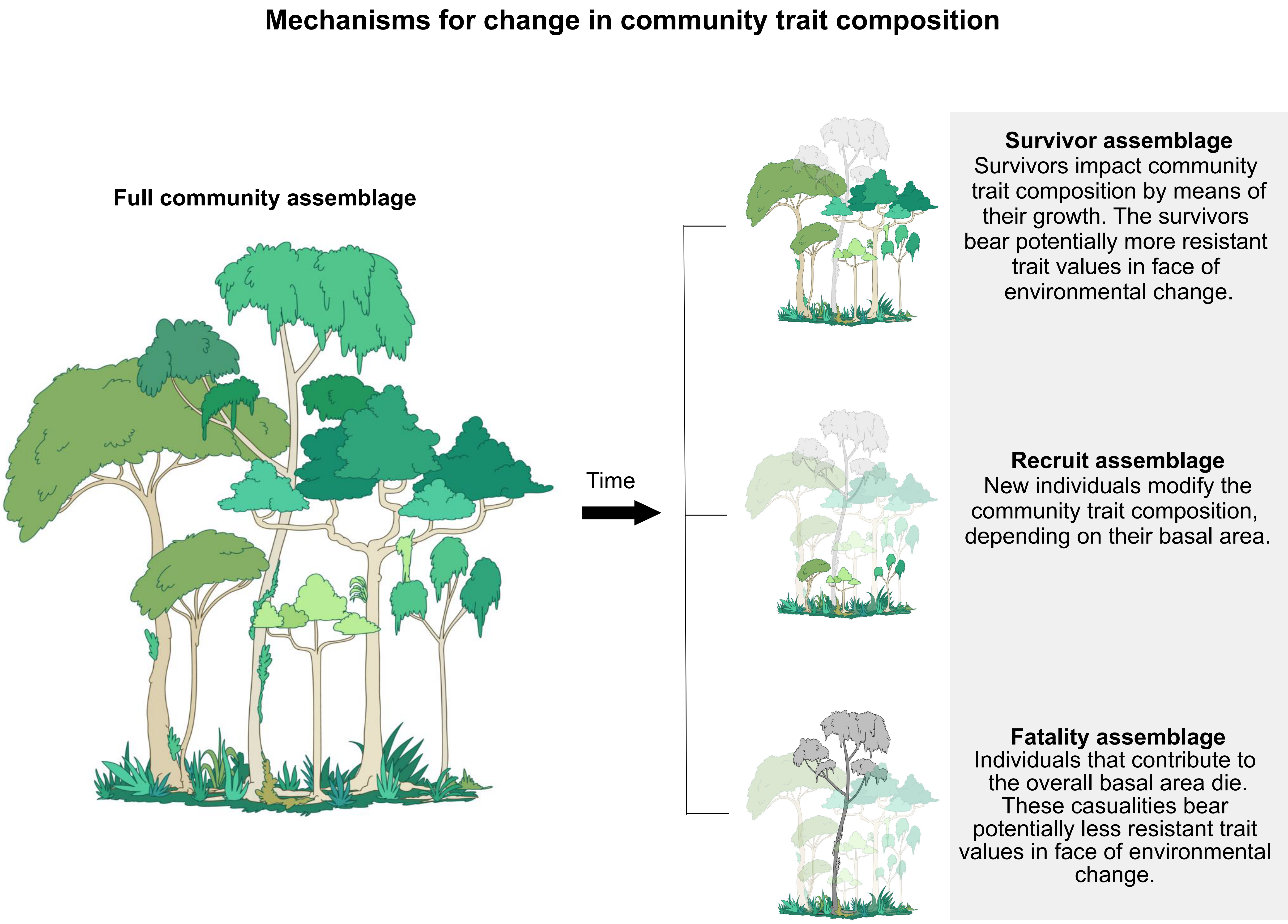


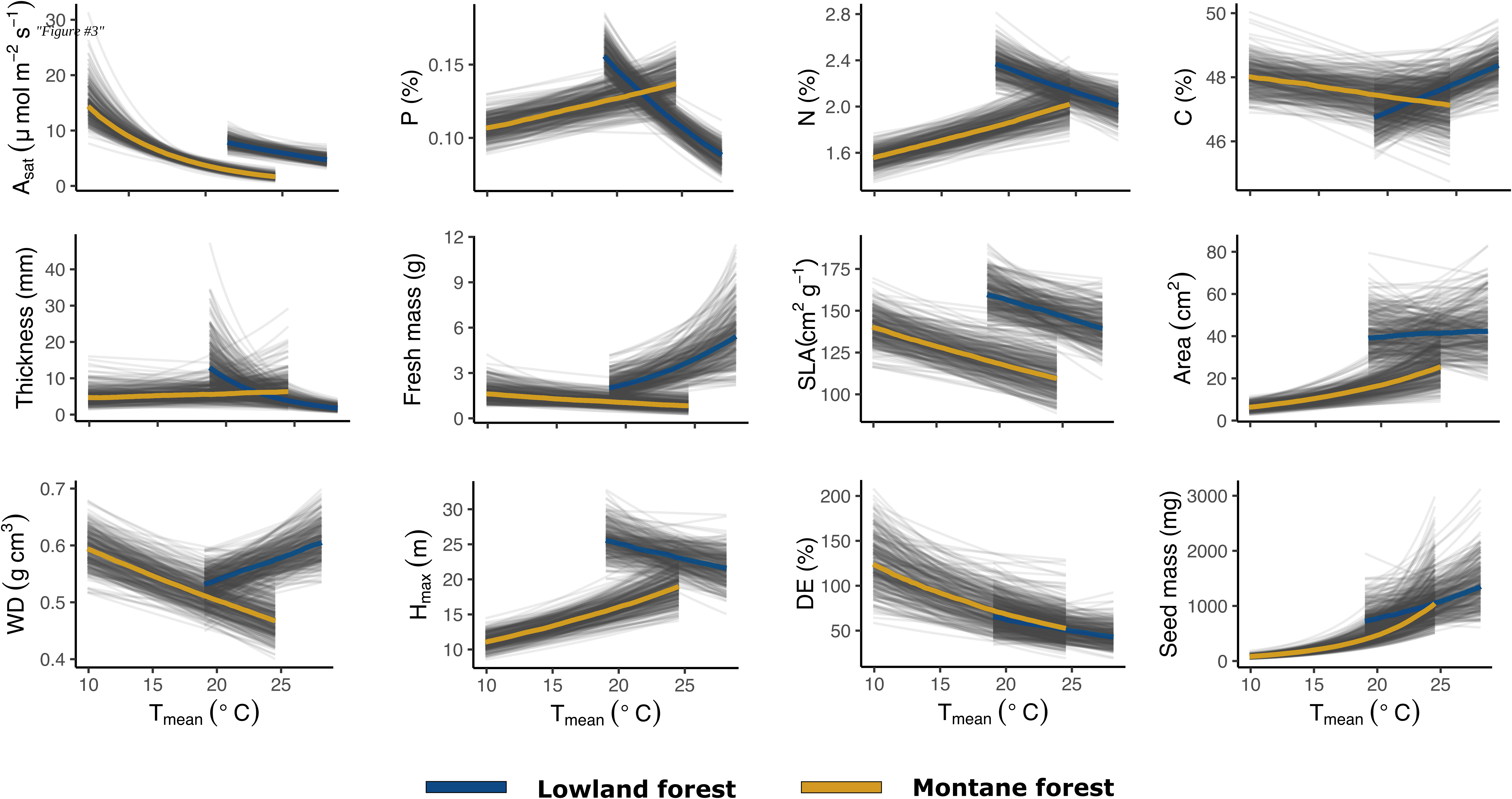
Initial community assemblage
Time
Survivor assemblage
<8% tracking climate
The survivors bear potentially more resistant trait values in face of environmental change.
Recruit assemblage
<22% tracking climate
New individuals bring traits potentially better adapted to the new climate.
Fatality assemblage
Not tracking climate
These casualities bear potentially less resistant trait values to a changing clmate.



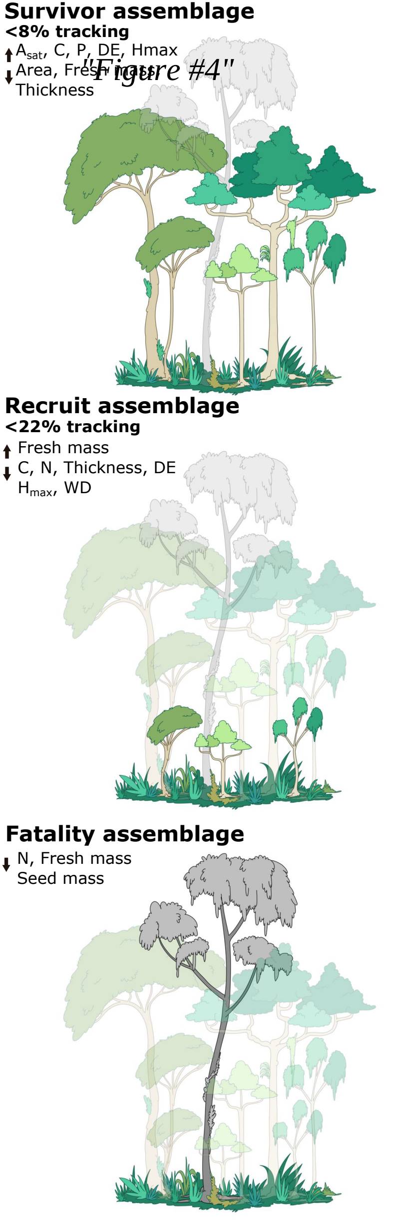
A)
"Figure #1"
Date range of plot sampling
Bolivia
Brazil
Colombia
Ecuador
French Guiana
Guyana
Mexico
Panama
Peru
Suriname
Venezuela
1980
1990
2000
2010
2020
20°N
0°
20°S
80°W
40°W
Latitude
Longitude
Number of plots
40
30
20
10
B)
PC2
PC3
PC1
CEC
pH
SPEI12
Clay
MCWD
VPD
Sand
T mean
4
2
0
-2
-4
-6
-5.0
-2.5
0.0
2.5
Environment in study area (raster cells density)
Sampling plots
20
40
60
C)
Montane
Lowland
0.0
0.5
1.0
ΔMean annual Temperature (°C)
0
100
200
ΔMean annual MCWD (mm)
0.0
0.1
0.2
ΔMean annual VPD (kPa)
-1
0
1
ΔMean annual SPEI (12 months)

"Figure #2"


Mechanisms for change in community trait composition
Full community assemblage
Time
Survivor assemblage
Survivors impact community trait composition by means of their growth. The survivors bear potentially more resistant trait values in face of environmental change.
Recruit assemblage
New individuals modify the community trait composition, depending on their basal area.
Fatality assemblage
Individuals that contribute to the overall basal area die. These casualities bear potentially less resistant trait values in face of environmental change.

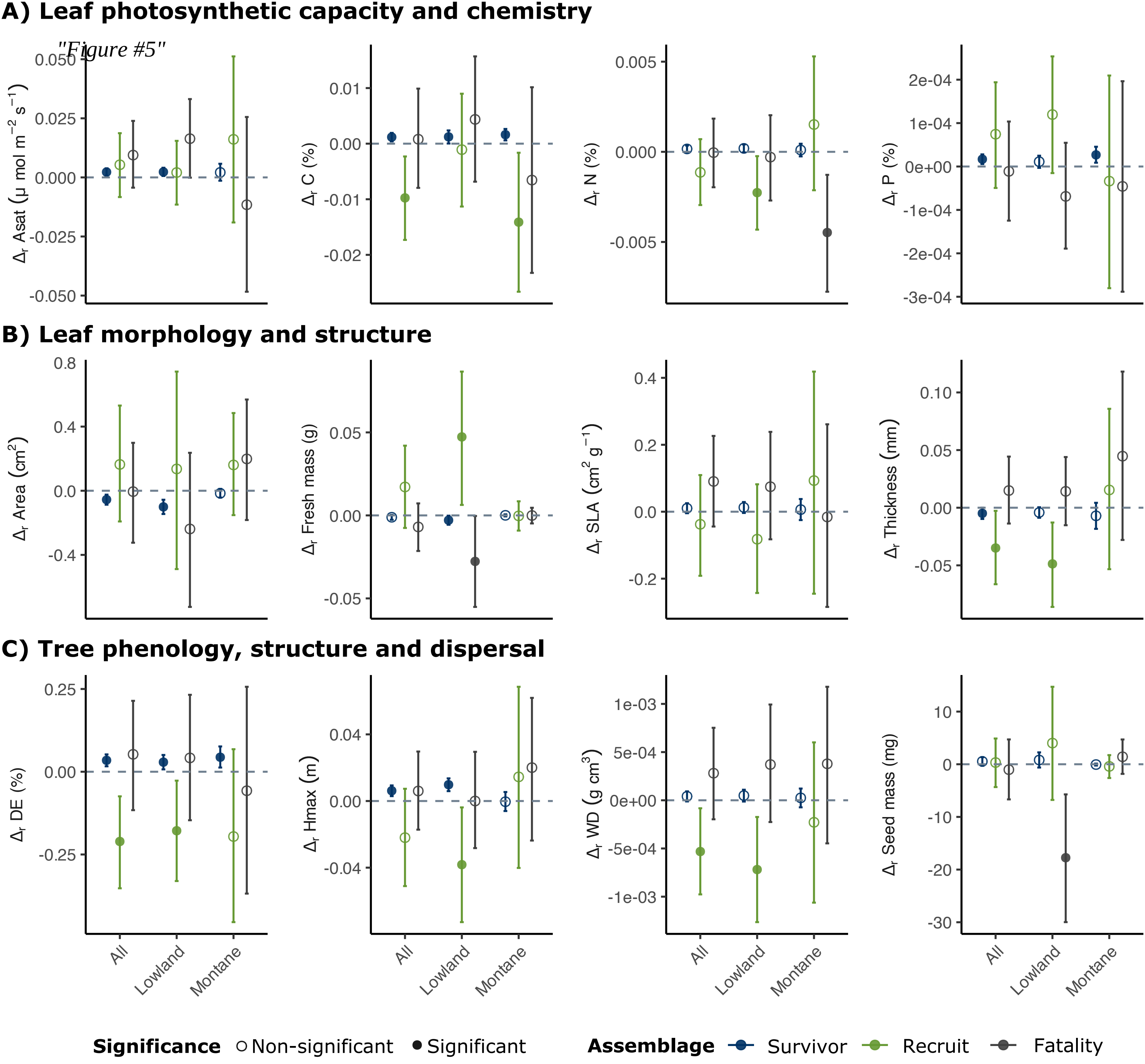


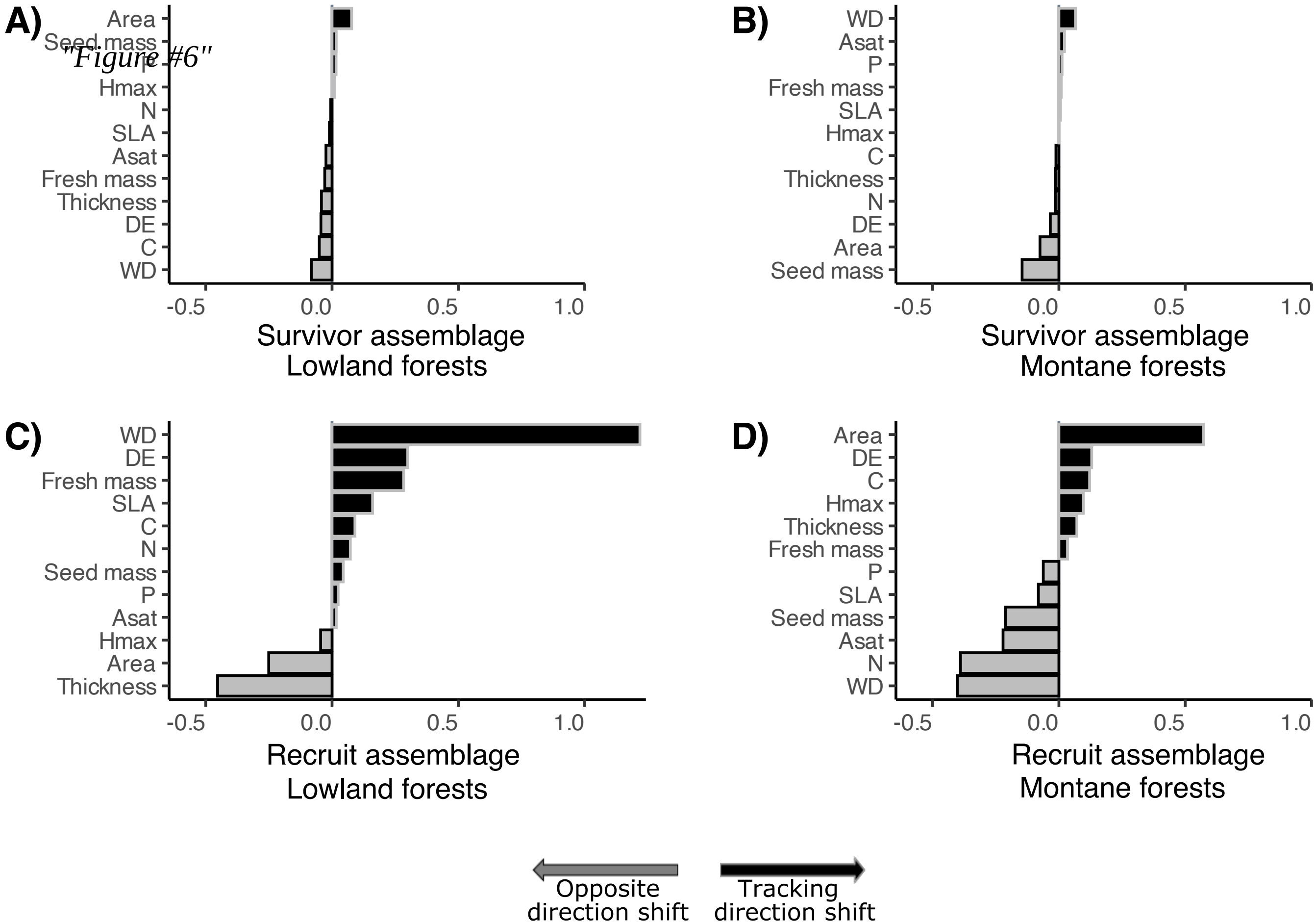
"Figure #3"
A_{sat} (μ mol m^{-2} s^{-1})
P (%)
N (%)
C (%)
Thickness (mm)
Fresh mass (g)
SLA(cm^2 g^{-1})
Area (cm^2)
WD (g cm^3)
H_{max} (m)
DE (%)
Seed mass (mg)
T_{mean} (° C)
Lowland forest
Montane forest


Survivor assemblage
<8% tracking
↑ A_{sat}, C, P, DE, Hmax
↓ Area, Fresh mass,
Thickness
Recruit assemblage
<22% tracking
↑ Fresh mass
↓ C, N, Thickness, DE
H_{max}, WD
Fatality assemblage
↓ N, Fresh mass
Seed mass

"Figure #4"

"Figure #5"


A) Leaf photosynthetic capacity and chemistry
Δr Asat (μ mol m−2 s−1)
0.050
0.025
0.000
-0.025
-0.050
Δr C (%)
0.01
0.00
-0.01
-0.02
Δr N (%)
0.005
0.000
-0.005
Δr P (%)
2e-04
1e-04
0e+00
-1e-04
-2e-04
-3e-04
B) Leaf morphology and structure
Δr Area (cm2)
0.8
0.4
0.0
-0.4
Δr Fresh mass (g)
0.05
0.00
-0.05
Δr SLA (cm2 g−1)
0.4
0.2
0.0
-0.2
Δr Thickness (mm)
0.10
0.05
0.00
-0.05
C) Tree phenology, structure and dispersal
Δr DE (%)
0.25
0.00
-0.25
Δr Hmax (m)
0.04
0.00
-0.04
Δr WD (g cm3)
1e-03
5e-04
0e+00
-5e-04
-1e-03
Δr Seed mass (mg)
10
0
-10
-20
-30
All
Lowland
Montane
Significance
Non-significant
Significant
Assemblage
Survivor
Recruit
Fatality



"Figure #6"
A)
Area
Seed mass
P
Hmax
N
SLA
Asat
Fresh mass
Thickness
DE
C
WD
-0.5
0.0
0.5
1.0
Survivor assemblage
Lowland forests
B)
WD
Asat
P
Fresh mass
SLA
Hmax
C
Thickness
N
DE
Area
Seed mass
-0.5
0.0
0.5
1.0
Survivor assemblage
Montane forests
C)
WD
DE
Fresh mass
SLA
C
N
Seed mass
P
Asat
Hmax
Area
Thickness
-0.5
0.0
0.5
1.0
Recruit assemblage
Lowland forests
D)
Area
DE
C
Hmax
Thickness
Fresh mass
P
SLA
Seed mass
Asat
N
WD
-0.5
0.0
0.5
1.0
Recruit assemblage
Montane forests
Opposite
direction shift
Tracking
direction shift

Supplementary Materials for

Tropical forests in the Americas are changing too slowly to track climate change

Jesús Aguirre-Gutiérrez, Sandra Diaz, Sami Rifai, Jose Javier Corral-Rivas, Maria Guadalupe Nava-Miranda, Roy González-M, Ana Belén Hurtado-M, Norma Salinas Revilla, Emilio Vilanova, Everton Almeida, Edmar Almeida de Oliveira, Esteban Alvarez-Davila, Luciana F. Alves, Ana Cristina Segalin de Andrade, Antonio Carlos Lola da Costa, Simone Aparecida Vieira, Luiz Aragão, Eric Arets, Gerardo A. Aymard C., Fabrício Baccaro, Yvonne Vanessa Bakker, Timothy Russell Baker, Olaf Bánki, Christopher Baraloto, Plínio Barbosa de Camargo, Erika Berenguer, Lilian Blanc, Damien Bonal, Frans Bongers, Kauane Maiara Bordin, Roel Brienen, Foster Brown, Nayane Cristina C. S. Prestes, Carolina V. Castilho, Sabina Cerruto Ribeiro, Fernanda Coelho de Souza, James A. Comiskey, Fernando Cornejo Valverde, Sandra Cristina Müller, Richarlly da Costa Silva, Julio Daniel do Vale, Vitor de Andrade Kamimura, Ricardo de Oliveira Perdiz, Jhon del Aguila Pasquel, Géraldine Derroire, Anthony Di Fiore, Mathias Disney, William Farfan-Rios, Sophie Fauset, Ted Feldpausch, Rafael Flora Ramos, Gerardo Flores Llampazo, Valéria Forni Martins, Claire Fortunel, Karina Garcia Cabrera, Jorcely Gonçalves Barroso, Bruno Hérault, Rafael Herrera, Eurídice Nora Honorio Coronado, Isau Huamantupa-Chuquimaco, John J. Pipoly, Katia Janaina Zanini, Eliana Jiménez, Carlos A. Joly, Michelle Kalamandeen, Joice Klipel, Aurora Levesley, Wilmar Lopez Oviedo, William E. Magnusson, Rubens Manoel dos Santos, Beatriz Schwantes Marimon, Ben Hur Marimon-Junior, Simone Matias de Almeida Reis, Omar Aurelio Melo Cruz, Abel Monteagudo Mendoza, Paulo Morandi, Robert Muscarella, Henrique Nascimento, David A. Neill, Imma Oliveras Menor, Walter A. Palacios, Sonia Palacios-Ramos, Nadir Carolina Pallqui Camacho, Guido Pardo, R. Toby Pennington, Luciana de Oliveira Pereira, Georgia Pickavance, Rayana Caroline Picolotto, Nigel C. A. Pitman, Adriana Prieto, Carlos Quesada, Hirma Ramírez-Angulo, Maxime Réjou-Méchain, Zorayda Restrepo Correa, José Manuel Reyna Huaymacari, Carlos Reynel Rodriguez, Gonzalo Rivas-Torres, Anand Roopsind, Agustín Rudas, Beatriz Eugenia Salgado Negret, Masha T. van der Sande, Flávia Delgado Santana, Flavio Antonio Maës Santos, Rodrigo Scarton Bergamin, Miles R. Silman, Camila Silva, Javier Silva Espejo, Marcos Silveira, Fernanda Cristina Souza, Martin J. P. Sullivan, Varun Swamy, Joey Talbot, John J. Terborgh, Peter van de Meer, Geertje van der Heijden, Bert van Ulft, Rodolfo Vasquez Martinez, Laura Vedovato, Jason Vleminckx, Vincent Antoine Vos, Verginia Wortel, Pieter Zuidema, Joeri Zwerts, Susan G. W. Laurance, William F. Laurance, Jerôme Chave, James W. Dalling, Jos Barlow, Lourens Poorter, Brian J. Enquist, Hans ter Steege, Oliver L. Phillips, David Galbraith, Yadvinder Malhi

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The PDF file includes:

Materials and Methods
Figs. S1 to S11
Tables S1 to S7
References *(35, 89-98)*

Materials and Methods

Plot data

Our study focuses primarily on tropical American forests, with some overflow into adjoining subtropical and warm temperate regions of Brazil and Mexico. We gathered tree-by-tree vegetation census data for 254,307 individual trees from 415 vegetation old-growth forest plots across 11 countries, spanning a wide range of environmental conditions and elevations from sea level to >3000 m elevation, with at least two censuses recorded (on average 5.7 censuses per plot) between the years of 1980 and 2021 (data S1). The modal plot size was 1 ha (mean 0.88 ha); all plots were located in structurally intact forests with no signs of direct anthropogenic impacts. In each, all woody plants with a diameter ≥10 cm at breast height (DBH) or above buttress roots were measured. Overall, identification rates of individuals exceeded 85% to the species level and 99% to the genus level (Fig. S10). Data were obtained through the ForestPlots network (www.ForestPlots.net) (*29*) and the MONAFOR Mexican plots network. We classified vegetation plots as either lowland or montane forests. We based our classification on literature that uses 500-800 metres above sea level (masl) as the threshold between lowland and montane climatic conditions (*45, 89*). In our dataset there were two clear elevational groups, where plots <604 masl (261 plots) were classified as lowland forests, and plots >730 masl (154 plots) were classified as montane forests.

Trait data

Tree functional trait data were obtained for several plots from local field collections carried out by collaborators from where plots are located (*25, 26, 27*), the Global Ecosystems Monitoring network (GEM; gem.tropicalforests.ox.ac.uk) (*28*), and the ForestPlots network (www.ForestPlots.net) (*29*) in addition to databases from BIEN (bien.nceas.ucsb.edu), TRY (www.try-db.org) (*30*) and Diaz et al. (*31*). The plant traits are related to fundamental aspects of leaf chemistry, photosynthetic capacity, leaf morphology, plant and organ size, and phenology (table S1). We gave priority to trait data from the GEM and ForestPlots networks; when these were not available, we used the databases from TRY (www.try-db.org), Diaz et al. (*19, 31*), and the BIEN (bien.nceas.ucsb.edu) network's database. When more than one trait value per species was available, we used the trait mean at the species level for subsequent analysis. We aimed to cover at least 70% of the basal area of each plot with trait data at species or genus level, often covering more than that (Fig. S11). When species-level trait data were unavailable, we used the mean genus-level data. Hence, our analysis could be seen as more representative of the genus-level trait responses. When achieving at least 70% coverage was not possible for a given trait, such a plot was left out of the analysis for the specific trait. All species names were standardised following the Taxonomic Name Resolution Service (TNRS; https://tnrs.biendata.org).

Climate data

We investigated the role that long-term climate and its changes play on determining the trait community composition across tropical American forests by gathering climatic data on the mean annual values of temperature (T_{mean}), maximum climatic water deficit (MCWD) (*53*), vapour pressure deficit (VPD_{mean}) (*52*), standardised precipitation-evapotranspiration index for a 12-month window ($SPEI_{12}$) (*54*) and dry season length. We calculated the long-term climate conditions as the mean annual values for the metrics described above between the years 1980 to 2021 (i.e., full time period). All climatic variables were derived from the TerraClimate dataset (*49*) and had an original spatial resolution of ~4 × 4 km at the Equator. We selected the TerraClimate product because of its accuracy and coverage. The MCWD was included as it is a metric for drought intensity and severity that has been shown to impact vegetation growth and survival (*56*). MCWD is thus defined as the most negative value of the climatological water deficit (CWD) each year. We converted the MCWD so that positive values indicate increases in water stress. Equally, the SPEI reflects drought severity, but its multi-scalar nature enables the identification of different drought types and severity (*86*). VPD is an indicator of atmospheric aridity, acts as a key environmental driver of plant transpiration, and reduces plant water use efficiency (*90*). We then tested the correlation between all pairs of climatic variables (full-term and their changes) to avoid confounding model coefficients (*91*); all had Pearson's correlation coefficients |<0.70| (Fig. S1). We also obtained the same variables outlined above for a period covering 1980-2005 (see models below). We calculated the yearly rate of change of the climatic variables (Δ*r* T, Δ*r* MCWD, Δ*r* VPD, and Δ*r* $SPEI_{12}$) to standardise for a different time between censuses for different plots and avoid the bias due to inter-annual short-term variability that occurs in addition to the long-term change. To this end, we fitted a linear model predicting the climate variable value as a function of time (year) and used the slope as the predicted annual rate of change (Δ*r*).

Soil variables are relevant predictors of vegetation distribution and are related to functional trait composition (*92*). Variation in soil properties could modify the rate of change in response to environmental change (*93*). Hence, in our models, we included soil clay (%), sand (%), cation exchange capacity (CEC; mmol) and pH information averaged from the first 30 cm of the soil surface. The soil data was derived from the SoilGrids global dataset (www.soilgrids.org) *(50)*.

All climatic and soil variables were numerically centred around the mean value before model fitting. The study area that was used to extract the climatic and soil data and to make spatial predictions was delineated using the European Space Agency Land Cover CCI Product (*94*) using all land use classes defined as tree or shrub cover classification.

Trait CWM calculation

The most dominant species are expected to drive ecosystem processes using their traits as described by the mass ratio hypothesis (*51*). Therefore, for each of the plant functional traits *t* and plots *p* per census time we calculated their community-level weighted mean (CWM) using the species basal area as the weighting factor: $CWM_{xp} = \sum_{i-1}^{s} ■ \; BA_{ip} \times x_i$. Here BA_{ip} is the basal area of species *i* in plot *p*, with x_i representing the average trait value of species *i*. Before calculating the trait CWM, when more than one value per trait was available for a species, we averaged the trait value at the species level; when the species had no trait values, we averaged the trait values at the genus level. Although species show some degree of intraspecific trait variation, research suggests it is relatively small compared to the trait variation found across forest tree species (*95*). Moreover, given the vast majority of functional trait data has only been collected in the last decade, it is not yet possible to evaluate the magnitude of intraspecific trait shifts across the spatial extent of the study area. The trait CWM is an indicator of mean canopy properties as basal area and crown area are highly related, and the latter indicates the amount of canopy area occupied by a specific trait (*96*). In the case of phenological strategy, as it was obtained as a categorical variable (deciduous or not deciduous), we calculated the percentage of basal area that is deciduous.

Understanding trait CWM-Climate relationships and the effects of climate change for driving trait CWM changes

All statistical models described below are linear models fitted under a Bayesian modelling framework with the 'rstanarm' R (*97*) package. All models were run with normal diffuse priors with a mean of 0 and 2.5 standard deviations (sd) to adjust the scale of coefficients and 10 sd to adjust the scale of the intercept. The models were run with three chains and 3,000 iterations. We computed the HDI (highest density interval), resulting in the range containing the 95% most probable effect values (*84, 98*), and considered a result significant when the HDI did not overlap 0. The CWM change models (a separated model per trait) used a Gaussian distribution, weighting the observations by the number of censuses, census time and plot size.

To understand the current trait-climate relationships across forests of the tropical Americas, for each plant trait we modelled the trait CWM as a function of the T_{mean}, VPD_{mean}, $MCWD_{mean}$, the $SPEI_{12}$ (from the full time period data) and the soil covariates, with each one of the climatic variables interacting with forest type (lowland or montane) (here onwards referred to these models as M1)**.** Because the studied functional trait values are always positive and often have a long-tailed distribution, the current Trait-Climate relationship statistical models used a Gamma distribution and log link function, using a weighting given the number of censuses, plot size and census time. We tested the model predictions using a spatial K-fold cross-validation approach where the spatial groups were determined based on the group ID described below. All models were developed in the R language for statistical computing (*97*).

We next analysed the climatic drivers of shifts in each functional trait given observed changes in climate over the past 40 years for the full community and survivor assemblages (415 vegetation plots), for the recruit community (377 plots) and fatality community (375 plots). We define the recruit assemblage as individuals that passed the threshold of 10 cm DBH between one census and the next. The fatality community is defined as those individuals of a plot who were alive in a previous census but dead in the following census. We calculated the temporal changes in trait CWM at the plot level as the annual rate of change (Δr of the trait CWM) to standardise for a different time between censuses for different plots. To this end, we fitted a linear model predicting the trait value as a function of time (year) and used the slope as the predicted annual rate of change (Δr). We then modelled the Δr CWM trait as a function of Δr of the climatic variables described above, each one of these interacting with forest type and also included the soil characteristics to account for their possible effect on the observed CWM trait changes (hereafter referred to these models as M2). We weighted the observations by the number of censuses, census time and plot size. We used the M2 models to predict and spatially project the changes in trait composition across Latin American forests over the past half-century.

We tested for spatial autocorrelation effects in the CWM traits using the Moran's I test and found significant effects (P-value<0.05). Therefore, for each trait CWM we calculated the spatial distance at which the spatial effect decreased, finding that a distance of nine kilometres for the full community and survivor assemblages (1 km for recruit and fatality) captured most of the spatial autocorrelation effect. Based on this we generated an identification (ID) for each group of plots that were at maximum nine kilometres away (or 1 km respectively) from each other and included such group ID as a random factor (*92*) in the statistical models to account for the spatial autocorrelation and visually checked the model residuals for any obvious patterns.

Understanding shifts in trait CWM

We used the annual rate of change (Δ*r*) of the trait CWM of the full, survivor, recruit and fatality assemblages to investigate if the rate of trait changes for the overall forests (lowland and montane together), for the lowland forests alone and the montane forest alone, was significantly different from 0. We did the same to understand if there were important differences between the rate of change between lowland and montane forests. To this end we carried out a Bayesian version of a typical T-test analysis using Bayesian estimation (*84, 85*). The Bayesian estimation was done using the 'BEST' package for R, with normal priors with mean for μ (the mean of rate of change) of 0 and a standard deviation for μ of 10. We used broad uniform priors for σ (standard deviation), and a shifted-exponential prior for the parameter v which describes the normality of the data within the group. As above, here we calculated the HDI containing the 95% most probable effect values and considered a result significant when the HDI did not overlap 0.

Understanding if forest community traits are tracking climate changes.

The process outlined below was carried out for the full community, the survivor and recruit assemblages only as the fatality ones are not tracking climate. We first built the same type of statistical models constructed above for the current trait-climate relationships (M1) but using only plot and climatic data from between 1980 and 2005, including also the soil variables described above (from now on called M1.1). This was done as there is potential for entanglement when using the same data for spatial and temporal analysis. The plot data up to year 2005 were still representative of the plot distributions across tropical Americas and helped separate the temporal effect from the spatial relationships.

We used the M1.1 Trait-Environment statistical models and obtained predictions of the trait CWM to a new set of climatic conditions composed of the 1980-2005 climate plus the observed climate yearly rate of change across the study period (here onwards M2). We then calculated the difference between the trait CWM obtained with the M1.1 and M2 models to obtain the expected trait CWM change. Lastly, we compared the expected trait CWM calculated above with the observed Δ*r* CWM trait (i.e., from section 'Understanding trait CWM-Climate relationships and the effects of climate change for driving trait CWM changes'). This allowed us to understand the expected shift in mean trait values given the 1980-2005 trait-climate relationship in comparison to the observed trait changes across time (i.e., from 1980-2021). Thus, the 1980-

2005 trait-climate relationship shows how much the tree communities would need to change to keep up with climate changes, and the observed trait changes across time show how much they have actually changed. We compared the observed and expected average change trait CWM across the sampling vegetation plots to understand the magnitude of their difference for lowland and montane forests and calculated their change ratio. To understand if there was a significant difference between observed and expected community trait changes, we carried out a Bayesian version of a typical T-test analysis using Bayesian estimation as described above and considered significance when at least 95% of the HDI values were greater than zero *(84, 85)*.

We also created map predictions of the 1980-2005 M1.1 trait-climate model across tropical American forests by predicting this model to a climate change scenario that was composed of the observed climate (1980-2005) plus the yearly rate change observed. We then subtracted the original map predictions (those made with the M1.1 models without changes in climate conditions) to obtain the expected CWM trait changes at the pixel level (in the map) for across forests in tropical America. Then we calculated the ratio of the observed, i.e., spatial predictions of the trait changes observed across time (from M2 models), versus expected and converted to percentage change relative to the 1980-2005 condition to understand if and to what extent the observed trait changes are tracking (values above zero) or not (values of zero) the expected changes given the observed changes in climate or shifting in opposite direction than expected (values below zero). All statistical analyses were carried out in R.

Creating the spatial predictions (maps)

All maps were generated by predicting the focus model (i.e., M1, M1.1, M2) to the study area. The study area was delineated using the European Space Agency Land Cover CCI Product (*94*) using all classes having tree cover classification and numbered from class 50 to class 100 as suggested here: http://maps.elie.ucl.ac.be/CCI/viewer/index.php. To avoid extreme values in the maps, given some extreme climate and soil values inherent to the climate and soil data, we truncated the map predictions to contain the 90-percentile predicted value as the maximum instead of the 100% which allowed us to eliminate the outlier values. The maps were created in the R platform.

Supplementary Figures

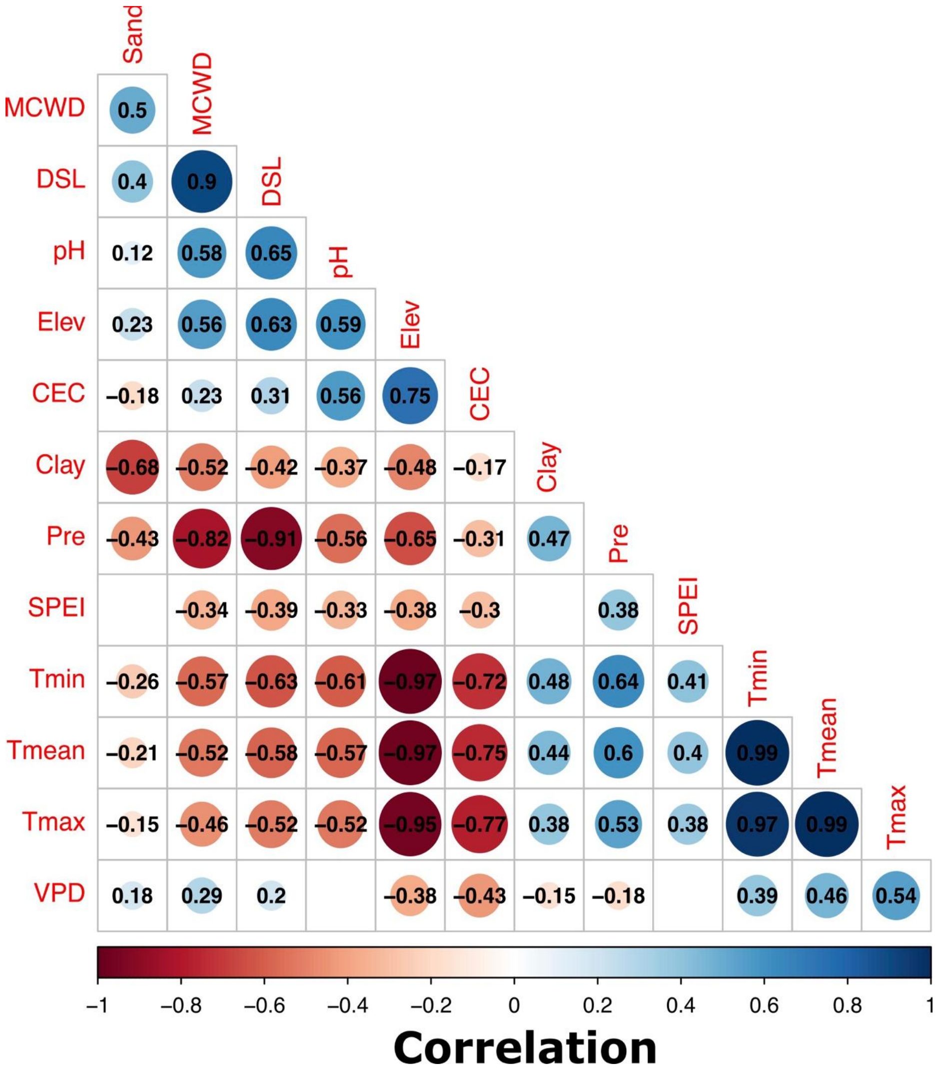

Figure S1. Correlation analysis for all covariates considered for the construction of statistical models testing the current relationship between trait community weighted mean (CWM) and climate and also changes in trait CWM and changes in climate. Tmean: mean annual temperature, Tmi_n: mean minimum annual temperature, Tmax: mean maximum annual temperature, Pre: mean annual precipitation, Elev: elevation, DSL: mean annual dry season length, MCWD: mean maximum climatic water deficit, VPD: mean annual vapour pressure deficit, SPEI: standardised precipitation-evapotranspiration index for a 12 month window, Sand: percent of sand content in the soil, Clay: percent of clay content in the soil, pH: soil acidity/alkalinity index, CEC: soil cation exchange capacity.

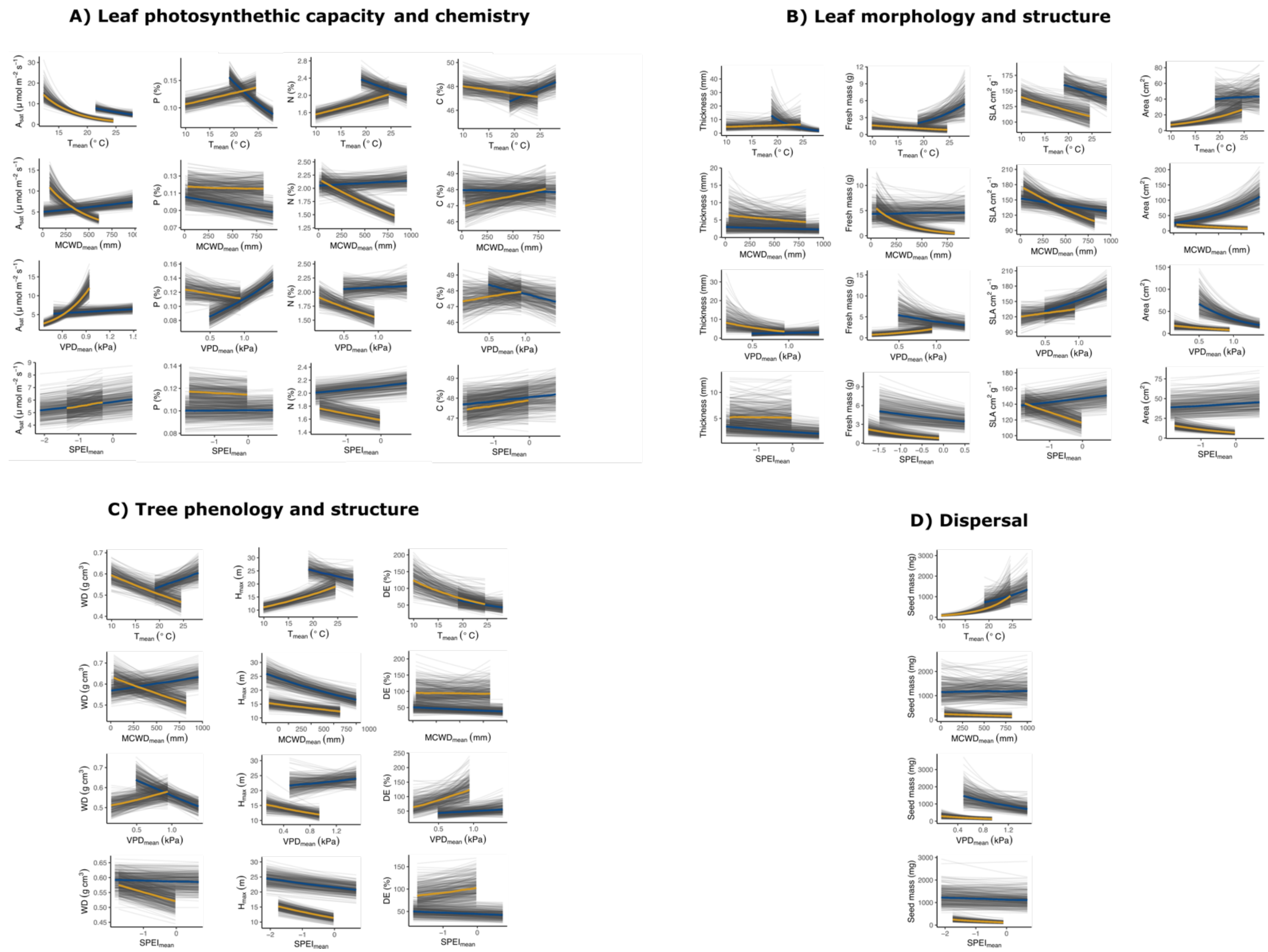

Figure S2. The relationship between community-mean plant traits and temperature. Trait-environment relationships for mean annual temperature (T_{mean}), maximum climatic water deficit ($MCWD_{mean}$), vapour pressure deficit (VPD_{mean}) and standardised precipitation-evapotranspiration index ($SPEI_{mean}$) across the vegetation plots. Thick blue (for lowland forests) and yellow (for montane forests) lines show the average trait response to the climatic variable for lowland (up to 604 m elevation plots, blue) and montane (>700 m elevation, yellow) forests, respectively, and grey-shaded lines show 700 random draws from the model posterior distribution representing the variability of the expected model fit. For full statistical multivariate model results see table S2**.** A_{sat}: photosynthetic capacity at light-saturation, C: leaf carbon content, N: leaf nitrogen content, P: leaf phosphorus content, Area: leaf area, Fresh mass: leaf fresh mass, SLA: specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: wood density, Seed mass: mass of the seed

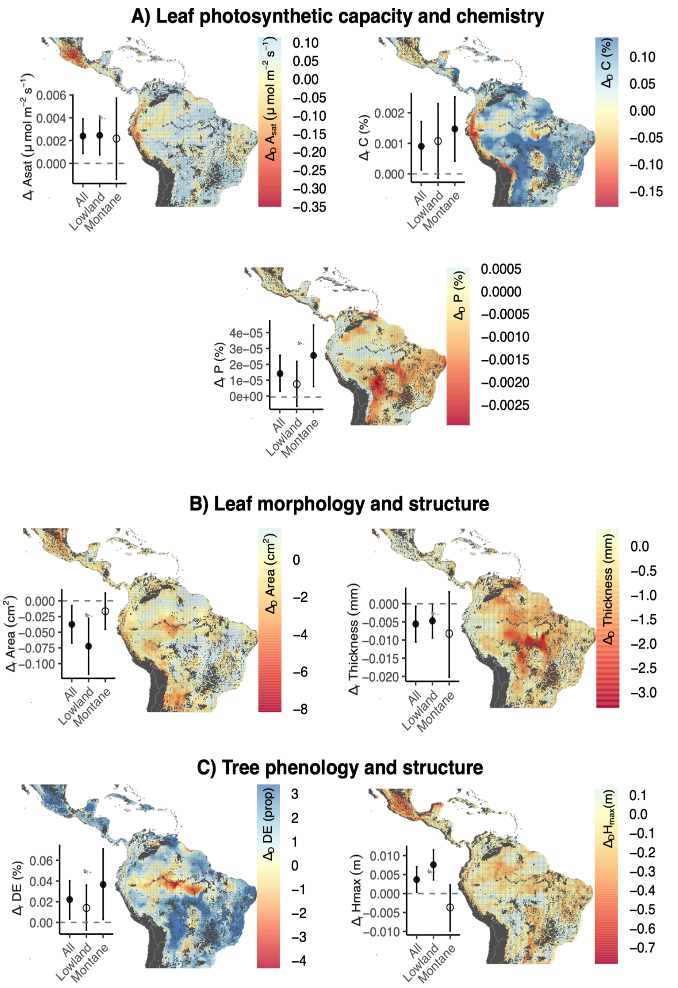

Figure S3. Estimated changes in mean community functional trait values across time for the full community assemblage across tropical American forests. Only traits with significant changes are shown, with others shown in Fig. S3. A) Changes in trait community-weighted mean (CWM) for leaf photosynthetic capacity and leaf chemistry traits, B) for leaf morphology and structural traits and C) for tree phenology and structural traits. The insets in the left-hand side of each map show the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in table S3 for all forests together and only for lowland or montane forests. In the A-C insets, significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. Maps show the decadal predicted changes (ΔD) in trait CWM across tropical American forests given changes in climate derived from the statistical model fits with R-squared values ranging between 0.21 and 0.34 (table S4). In the maps, warmer colours represent decreases in the trait CWM, and cooler colours increase in the trait CWM, with yellow-white colours representing slight or no change. The grey mask on the background of each map represents all predominately non-forested areas (e.g., crop fields, swamps, open woodland, areas with small patches of trees, deserts and alpine regions) and was derived from the European Space Agency Land Cover CCI Product (*94*). A_{sat}: photosynthetic capacity at light saturation, C: leaf carbon content, P: leaf phosphorus content, Area: leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height. R-squared values of community functional trait model predictions range from 21%-34% and are shown in table S5.

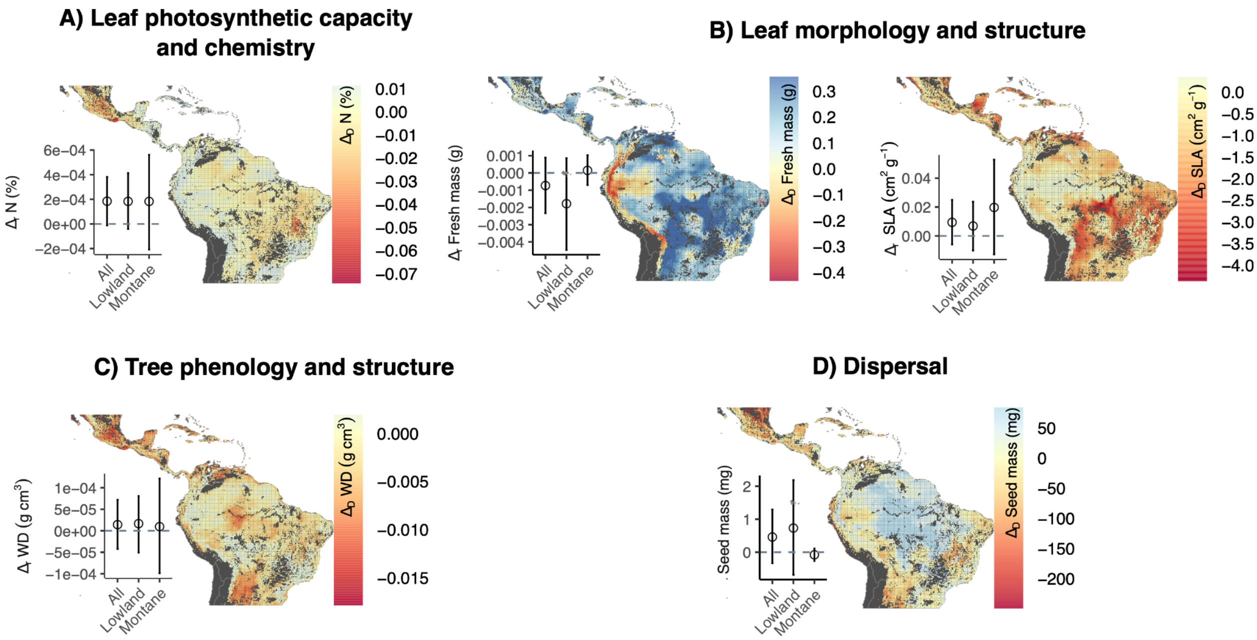

Figure S4. Estimated changes in the mean community functional trait values, across Latin American forests for the full community assemblage. Only traits with non-significant changes are shown. A) Changes in trait community-weighted mean (CWM) for leaf photosynthetic capacity and leaf chemistry traits, B) for leaf morphology and structural traits, C) for tree phenology and structural traits, and D) for dispersal traits. The insets in the left-hand side of each map show the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in table 3 and table 4 for all forests together and only for lowland or montane forests. In the A-D insets, significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. Maps show the decadal (ΔD) predicted changes in trait CWM for across tropical American forests as a result of the statistical models (shown in table S7). In the maps, warmer colours represent decreases in the trait CWM, and cooler colours increase in the trait CWM, with yellow-white colours representing slight or no changes. The grey mask on the background of each map represents all predominately non-forested areas (e.g., crop fields, swamps, open woodland, areas with small patches of trees) and was derived from the European Space Agency Land Cover CCI Product (*94*). N: leaf nitrogen content, Fresh mass: leaf fresh mass, SLA: Specific leaf area, WD: Wood density, Seed Mass: weight of the seed.

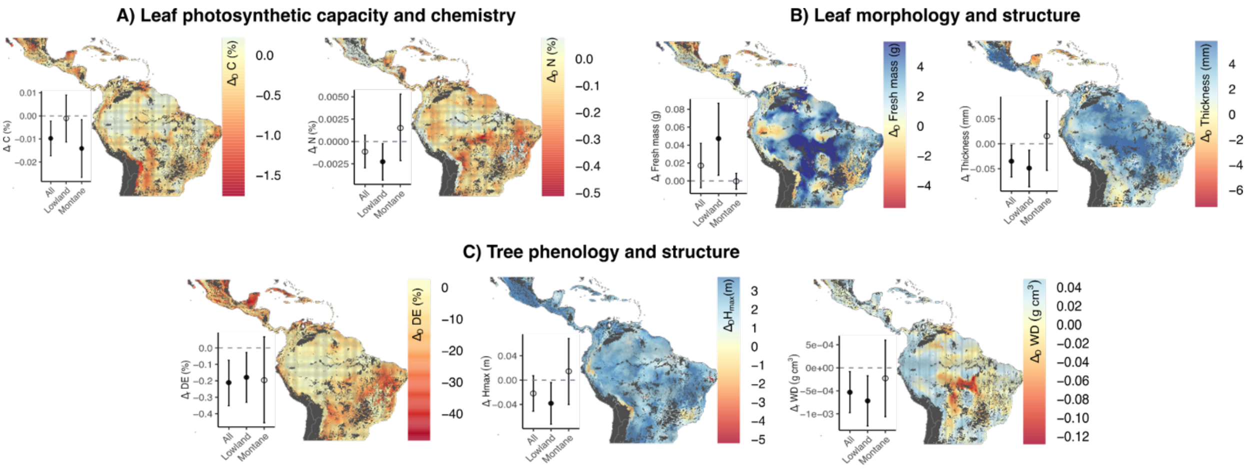

Figure S5. Estimated changes in mean community functional trait values across time for tropical American forests for the recruit assemblage. Only traits with significant changes are shown, with others shown in Fig. S5. A) Changes in trait community-weighted mean (CWM) for the recruit assemblage for leaf chemistry traits, B) for leaf morphology and structural traits, and C) for tree phenology and structural traits. There were no significant changes recorded for dispersal traits. The insets in the left-hand side of each map show the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in table S3 for all forests together and only for lowland or montane forests. In the A-C insets, significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. Maps show the decadal predicted changes (ΔD) in trait CWM across tropical American forests given changes in climate as a result of the statistical model fits with R-squared values ranging between 0.43 and 0.65 (table S4). In the maps, warmer colours represent decreases in the trait CWM, and cooler colours increase in the trait CWM, with yellow-white colours representing slight or no change. The grey mask on the background of each map represents all predominately non-forested areas (e.g., crop fields, swamps, open woodland, areas with small patches of trees, deserts and alpine regions) and was derived from the European Space Agency Land Cover CCI Product (*94*). C: leaf carbon content, N: leaf nitrogen content, Fresh mass: leaf fresh mass, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: wood density.

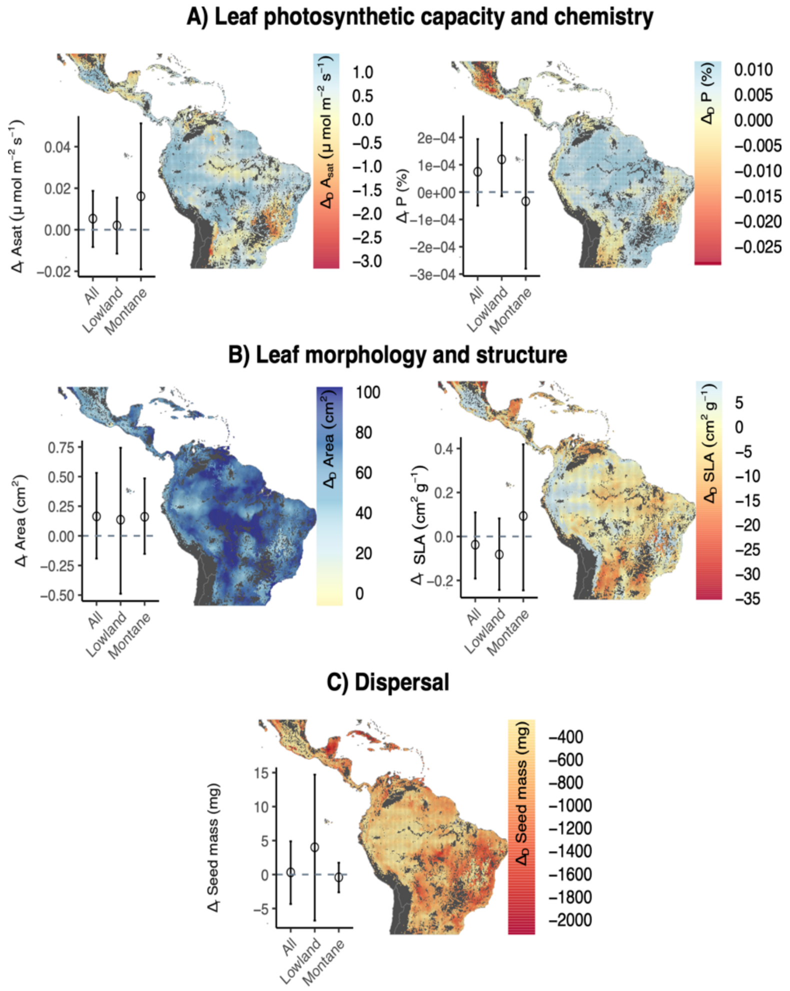

Figure S6. Estimated changes in mean community functional trait values across tropical American forests for the recruitment assemblages. Only traits with non-significant changes are shown. A) Changes in trait community-weighted mean (CWM) for the recruitment community for leaf chemistry traits, B) for leaf morphology and structural traits, and C) for tree phenology and structural traits. There were no significant changes recorded for dispersal traits. The insets in the left-hand side of each map show the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in Supplementary table S3 and table S4 for all forests together and only for lowland or montane forests. In the A-C insets, significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. Maps show the decadal (ΔD) predicted changes in trait CWM across tropical American forests as a result of the statistical models (shown in table S7). In the maps, warmer colours represent decreases in the trait CWM, and cooler colours increase in the trait CWM, with yellow-white colours representing slight or no change. The grey mask on the background of each map represents all predominately non-forested areas (e.g., crop fields, swamps, open woodland, areas with small patches of trees, deserts and alpine regions) and was derived from the European Space Agency Land Cover CCI Product (*94*). A_{sat}: photosynthetic capacity at light saturation, P: leaf phosphorus content, Area: leaf area, SLA: Specific leaf area, Seed Mass: weight of the seed.

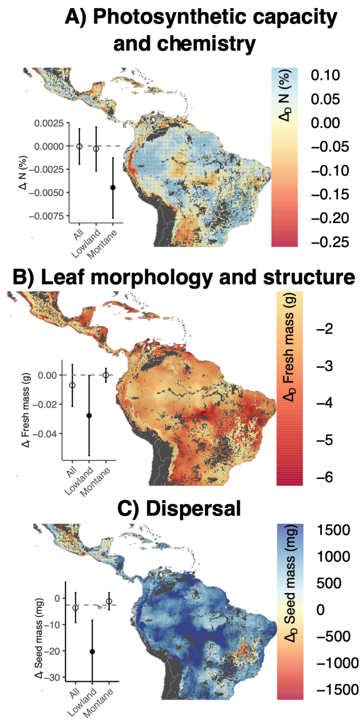

Figure S7. Estimated changes in mean community functional trait values across time for tropical American forests for the fatality assemblage. Only traits with significant changes are shown, with others shown in Fig. S6. A) Changes in trait community-weighted mean (CWM) for the fatality assemblage for leaf chemistry traits, B) for leaf morphology and structural traits, and C) for dispersal traits. There were no significant changes recorded for tree phenology and structural traits. The insets in the left-hand side of each map show the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in table S3 for all forests together and only for lowland or montane forests. In the A-C insets, significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. Maps show the decadal predicted changes (ΔD) in trait CWM across tropical American forests given changes in climate as a result of the statistical model fits with R-squared values ranging between 0.43 and 0.65 (table S4). In the maps, warmer colours represent decreases in the trait CWM, and cooler colours increase in the trait CWM, with yellow-white colours representing slight or no change. The grey mask on the background of each map represents all predominately non-forested areas (e.g., crop fields, swamps, open woodland, areas with small patches of trees, deserts and alpine regions) and was derived from the European Space Agency Land Cover CCI Product (*94*). N: leaf nitrogen content, Fresh mass: leaf fresh mass, Seed mass: seed mass weight.

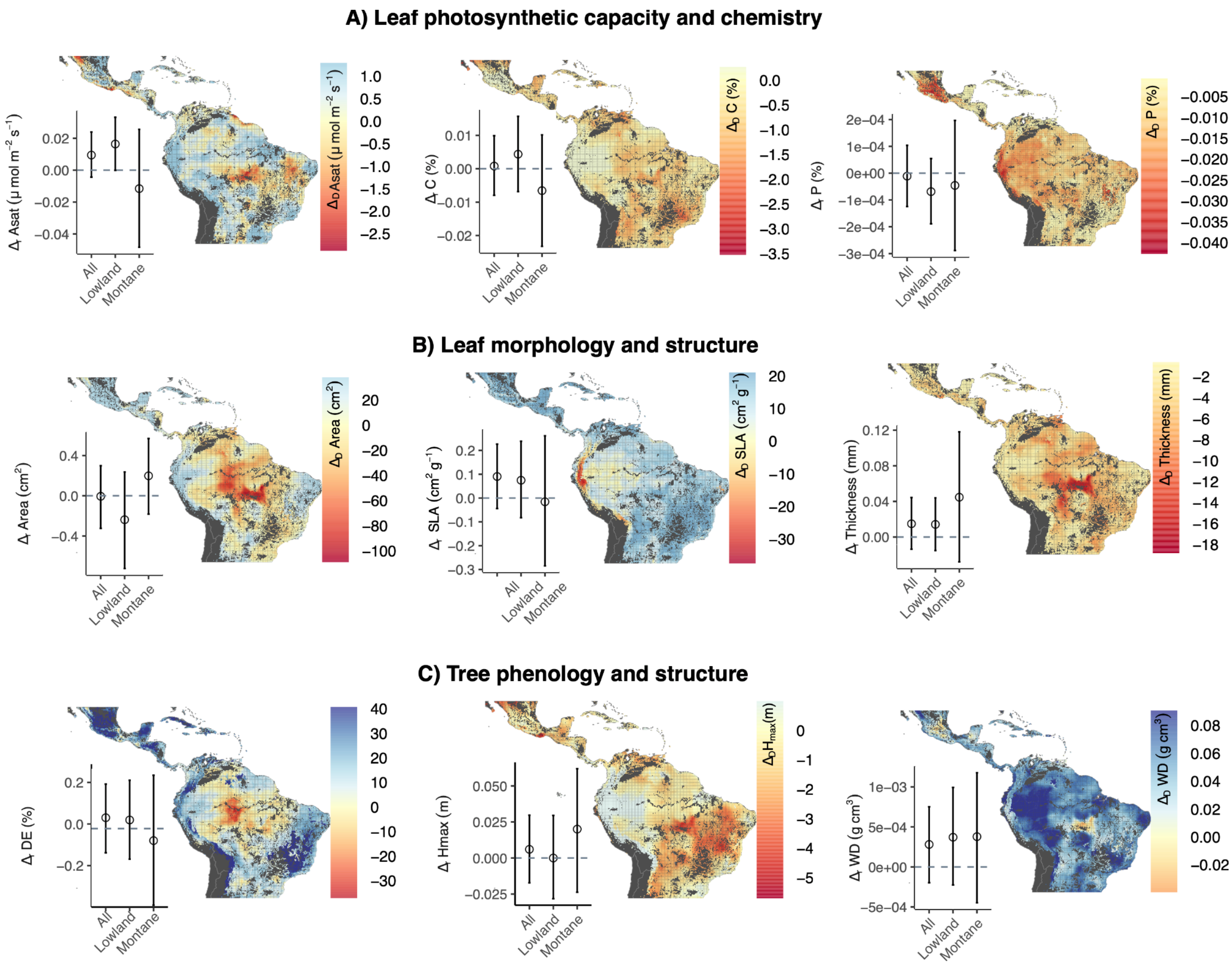

Figure S8. Estimated changes in mean community functional trait values across tropical American forests for the fatality assemblage. Only traits with non-significant changes are shown. A) Changes in trait community-weighted mean (CWM) for the recruitment community for leaf chemistry traits, B) for leaf morphology and structural traits, and C) for tree phenology and structural traits. There were no significant changes recorded for dispersal traits. The insets in the left-hand side of each map show the observed yearly rate of change, obtained from sampled vegetation plots, from the statistical models in table S3 and table S4 for all forests together and only for lowland or montane forests. In the A-C insets, significant shifts are shown as filled circles and non-significant as empty circles. The vertical lines depict the Highest Density Intervals (95% HDI), and the horizontal grey dotted line indicates zero change. Maps show the decadal (ΔD) predicted changes in trait CWM across tropical American forests as a result of the statistical models (shown in table S7). In the maps, warmer colours represent decreases in the trait CWM, and cooler colours increase in the trait CWM, with yellow-white colours representing slight or no change. The grey mask on the background of each map represents all predominately non-forested areas (e.g., crop fields, swamps, open woodland, areas with small patches of trees, deserts and alpine regions) and was derived from the European Space Agency Land Cover CCI Product *(94)*. A_{sat}: photosynthetic capacity at light saturation, C: leaf carbon content, P: leaf phosphorus content, Area: leaf area, SLA: Specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: Wood density.

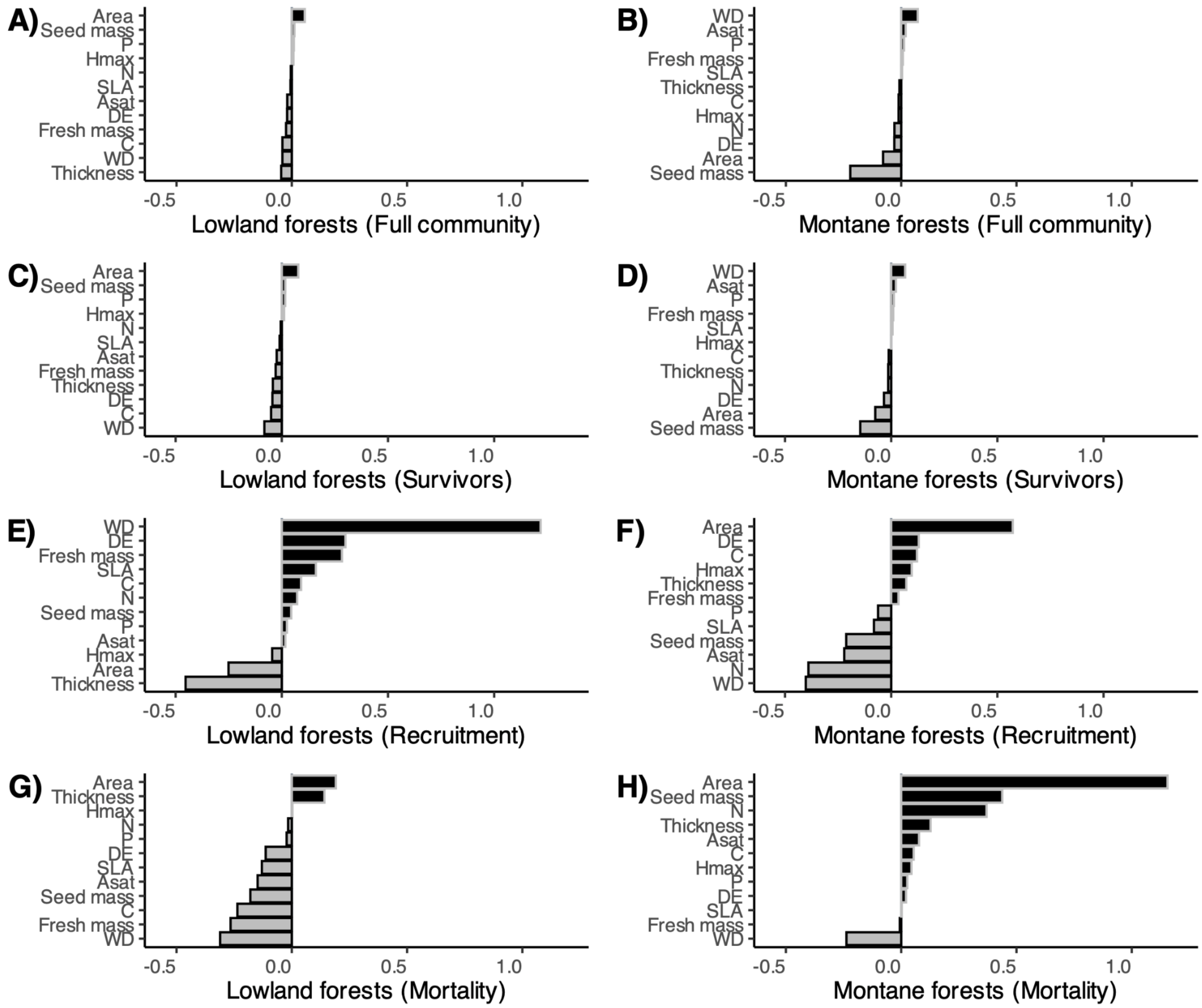

Figure S9. Tracking of trait community weighted mean (CWM) for the full alive (A, B), survivors (C, D), recruiting (E, F) and mortality assemblages in lowland (A, C, E, G) and montane (B, D, F, H) forests given the observed changes in climate across the sampling plots. The X axis shows the ratio of changes in trait CWM, based on actual trait CWM changes observed at the plot level through time, versus expected changes in trait CWM, based on spatial traits-climate relationships given observed changes in climate. Positive values (black bars) indicate that observed and predicted changes are both positive or both negative and, hence, are going into the same direction, whereas negative values (grey bars) indicate that observed and predicted changes are going in opposite directions. In the X axis a ratio of change value of one would indicate perfect tracking. The Y axis shows the traits sorted by the change ratio amount (see full statistical details in table S6 and table 7). Values of zero and close to zero represent no or slight trait shifts. A_{sat}: photosynthetic capacity at light saturation, C: leaf carbon content, N: leaf nitrogen content, P: leaf phosphorus content, Area: leaf area, Fresh mass: leaf fresh mass, SLA: Specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: maximum height, WD: wood density, Seed mass: weight of the seed.

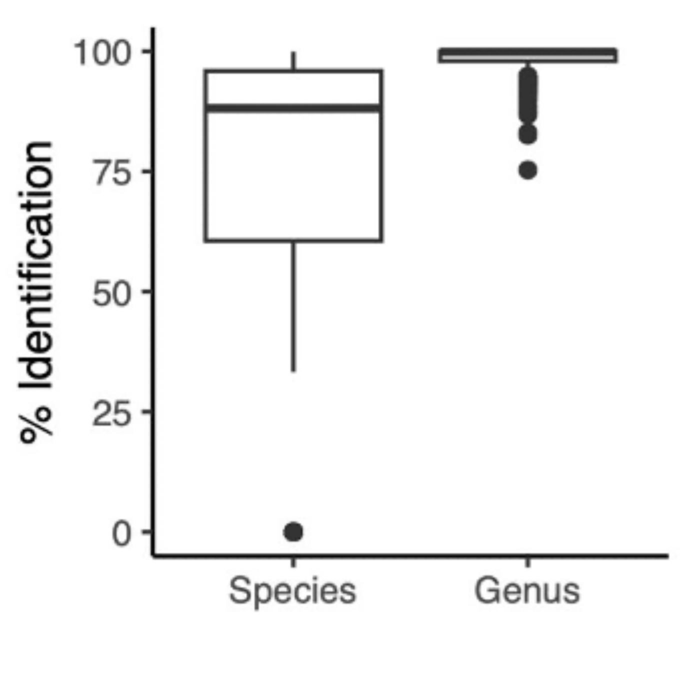

Figure S10. Percentage of tree individuals identified at the species and genus level across the sampling vegetation plots.

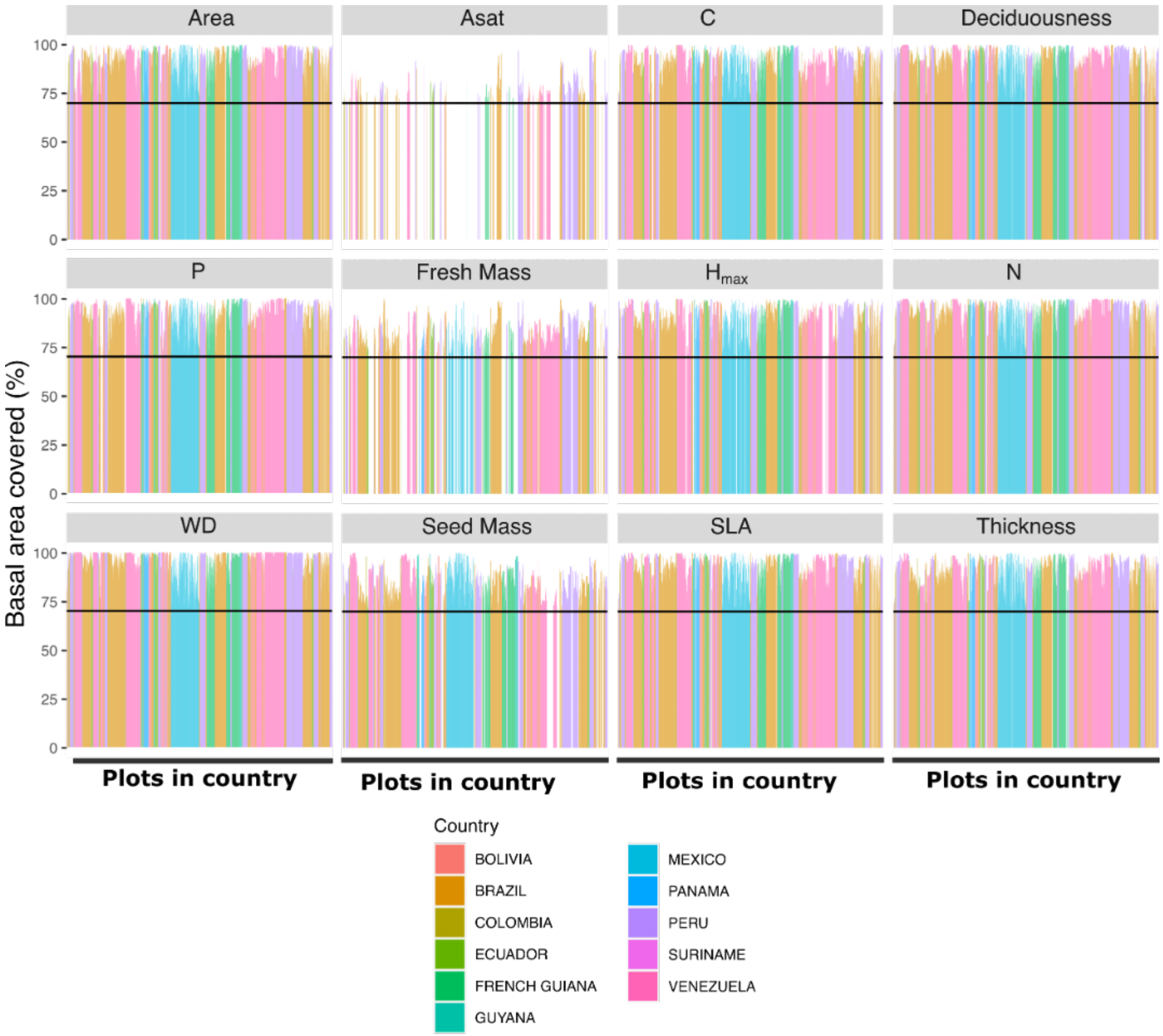

Figure S11. Average trait coverage per plot, census and country, only showing the plots used which had at least 70% of their basal area covered with trait data at species or genus level. The horizontal black line shows the 70% basal area coverage used as trait selection threshold. A_{sat}: photosynthetic capacity at light saturated carbon assimilation rates, C: leaf carbon content, N: leaf nitrogen content, P: leaf phosphorus content, Area: leaf area, Fresh mass: leaf fresh mass, SLA: Specific leaf area, Thickness: leaf thickness, DE: deciduousness, H_{max}: adult maximum height, WD: wood density, Seed Mass: weight of the seed.

Supplementary Tables

Table S1. Plant functional traits included in the analysis with information about their description and hypothesised relation with a changing climate.

Functional group	Trait	Description	Importance and hypothesised response to a drying climate	Impact with a hotter and dryer climate: Positive (+) or Negative (-)	References
Leaf morphology, structure and chemistry	Area: Leaf area: (cm²)	Area of the leaf determined by scanning the adaxial side of the leaf lamina on a flatbed scanner Canon LiDE220®	Relevant as a main light capture mechanism. Higher leaf area could result in more leaf transpiration and thus water loss under a drying climate. Under a drying climate leaf area may increase if of deciduous species and expect decreases if on evergreens as to limit water loss by transpiration and for increasing cooling.	-	**Lázaro-Nogal A, Matesanz S, Godoy A, Pérez-Trautman F, Gianoli E, Valladares F.** Environmental heterogeneity leads to higher plasticity in dry-edge populations of a semi-arid chilean shrub: Insights into climate change responses. J Ecol. 2015;103(2):338-50. **Greenwood S, Ruiz-Benito P, Martínez-Vilalta J, Lloret F, Kitzberger T, Allen CD, et al.** Tree mortality across biomes is promoted by drought intensity, lower wood density and higher specific leaf area. Ecol Lett. 2017;20(4):539-53. **Van der Sande, Masha T., et al.** "Old-growth Neotropical forests are shifting in species and trait composition." Ecological Monographs 86.2 (2016): 228-243.
	FM: leaf fresh mass (g)	Leaf fresh mass calculated as the fresh weight of the recently obtained leaves.	Increasing droughts may cause decreases in leaf fresh mass. Decreases in leaf fresh mass could have negative implications for biomass productivity. It is an indicator of leaf defense against drying conditions. It is also an indicator of leaf water strees which can limit photosynthesis.	-	**Habermann, E., Dias de Oliveira, E. A., Contin, D. R., Delvecchio, G., Viciedo, D. O., de Moraes, M. A., ... & Martinez, C. A.** Warming and water deficit impact leaf photosynthesis and decrease forage quality and digestibility of a C4 tropical grass. Physiologia Plantarum (2019), 165(2), 383-402.

SLA: Specific Leaf Area (m2/g)	Specific leaf area calculated as the one-sided area of a leaf divided by dry mass	Important for photosynthetic capacity, light capture, water loss, net assimilation rate, leaf life span. May increase if acquisitive species, e.g. deciduous species, become more abundant with a drying climate.	+	**Van der Sande, Masha T., et al.** "Old-growth Neotropical forests are shifting in species and trait composition." Ecological Monographs 86.2 (2016): 228-243. **Cornelissen JH, PÉREZ-HARGUINDEGUY N, Díaz S, Grime JP, Marzano B, Cabido M, et al.** Leaf structure and defence control litter decomposition rate across species and life forms in regional floras on two continents. New Phytol. 1999;143(1):191-200. **Poorter L, McDonald I, Alarcón A, Fichtler E, Licona J, Peña-Claros M, et al.** The importance of wood traits and hydraulic conductance for the performance and life history strategies of 42 rainforest tree species. New Phytol. 2010;185(2):481-92. **Lohbeck M, Poorter L, Paz H, Pla L, van Breugel M, Martínez-Ramos M, et al.** Functional diversity changes during tropical forest succession. Perspect Plant Ecol Evol Syst. 2012;14(2):89-96.
Thickness: Leaf Thickness (mm)	Thickness of leaf lamina measured by taking four micrometre measurements halfway between the mid-vein and the edge of the leaf, avoiding major secondary veins.	Trade-off between decreasing water transpiration at the expense of higher construction investment. May decrease under a drying climate as a result of increasing in deciduous species which may tend to have thinner leaves. It is expected that thicker leaves become more common under larger water deficits for evergreen species but may decreases for acquisitive deciduous species.	+	**Lázaro-Nogal A, Matesanz S, Godoy A, Pérez-Trautman F, Gianoli E, Valladares F.** Environmental heterogeneity leads to higher plasticity in dry-edge populations of a semi-arid chilean shrub: Insights into climate change responses. J Ecol. 2015;103(2):338-50. **Greenwood S, Ruiz-Benito P, Martínez-Vilalta J, Lloret F, Kitzberger T, Allen CD, et al.** Tree mortality across biomes is promoted by drought intensity, lower wood density and higher specific leaf area. Ecol Lett. 2017;20(4):539-53.

N: leaf nitrogen (%) C: leaf carbon (%) P: leaf phosphorus (%)	Leaf nutrients concentration in percentage obtained from dry leaf samples. On a different branch, all leaves were removed for bulk chemical analysis at different laboratories depending on the traits campaign.	Essential for metabolic reactions involved in light capture, photosynthetic capacity and growth. Restricted availabilities limit plant carbon acquisition and growth. Drought effects may be compensated if nitrogen fixing species (mainly Fabaceae) become more abundant. It is expected that leaf nitrogen content will decrease with increasing temperature and droughts. Needed nutrient for metabolic reactions that include light capture, related to photosynthetic capacity and growth. Lack of P may limit carbon acquisition and growth. Decreases under a drying climate and possible not strong effect under short term droughts or in wet forests. May be more dependent on soil conditions than on climate.	**+/-**	**Elser JJ, Bracken ME, Cleland EE, Gruner DS, Harpole WS, Hillebrand H, et al.** Global analysis of nitrogen and phosphorus limitation of primary producers in freshwater, marine and terrestrial ecosystems. Ecol Lett. 2007;10(12):1135-42. **Reich PB, Oleksyn J, Wright IJ, Niklas KJ, Hedin L, Elser JJ.** Evidence of a general 2/3-power law of scaling leaf nitrogen to phosphorus among major plant groups and biomes. Proceedings of the Royal Society of London B: Biological Sciences. 2010;277(1683):877-83. **He M, Dijkstra FA.** Drought effect on plant nitrogen and phosphorus: A meta-analysis. New Phytol. 2014;204(4):924-31. **Van der Sande, Masha T., et al.** "Old-growth Neotropical forests are shifting in species and trait composition." Ecological Monographs 86.2 (2016): 228-243.

Photosynthesis	Asat: Asat (μmol m−2 s−1)	Asat: Light-saturated rates of net photosynthesis at ambient CO2 concentration. Photosynthetic capacity (light-saturated net assimilation rate) was measured at both saturating CO2 concentration (2000 ppm CO2; Amax), and at ambient CO2 concentration (400 ppm CO2; Asat) under saturating light conditions and at a temperature of 25 ◦C using a LICOR 6400-XT. RDark: Leaf dark respiration.	Saturated photosynthetic rate. Index of leaf photosynthetic capacity. Declines with higher temperatures and lower precipitation. However, Asat is also dependent on CO2 fertilization, N and P levels and phenology.	**+/-**	**Pineda-García F, Paz H, Meinzer FC, Angeles G.** Exploiting water versus tolerating drought: Water-use strategies of trees in a secondary successional tropical dry forest. Tree Physiol. 2015;36(2):208-17. **Sobrado M.** Cost-benefit relationships in deciduous and evergreen leaves of tropical dry forest species. Funct Ecol. 1991:608-16. **Mielke MS, Almeida AFd, Gomes FP.** Photosynthetic traits of five neotropical rainforest tree species: Interactions between light response curves and leaf-to-air vapour pressure deficit. Brazilian Archives of Biology and Technology. 2005;48(5):815-24.

Tree structure and phenology	WD: Wood density (g/cm3).	Wood density obtained from the oven dried wood mass divided by its fresh volume	Relevant for mechanical strengths, stem vulnerability to xylem cavitation. Expected to be higher in areas with lower water resources, and thus increase with a drying climate.	+	**Lohbeck M, Poorter L, Paz H, Pla L, van Breugel M, Martínez-Ramos M, et al.** Functional diversity changes during tropical forest succession. Perspect Plant Ecol Evol Syst. 2012;14(2):89-96. **Poorter L, Hawthorne W, Bongers F, Sheil D.** Maximum size distributions in tropical forest communities: Relationships with rainfall and disturbance. J Ecol. 2008;96(3):495-504. **Chave J, Coomes D, Jansen S, Lewis SL, Swenson NG, Zanne AE.** Towards a worldwide wood economics spectrum. Ecol Lett. 2009;12(4):351-66. **Markesteijn L, Poorter L, Paz H, Sack L, Bongers F.** Ecological differentiation in xylem cavitation resistance is associated with stem and leaf structural traits. Plant, Cell Environ. 2011;34(1):137-48.
	H_{max} : Maximum height of the species (m)	Depicts the species position in the vertical light gradient across the forest canopy. Taller species tend to be more exposed to light than shorter species.	Species that are taller can potentially access more light resources but however could increase cavitation risks especially in a drier climate.	-	**Poorter L, Bongers F, Sterck FJ, Wöll H.** Beyond the regeneration phase: Differentiation of height–light trajectories among tropical tree species. J Ecol. 2005;93(2):256-67. **Poorter L, Hawthorne W, Bongers F, Sheil D.** Maximum size distributions in tropical forest communities: Relationships with rainfall and disturbance. J Ecol. 2008;96(3):495-504.

	DE: Deciduous species abundance (%)	Species phenology related to leaf life patterns. All species were classified as deciduous if the published literature specified the species was at least brevideciduous. Deciduous species do not invest much in leaf construction and have rapid leaf turnover and photosynthetic capacity. The deciduous species tend to present a reduction of water transpiration and avoidance of xylem cavitation, which are important as drought avoiders. In contrast the evergreens have high investment in leaf construction with slow leaf turnover and photosynthetic capacity, these are drought resistant.	Deciduous species may be better adapted to long and intense droughts than evergreen species and thus their abundance may increase, which could potentially impact biomass levels.	+	**Poorter L, Markesteijn L.** Seedling traits determine drought tolerance of tropical tree species. Biotropica. 2008;40(3):321-31. **Fauset S, Baker TR, Lewis SL, Feldpausch TR, Affum-Baffoe K, Foli EG, et al.** Drought-induced shifts in the floristic and functional composition of tropical forests in ghana. Ecol Lett. 2012;15(10):1120-9. **Gvozdevaite A, Oliveras I, Domingues TF, Peprah T, Boakye M, Afriyie L, et al.** Leaf-level photosynthetic capacity dynamics in relation to soil and foliar nutrients along forest–savanna boundaries in ghana and brazil. Tree Physiol. 2018;38(12):1912-25.
Dispersal	SM: seed mass (mg)	The mass of the dry seeds	Climate change can affect seed traits such as seed size, weight, longevity, germination and migratory capacity. Specifically, seed size and mass are traits that can affect fitness, thus potentially affecting the lifespan of plants.	-	**Souza F. C.** Seed and fruit dispersal traits across Brazilian biomes: Exploring trends, predicting, and mapping ecological correlates.174p. Tese (Doutorado em Ecologia aplicada) - Universidade Federal de Lavras, Lavras, (2023).

Table S2. Models results testing for the relation between current trait CWM and climate across tropical American forests. Number: number of plots used for model fitting. Tmean: mean annual temperature, MCWDmean: mean maximum climatic water deficit, VPDmean: mean annual vapour pressure deficit, SPEI12: standardised precipitation-evapotranspiration index for a 12-month window. MCSE: Montecarlo Standard Error. The R2 (coefficient of determination) scores were obtained after applying a spatial leave one out cross-validation approach as described in the methods section.

Trait	Parameter	Median	HDI-L	HDI-H	Rhat	ESS	MCSE	Number	R2	RMSE	MAE
Area	Intercept (Lowland forest)	4.8143	4.5230	5.0894	1.0058	668.6171	0.0056	369	0.21	56.15	40.69
	T_{mean}	0.0072	-0.0596	0.0755	1.0051	583.0252	0.0014	369			
	Forest type -Montane	-0.7744	-1.0297	-0.5064	1.0008	935.8439	0.0045	369			
	$MCWD_{mean}$	0.0015	0.0010	0.0022	1.0024	863.4134	0.0000	369			
	VPD_{mean}	-1.4272	-2.2237	-0.7256	1.0062	868.3005	0.0128	369			
	$SPEI_{12}$	0.0628	-0.0201	0.1433	1.0016	2330.0994	0.0009	369			
	CEC	-0.0142	-0.0229	-0.0058	1.0007	1832.4310	0.0001	369			
	Clay	0.0155	0.0075	0.0238	1.0025	1290.3928	0.0001	369			
	pH	-0.0721	-0.2055	0.0614	1.0037	1489.0448	0.0017	369			
	Sand	-0.0003	-0.0076	0.0077	1.0014	1198.6237	0.0001	369			
	T_{mean} : Forest type -Montane	0.0811	-0.0007	0.1661	1.0063	617.5931	0.0017	369			
	Forest type -Montane : $MCWD_{mean}$	-0.0028	-0.0036	-0.0019	1.0012	1014.7133	0.0000	369			
	Forest type -Montane : VPD_{mean}	0.4955	-0.4730	1.5126	1.0085	812.9756	0.0173	369			
	Forest type -Montane : $SPEI_{12}$	-0.5434	-0.6800	-0.4129	1.0002	1731.9464	0.0016	369			
DE	Intercept (Lowland forest)	3.5577	3.3378	3.7927	1.0002	544.0347	0.0049	396	0.52	19.45	14.55
	T_{mean}	-0.0448	-0.1045	0.0108	1.0016	461.1429	0.0014	396			
	Forest type -Montane	0.1532	-0.0966	0.4080	1.0010	650.2514	0.0049	396			
	$MCWD_{mean}$	-0.0003	-0.0008	0.0002	1.0051	634.2628	0.0000	396			
	VPD_{mean}	0.3602	-0.2867	0.9648	1.0102	443.1525	0.0152	396			
	$SPEI_{12}$	-0.0774	-0.1743	0.0203	1.0015	1583.4877	0.0012	396			
	CEC	-0.0015	-0.0107	0.0079	1.0033	1378.8378	0.0001	396			
	Clay	0.0228	0.0129	0.0327	1.0010	941.5230	0.0002	396			
	pH	0.2760	0.1303	0.4203	1.0025	965.7856	0.0024	396			
	Sand	0.0189	0.0112	0.0264	1.0003	855.0417	0.0001	396			
	T_{mean} : Forest type -Montane	-0.0144	-0.0811	0.0570	1.0012	574.0621	0.0015	396			
	Forest type -Montane : $MCWD_{mean}$	0.0002	-0.0006	0.0011	1.0006	709.7934	0.0000	396			
	Forest type -Montane : VPD_{mean}	0.4677	-0.4071	1.3539	1.0067	738.5406	0.0167	396			

	Forest type -Montane : $SPEI_{12}$	0.1775	0.0234	0.3366	1.0012	1423.4713	0.0021	396			
FM	Intercept (Lowland forest)	0.6538	0.3107	0.9787	1.0044	715.8810	0.0064	269	0.34	1.63	1.16
	T_{mean}	0.1109	0.0267	0.1951	1.0015	1018.0765	0.0014	269			
	Forest type -Montane	-0.5074	-0.7916	-0.2240	1.0030	1671.3643	0.0035	269			
	$MCWD_{mean}$	0.0001	-0.0006	0.0008	1.0031	1829.8703	0.0000	269			
	VPD_{mean}	-0.6960	-1.6090	0.2236	1.0004	1089.9927	0.0140	269			
	$SPEI_{12}$	-0.1992	-0.3074	-0.0918	1.0003	3276.2070	0.0010	269			
	CEC	-0.0293	-0.0396	-0.0190	1.0015	2444.9229	0.0001	269			
	Clay	-0.0300	-0.0397	-0.0202	1.0008	2183.8521	0.0001	269			
	pH	-0.0256	-0.2051	0.1409	1.0015	2631.4017	0.0017	269			
	Sand	-0.0401	-0.0491	-0.0307	1.0011	2010.6804	0.0001	269			
	T_{mean} : Forest type -Montane	-0.1542	-0.2725	-0.0470	1.0019	1166.0611	0.0017	269			
	Forest type -Montane : $MCWD_{mean}$	-0.0032	-0.0043	-0.0022	1.0030	1834.4829	0.0000	269			
	Forest type -Montane : VPD_{mean}	1.9994	0.7975	3.3336	1.0025	1383.0078	0.0174	269			
	Forest type -Montane : $SPEI_{12}$	-0.4264	-0.5956	-0.2659	1.0002	2428.5017	0.0017	269			
N	Intercept (Lowland forest)	0.8462	0.7972	0.8953	1.0038	792.5420	0.0009	397	0.51	0.24	0.18
	T_{mean}	-0.0183	-0.0318	-0.0058	1.0011	699.8654	0.0002	397			
	Forest type -Montane	-0.1898	-0.2380	-0.1442	1.0014	1182.8295	0.0007	397			
	$MCWD_{mean}$	0.0000	-0.0001	0.0001	1.0047	909.7136	0.0000	397			
	VPD_{mean}	0.0242	-0.1187	0.1605	1.0042	644.2166	0.0027	397			
	$SPEI_{12}$	0.0280	0.0105	0.0454	1.0006	2702.0219	0.0002	397			
	CEC	-0.0016	-0.0034	0.0002	0.9999	1736.1204	0.0000	397			
	Clay	-0.0039	-0.0056	-0.0021	1.0018	1589.8368	0.0000	397			
	pH	0.0766	0.0510	0.1027	1.0005	1443.0063	0.0003	397			
	Sand	-0.0009	-0.0025	0.0006	1.0045	1276.7847	0.0000	397			
	T_{mean} : Forest type -Montane	0.0364	0.0206	0.0531	1.0004	742.9300	0.0003	397			
	Forest type -Montane : $MCWD_{mean}$	-0.0005	-0.0007	-0.0003	1.0020	1047.5384	0.0000	397			
	Forest type -Montane : VPD_{mean}	-0.2867	-0.4773	-0.0972	1.0014	904.4489	0.0033	397			
	Forest type -Montane : $SPEI_{12}$	-0.0885	-0.1174	-0.0607	1.0005	2588.7062	0.0003	397			
SLA	Intercept (Lowland forest)	4.9047	4.8445	4.9731	1.0025	566.5249	0.0014	383	0.17	18.16	12.98
	T_{mean}	-0.0141	-0.0337	0.0027	1.0048	481.3601	0.0004	383			
	Forest type -Montane	-0.1530	-0.2266	-0.0853	1.0000	558.0124	0.0015	383			
	$MCWD_{mean}$	-0.0002	-0.0003	0.0000	1.0025	623.4408	0.0000	383			

	VPD_{mean}	0.3152	0.1271	0.5081	1.0059	555.8889	0.0042	383			
	$SPEI_{12}$	0.0346	0.0073	0.0613	1.0011	1837.8236	0.0003	383			
	CEC	-0.0025	-0.0055	0.0003	1.0011	1174.8756	0.0000	383			
	Clay	0.0033	0.0008	0.0057	1.0005	1070.8874	0.0000	383			
	pH	0.0400	0.0013	0.0791	1.0018	1033.1547	0.0006	383			
	Sand	0.0010	-0.0011	0.0032	1.0022	746.8072	0.0000	383			
	T_{mean} : Forest type -Montane	-0.0020	-0.0232	0.0218	1.0066	517.4744	0.0005	383			
	Forest type -Montane : $MCWD_{mean}$	-0.0004	-0.0007	-0.0002	1.0009	585.2565	0.0000	383			
	Forest type -Montane : VPD_{mean}	-0.1635	-0.4393	0.1287	1.0055	628.8220	0.0058	383			
	Forest type -Montane : $SPEI_{12}$	-0.1418	-0.1837	-0.0991	1.0004	1778.1346	0.0005	383			
SM	Intercept (Lowland forest)	7.4017	7.0859	7.7080	1.0001	567.5283	0.0066	354			
	T_{mean}	0.0695	-0.0047	0.1445	1.0021	573.8784	0.0016	354			
	Forest type -Montane	-0.2561	-0.5631	0.0547	1.0009	793.1289	0.0056	354			
	$MCWD_{mean}$	0.0000	-0.0006	0.0007	1.0069	561.3840	0.0000	354			
	VPD_{mean}	-0.7363	-1.5021	0.0576	1.0039	727.8008	0.0149	354			
	$SPEI_{12}$	-0.0371	-0.1437	0.0706	1.0003	1776.0258	0.0013	354			
	CEC	-0.0358	-0.0475	-0.0235	1.0042	1567.3873	0.0002	354	0.44	1395.91	926.78
	Clay	0.0039	-0.0072	0.0150	1.0011	1207.3620	0.0002	354			
	pH	0.0798	-0.1002	0.2665	1.0031	1412.0039	0.0025	354			
	Sand	-0.0004	-0.0097	0.0092	1.0015	937.4653	0.0002	354			
	T_{mean} : Forest type -Montane	0.1065	0.0147	0.2000	1.0024	523.5577	0.0020	354			
	Forest type -Montane : $MCWD_{mean}$	-0.0006	-0.0017	0.0004	1.0043	1149.7426	0.0000	354			
	Forest type -Montane : VPD_{mean}	-0.3429	-1.4800	0.7779	1.0042	841.9922	0.0200	354			
	Forest type -Montane : $SPEI_{12}$	-0.4197	-0.6108	-0.2297	1.0008	1308.1038	0.0027	354			
Thickness	Intercept (Lowland forest)	1.8221	1.5451	2.1119	1.0028	705.6419	0.0053	339			
	T_{mean}	-0.2159	-0.3214	-0.1193	1.0017	658.9315	0.0020	339			
	Forest type -Montane	0.1127	-0.3024	0.5187	1.0003	1037.8771	0.0066	339			
	$MCWD_{mean}$	-0.0002	-0.0010	0.0005	1.0016	965.9072	0.0000	339			
	VPD_{mean}	0.2401	-0.7842	1.2761	1.0008	749.7708	0.0192	339	0.13	2.37	1.89
	$SPEI_{12}$	-0.1896	-0.3280	-0.0545	1.0010	2125.6095	0.0015	339			
	CEC	0.0132	-0.0018	0.0283	1.0009	1416.1520	0.0002	339			
	Clay	-0.0185	-0.0326	-0.0049	1.0006	1226.3475	0.0002	339			
	pH	-0.2688	-0.5109	-0.0294	1.0008	1462.8461	0.0031	339			

	Sand	-0.0201	-0.0325	-0.0076	1.0029	1001.7723	0.0002	339			
	T_{mean} : Forest type -Montane	0.2353	0.1072	0.3716	1.0018	736.2963	0.0025	339			
	Forest type -Montane : $MCWD_{mean}$	-0.0002	-0.0018	0.0012	1.0012	1052.2640	0.0000	339			
	Forest type -Montane : VPD_{mean}	-1.3254	-2.8630	0.2951	1.0017	923.3595	0.0267	339			
	Forest type -Montane : $SPEI_{12}$	0.1803	-0.0917	0.4428	1.0005	1754.5269	0.0033	339			
	Intercept (Lowland forest)	-0.5357	-0.5919	-0.4816	1.0079	454.8653	0.0013	406			
	T_{mean}	0.0148	0.0008	0.0297	1.0150	344.5423	0.0004	406			
	Forest type -Montane	-0.1135	-0.1598	-0.0643	1.0007	855.6970	0.0008	406			
	$MCWD_{mean}$	0.0001	0.0000	0.0002	1.0050	784.0298	0.0000	406			
	VPD_{mean}	-0.2653	-0.4247	-0.1306	1.0124	422.9006	0.0036	406			
	$SPEI_{12}$	-0.0044	-0.0209	0.0129	1.0005	2409.1951	0.0002	406			
WD	CEC	-0.0037	-0.0056	-0.0018	1.0057	1316.2733	0.0000	406	0.14	0.01	0.08
	Clay	0.0025	0.0008	0.0042	1.0026	1229.8694	0.0000	406			
	pH	0.0771	0.0493	0.1043	1.0037	1009.8476	0.0005	406			
	Sand	0.0005	-0.0011	0.0021	1.0051	682.7636	0.0000	406			
	T_{mean} : Forest type -Montane	-0.0307	-0.0494	-0.0139	1.0151	361.4131	0.0005	406			
	Forest type -Montane : $MCWD_{mean}$	-0.0004	-0.0005	-0.0002	1.0076	954.5933	0.0000	406			
	Forest type -Montane : VPD_{mean}	0.4217	0.2293	0.6426	1.0115	559.7518	0.0044	406			
	Forest type -Montane : $SPEI_{12}$	-0.0554	-0.0833	-0.0266	1.0014	2150.2853	0.0003	406			
	Intercept (Lowland forest)	3.8545	3.8446	3.8655	1.0006	1349.1732	0.0001	377			
	T_{mean}	0.0038	0.0012	0.0062	1.0011	1318.1870	0.0000	377			
	Forest type -Montane	0.0110	-0.0020	0.0232	1.0014	1666.0702	0.0002	377			
	$MCWD_{mean}$	0.0000	0.0000	0.0000	0.9995	1405.3385	0.0000	377			
	VPD_{mean}	-0.0213	-0.0486	0.0040	1.0010	1344.3930	0.0004	377			
	$SPEI_{12}$	0.0047	-0.0025	0.0117	1.0016	2584.7159	0.0001	377			
C	CEC	0.0000	-0.0005	0.0007	1.0017	2875.9119	0.0000	377	0.30	0.77	0.59
	Clay	0.0007	0.0002	0.0012	1.0023	1986.7369	0.0000	377			
	pH	-0.0150	-0.0230	-0.0072	1.0017	2146.7906	0.0001	377			
	Sand	0.0008	0.0004	0.0012	1.0008	1700.6757	0.0000	377			
	T_{mean} : Forest type -Montane	-0.0051	-0.0081	-0.0020	1.0008	1472.9497	0.0000	377			
	Forest type -Montane : $MCWD_{mean}$	0.0000	0.0000	0.0001	0.9996	1906.9770	0.0000	377			
	Forest type -Montane : VPD_{mean}	0.0346	-0.0071	0.0784	1.0001	1666.2327	0.0005	377			
	Forest type -Montane : $SPEI_{12}$	0.0004	-0.0100	0.0111	1.0007	2868.7735	0.0001	377			

	Intercept (Lowland forest)	3.1948	3.1012	3.2919	1.0050	815.1746	0.0017	383			
	T_{mean}	-0.0197	-0.0468	0.0056	1.0016	771.8518	0.0005	383			
	Forest type -Montane	-0.2406	-0.3279	-0.1534	1.0003	1306.8811	0.0012	383			
	$MCWD_{mean}$	-0.0005	-0.0006	-0.0003	1.0009	1147.9115	0.0000	383			
	VPD_{mean}	0.1061	-0.1379	0.3548	1.0008	1004.6986	0.0040	383			
	$SPEI_{12}$	-0.0565	-0.0861	-0.0279	0.9997	3410.1789	0.0003	383			
H_{max}	CEC	-0.0069	-0.0099	-0.0038	1.0011	2262.1557	0.0000	383	0.56	4.43	3.16
	Clay	0.0193	0.0160	0.0225	1.0013	1900.5007	0.0000	383			
	pH	0.0356	-0.0109	0.0839	1.0007	2169.5293	0.0005	383			
	Sand	0.0113	0.0086	0.0142	1.0021	1617.1097	0.0000	383			
	T_{mean} : Forest type -Montane	0.0562	0.0258	0.0882	1.0003	909.2434	0.0005	383			
	Forest type -Montane : $MCWD_{mean}$	0.0002	-0.0001	0.0005	0.9996	1355.4550	0.0000	383			
	Forest type -Montane : VPD_{mean}	-0.4083	-0.7660	-0.0617	0.9996	1403.9271	0.0047	383			
	Forest type -Montane : $SPEI_{12}$	-0.1131	-0.1602	-0.0669	0.9998	3170.9104	0.0004	383			
	Intercept (Lowland forest)	-2.0690	-2.1470	-1.9913	1.0005	785.2168	0.0014	377			
	T_{mean}	-0.0643	-0.0839	-0.0441	1.0025	705.7651	0.0004	377			
	Forest type -Montane	-0.0579	-0.1263	0.0111	1.0014	1053.1785	0.0011	377			
	$MCWD_{mean}$	-0.0002	-0.0003	0.0000	1.0029	1140.0253	0.0000	377			
	VPD_{mean}	0.5122	0.3095	0.7138	1.0080	695.9230	0.0040	377			
	$SPEI_{12}$	0.0022	-0.0224	0.0278	1.0002	2524.8051	0.0003	377			
P	CEC	0.0044	0.0017	0.0071	0.9996	1642.6243	0.0000	377	0.33	0.02	0.01
	Clay	-0.0028	-0.0054	-0.0002	1.0007	1540.0326	0.0000	377			
	pH	0.0566	0.0153	0.0962	1.0016	1425.2161	0.0005	377			
	Sand	0.0007	-0.0015	0.0030	1.0017	1331.6088	0.0000	377			
	T_{mean} : Forest type -Montane	0.0813	0.0564	0.1053	1.0014	840.6794	0.0004	377			
	Forest type -Montane : $MCWD_{mean}$	0.0002	-0.0001	0.0004	1.0022	1293.0112	0.0000	377			
	Forest type -Montane : VPD_{mean}	-0.6375	-0.9227	-0.3496	1.0044	985.6783	0.0046	377			
	Forest type -Montane : $SPEI_{12}$	-0.0203	-0.0592	0.0186	1.0007	2041.9997	0.0004	377			
	Intercept (Lowland forest)	1.8108	1.7199	1.8981	1.0005	1674.5712	0.0011	127			
	T_{mean}	-0.0777	-0.1227	-0.0302	1.0001	1916.9027	0.0005	127			
A_{sat}	Forest type -Montane	-0.6835	-0.9311	-0.4648	0.9997	1569.2998	0.0030	127	0.02	1.38	0.99
	$MCWD_{mean}$	0.0004	0.0001	0.0006	1.0006	3444.6138	0.0000	127			
	VPD_{mean}	0.2059	-0.1044	0.5040	0.9999	2242.6865	0.0033	127			

$SPEI_{12}$	0.0586	0.0314	0.0851	0.9997	4310.1717	0.0002	127
CEC	-0.0107	-0.0162	-0.0054	1.0001	2181.4657	0.0001	127
Clay	0.0167	0.0122	0.0211	1.0000	3522.0045	0.0000	127
pH	-0.0020	-0.0967	0.0946	1.0006	4024.9411	0.0008	127
Sand	-0.0029	-0.0075	0.0018	1.0004	2500.0023	0.0000	127
T_{mean} : Forest type -Montane	-0.0993	-0.1821	-0.0280	0.9997	1388.2447	0.0011	127
Forest type -Montane : $MCWD_{mean}$	-0.0027	-0.0037	-0.0017	1.0000	1545.2888	0.0000	127
Forest type -Montane : VPD_{mean}	2.4983	1.6552	3.3944	0.9996	1321.0119	0.0123	127
Forest type -Montane : $SPEI_{12}$	0.0261	-0.1302	0.1858	1.0004	3891.5260	0.0013	127

SLA: Specific leaf area, Area: leaf area**,** Thickness: leaf thickness, N: leaf nitrogen content, P: leaf phosphorus content, Asat: photosynthetic capacity at light saturated carbon assimilation rates, WD: wood density, Hmax: adult maximum height; DE: deciduous, FM: leaf fresh mass, SM: seed mass, C: leaf carbon content. CEC: cation exchange capacity, pH: soil acidity index, Clay: percentage clay content, Sand: percentage sand content. HDI: Highest Density Interval, HDI-L: Lowest HDI, HDI-H: Highest HDI, Rhat: Potential scale reduction statistic, ESS: Effective sample size.

Table S3. Results of models testing for changes in CWM trait values for all sampled tropical American forests together, when only including lowland forests and when only including montane forests. The mean values are those obtained after carrying out the comparison with the rate of change of trait values. Lower: lowest highest density interval (HDI), Upper: Upper HDI. Analysis: For the full alive assemblage (Full), for the survivor assemblage, i.e. not including recruitment or mortality (Survivor) for the recruits assemblage only (Recruit) or for the fatalities assemblage only (Fatality).

Comparison	Trait	95% HDI			Analysis
		mean	Lower	Upper	
All forests rate of change different from 0	WD	1.4E-05	-4.22E-05	7.19E-05	Full
	Area	-3.7E-02	-6.71E-02	-7.68E-03	
	SLA	9.4E-03	-5.91E-03	2.49E-02	
	FM	-7.3E-04	-2.33E-03	8.87E-04	
	SM	4.6E-01	-3.32E-01	1.29E+00	
	N	1.8E-04	-1.22E-05	3.82E-04	
	DE	2.2E-02	3.23E-03	4.03E-02	
	Thickness	-5.6E-03	-1.05E-02	-7.14E-04	
	P	1.5E-05	3.58E-06	2.63E-05	
	C	9.0E-04	1.28E-04	1.71E-03	
	H_{max}	3.7E-03	2.89E-04	7.04E-03	
	A_{sat}	2.4E-03	8.72E-04	3.91E-03	
Montane forests rate of change different from 0	WD	9.5E-06	-9.87E-05	1.21E-04	Full
	Area	-1.7E-02	-4.56E-02	1.24E-02	
	SLA	2.0E-02	-1.28E-02	5.28E-02	
	FM	1.5E-04	-7.00E-04	1.02E-03	
	SM	-7.8E-02	-2.66E-01	1.09E-01	
	N	1.8E-04	-2.07E-04	5.62E-04	
	DE	3.7E-02	2.88E-03	7.12E-02	
	Thickness	-8.2E-03	-2.02E-02	3.26E-03	
	P	2.6E-05	6.65E-06	4.54E-05	
	C	1.5E-03	4.14E-04	2.52E-03	
	H_{max}	-3.7E-03	-9.85E-03	2.26E-03	
	A_{sat}	2.2E-03	-1.41E-03	5.72E-03	
Lowland forests rate of change different from 0	WD	1.7E-05	-5.07E-05	8.07E-05	Full
	Area	-7.2E-02	-1.17E-01	-2.73E-02	
	SLA	6.9E-03	-1.01E-02	2.37E-02	
	FM	-1.8E-03	-4.47E-03	8.63E-04	
	SM	7.3E-01	-6.86E-01	2.18E+00	
	N	1.8E-04	-4.09E-05	4.13E-04	
	DE	1.4E-02	-7.34E-03	3.61E-02	
	Thickness	-4.7E-03	-9.43E-03	-7.98E-05	
	P	8.2E-06	-5.80E-06	2.25E-05	
	C	1.1E-03	-1.40E-04	2.30E-03	
	H_{max}	7.6E-03	3.58E-03	1.16E-02	
	A_{sat}	2.5E-03	7.52E-04	4.14E-03	

All forests rate of change different from 0	DE	3.45E-02	1.64E-02	5.24E-02	Survivor
	H_{max}	6.16E-03	2.94E-03	9.36E-03	
	SLA	1.02E-02	-4.50E-03	2.54E-02	
	SM	5.42E-01	-2.78E-01	1.34E+00	
	Thickness	-4.88E-03	-9.74E-03	-6.24E-06	
	WD	4.09E-05	-1.17E-05	9.25E-05	
	Area	-5.52E-02	-8.70E-02	-2.45E-02	
	FM	-1.11E-03	-2.63E-03	3.22E-04	
	N	1.60E-04	-2.80E-05	3.50E-04	
	C	1.18E-03	4.17E-04	1.94E-03	
	P	1.68E-05	5.73E-06	2.79E-05	
	A_{sat}	2.26E-03	7.16E-04	3.84E-03	
Montane forests rate of change different from 0	DE	4.39E-02	1.27E-02	7.64E-02	Survivor
	H_{max}	-4.24E-04	-6.01E-03	5.40E-03	
	SLA	6.29E-03	-2.50E-02	3.79E-02	
	SM	-5.84E-02	-2.37E-01	1.20E-01	
	Thickness	-7.03E-03	-1.83E-02	4.26E-03	
	WD	2.50E-05	-7.32E-05	1.22E-04	
	Area	-1.59E-02	-4.28E-02	1.14E-02	
	FM	4.64E-05	-5.76E-04	6.25E-04	
	N	1.01E-04	-2.53E-04	4.48E-04	
	C	1.62E-03	5.88E-04	2.64E-03	
	P	2.68E-05	8.74E-06	4.55E-05	
	A_{sat}	2.12E-03	-1.40E-03	5.77E-03	
Lowland forests rate of change different from 0	DE	2.90E-02	7.13E-03	5.06E-02	Survivor
	H_{max}	9.80E-03	5.94E-03	1.36E-02	
	SLA	1.27E-02	-3.75E-03	2.89E-02	
	SM	8.03E-01	-6.21E-01	2.25E+00	
	Thickness	-4.13E-03	-8.71E-03	3.96E-04	
	WD	4.89E-05	-1.28E-05	1.10E-04	
	Area	-1.01E-01	-1.45E-01	-5.61E-02	
	FM	-2.89E-03	-5.62E-03	-1.56E-04	
	N	1.91E-04	-3.05E-05	4.10E-04	
	C	1.22E-03	2.83E-05	2.38E-03	
	P	1.11E-05	-3.12E-06	2.49E-05	
	A_{sat}	2.32E-03	6.07E-04	4.09E-03	
All forests rate of change different from 0	SLA	-0.0375824	-1.91E-01	1.09E-01	Recruit
	H_{max}	-0.0219922	-5.11E-02	7.35E-03	
	WD	-0.0005317	-9.76E-04	-8.29E-05	
	Area	0.1640211	-1.92E-01	5.31E-01	
	FM	0.0171358	-7.55E-03	4.20E-02	
	N	-0.0011403	-2.95E-03	7.03E-04	
	SM	0.324576	-4.33E+00	4.89E+00	
	Thickness	-0.0349301	-6.64E-02	-2.71E-03	

	C	-0.0097547	-1.73E-02	-2.30E-03	
	P	7.44E-05	-4.94E-05	1.94E-04	
	DE	-0.2106902	-3.52E-01	-7.43E-02	
	A_{sat}	0.0053461	-8.32E-03	1.87E-02	
Montane forests rate of change different from 0	SLA	0.0930306	-2.45E-01	4.19E-01	Recruit
	H_{max}	0.0144868	-4.02E-02	6.86E-02	
	WD	-0.0002285	-1.06E-03	6.01E-04	
	Area	0.1608627	-1.52E-01	4.84E-01	
	FM	-0.0002895	-9.15E-03	8.50E-03	
	N	0.0015136	-2.13E-03	5.29E-03	
	SM	-0.4091746	-2.61E+00	1.73E+00	
	Thickness	0.0154082	-5.33E-02	8.58E-02	
	C	-0.0141178	-2.66E-02	-1.63E-03	
	P	-3.37E-05	-2.80E-04	2.10E-04	
	DE	-0.1957668	-4.54E-01	6.80E-02	
	A_{sat}	0.0161121	-1.91E-02	5.12E-02	
Lowland forests rate of change different from 0	SLA	-0.0821186	-2.43E-01	8.19E-02	Recruit
	H_{max}	-0.0382077	-7.27E-02	-3.82E-03	
	WD	-0.0007187	-1.26E-03	-1.73E-04	
	Area	0.1359425	-4.89E-01	7.43E-01	
	FM	0.0472876	6.32E-03	8.66E-02	
	N	-0.0022635	-4.32E-03	-2.41E-04	
	SM	4.0160135	-6.77E+00	1.47E+01	
	Thickness	-0.0487174	-8.61E-02	-1.28E-02	
	C	-0.0010758	-1.13E-02	8.99E-03	
	P	0.0001197	-1.52E-05	2.54E-04	
	DE	-0.1782582	-3.30E-01	-2.69E-02	
	A_{sat}	0.0020604	-1.15E-02	1.55E-02	
All forests rate of change different from 0	SM	-1.0265048	-6.67E+00	4.71E+00	Fatality
	H_{max}	0.0060093	-1.72E-02	2.97E-02	
	SLA	0.0904213	-4.43E-02	2.26E-01	
	Area	-0.0055557	-3.24E-01	2.99E-01	
	FM	-0.0069365	-2.14E-02	7.23E-03	
	N	-4.39E-05	-1.97E-03	1.84E-03	
	Thickness	0.0149096	-1.37E-02	4.44E-02	
	WD	0.0002811	-1.97E-04	7.52E-04	
	C	0.000803	-7.95E-03	9.90E-03	
	P	-1.12E-05	-1.25E-04	1.04E-04	
	DE	0.0525849	-1.16E-01	2.14E-01	
	A_{sat}	0.0094438	-4.34E-03	2.39E-02	
Montane forests rate of change different from 0	SM	1.4174695	-1.83E+00	4.71E+00	Fatality
	H_{max}	0.020037	-2.37E-02	6.19E-02	
	SLA	-0.0156715	-2.85E-01	2.61E-01	
	Area	0.1984757	-1.83E-01	5.69E-01	

	FM	-5.80E-05	-4.82E-03	4.60E-03	
	N	-0.0044761	-7.76E-03	-1.28E-03	
	Thickness	0.0447151	-2.80E-02	1.18E-01	
	WD	0.0003785	-4.47E-04	1.18E-03	
	C	-0.0065513	-2.32E-02	1.01E-02	
	P	-4.58E-05	-2.88E-04	1.96E-04	
	DE	-0.0573978	-3.68E-01	2.57E-01	
	A_{sat}	-0.0115712	-4.84E-02	2.56E-02	
Lowland forests rate of change different from 0	SM	-17.744632	-3.00E+01	-5.72E+00	Fatality
	H_{max}	6.34E-08	-2.83E-02	2.95E-02	
	SLA	0.0746695	-8.25E-02	2.39E-01	
	Area	-0.2383545	-7.25E-01	2.37E-01	
	FM	-0.0277034	-5.51E-02	-3.40E-04	
	N	-0.0002943	-2.70E-03	2.03E-03	
	Thickness	0.014193	-1.52E-02	4.40E-02	
	WD	0.0003711	-2.26E-04	9.94E-04	
	C	0.0043646	-6.84E-03	1.57E-02	
	P	-6.88E-05	-1.89E-04	5.46E-05	
	DE	0.0417127	-1.47E-01	2.32E-01	
	A_{sat}	0.0163855	-1.06E-04	3.31E-02	

SLA: Specific leaf area, Area: leaf area, Thickness: leaf thickness, N: leaf nitrogen content, P: leaf phosphorus content, Asat: photosynthetic capacity at light saturated carbon assimilation rates, WD: wood density, Hmax: adult maximum height; DE: deciduous, FM: leaf fresh mass, SM: seed mass, C: leaf carbon content.

Table S4. Models results testing for the relation between observed yearly rate of change (YRC) in trait CWM and the yearly rate of change in climate (1980-2021) across tropical American forests. Number: number of plots used for model fitting. ΔTYRC: change in mean annual temperature, ΔMCWDYRC: change in mean maximum climatic water deficit, ΔVPDYRC: change in mean annual vapour pressure deficit, ΔSPEIYRC: change in the standardised precipitation-evapotranspiration index for a 12-month window, CEC: cation exchange capacity, Clay: soil percentage clay, Sand: soil percentage sand and pH: soil acidity index. Analysis: For the full alive assemblage (Full), for the Survivor assemblage, i.e. not including recruitment or mortality (Survivor) for the recruits assemblage only (Recruit) or for the mortality assemblage only (Fatality).

Trait	Parameter	Median	HDI-Low	HDI-Up	Rhat	ESS	R2	Number	Analysis
WD	Intercept (Lowland forest)	-5.43E-05	-2.32E-04	1.10E-04	1.0072	488.0363	0.29	371	FULL
	ΔT_{YRC}	-2.39E-02	-5.32E-02	5.18E-03	1.0091	465.5854			
	Forest type -Montane	-1.12E-04	-4.50E-04	2.38E-04	1.0031	687.7467			
	$\Delta MCWD_{YRC}$	1.17E-04	-1.77E-05	2.62E-04	1.0004	601.5845			
	ΔVPD_{YRC}	1.52E-02	-1.38E-01	1.69E-01	1.0041	488.5684			
	$\Delta SPEI_{YRC}$	4.38E-04	-1.53E-02	1.64E-02	1.0007	536.7069			
	CEC	-1.70E-05	-3.38E-05	-2.88E-07	1.0057	1024.1044			
	Clay	2.59E-05	1.16E-05	4.06E-05	1.0025	875.0931			
	pH	-1.78E-04	-3.90E-04	1.86E-05	1.0073	745.0716			
	Sand	1.85E-05	6.29E-06	3.08E-05	1.0044	669.5537			
	ΔT_{YRC} : Forest type -Montane	2.13E-02	-2.54E-02	6.45E-02	1.0033	620.0400			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-3.57E-04	-5.84E-04	-1.63E-04	1.0012	476.4864			
	Forest type -Montane : ΔVPD_{YRC}	-1.99E-01	-5.38E-01	1.49E-01	0.9999	611.5181			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.81E-02	-4.02E-02	2.17E-03	0.9996	570.7934			
WD	Intercept (Lowland forest)	8.68E-07	-1.40E-04	1.46E-04	1.0060	553.9673	0.26	367	Survivor
	ΔT_{YRC}	-1.33E-02	-3.85E-02	1.26E-02	1.0093	478.3844			
	Forest type -Montane	-1.60E-04	-4.52E-04	1.27E-04	1.0009	682.3185			
	$\Delta MCWD_{YRC}$	-1.94E-05	-1.43E-04	9.30E-05	1.0050	630.6083			
	ΔVPD_{YRC}	1.51E-03	-1.41E-01	1.30E-01	1.0091	599.0460			
	$\Delta SPEI_{YRC}$	-5.86E-03	-1.94E-02	7.24E-03	1.0066	583.5601			
	CEC	-2.56E-05	-4.03E-05	-1.10E-05	1.0005	1355.7691			
	Clay	1.02E-05	-4.09E-06	2.47E-05	1.0013	774.3371			
	pH	-8.81E-05	-2.71E-04	9.22E-05	1.0030	989.0588			
	Sand	9.82E-06	-7.14E-07	2.21E-05	1.0031	657.4418			
	ΔT_{YRC} : Forest type -Montane	2.95E-04	-4.15E-02	3.94E-02	1.0098	511.5923			

	Forest type -Montane : $\Delta MCWD_{YRC}$	-2.71E-04	-4.46E-04	-1.00E-04	1.0057	690.4171			
	Forest type -Montane : ΔVPD_{YRC}	-1.27E-01	-4.26E-01	1.64E-01	1.0021	715.0066			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.25E-02	-2.94E-02	4.73E-03	1.0081	742.9208			
	Intercept (Lowland forest)	-1.32E-03	-2.14E-03	-4.79E-04	1.0032	422.5932			
	ΔT_{YRC}	-1.07E-01	-3.11E-01	8.61E-02	1.0111	370.9040			
	Forest type -Montane	6.28E-05	-2.19E-03	2.24E-03	1.0013	575.3040			
	$\Delta MCWD_{YRC}$	7.77E-04	-1.77E-04	1.80E-03	1.0144	432.7671			
	ΔVPD_{YRC}	7.03E-01	-2.19E-01	1.63E+00	1.0035	377.5405			
	$\Delta SPEI_{YRC}$	8.83E-02	-8.05E-03	1.82E-01	1.0173	343.7145			
WD	CEC	1.35E-07	-1.34E-04	1.29E-04	0.9998	743.5688	0.44	317	Recruit
	Clay	-5.30E-05	-1.75E-04	7.27E-05	1.0103	305.6381			
	pH	1.14E-04	-1.09E-03	1.49E-03	1.0172	447.5658			
	Sand	-6.78E-05	-1.67E-04	2.91E-05	1.0052	337.2687			
	ΔT_{YRC} : Forest type -Montane	9.43E-02	-1.89E-01	3.71E-01	1.0108	460.9527			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-5.77E-04	-1.91E-03	8.04E-04	1.0107	470.8420			
	Forest type -Montane : ΔVPD_{YRC}	-1.42E+00	-3.50E+00	6.09E-01	1.0031	635.4455			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.44E-01	-2.78E-01	3.88E-04	1.0129	474.6508			
	Intercept (Lowland forest)	-1.09E-04	-1.02E-03	8.17E-04	1.0052	596.7356			
	ΔT_{YRC}	-3.39E-02	-2.46E-01	1.71E-01	1.0037	473.0440			
	Forest type -Montane	-3.90E-05	-2.16E-03	2.38E-03	1.0018	1003.7642			
	$\Delta MCWD_{YRC}$	8.75E-04	-1.67E-04	1.95E-03	1.0054	626.2414			
	ΔVPD_{YRC}	-3.80E-01	-1.44E+00	7.39E-01	1.0025	547.1117			
	$\Delta SPEI_{YRC}$	9.68E-02	-1.57E-03	1.93E-01	1.0043	672.9657			
WD	CEC	1.37E-05	-1.36E-04	1.74E-04	1.0018	862.1006	0.41	334	Fatality
	Clay	-1.15E-04	-2.42E-04	1.92E-05	1.0015	666.5178			
	pH	-8.63E-04	-2.40E-03	5.94E-04	1.0051	888.6630			
	Sand	-6.97E-05	-1.74E-04	2.95E-05	1.0014	628.3606			
	ΔT_{YRC} : Forest type -Montane	1.38E-01	-1.69E-01	4.55E-01	1.0077	515.9359			
	Forest type -Montane : $\Delta MCWD_{YRC}$	3.13E-04	-1.16E-03	1.81E-03	1.0046	786.6770			
	Forest type -Montane : ΔVPD_{YRC}	-7.17E-01	-2.71E+00	1.46E+00	1.0011	833.5864			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.06E-01	-2.57E-01	4.74E-02	1.0050	873.1013			
Area	Intercept (Lowland forest)	-9.42E-02	-1.92E-01	1.21E-02	1.0045	467.3526	0.24	335	FULL
	ΔT_{YRC}	-8.15E+00	-2.47E+01	8.35E+00	1.0083	470.9733			

	Forest type -Montane	5.71E-02	-1.21E-01	2.39E-01	1.0104	562.1797			
	$\Delta MCWD_{YRC}$	-5.02E-02	-1.38E-01	2.45E-02	1.0064	483.1091			
	ΔVPD_{YRC}	7.81E+01	-8.47E+00	1.65E+02	1.0093	442.0672			
	$\Delta SPEI_{YRC}$	-2.84E+00	-1.18E+01	5.44E+00	1.0061	471.2748			
	CEC	7.32E-03	-2.39E-03	1.74E-02	1.0008	1150.0715			
	Clay	1.58E-02	7.72E-03	2.43E-02	1.0045	939.0838			
	pH	-1.12E-01	-2.11E-01	-6.80E-03	1.0030	882.7594			
	Sand	1.39E-02	6.88E-03	2.08E-02	1.0043	818.0809			
	ΔT_{YRC} : Forest type -Montane	1.72E+01	-6.62E+00	4.10E+01	1.0131	610.0138			
	Forest type -Montane : $\Delta MCWD_{YRC}$	3.93E-02	-7.28E-02	1.56E-01	1.0004	685.2557			
	Forest type -Montane : ΔVPD_{YRC}	-1.46E+02	-3.27E+02	3.52E+01	1.0084	433.0166			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-4.06E-01	-1.32E+01	1.24E+01	1.0024	517.6676			
Area	Intercept (Lowland forest)	-1.36E-01	-2.48E-01	-2.51E-02	1.0072	402.0481	0.33	339	Survivor
	ΔT_{YRC}	3.20E+00	-1.52E+01	2.21E+01	1.0046	358.0971			
	Forest type -Montane	2.28E-01	5.10E-02	4.04E-01	1.0060	413.3353			
	$\Delta MCWD_{YRC}$	-6.03E-02	-1.51E-01	2.63E-02	1.0093	396.7406			
	ΔVPD_{YRC}	3.23E+01	-6.55E+01	1.33E+02	1.0052	362.0509			
	$\Delta SPEI_{YRC}$	-1.29E+00	-9.95E+00	7.40E+00	1.0074	419.4490			
	CEC	-1.78E-02	-2.74E-02	-8.40E-03	1.0019	599.2803			
	Clay	5.28E-03	-3.13E-03	1.34E-02	1.0002	635.1501			
	pH	3.37E-02	-6.06E-02	1.30E-01	1.0026	705.4955			
	Sand	1.81E-03	-4.91E-03	8.43E-03	1.0022	479.9230			
	ΔT_{YRC} : Forest type -Montane	2.00E+01	-6.26E+00	4.41E+01	1.0036	468.7558			
	Forest type -Montane : $\Delta MCWD_{YRC}$	5.83E-02	-6.37E-02	1.78E-01	1.0065	407.5147			
	Forest type -Montane : ΔVPD_{YRC}	7.82E+01	-1.05E+02	2.61E+02	1.0021	417.0505			
	Forest type -Montane : $\Delta SPEI_{YRC}$	3.80E+00	-8.30E+00	1.55E+01	1.0053	404.1299			
Area	Intercept (Lowland forest)	5.62E-01	-4.18E-01	1.50E+00	1.0041	455.5504	0.45	314	Recruit
	ΔT_{YRC}	8.86E+00	-1.43E+02	1.75E+02	1.0051	439.8263			
	Forest type -Montane	-4.88E-01	-2.28E+00	1.25E+00	1.0026	616.7475			
	$\Delta MCWD_{YRC}$	-4.23E-01	-1.31E+00	3.94E-01	1.0060	350.8814			
	ΔVPD_{YRC}	-3.34E+02	-1.16E+03	4.48E+02	1.0050	522.7445			
	$\Delta SPEI_{YRC}$	4.49E+00	-7.97E+01	8.52E+01	1.0042	382.0490			
	CEC	1.16E-01	-1.15E-02	2.54E-01	1.0098	529.3734			

	Clay	7.58E-02	-2.35E-02	1.84E-01	1.0028	415.3778			
	pH	1.33E-01	-9.57E-01	1.24E+00	1.0005	504.5534			
	Sand	3.92E-02	-3.99E-02	1.20E-01	1.0055	411.7705			
	ΔT_{YRC} : Forest type -Montane	-7.94E+01	-3.07E+02	1.51E+02	1.0015	532.3004			
	Forest type -Montane : $\Delta MCWD_{YRC}$	2.56E-01	-1.02E+00	1.50E+00	1.0037	345.0793			
	Forest type -Montane : ΔVPD_{YRC}	4.05E+02	-1.06E+03	1.95E+03	1.0013	651.4487			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.59E+01	-1.57E+02	1.07E+02	1.0047	487.4689			
Area	Intercept (Lowland forest)	-6.43E-01	-1.57E+00	2.37E-01	1.0085	312.2206	0.59	330	Fatality
	ΔT_{YRC}	-2.61E+01	-2.02E+02	1.31E+02	1.0086	359.2677			
	Forest type -Montane	4.67E-01	-1.07E+00	2.06E+00	1.0084	378.6926			
	$\Delta MCWD_{YRC}$	1.08E+00	2.41E-01	1.94E+00	1.0062	329.8970			
	ΔVPD_{YRC}	1.47E+02	-6.72E+02	9.82E+02	1.0061	390.1413			
	$\Delta SPEI_{YRC}$	1.26E+02	5.37E+01	2.06E+02	1.0136	345.7415			
	CEC	4.23E-02	-6.53E-02	1.44E-01	1.0021	611.3599			
	Clay	-4.84E-02	-1.41E-01	4.90E-02	1.0068	367.9545			
	pH	1.60E+00	4.98E-01	2.65E+00	1.0032	367.6019			
	Sand	-2.18E-02	-9.04E-02	4.59E-02	1.0126	276.4970			
	ΔT_{YRC} : Forest type -Montane	-2.19E+01	-2.50E+02	2.05E+02	1.0099	390.9580			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.02E+00	-2.17E+00	1.03E-01	1.0037	395.9335			
	Forest type -Montane : ΔVPD_{YRC}	8.56E+01	-1.23E+03	1.48E+03	1.0059	480.8936			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-8.58E+01	-2.02E+02	3.13E+01	1.0041	368.2348			
SLA	Intercept (Lowland forest)	-3.94E-03	-4.22E-02	3.50E-02	1.0041	339.0499	0.26	354	FULL
	ΔT_{YRC}	2.11E+00	-5.43E+00	9.85E+00	1.0014	420.7774			
	Forest type -Montane	3.98E-02	-3.78E-02	1.20E-01	1.0024	590.8878			
	$\Delta MCWD_{YRC}$	3.48E-02	2.00E-03	7.39E-02	1.0065	462.7126			
	ΔVPD_{YRC}	-2.01E+01	-5.81E+01	2.17E+01	1.0019	416.1522			
	$\Delta SPEI_{YRC}$	2.84E+00	-7.98E-01	7.12E+00	1.0109	458.5987			
	CEC	2.68E-04	-3.86E-03	4.41E-03	1.0017	904.1086			
	Clay	-6.84E-03	-1.08E-02	-3.19E-03	1.0136	681.1685			
	pH	-4.31E-02	-9.20E-02	3.30E-03	1.0060	582.3409			
	Sand	-3.84E-03	-6.91E-03	-8.75E-04	1.0088	718.7909			
	ΔT_{YRC} : Forest type -Montane	-6.19E+00	-1.75E+01	4.49E+00	1.0021	416.8179			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-3.46E-02	-8.32E-02	1.15E-02	1.0056	466.2263			

	Forest type -Montane : ΔVPD_{YRC}	2.26E+01	-5.63E+01	1.05E+02	1.0062	462.5571			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-3.26E+00	-8.27E+00	1.52E+00	1.0077	457.0005			
	Intercept (Lowland forest)	8.62E-03	-2.52E-02	4.44E-02	1.0019	688.7248			
	ΔT_{YRC}	2.78E+00	-3.64E+00	9.21E+00	0.9993	711.6871			
	Forest type -Montane	-1.44E-03	-7.41E-02	7.20E-02	1.0048	786.4771			
	$\Delta MCWD_{YRC}$	3.73E-03	-2.68E-02	3.53E-02	1.0021	760.3870			
	ΔVPD_{YRC}	-1.73E+01	-5.19E+01	1.73E+01	1.0017	762.6314			
	$\Delta SPEI_{YRC}$	2.13E+00	-1.03E+00	5.72E+00	1.0021	620.1715			
SLA	CEC	-2.76E-03	-7.08E-03	1.21E-03	1.0006	1550.1793	0.17	361	Survivor
	Clay	-5.89E-03	-9.31E-03	-2.36E-03	0.9999	1185.6415			
	pH	1.74E-02	-2.56E-02	6.12E-02	0.9997	1175.5183			
	Sand	-3.22E-03	-6.03E-03	-4.17E-04	0.9999	1078.6872			
	ΔT_{YRC} : Forest type -Montane	-7.43E+00	-1.70E+01	2.43E+00	1.0004	871.6778			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.34E-02	-6.14E-02	2.93E-02	1.0025	886.1486			
	Forest type -Montane : ΔVPD_{YRC}	1.41E+01	-5.57E+01	8.92E+01	1.0029	973.6854			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-2.15E+00	-6.87E+00	2.05E+00	1.0019	767.0796			
	Intercept (Lowland forest)	4.87E-02	-2.07E-01	3.38E-01	1.0070	243.0631			
	ΔT_{YRC}	-2.53E+01	-8.77E+01	3.76E+01	1.0143	204.8383			
	Forest type -Montane	-2.22E-02	-7.41E-01	7.30E-01	1.0047	371.4445			
	$\Delta MCWD_{YRC}$	5.80E-01	2.15E-01	9.36E-01	1.0243	193.4765			
	ΔVPD_{YRC}	3.59E+01	-2.80E+02	3.52E+02	1.0065	267.6084			
	$\Delta SPEI_{YRC}$	2.03E+01	-1.18E+01	5.49E+01	1.0188	154.8846			
SLA	CEC	1.02E-01	5.61E-02	1.52E-01	1.0035	367.5489	0.51	311	Recruit
	Clay	-3.82E-02	-7.64E-02	-5.44E-05	1.0248	169.0550			
	pH	-4.83E-01	-9.02E-01	-6.41E-02	1.0064	284.2513			
	Sand	-7.13E-04	-2.91E-02	2.77E-02	1.0212	208.1862			
	ΔT_{YRC} : Forest type -Montane	-8.91E+01	-1.82E+02	2.07E+00	1.0075	284.4734			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-7.45E-01	-1.25E+00	-2.35E-01	1.0256	186.8055			
	Forest type -Montane : ΔVPD_{YRC}	2.53E+02	-4.08E+02	9.86E+02	1.0029	333.5008			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-2.54E+01	-7.76E+01	2.75E+01	1.0088	188.9542			
SLA	Intercept (Lowland forest)	1.55E-05	-2.47E-01	2.58E-01	1.0052	364.3782	0.53	319	Fatality
	ΔT_{YRC}	-4.41E+01	-9.97E+01	1.21E+01	1.0026	408.0551			

	Forest type -Montane	-1.46E-01	-7.51E-01	4.60E-01	1.0030	590.2539			
	$\Delta MCWD_{YRC}$	-5.15E-02	-3.57E-01	2.71E-01	1.0033	354.2417			
	ΔVPD_{YRC}	1.99E+02	-9.03E+01	4.84E+02	1.0047	384.5598			
	$\Delta SPEI_{YRC}$	-2.73E+00	-3.31E+01	2.65E+01	1.0053	377.2511			
	CEC	-1.75E-02	-5.89E-02	2.32E-02	1.0107	586.7028			
	Clay	6.13E-02	2.91E-02	9.84E-02	1.0095	371.7310			
	pH	2.89E-01	-7.80E-02	6.74E-01	1.0029	628.9351			
	Sand	3.23E-02	5.91E-03	5.86E-02	1.0102	438.1719			
	ΔT_{YRC} : Forest type -Montane	9.56E+01	1.16E+01	1.78E+02	1.0052	484.9972			
	Forest type -Montane : $\Delta MCWD_{YRC}$	2.54E-02	-4.01E-01	4.60E-01	1.0034	425.7679			
	Forest type -Montane : ΔVPD_{YRC}	-1.71E+02	-7.27E+02	3.96E+02	1.0048	499.2587			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-3.00E+01	-7.29E+01	1.67E+01	1.0019	420.2665			
	Intercept (Lowland forest)	9.24E-04	-3.79E-03	6.67E-03	1.0021	557.9187			
	ΔT_{YRC}	3.83E-01	-6.11E-01	1.53E+00	1.0001	530.7995			
	Forest type -Montane	3.58E-03	-5.33E-03	1.20E-02	1.0038	746.7461			
	$\Delta MCWD_{YRC}$	-9.54E-03	-1.44E-02	-5.23E-03	0.9998	547.9604			
	ΔVPD_{YRC}	-5.82E-01	-5.76E+00	3.89E+00	1.0013	526.2485			
	$\Delta SPEI_{YRC}$	-5.71E-01	-1.03E+00	-1.47E-01	1.0074	479.9736			
FM	CEC	-9.28E-04	-1.50E-03	-3.83E-04	1.0004	930.9736	0.21	241	FULL
	Clay	3.41E-04	-1.65E-04	8.62E-04	1.0037	1037.8886			
	pH	4.52E-03	-1.75E-03	1.07E-02	1.0004	876.9873			
	Sand	6.27E-05	-3.49E-04	4.56E-04	1.0012	1046.1144			
	ΔT_{YRC} : Forest type -Montane	6.02E-01	-7.45E-01	1.90E+00	0.9997	687.8171			
	Forest type -Montane : $\Delta MCWD_{YRC}$	1.22E-02	6.25E-03	1.87E-02	0.9997	606.0931			
	Forest type -Montane : ΔVPD_{YRC}	1.91E+00	-7.00E+00	1.03E+01	1.0013	723.8630			
	Forest type -Montane : $\Delta SPEI_{YRC}$	7.50E-01	1.90E-01	1.38E+00	1.0054	550.0803			
	Intercept (Lowland forest)	-3.58E-03	-9.04E-03	1.89E-03	1.0048	521.4472			
	ΔT_{YRC}	1.43E-02	-1.02E+00	1.12E+00	1.0033	366.6258			
	Forest type -Montane	4.80E-03	-4.03E-03	1.37E-02	1.0015	822.6674			
FM	$\Delta MCWD_{YRC}$	-6.03E-03	-1.11E-02	-1.43E-03	1.0033	520.1372	0.24	243	Survivor
	ΔVPD_{YRC}	-1.47E-01	-5.42E+00	5.25E+00	1.0007	455.7640			
	$\Delta SPEI_{YRC}$	-2.09E-01	-6.76E-01	2.39E-01	1.0025	661.5252			
	CEC	-1.18E-03	-1.78E-03	-6.12E-04	1.0043	713.0953			

	Clay	6.51E-04	1.54E-04	1.17E-03	0.9997	1178.9918			
	pH	4.63E-03	-2.59E-03	1.21E-02	1.0014	907.5261			
	Sand	2.34E-04	-1.87E-04	6.31E-04	1.0009	977.5328			
	ΔT_{YRC} : Forest type -Montane	1.59E+00	1.54E-01	2.97E+00	1.0025	622.6010			
	Forest type -Montane : $\Delta MCWD_{YRC}$	9.44E-03	2.78E-03	1.63E-02	1.0031	607.2767			
	Forest type -Montane : ΔVPD_{YRC}	1.43E+00	-7.99E+00	1.15E+01	1.0034	560.7902			
	Forest type -Montane : $\Delta SPEI_{YRC}$	1.04E-01	-5.14E-01	7.24E-01	1.0038	533.6800			
FM	Intercept (Lowland forest)	6.54E-02	3.38E-03	1.25E-01	1.0055	361.7591	0.40	236	Recruit
	ΔT_{YRC}	-8.22E+00	-1.95E+01	3.49E+00	1.0130	280.1828			
	Forest type -Montane	-2.07E-02	-1.37E-01	9.09E-02	1.0048	476.3911			
	$\Delta MCWD_{YRC}$	-2.13E-02	-7.60E-02	3.52E-02	1.0074	421.6460			
	ΔVPD_{YRC}	6.33E+00	-5.12E+01	6.31E+01	1.0080	315.0233			
	$\Delta SPEI_{YRC}$	-2.12E+00	-7.57E+00	3.49E+00	1.0079	409.5973			
	CEC	4.14E-03	-3.38E-03	1.18E-02	1.0003	546.6144			
	Clay	1.82E-03	-5.60E-03	8.99E-03	1.0046	409.6738			
	pH	-2.90E-02	-1.11E-01	5.62E-02	1.0023	541.0106			
	Sand	2.26E-03	-3.32E-03	7.99E-03	1.0042	434.2062			
	ΔT_{YRC} : Forest type -Montane	5.47E+00	-1.03E+01	2.11E+01	1.0105	315.3203			
	Forest type -Montane : $\Delta MCWD_{YRC}$	5.92E-02	-1.49E-02	1.32E-01	1.0040	513.3331			
	Forest type -Montane : ΔVPD_{YRC}	-7.71E+00	-1.14E+02	9.91E+01	1.0020	521.6443			
	Forest type -Montane : $\Delta SPEI_{YRC}$	4.55E+00	-3.40E+00	1.19E+01	1.0060	548.8165			
FM	Intercept (Lowland forest)	-5.97E-03	-4.62E-02	3.37E-02	1.0088	273.2221	0.63	240	Fatality
	ΔT_{YRC}	1.08E+01	2.81E+00	1.91E+01	1.0104	212.4886			
	Forest type -Montane	8.40E-03	-5.94E-02	8.26E-02	1.0070	493.3547			
	$\Delta MCWD_{YRC}$	6.81E-03	-3.37E-02	4.42E-02	1.0023	418.2162			
	ΔVPD_{YRC}	-5.54E+01	-9.99E+01	-1.42E+01	1.0136	197.2589			
	$\Delta SPEI_{YRC}$	2.38E+00	-1.37E+00	5.77E+00	1.0049	434.7373			
	CEC	-4.52E-03	-1.01E-02	3.71E-04	0.9998	658.7043			
	Clay	-2.18E-03	-7.09E-03	2.73E-03	1.0069	429.8670			
	pH	4.78E-02	-9.48E-03	1.06E-01	1.0003	481.5120			
	Sand	-3.56E-04	-3.91E-03	3.02E-03	1.0022	446.2002			
	ΔT_{YRC} : Forest type -Montane	-9.64E+00	-2.09E+01	2.14E+00	1.0043	348.0519			
	Forest type -Montane : $\Delta MCWD_{YRC}$	3.47E-03	-5.23E-02	6.42E-02	1.0023	404.5435			

	Forest type -Montane : ΔVPD_{YRC}	6.32E+01	-1.08E+01	1.39E+02	1.0049	361.4597			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.96E+00	-7.52E+00	3.96E+00	1.0092	378.8833			
SM	Intercept (Lowland forest)	1.69E+00	-8.42E-01	4.12E+00	1.0000	947.0171	0.18	313	FULL
	ΔT_{YRC}	1.77E+02	-2.15E+02	5.53E+02	1.0006	924.2505			
	Forest type -Montane	-2.15E+00	-6.16E+00	1.61E+00	1.0019	1336.3508			
	$\Delta MCWD_{YRC}$	-7.56E-01	-2.84E+00	1.24E+00	1.0015	902.2358			
	ΔVPD_{YRC}	-2.68E+02	-2.33E+03	1.82E+03	0.9997	1029.3381			
	$\Delta SPEI_{YRC}$	-1.42E+02	-3.50E+02	6.99E+01	1.0025	907.4385			
	CEC	2.93E-01	2.27E-02	5.60E-01	1.0002	1629.1815			
	Clay	8.98E-02	-1.33E-01	3.33E-01	1.0009	1594.8460			
	pH	-5.72E+00	-8.65E+00	-2.81E+00	1.0003	1341.3519			
	Sand	1.91E-01	7.68E-03	3.85E-01	1.0001	1465.0335			
	ΔT_{YRC} : Forest type -Montane	-2.55E+02	-7.74E+02	2.70E+02	1.0019	1136.1918			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.10E-02	-2.65E+00	2.63E+00	1.0022	920.5403			
	Forest type -Montane : ΔVPD_{YRC}	-7.04E+02	-4.66E+03	3.08E+03	1.0003	1233.7011			
	Forest type -Montane : $\Delta SPEI_{YRC}$	1.26E+02	-1.40E+02	3.99E+02	1.0010	1009.3959			
SM	Intercept (Lowland forest)	1.26E-01	-2.35E+00	2.64E+00	1.0068	360.2122	0.25	314	Survivor
	ΔT_{YRC}	-6.55E+00	-3.80E+02	3.73E+02	1.0057	331.6255			
	Forest type -Montane	-1.38E+00	-5.56E+00	2.65E+00	1.0069	613.9046			
	$\Delta MCWD_{YRC}$	-1.41E+00	-3.62E+00	7.14E-01	1.0095	504.7754			
	ΔVPD_{YRC}	9.15E+02	-1.25E+03	3.13E+03	1.0101	343.1446			
	$\Delta SPEI_{YRC}$	-5.93E+01	-3.05E+02	1.51E+02	1.0091	454.4778			
	CEC	7.46E-02	-1.84E-01	3.40E-01	1.0009	805.6128			
	Clay	1.44E-01	-9.63E-02	3.88E-01	1.0037	931.8393			
	pH	-1.83E+00	-4.92E+00	1.04E+00	1.0007	945.7437			
	Sand	2.30E-01	4.85E-02	4.26E-01	1.0016	717.5649			
	ΔT_{YRC} : Forest type -Montane	-1.32E+02	-6.70E+02	4.59E+02	1.0085	457.5739			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-2.86E-01	-3.07E+00	2.59E+00	1.0037	617.0756			
	Forest type -Montane : ΔVPD_{YRC}	-1.54E+03	-5.63E+03	2.54E+03	1.0111	538.3428			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.48E+02	-4.18E+02	1.42E+02	1.0047	544.5974			
SM	Intercept (Lowland forest)	8.77E+00	-1.08E+01	2.66E+01	1.0068	256.7063	0.66	276	Recruit
	ΔT_{YRC}	4.57E+02	-2.60E+03	3.20E+03	1.0038	283.8430			
	Forest type -Montane	-5.17E+00	-3.76E+01	2.38E+01	1.0092	383.7789			

	$\Delta MCWD_{YRC}$	8.98E+00	-5.78E+00	2.53E+01	1.0087	366.8000			
	ΔVPD_{YRC}	-1.97E+03	-1.71E+04	1.43E+04	1.0032	297.0981			
	$\Delta SPEI_{YRC}$	1.82E+03	3.68E+02	3.29E+03	1.0042	341.4296			
	CEC	1.93E-01	-2.05E+00	2.53E+00	1.0175	411.5667			
	Clay	-3.42E+00	-5.43E+00	-1.53E+00	1.0066	423.7475			
	pH	1.10E+01	-1.09E+01	3.44E+01	1.0067	444.6928			
	Sand	-2.42E+00	-3.84E+00	-1.01E+00	1.0021	443.0975			
	ΔT_{YRC} : Forest type -Montane	-2.65E+03	-6.26E+03	1.34E+03	1.0078	344.8235			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-9.78E+00	-3.13E+01	1.06E+01	1.0079	426.9295			
	Forest type -Montane : ΔVPD_{YRC}	5.80E+03	-2.37E+04	3.47E+04	1.0092	394.0149			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-9.53E+02	-3.32E+03	1.27E+03	1.0037	460.3931			
SM	Intercept (Lowland forest)	-2.06E+01	-3.93E+01	-2.01E+00	1.0034	404.6218	0.49	287	Fatality
	ΔT_{YRC}	-2.52E+03	-5.57E+03	5.40E+02	1.0089	497.3483			
	Forest type -Montane	1.31E+01	-1.90E+01	4.33E+01	1.0016	621.9317			
	$\Delta MCWD_{YRC}$	1.53E+01	-2.06E+00	3.19E+01	1.0007	427.7241			
	ΔVPD_{YRC}	5.69E+03	-1.30E+04	2.47E+04	1.0144	452.2843			
	$\Delta SPEI_{YRC}$	1.72E+02	-1.52E+03	1.84E+03	1.0006	426.7022			
	CEC	3.79E+00	1.15E+00	6.46E+00	1.0084	544.3506			
	Clay	-1.74E+00	-3.89E+00	2.72E-01	1.0021	507.0334			
	pH	-1.72E+01	-4.21E+01	8.04E+00	1.0032	637.2332			
	Sand	-1.41E+00	-2.98E+00	3.02E-02	1.0007	532.0996			
	ΔT_{YRC} : Forest type -Montane	2.50E+02	-3.91E+03	4.45E+03	1.0049	552.1278			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.43E+01	-3.80E+01	9.21E+00	1.0011	525.9755			
	Forest type -Montane : ΔVPD_{YRC}	-1.89E+04	-5.01E+04	9.52E+03	1.0052	571.9085			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-3.72E+02	-2.82E+03	2.11E+03	1.0009	616.1231			
N	Intercept (Lowland forest)	-1.84E-05	-5.10E-04	4.41E-04	1.0015	740.4500	0.25	373	FULL
	ΔT_{YRC}	-3.39E-02	-1.20E-01	5.34E-02	1.0010	654.5275			
	Forest type -Montane	-4.79E-04	-1.38E-03	4.18E-04	0.9997	1046.4203			
	$\Delta MCWD_{YRC}$	-3.56E-05	-4.04E-04	3.57E-04	1.0064	941.1841			
	ΔVPD_{YRC}	-7.69E-02	-5.20E-01	3.83E-01	1.0017	668.0191			
	$\Delta SPEI_{YRC}$	-1.15E-02	-5.21E-02	2.95E-02	1.0057	742.3098			
	CEC	1.51E-05	-3.95E-05	6.99E-05	1.0013	1184.5220			
	Clay	4.54E-05	-1.57E-07	9.27E-05	1.0013	1100.7998			

	pH	-1.02E-04	-6.39E-04	4.83E-04	1.0005	1220.0008			
	Sand	-2.34E-05	-5.86E-05	1.38E-05	1.0021	935.3818			
	ΔT_{YRC} : Forest type -Montane	-2.86E-02	-1.55E-01	1.01E-01	1.0020	750.5286			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-4.61E-04	-1.03E-03	1.10E-04	1.0058	885.2562			
	Forest type -Montane : ΔVPD_{YRC}	-7.21E-01	-1.60E+00	1.67E-01	0.9997	853.7639			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.94E-02	-7.69E-02	3.91E-02	1.0027	840.7172			
	Intercept (Lowland forest)	-2.82E-04	-7.22E-04	1.74E-04	1.0037	534.7928			
	ΔT_{YRC}	-6.80E-02	-1.49E-01	1.30E-02	0.9998	531.0401			
	Forest type -Montane	-1.38E-04	-1.02E-03	7.40E-04	1.0024	768.3236			
	$\Delta MCWD_{YRC}$	3.11E-04	-6.96E-05	6.91E-04	1.0082	536.6365			
	ΔVPD_{YRC}	1.54E-01	-2.75E-01	6.19E-01	1.0006	547.7460			
	$\Delta SPEI_{YRC}$	9.64E-03	-3.00E-02	5.01E-02	1.0067	510.9667			
N	CEC	8.93E-06	-4.49E-05	6.16E-05	1.0004	1194.6855	0.23	374	Survivor
	Clay	6.02E-05	1.49E-05	1.07E-04	1.0062	892.7589			
	pH	5.20E-05	-4.99E-04	6.10E-04	1.0052	809.5500			
	Sand	-2.55E-05	-6.19E-05	8.67E-06	1.0047	778.6261			
	ΔT_{YRC} : Forest type -Montane	6.70E-03	-1.20E-01	1.27E-01	0.9999	659.8681			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-8.85E-04	-1.48E-03	-3.21E-04	1.0035	681.2746			
	Forest type -Montane : ΔVPD_{YRC}	-8.20E-01	-1.76E+00	5.58E-02	1.0011	756.4782			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-5.22E-02	-1.09E-01	2.33E-03	1.0018	716.4549			
	Intercept (Lowland forest)	1.35E-03	-2.43E-03	4.79E-03	1.0055	351.2880			
	ΔT_{YRC}	8.97E-01	1.31E-01	1.68E+00	1.0150	356.1821			
	Forest type -Montane	3.85E-03	-5.14E-03	1.24E-02	1.0084	387.7085			
	$\Delta MCWD_{YRC}$	1.90E-03	-2.02E-03	5.82E-03	1.0004	423.7429			
	ΔVPD_{YRC}	-6.53E+00	-1.05E+01	-2.49E+00	1.0226	473.6907			
	$\Delta SPEI_{YRC}$	8.00E-02	-2.87E-01	4.57E-01	1.0048	346.6422			
N	CEC	4.95E-05	-5.45E-04	6.04E-04	0.9994	499.7991	0.56	331	Recruit
	Clay	-4.56E-04	-9.48E-04	4.88E-05	1.0244	345.4385			
	pH	-2.10E-05	-5.95E-03	5.48E-03	1.0021	550.7562			
	Sand	-1.06E-04	-4.59E-04	2.27E-04	1.0180	327.1029			
	ΔT_{YRC} : Forest type -Montane	-1.72E+00	-2.81E+00	-6.44E-01	1.0093	579.6104			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-4.57E-03	-1.02E-02	9.35E-04	1.0023	447.9781			
	Forest type -Montane : ΔVPD_{YRC}	1.34E+01	5.17E+00	2.09E+01	1.0077	449.0871			

	Forest type -Montane : $\Delta SPEI_{YRC}$	-2.25E-01	-8.32E-01	3.64E-01	1.0022	483.9117			
N	Intercept (Lowland forest)	-2.92E-03	-6.28E-03	5.00E-04	1.0064	466.5826	0.45	340	Fatality
	ΔT_{YRC}	-3.84E-01	-1.19E+00	3.52E-01	1.0056	404.0269			
	Forest type -Montane	-2.00E-04	-8.73E-03	8.65E-03	1.0008	589.6195			
	$\Delta MCWD_{YRC}$	3.92E-04	-3.79E-03	4.28E-03	1.0067	334.6424			
	ΔVPD_{YRC}	7.33E-01	-2.98E+00	4.58E+00	1.0042	379.2784			
	$\Delta SPEI_{YRC}$	1.03E-01	-3.10E-01	4.77E-01	1.0139	340.2423			
	CEC	-5.97E-04	-1.18E-03	-6.28E-05	1.0023	539.1158			
	Clay	4.76E-04	9.97E-06	9.43E-04	1.0080	457.9726			
	pH	-4.04E-04	-5.56E-03	4.88E-03	1.0057	529.6776			
	Sand	9.36E-05	-2.60E-04	4.54E-04	1.0039	447.9534			
	ΔT_{YRC} : Forest type -Montane	6.54E-01	-4.77E-01	1.76E+00	1.0024	449.6756			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.94E-03	-7.72E-03	4.11E-03	1.0141	345.2703			
	Forest type -Montane : ΔVPD_{YRC}	-1.20E+00	-9.10E+00	6.01E+00	1.0034	544.6221			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-5.15E-01	-1.13E+00	9.01E-02	1.0152	334.7067			
DE	Intercept (Lowland forest)	2.09E-02	-2.79E-02	7.29E-02	1.0138	325.7534	0.26	381	FULL
	ΔT_{YRC}	-5.81E+00	-1.46E+01	2.51E+00	1.0143	360.5093			
	Forest type -Montane	6.81E-02	-3.26E-02	1.67E-01	1.0138	363.9293			
	$\Delta MCWD_{YRC}$	-2.91E-02	-7.17E-02	1.06E-02	1.0159	359.7997			
	ΔVPD_{YRC}	-1.80E+01	-6.26E+01	2.38E+01	1.0191	417.2409			
	$\Delta SPEI_{YRC}$	-4.81E+00	-9.37E+00	-4.25E-01	1.0162	306.0772			
	CEC	8.58E-04	-4.28E-03	5.98E-03	1.0134	678.2506			
	Clay	1.55E-02	1.06E-02	2.09E-02	1.0041	578.0704			
	pH	3.70E-02	-2.42E-02	1.03E-01	1.0012	643.6108			
	Sand	8.88E-03	5.22E-03	1.27E-02	1.0018	647.6305			
	ΔT_{YRC} : Forest type -Montane	4.77E+00	-8.00E+00	1.71E+01	1.0092	511.3646			
	Forest type -Montane : $\Delta MCWD_{YRC}$	1.85E-02	-3.47E-02	7.45E-02	1.0089	419.1836			
	Forest type -Montane : ΔVPD_{YRC}	7.77E+01	-1.82E+01	1.70E+02	1.0336	235.1582			
	Forest type -Montane : $\Delta SPEI_{YRC}$	5.15E+00	-1.24E+00	1.11E+01	1.0149	320.4627			
DE	Intercept (Lowland forest)	3.60E-02	-1.37E-02	8.84E-02	1.0110	387.0682	0.23	380	Survivor
	ΔT_{YRC}	-5.05E+00	-1.30E+01	3.37E+00	1.0065	495.2848			
	Forest type -Montane	5.29E-02	-4.15E-02	1.40E-01	1.0025	649.9443			
	$\Delta MCWD_{YRC}$	-3.73E-02	-8.10E-02	4.18E-03	1.0062	519.1964			

	ΔVPD_{YRC}	-6.54E+00	-5.42E+01	3.81E+01	1.0067	498.3805			
	$\Delta SPEI_{YRC}$	-6.17E+00	-1.09E+01	-1.62E+00	1.0116	384.2984			
	CEC	2.95E-04	-4.52E-03	4.87E-03	1.0024	1292.8291			
	Clay	1.42E-02	9.26E-03	1.93E-02	1.0012	854.1906			
	pH	3.75E-02	-1.99E-02	1.02E-01	1.0011	827.6312			
	Sand	6.01E-03	2.52E-03	9.72E-03	1.0048	614.2878			
	ΔT_{YRC} : Forest type -Montane	5.42E+00	-7.07E+00	1.79E+01	1.0014	530.8607			
	Forest type -Montane : $\Delta MCWD_{YRC}$	3.91E-02	-1.41E-02	9.62E-02	1.0041	599.9674			
	Forest type -Montane : ΔVPD_{YRC}	4.81E+01	-4.80E+01	1.38E+02	1.0044	577.7626			
	Forest type -Montane : $\Delta SPEI_{YRC}$	5.81E+00	5.05E-02	1.20E+01	1.0074	528.2599			
DE	Intercept (Lowland forest)	-2.40E-01	-5.20E-01	6.71E-02	1.0086	224.1120	0.57	326	Recruit
	ΔT_{YRC}	-2.53E+00	-6.50E+01	5.80E+01	1.0161	220.5328			
	Forest type -Montane	-5.36E-02	-6.96E-01	6.21E-01	1.0113	258.4621			
	$\Delta MCWD_{YRC}$	-1.20E-01	-4.59E-01	1.80E-01	1.0127	199.6961			
	ΔVPD_{YRC}	-2.14E+02	-4.96E+02	8.55E+01	1.0156	256.6916			
	$\Delta SPEI_{YRC}$	-7.84E+00	-4.12E+01	2.22E+01	1.0133	161.7048			
	CEC	2.04E-02	-2.08E-02	6.06E-02	1.0099	355.7150			
	Clay	-4.60E-02	-8.54E-02	-7.96E-03	1.0311	245.6001			
	pH	-5.98E-01	-1.06E+00	-1.39E-01	1.0021	243.0380			
	Sand	-1.45E-02	-4.60E-02	1.53E-02	1.0341	252.1572			
	ΔT_{YRC} : Forest type -Montane	1.11E+00	-8.20E+01	8.83E+01	1.0135	231.5324			
	Forest type -Montane : $\Delta MCWD_{YRC}$	2.69E-01	-1.63E-01	7.29E-01	1.0067	227.2417			
	Forest type -Montane : ΔVPD_{YRC}	-3.03E+01	-6.12E+02	5.43E+02	1.0135	307.7074			
	Forest type -Montane : $\Delta SPEI_{YRC}$	1.35E+00	-4.76E+01	5.12E+01	1.0124	167.0761			
DE	Intercept (Lowland forest)	-3.44E-02	-3.91E-01	2.88E-01	1.0166	430.7330	0.59	337	Fatality
	ΔT_{YRC}	-5.97E+01	-1.33E+02	1.07E+01	1.0090	393.7828			
	Forest type -Montane	-2.82E-01	-1.08E+00	4.94E-01	1.0051	591.5893			
	$\Delta MCWD_{YRC}$	4.97E-02	-3.06E-01	4.43E-01	1.0107	377.5161			
	ΔVPD_{YRC}	2.31E+02	-1.36E+02	6.21E+02	1.0082	369.0916			
	$\Delta SPEI_{YRC}$	2.92E+01	-3.13E+00	6.73E+01	1.0111	379.6410			
	CEC	3.75E-02	-9.96E-03	9.00E-02	1.0035	772.2408			
	Clay	8.03E-02	3.37E-02	1.26E-01	1.0013	485.7725			
	pH	9.02E-01	4.19E-01	1.43E+00	1.0030	693.1312			

	Sand	3.27E-02	-1.51E-04	6.39E-02	1.0032	615.9238			
	ΔT_{YRC} : Forest type -Montane	-7.60E+01	-1.75E+02	2.76E+01	1.0126	521.2922			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-9.97E-01	-1.58E+00	-5.00E-01	1.0044	559.5845			
	Forest type -Montane : ΔVPD_{YRC}	4.38E+02	-3.08E+02	1.13E+03	1.0028	490.2187			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-8.70E+01	-1.46E+02	-3.46E+01	1.0133	439.2976			
	Intercept (Lowland forest)	-3.01E-02	-4.52E-02	-1.62E-02	1.0116	408.6352			
	ΔT_{YRC}	-4.04E+00	-6.82E+00	-1.17E+00	1.0040	386.6475			
	Forest type -Montane	3.18E-02	1.59E-03	6.23E-02	1.0005	682.6423			
	$\Delta MCWD_{YRC}$	2.75E-02	1.48E-02	4.00E-02	1.0054	573.1183			
	ΔVPD_{YRC}	1.85E+01	4.53E+00	3.35E+01	1.0033	332.6305			
	$\Delta SPEI_{YRC}$	2.42E+00	9.71E-01	3.84E+00	1.0091	575.8463			
Thickness	CEC	-5.13E-04	-1.84E-03	7.33E-04	1.0005	1067.8895	0.35	336	FULL
	Clay	3.08E-04	-9.68E-04	1.58E-03	1.0038	855.4032			
	pH	2.82E-02	1.09E-02	4.62E-02	1.0058	682.9917			
	Sand	-1.11E-03	-2.18E-03	-4.74E-05	1.0036	803.5234			
	ΔT_{YRC} : Forest type -Montane	3.10E+00	-1.18E+00	7.22E+00	1.0080	370.7096			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-3.34E-02	-5.10E-02	-1.59E-02	1.0040	576.3716			
	Forest type -Montane : ΔVPD_{YRC}	-7.31E+00	-3.87E+01	2.38E+01	1.0027	573.7421			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.83E+00	-3.72E+00	3.68E-03	1.0044	552.8751			
	Intercept (Lowland forest)	-2.78E-02	-4.19E-02	-1.47E-02	1.0037	581.6690			
	ΔT_{YRC}	-3.96E+00	-6.92E+00	-1.19E+00	1.0024	624.4282			
	Forest type -Montane	2.15E-02	-1.11E-02	5.40E-02	1.0071	654.7476			
	$\Delta MCWD_{YRC}$	2.12E-02	9.38E-03	3.49E-02	1.0055	592.5643			
	ΔVPD_{YRC}	2.23E+01	8.49E+00	3.80E+01	1.0007	699.2066			
	$\Delta SPEI_{YRC}$	1.79E+00	4.88E-01	3.26E+00	1.0032	661.8998			
Thickness	CEC	-9.03E-05	-1.37E-03	1.26E-03	1.0011	1127.0259	0.33	338	Survivor
	Clay	1.49E-04	-1.05E-03	1.42E-03	1.0027	1036.7129			
	pH	3.16E-02	1.39E-02	5.25E-02	1.0005	777.2208			
	Sand	-5.98E-04	-1.61E-03	4.16E-04	1.0017	854.5964			
	ΔT_{YRC} : Forest type -Montane	2.52E+00	-1.95E+00	6.67E+00	1.0059	617.7521			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-3.34E-02	-5.22E-02	-1.73E-02	1.0024	638.5422			
	Forest type -Montane : ΔVPD_{YRC}	-1.19E+01	-4.56E+01	2.19E+01	1.0070	730.4854			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.93E+00	-3.85E+00	-1.32E-01	1.0012	704.8914			

Thickness	Intercept (Lowland forest)	-4.93E-02	-1.11E-01	6.96E-03	1.0326	158.9047	0.51	302	Recruit
	ΔT_{YRC}	-5.41E-01	-1.31E+01	1.35E+01	1.0280	215.0473			
	Forest type -Montane	1.30E-01	-6.31E-02	3.12E-01	1.0123	296.4167			
	$\Delta MCWD_{YRC}$	-5.87E-02	-1.32E-01	2.12E-02	1.0425	209.5853			
	ΔVPD_{YRC}	3.53E+01	-4.32E+01	9.96E+01	1.0287	148.8701			
	$\Delta SPEI_{YRC}$	-3.50E+00	-1.04E+01	3.82E+00	1.0378	213.6716			
	CEC	8.33E-03	-2.33E-03	1.95E-02	1.0149	253.6075			
	Clay	4.03E-03	-5.44E-03	1.36E-02	1.0077	233.1654			
	pH	-9.86E-02	-2.01E-01	3.02E-03	1.0227	228.0185			
	Sand	7.88E-03	1.23E-03	1.55E-02	1.0063	214.2701			
	ΔT_{YRC} : Forest type -Montane	-2.72E+00	-2.48E+01	1.97E+01	1.0482	159.6510			
	Forest type -Montane : $\Delta MCWD_{YRC}$	1.04E-01	-6.48E-03	2.11E-01	1.0297	191.8016			
	Forest type -Montane : ΔVPD_{YRC}	-7.29E+00	-1.82E+02	1.78E+02	1.0195	215.7840			
	Forest type -Montane : $\Delta SPEI_{YRC}$	4.39E+00	-6.82E+00	1.58E+01	1.0484	86.8874			
Thickness	Intercept (Lowland forest)	3.11E-02	-3.29E-02	9.24E-02	1.0040	335.2755	0.51	296	Fatality
	ΔT_{YRC}	8.90E+00	-4.60E+00	2.15E+01	1.0050	343.5817			
	Forest type -Montane	-9.26E-02	-2.62E-01	9.21E-02	1.0030	341.4349			
	$\Delta MCWD_{YRC}$	1.56E-02	-6.03E-02	9.16E-02	0.9994	392.7220			
	ΔVPD_{YRC}	-2.32E+01	-8.97E+01	4.58E+01	1.0104	359.5345			
	$\Delta SPEI_{YRC}$	2.82E+00	-4.52E+00	1.02E+01	1.0014	363.8394			
	CEC	2.73E-03	-8.35E-03	1.35E-02	1.0050	437.4779			
	Clay	-7.74E-03	-1.69E-02	1.54E-03	1.0102	412.3248			
	pH	1.24E-01	1.30E-02	2.40E-01	1.0029	437.1878			
	Sand	-8.69E-04	-7.32E-03	5.53E-03	1.0072	425.7868			
	ΔT_{YRC} : Forest type -Montane	-1.60E+01	-3.71E+01	5.35E+00	1.0073	430.1654			
	Forest type -Montane : $\Delta MCWD_{YRC}$	1.01E-01	-2.39E-03	2.07E-01	1.0022	488.3635			
	Forest type -Montane : ΔVPD_{YRC}	-6.50E+01	-2.17E+02	8.66E+01	1.0047	507.7611			
	Forest type -Montane : $\Delta SPEI_{YRC}$	2.25E+00	-8.53E+00	1.32E+01	1.0036	548.9398			
P	Intercept (Lowland forest)	1.72E-05	-1.28E-05	4.72E-05	1.0069	682.5068	0.16	363	FULL
	ΔT_{YRC}	2.07E-03	-3.24E-03	6.84E-03	1.0065	691.5487			
	Forest type -Montane	-1.88E-05	-7.80E-05	4.07E-05	1.0039	923.7121			
	$\Delta MCWD_{YRC}$	2.61E-05	1.60E-06	5.46E-05	1.0032	636.5699			
	ΔVPD_{YRC}	-7.60E-04	-2.57E-02	2.53E-02	1.0046	819.4221			

	$\Delta SPEI_{YRC}$	2.21E-03	-4.41E-04	5.00E-03	1.0010	632.8835			
	CEC	6.90E-06	3.07E-06	1.10E-05	1.0009	1234.7427			
	Clay	-2.25E-07	-3.25E-06	2.88E-06	1.0042	825.6517			
	pH	-3.14E-05	-7.01E-05	7.16E-06	1.0023	958.5997			
	Sand	-1.18E-06	-3.70E-06	1.24E-06	1.0044	851.6060			
	ΔT_{YRC} : Forest type -Montane	-4.12E-03	-1.08E-02	3.51E-03	1.0064	999.5988			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-4.03E-05	-7.63E-05	-6.07E-06	1.0014	730.9818			
	Forest type -Montane : ΔVPD_{YRC}	-1.08E-02	-6.23E-02	4.44E-02	1.0030	870.9612			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-3.39E-03	-7.18E-03	6.05E-05	1.0019	784.0953			
	Intercept (Lowland forest)	3.72E-05	8.48E-06	6.63E-05	1.0010	574.5232			
	ΔT_{YRC}	3.95E-03	-1.02E-03	9.12E-03	0.9993	507.9941			
	Forest type -Montane	-2.23E-05	-7.26E-05	2.86E-05	1.0020	986.9743			
	$\Delta MCWD_{YRC}$	2.35E-06	-2.09E-05	2.63E-05	1.0025	708.6189			
	ΔVPD_{YRC}	-1.52E-03	-2.81E-02	2.31E-02	1.0001	555.4295			
	$\Delta SPEI_{YRC}$	-2.06E-04	-2.59E-03	2.16E-03	1.0045	609.0770			
P	CEC	5.38E-06	1.84E-06	9.17E-06	1.0007	819.3811	0.16	357	Survivor
	Clay	-2.50E-06	-5.31E-06	2.76E-07	1.0031	911.6950			
	pH	-2.54E-05	-6.06E-05	9.40E-06	1.0008	951.8648			
	Sand	-1.49E-06	-3.73E-06	7.39E-07	1.0010	750.8410			
	ΔT_{YRC} : Forest type -Montane	-7.63E-03	-1.52E-02	-6.52E-04	1.0021	683.8010			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-9.28E-06	-4.20E-05	2.15E-05	1.0002	748.9142			
	Forest type -Montane : ΔVPD_{YRC}	7.69E-03	-4.07E-02	5.58E-02	1.0022	582.0651			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-8.52E-04	-4.10E-03	2.49E-03	1.0024	629.9206			
	Intercept (Lowland forest)	1.33E-04	-1.54E-04	4.22E-04	1.0080	359.7332			
	ΔT_{YRC}	2.59E-02	-2.88E-02	8.10E-02	1.0077	401.9959			
	Forest type -Montane	-5.56E-04	-1.13E-03	3.98E-05	1.0015	626.2854			
	$\Delta MCWD_{YRC}$	1.19E-05	-2.85E-04	2.82E-04	1.0146	234.7925			
P	ΔVPD_{YRC}	-2.43E-01	-5.23E-01	1.92E-02	1.0046	447.8085	0.44	338	Recruit
	$\Delta SPEI_{YRC}$	6.89E-03	-2.09E-02	3.29E-02	1.0063	286.3055			
	CEC	-3.22E-05	-7.31E-05	6.64E-06	1.0020	540.8612			
	Clay	8.10E-06	-2.73E-05	4.15E-05	1.0057	593.4477			
	pH	9.95E-05	-3.07E-04	5.20E-04	1.0014	577.1051			
	Sand	5.13E-06	-2.30E-05	3.18E-05	1.0048	490.7513			

	ΔT_{YRC} : Forest type -Montane	1.12E-02	-6.41E-02	8.61E-02	1.0027	466.3960			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.02E-04	-5.10E-04	3.31E-04	1.0091	364.8622			
	Forest type -Montane : ΔVPD_{YRC}	-2.61E-01	-7.58E-01	2.64E-01	1.0049	492.8714			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-2.03E-02	-6.18E-02	2.28E-02	1.0004	502.6095			
	Intercept (Lowland forest)	1.02E-04	-1.79E-04	3.83E-04	1.0040	323.6417			
	ΔT_{YRC}	1.39E-02	-3.85E-02	6.49E-02	1.0015	379.5216			
	Forest type -Montane	-7.05E-04	-1.28E-03	-1.61E-04	1.0038	502.0036			
	$\Delta MCWD_{YRC}$	-6.07E-05	-3.32E-04	2.07E-04	1.0134	320.5378			
	ΔVPD_{YRC}	6.52E-02	-1.88E-01	3.53E-01	1.0075	289.7739			
	$\Delta SPEI_{YRC}$	-1.79E-02	-4.38E-02	9.36E-03	1.0117	320.8478			
P	CEC	2.70E-05	-8.57E-06	6.31E-05	1.0055	667.3196	0.63	323	Fatality
	Clay	6.45E-05	3.25E-05	9.43E-05	1.0107	408.4776			
	pH	3.08E-04	-9.33E-05	7.12E-04	1.0048	470.1634			
	Sand	2.56E-05	1.42E-06	4.86E-05	1.0076	453.3641			
	ΔT_{YRC} : Forest type -Montane	2.73E-03	-7.19E-02	7.78E-02	1.0060	370.5327			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-2.64E-04	-6.68E-04	1.42E-04	1.0049	466.1993			
	Forest type -Montane : ΔVPD_{YRC}	-3.08E-01	-8.24E-01	2.04E-01	1.0087	431.3367			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.60E-02	-5.86E-02	2.64E-02	1.0096	376.8194			
	Intercept (Lowland forest)	9.27E-04	-1.50E-03	3.72E-03	1.0085	506.0758			
	ΔT_{YRC}	-2.41E-01	-6.58E-01	2.12E-01	1.0058	470.3702			
	Forest type -Montane	-7.06E-04	-4.64E-03	3.39E-03	1.0026	789.6697			
	$\Delta MCWD_{YRC}$	-4.04E-03	-6.51E-03	-1.90E-03	1.0083	475.3369			
	ΔVPD_{YRC}	1.03E+00	-1.27E+00	3.10E+00	1.0027	579.3365			
	$\Delta SPEI_{YRC}$	-2.88E-01	-5.67E-01	-7.31E-02	1.0089	475.1896			
C	CEC	-2.06E-05	-2.46E-04	2.02E-04	1.0002	1280.5626	0.26	369	FULL
	Clay	4.01E-05	-1.74E-04	2.43E-04	1.0027	884.2371			
	pH	-1.29E-03	-4.08E-03	1.32E-03	1.0048	912.5459			
	Sand	-8.63E-05	-2.57E-04	7.73E-05	1.0030	998.5033			
	ΔT_{YRC} : Forest type -Montane	6.02E-01	5.29E-03	1.17E+00	1.0029	628.7598			
	Forest type -Montane : $\Delta MCWD_{YRC}$	3.32E-03	7.01E-04	6.12E-03	1.0058	487.3550			
	Forest type -Montane : ΔVPD_{YRC}	-6.85E-01	-4.52E+00	3.77E+00	1.0039	701.2298			
	Forest type -Montane : $\Delta SPEI_{YRC}$	2.13E-01	-6.77E-02	5.46E-01	1.0055	526.5787			
C	Intercept (Lowland forest)	-1.72E-04	-2.41E-03	2.39E-03	1.0000	901.5274	0.24	365	Survivor

	ΔT_{YRC}	-3.51E-01	-7.33E-01	5.26E-02	1.0020	786.0809		
	Forest type -Montane	1.59E-03	-2.12E-03	5.60E-03	1.0011	1088.9580		
	$\Delta MCWD_{YRC}$	-7.22E-04	-2.63E-03	1.06E-03	1.0015	976.2262		
	ΔVPD_{YRC}	1.07E+00	-1.01E+00	3.15E+00	1.0016	777.0645		
	$\Delta SPEI_{YRC}$	-3.90E-02	-2.42E-01	1.46E-01	1.0020	837.2463		
	CEC	7.98E-06	-2.00E-04	2.18E-04	0.9994	1708.1963		
	Clay	5.60E-06	-1.90E-04	2.02E-04	1.0006	1499.3594		
	pH	-1.41E-03	-3.87E-03	1.03E-03	0.9996	1339.9472		
	Sand	-1.53E-04	-3.21E-04	5.50E-06	0.9999	1151.4359		
	ΔT_{YRC} : Forest type -Montane	6.62E-01	1.18E-01	1.19E+00	1.0033	950.3397		
	Forest type -Montane : $\Delta MCWD_{YRC}$	8.32E-04	-1.65E-03	3.48E-03	1.0000	1040.8527		
	Forest type -Montane : ΔVPD_{YRC}	-4.23E-01	-4.26E+00	3.67E+00	1.0036	900.4569		
	Forest type -Montane : $\Delta SPEI_{YRC}$	5.10E-02	-2.03E-01	3.30E-01	1.0020	959.3917		
C	Intercept (Lowland forest)	-2.33E-02	-3.80E-02	-6.79E-03	1.0000	330.7763	0.47	352	Recruit
	ΔT_{YRC}	-1.64E+00	-4.76E+00	1.65E+00	1.0020	316.3770		
	Forest type -Montane	8.05E-03	-2.55E-02	4.28E-02	1.0085	321.9517		
	$\Delta MCWD_{YRC}$	-6.26E-03	-2.19E-02	9.68E-03	1.0084	357.2559		
	ΔVPD_{YRC}	1.37E+01	-2.38E+00	2.91E+01	1.0076	323.0765		
	$\Delta SPEI_{YRC}$	-1.63E-02	-1.59E+00	1.38E+00	1.0153	326.0807		
	CEC	-1.90E-03	-4.12E-03	4.88E-04	1.0069	369.5606		
	Clay	1.07E-03	-8.92E-04	3.02E-03	1.0032	381.3729		
	pH	-1.96E-02	-4.15E-02	1.09E-03	1.0164	391.1147		
	Sand	-4.24E-04	-1.97E-03	1.12E-03	1.0071	368.7366		
	ΔT_{YRC} : Forest type -Montane	5.59E+00	1.01E+00	9.91E+00	1.0011	335.6079		
	Forest type -Montane : $\Delta MCWD_{YRC}$	1.50E-02	-9.91E-03	3.82E-02	1.0063	415.5836		
	Forest type -Montane : ΔVPD_{YRC}	-4.10E+01	-7.05E+01	-1.15E+01	1.0138	324.1165		
	Forest type -Montane : $\Delta SPEI_{YRC}$	7.30E-02	-2.29E+00	2.59E+00	1.0130	386.9786		
C	Intercept (Lowland forest)	-2.30E-03	-2.56E-02	2.06E-02	1.0020	557.7225	0.61	347	Fatality
	ΔT_{YRC}	-3.29E+00	-7.74E+00	9.72E-01	1.0019	550.9145		
	Forest type -Montane	-1.05E-03	-4.20E-02	4.29E-02	1.0019	748.8074		
	$\Delta MCWD_{YRC}$	3.41E-02	1.15E-02	5.69E-02	1.0048	629.2950		
	ΔVPD_{YRC}	9.89E+00	-1.26E+01	3.22E+01	1.0021	567.0664		
	$\Delta SPEI_{YRC}$	2.58E+00	4.60E-01	4.70E+00	1.0029	749.7754		

	CEC	4.23E-03	1.20E-03	7.23E-03	1.0024	964.1836			
	Clay	-1.76E-03	-4.39E-03	9.38E-04	1.0003	661.5847			
	pH	-1.15E-02	-4.04E-02	1.83E-02	1.0016	711.3170			
	Sand	-8.43E-04	-2.94E-03	1.20E-03	1.0004	643.4368			
	ΔT_{YRC} : Forest type -Montane	2.46E+00	-3.46E+00	8.28E+00	1.0038	689.9189			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-2.34E-03	-3.49E-02	3.03E-02	1.0021	788.1879			
	Forest type -Montane : ΔVPD_{YRC}	-1.45E+01	-5.39E+01	2.51E+01	1.0035	803.7044			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-5.07E-01	-3.88E+00	2.66E+00	1.0030	868.9008			
	Intercept (Lowland forest)	-2.20E-03	-1.11E-02	6.86E-03	1.0014	340.8713			
	ΔT_{YRC}	-1.45E+00	-3.08E+00	1.63E-01	1.0024	382.4944			
	Forest type -Montane	-2.79E-03	-1.82E-02	1.28E-02	1.0016	489.6001			
	$\Delta MCWD_{YRC}$	8.17E-03	3.84E-04	1.61E-02	1.0018	403.5597			
	ΔVPD_{YRC}	4.77E+00	-3.17E+00	1.32E+01	1.0061	364.4663			
	$\Delta SPEI_{YRC}$	-4.01E-01	-1.18E+00	4.14E-01	1.0048	431.4160			
H_{max}	CEC	-8.29E-04	-1.70E-03	8.80E-05	1.0007	1073.6724	0.32	359	FULL
	Clay	1.01E-03	1.88E-04	1.84E-03	1.0019	687.4671			
	pH	-2.61E-03	-1.27E-02	7.66E-03	1.0042	661.1617			
	Sand	-4.44E-04	-1.16E-03	2.21E-04	1.0013	608.8187			
	ΔT_{YRC} : Forest type -Montane	2.01E+00	-2.91E-01	4.11E+00	1.0047	450.1150			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.22E-02	-2.29E-02	-1.22E-03	0.9999	433.6605			
	Forest type -Montane : ΔVPD_{YRC}	-1.50E+01	-3.07E+01	6.66E-01	1.0041	497.7615			
	Forest type -Montane : $\Delta SPEI_{YRC}$	1.23E-01	-9.67E-01	1.21E+00	1.0013	448.8139			
	Intercept (Lowland forest)	2.09E-04	-8.28E-03	8.38E-03	1.0179	486.4552			
	ΔT_{YRC}	-1.42E+00	-2.93E+00	-2.83E-02	1.0212	363.8649			
	Forest type -Montane	1.38E-03	-1.39E-02	1.68E-02	0.9994	742.1298			
	$\Delta MCWD_{YRC}$	1.23E-02	5.13E-03	1.98E-02	1.0055	347.4011			
	ΔVPD_{YRC}	4.40E+00	-2.91E+00	1.26E+01	1.0282	409.5591			
H_{max}	$\Delta SPEI_{YRC}$	-1.05E-01	-8.07E-01	6.70E-01	1.0082	355.3856	0.30	359	Survivor
	CEC	-7.75E-04	-1.66E-03	9.67E-05	0.9992	690.0971			
	Clay	3.89E-04	-3.87E-04	1.16E-03	1.0038	772.0522			
	pH	-9.49E-04	-9.89E-03	8.09E-03	1.0016	774.6422			
	Sand	-7.94E-04	-1.45E-03	-1.32E-04	1.0078	594.5576			
	ΔT_{YRC} : Forest type -Montane	1.78E+00	-3.13E-01	3.93E+00	1.0143	414.0789			

	Forest type -Montane : $\Delta MCWD_{YRC}$	-1.16E-02	-2.10E-02	-2.07E-03	1.0057	496.1406			
	Forest type -Montane : ΔVPD_{YRC}	-1.12E+01	-2.80E+01	4.65E+00	1.0152	621.4170			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.02E-02	-9.93E-01	9.95E-01	1.0089	508.8953			
H_{max}	Intercept (Lowland forest)	-3.56E-02	-9.69E-02	2.28E-02	1.0118	144.5057	0.61	325	Recruit
	ΔT_{YRC}	-1.55E+01	-2.76E+01	-3.74E+00	1.0031	246.8994			
	Forest type -Montane	4.10E-02	-9.60E-02	1.81E-01	1.0076	308.7729			
	$\Delta MCWD_{YRC}$	8.01E-02	1.14E-02	1.51E-01	1.0037	227.6809			
	ΔVPD_{YRC}	8.75E+01	2.92E+01	1.51E+02	0.9993	273.2784			
	$\Delta SPEI_{YRC}$	1.49E+00	-4.97E+00	7.53E+00	1.0037	184.0200			
	CEC	1.36E-02	4.39E-03	2.24E-02	1.0015	437.2120			
	Clay	-4.02E-06	-7.30E-03	7.96E-03	1.0202	225.7394			
	pH	3.96E-02	-4.59E-02	1.24E-01	1.0154	340.7374			
	Sand	1.11E-03	-4.73E-03	6.92E-03	1.0114	252.1519			
	ΔT_{YRC} : Forest type -Montane	1.74E+01	9.15E-01	3.50E+01	1.0146	250.2847			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-9.69E-03	-1.05E-01	8.34E-02	1.0027	298.7220			
	Forest type -Montane : ΔVPD_{YRC}	-5.06E+01	-1.75E+02	7.40E+01	1.0053	308.9215			
	Forest type -Montane : $\Delta SPEI_{YRC}$	8.59E-01	-8.71E+00	1.13E+01	1.0045	240.4544			
H_{max}	Intercept (Lowland forest)	-2.84E-03	-5.08E-02	4.45E-02	1.0011	392.9644	0.55	311	Fatality
	ΔT_{YRC}	5.74E-02	-1.06E+01	1.07E+01	1.0056	407.8674			
	Forest type -Montane	6.72E-02	-3.91E-02	1.72E-01	1.0041	525.4779			
	$\Delta MCWD_{YRC}$	-2.79E-02	-9.06E-02	2.73E-02	1.0026	354.7653			
	ΔVPD_{YRC}	-1.58E+01	-6.65E+01	3.74E+01	1.0028	456.0473			
	$\Delta SPEI_{YRC}$	-9.49E-02	-5.55E+00	5.04E+00	1.0049	406.8971			
	CEC	-8.59E-05	-7.44E-03	7.00E-03	1.0052	570.0066			
	Clay	-2.32E-03	-8.88E-03	4.13E-03	1.0038	475.8499			
	pH	-4.68E-02	-1.19E-01	3.13E-02	1.0087	406.1128			
	Sand	-1.89E-03	-7.06E-03	3.51E-03	1.0077	376.6695			
	ΔT_{YRC} : Forest type -Montane	-7.26E+00	-2.17E+01	7.88E+00	1.0079	452.9618			
	Forest type -Montane : $\Delta MCWD_{YRC}$	3.10E-02	-4.29E-02	1.15E-01	1.0030	422.0732			
	Forest type -Montane : ΔVPD_{YRC}	2.99E+01	-6.73E+01	1.35E+02	1.0034	470.1012			
	Forest type -Montane : $\Delta SPEI_{YRC}$	2.95E+00	-4.71E+00	1.12E+01	1.0026	530.9959			
A_{sat}	Intercept (Lowland forest)	3.71E-03	1.12E-03	6.40E-03	1.0001	1667.1478	0.34	122	FULL
	ΔT_{YRC}	1.39E-01	-5.32E-01	8.05E-01	1.0008	1468.7999			

	Forest type -Montane	-7.24E-03	-1.64E-02	2.30E-03	1.0005	1611.2498			
	$\Delta MCWD_{YRC}$	-1.63E-03	-5.19E-03	2.19E-03	1.0007	1198.7212			
	ΔVPD_{YRC}	-1.42E+00	-5.18E+00	2.20E+00	1.0009	1459.5292			
	$\Delta SPEI_{YRC}$	-7.40E-02	-4.49E-01	2.75E-01	1.0002	1374.4012			
	CEC	-7.93E-04	-1.10E-03	-4.69E-04	0.9999	2241.2213			
	Clay	2.18E-04	-1.99E-04	6.25E-04	1.0007	1962.1618			
	pH	3.90E-03	-1.88E-03	9.06E-03	1.0010	1863.2548			
	Sand	-2.30E-04	-5.40E-04	5.79E-05	1.0002	1945.6990			
	ΔT_{YRC} : Forest type -Montane	2.97E-01	-1.17E+00	1.83E+00	1.0010	1651.1766			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-5.85E-04	-5.24E-03	4.12E-03	0.9998	1605.2784			
	Forest type -Montane : ΔVPD_{YRC}	-4.11E+00	-1.47E+01	6.99E+00	1.0004	1550.9499			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-2.58E-01	-7.32E-01	2.08E-01	0.9997	1717.7858			
	Intercept (Lowland forest)	3.62E-03	9.13E-04	6.50E-03	1.0017	1507.1204			
	ΔT_{YRC}	2.21E-01	-4.50E-01	9.03E-01	1.0012	1193.4822			
	Forest type -Montane	-9.82E-03	-1.86E-02	-1.03E-03	0.9998	1986.8119			
	$\Delta MCWD_{YRC}$	-2.09E-03	-6.07E-03	1.45E-03	1.0014	1114.2312			
	ΔVPD_{YRC}	-4.98E-01	-4.43E+00	3.31E+00	0.9998	1141.5509			
	$\Delta SPEI_{YRC}$	-8.94E-02	-4.71E-01	2.64E-01	1.0015	1242.1148			
A_{sat}	CEC	-6.39E-04	-9.51E-04	-3.32E-04	0.9994	2165.9188	0.38	124	Survivor
	Clay	3.69E-04	-5.44E-05	8.05E-04	1.0010	1885.3517			
	pH	4.67E-03	-1.14E-03	1.06E-02	1.0004	1941.4158			
	Sand	-2.47E-04	-5.56E-04	7.23E-05	1.0012	1646.2684			
	ΔT_{YRC} : Forest type -Montane	8.45E-01	-5.88E-01	2.19E+00	1.0004	1662.0503			
	Forest type -Montane : $\Delta MCWD_{YRC}$	7.95E-04	-4.08E-03	5.70E-03	1.0018	1350.7330			
	Forest type -Montane : ΔVPD_{YRC}	-7.96E+00	-1.76E+01	2.67E+00	0.9996	1849.0277			
	Forest type -Montane : $\Delta SPEI_{YRC}$	-1.31E-01	-6.16E-01	3.80E-01	1.0014	1461.7968			
	Intercept (Lowland forest)	-6.74E-03	-2.80E-02	1.48E-02	1.0005	1176.6882			
	ΔT_{YRC}	-5.08E+00	-1.06E+01	5.26E-01	1.0074	1167.7406			
	Forest type -Montane	9.42E-02	4.40E-03	1.89E-01	0.9995	1615.7833			
A_{sat}	$\Delta MCWD_{YRC}$	2.89E-03	-3.05E-02	3.54E-02	1.0006	1219.2961	0.64	114	Recruit
	ΔVPD_{YRC}	1.34E+01	-1.64E+01	4.39E+01	1.0071	1187.0523			
	$\Delta SPEI_{YRC}$	-1.05E+00	-4.20E+00	1.83E+00	1.0007	1293.9973			
	CEC	2.87E-04	-3.71E-03	4.21E-03	1.0028	1455.3862			

	Clay	5.81E-04	-3.69E-03	4.67E-03	1.0040	1282.6370			
	pH	-6.88E-02	-1.17E-01	-2.26E-02	0.9997	1537.2571			
	Sand	6.87E-04	-2.02E-03	3.65E-03	1.0011	1228.2032			
	ΔT_{YRC} : Forest type -Montane	-1.32E+00	-1.73E+01	1.57E+01	0.9997	1713.1051			
	Forest type -Montane : $\Delta MCWD_{YRC}$	2.09E-02	-4.08E-02	8.04E-02	1.0002	1413.9453			
	Forest type -Montane : ΔVPD_{YRC}	2.39E+01	-9.75E+01	1.37E+02	0.9993	1709.4562			
	Forest type -Montane : $\Delta SPEI_{YRC}$	4.53E+00	-1.10E+00	1.02E+01	0.9997	1289.2886			
	Intercept (Lowland forest)	1.42E-02	-9.08E-03	3.68E-02	1.0005	1349.5781			
	ΔT_{YRC}	2.46E+00	-3.28E+00	8.45E+00	1.0004	1304.5627			
	Forest type -Montane	4.59E-02	-6.75E-02	1.62E-01	1.0008	1700.9012			
	$\Delta MCWD_{YRC}$	-1.07E-02	-4.55E-02	2.23E-02	1.0026	1148.9279			
	ΔVPD_{YRC}	-3.76E+01	-6.97E+01	-5.70E+00	1.0013	1274.9770			
	$\Delta SPEI_{YRC}$	-3.96E-01	-3.90E+00	2.89E+00	1.0035	1120.8380			
A_{sat}	CEC	-6.56E-03	-1.13E-02	-1.90E-03	1.0018	1594.2708	0.49	122	Fatality
	Clay	1.43E-03	-3.56E-03	6.46E-03	0.9998	1390.8044			
	pH	-4.39E-03	-6.35E-02	5.02E-02	1.0003	1426.1973			
	Sand	-1.91E-03	-5.12E-03	1.41E-03	1.0007	1182.6717			
	ΔT_{YRC} : Forest type -Montane	-9.55E+00	-2.80E+01	7.34E+00	1.0005	1527.2036			
	Forest type -Montane : $\Delta MCWD_{YRC}$	-2.47E-02	-9.15E-02	3.38E-02	1.0021	1388.9681			
	Forest type -Montane : ΔVPD_{YRC}	7.68E+01	-5.62E+01	2.14E+02	1.0003	1515.9061			
	Forest type -Montane : $\Delta SPEI_{YRC}$	1.05E+00	-4.72E+00	6.53E+00	1.0021	1630.8835			

SLA: Specific leaf area, Area: leaf area, Thickness: leaf thickness, N: leaf nitrogen content, P: leaf phosphorus content, A_{sat}: photosynthetic capacity at light saturated carbon assimilation rates, WD: wood density, H_{max}: adult maximum height; DE: deciduous, FM: leaf fresh mass, SM: seed mass, C: leaf carbon content. HDI: Highest Density Interval, pd: Probability of direction Rhat: Potential scale reduction statistic, ESS: Effective sample size, ROPE: Region of practical equivalency, R2: coefficient of determination.

Table S5. Models results testing for the relation between the 1980-2005 trait CWM and climate across tropical American forests. Number: number of plots used for model fitting. Tmean: mean annual temperature, MCWDmean: mean maximum climatic water deficit, VPDmean: mean annual vapour pressure deficit, SPEI12: standardised precipitation-evapotranspiration index for a 12-month window. MCSE: Montecarlo Standard Error.

Trait	Parameter	Median	CI_low	CI_high	Rhat	ESS	MCSE	Number
Area	Intercept (Lowland forest)	4.6733	4.5258	4.8139	1.0011	1194.1297	0.0022	222
	T_{mean}	0.0684	-0.0007	0.1391	1.0012	1885.2674	0.0008	
	Forest type -Montane	0.3202	-0.0287	0.6620	0.9996	2068.8455	0.0039	
	$MCWD_{mean}$	0.0017	0.0012	0.0023	1.0004	1610.9415	0.0000	
	VPD_{mean}	-1.3873	-1.9481	-0.8530	1.0007	1933.4435	0.0064	
	$SPEI_{12}$	-0.1492	-0.1916	-0.1050	0.9999	3751.8215	0.0004	
	CEC	0.0228	0.0139	0.0317	1.0012	3499.4074	0.0001	
	Clay	-0.0327	-0.0405	-0.0248	1.0006	2555.3714	0.0001	
	pH	-0.3925	-0.5352	-0.2457	1.0003	3215.5192	0.0013	
	Sand	-0.0266	-0.0342	-0.0186	1.0029	2211.1247	0.0001	
	T_{mean} : Forest type -Montane	0.0141	-0.0810	0.1111	1.0011	2058.7489	0.0011	
	Forest type -Montane : $MCWD_{mean}$	0.0004	-0.0008	0.0015	1.0000	2262.9824	0.0000	
	Forest type -Montane : VPD_{mean}	0.6318	-0.6130	1.8125	1.0008	2326.3653	0.0129	
	Forest type -Montane : $SPEI_{12}$	0.2758	0.1622	0.3843	1.0001	2559.8260	0.0011	
DE	Intercept (Lowland forest)	3.1513	2.9918	3.3155	1.0011	1575.1973	0.0021	214
	T_{mean}	0.1522	0.0450	0.2580	0.9996	1911.7436	0.0012	
	Forest type -Montane	-0.0585	-0.4227	0.3076	1.0020	2009.0828	0.0042	
	$MCWD_{mean}$	0.0000	-0.0006	0.0007	0.9995	1787.3906	0.0000	
	VPD_{mean}	-1.9424	-2.7359	-1.1539	1.0009	1619.5679	0.0100	
	$SPEI_{12}$	-0.0941	-0.1574	-0.0300	1.0003	3149.9713	0.0006	
	CEC	-0.0364	-0.0491	-0.0233	0.9998	3057.2425	0.0001	
	Clay	-0.0030	-0.0157	0.0094	0.9999	2717.1048	0.0001	
	pH	0.7990	0.5733	1.0211	1.0012	2669.9522	0.0022	
	Sand	-0.0117	-0.0228	-0.0005	1.0010	2346.5187	0.0001	
	T_{mean} : Forest type -Montane	-0.1599	-0.2828	-0.0321	1.0003	1826.4696	0.0015	
	Forest type -Montane : $MCWD_{mean}$	-0.0007	-0.0020	0.0007	1.0014	2174.8612	0.0000	
	Forest type -Montane : VPD_{mean}	2.1763	0.9126	3.4806	1.0021	1916.9378	0.0149	
	Forest type -Montane : $SPEI_{12}$	0.0305	-0.1851	0.2579	1.0008	2149.3325	0.0025	

FM	Intercept (Lowland forest)	1.0871	0.9587	1.2180	1.0011	1884.2287	0.0015	177
	T_{mean}	0.0573	-0.0111	0.1226	0.9997	2271.3649	0.0007	
	Forest type -Montane	0.0398	-0.2224	0.2989	1.0003	2073.1909	0.0029	
	$MCWD_{mean}$	-0.0010	-0.0014	-0.0005	1.0004	2547.4242	0.0000	
	VPD_{mean}	0.2333	-0.2582	0.7280	0.9999	2295.5493	0.0053	
	$SPEI_{12}$	-0.0992	-0.1368	-0.0601	1.0000	3708.9678	0.0003	
	CEC	0.0135	0.0034	0.0236	0.9996	2922.8163	0.0001	
	Clay	-0.0362	-0.0456	-0.0270	1.0000	2634.4390	0.0001	
	pH	-0.0381	-0.2010	0.1200	0.9998	3294.6990	0.0014	
	Sand	-0.0296	-0.0379	-0.0208	0.9995	2351.6375	0.0001	
	T_{mean} : Forest type -Montane	-0.0066	-0.0889	0.0761	1.0003	2295.8206	0.0009	
	Forest type -Montane : $MCWD_{mean}$	0.0020	0.0010	0.0031	0.9997	1981.3298	0.0000	
	Forest type -Montane : VPD_{mean}	-0.6392	-1.6365	0.2727	1.0000	2466.8342	0.0099	
	Forest type -Montane : $SPEI_{12}$	-0.0388	-0.1971	0.1303	0.9997	2904.4222	0.0016	
N	Intercept (Lowland forest)	0.7647	0.7297	0.7994	1.0031	949.7009	0.0006	237
	T_{mean}	-0.0176	-0.0365	0.0006	1.0012	1540.5452	0.0002	
	Forest type -Montane	0.0117	-0.0787	0.0960	1.0035	1725.2116	0.0011	
	$MCWD_{mean}$	-0.0001	-0.0002	0.0000	1.0023	1914.5275	0.0000	
	VPD_{mean}	0.0053	-0.1287	0.1445	0.9997	1556.9321	0.0018	
	$SPEI_{12}$	0.0220	0.0120	0.0321	1.0004	3973.1475	0.0001	
	CEC	0.0049	0.0023	0.0074	1.0005	2797.5145	0.0000	
	Clay	-0.0112	-0.0132	-0.0091	1.0009	2776.4930	0.0000	
	pH	0.0940	0.0557	0.1322	1.0018	2696.3045	0.0004	
	Sand	-0.0028	-0.0049	-0.0007	1.0018	2221.4578	0.0000	
	T_{mean} : Forest type -Montane	0.0434	0.0200	0.0696	0.9999	1726.5111	0.0003	
	Forest type -Montane : $MCWD_{mean}$	0.0005	0.0002	0.0009	1.0004	2234.3591	0.0000	
	Forest type -Montane : VPD_{mean}	-0.1403	-0.4663	0.1748	0.9997	1874.9777	0.0038	
	Forest type -Montane : $SPEI_{12}$	-0.0186	-0.0516	0.0128	0.9995	2689.5275	0.0003	
SLA	Intercept (Lowland forest)	4.8711	4.8435	4.8987	1.0018	1117.2627	0.0004	229
	T_{mean}	0.0114	-0.0046	0.0266	1.0014	1779.9210	0.0002	
	Forest type -Montane	0.1030	0.0091	0.1949	1.0007	2490.1649	0.0010	
	$MCWD_{mean}$	-0.0002	-0.0003	-0.0001	1.0008	1959.1099	0.0000	
	VPD_{mean}	0.0575	-0.0737	0.1885	1.0010	1702.1397	0.0016	

	$SPEI_{12}$	0.0299	0.0183	0.0410	1.0005	4629.7193	0.0001	
	CEC	-0.0047	-0.0078	-0.0014	1.0000	3362.9598	0.0000	
	Clay	0.0003	-0.0019	0.0025	1.0020	2591.1740	0.0000	
	pH	0.1402	0.0961	0.1805	1.0000	3366.9369	0.0004	
	Sand	-0.0014	-0.0035	0.0008	1.0006	2113.1608	0.0000	
	T_{mean} : Forest type -Montane	0.0233	0.0006	0.0453	1.0007	1925.4387	0.0003	
	Forest type -Montane : $MCWD_{mean}$	0.0001	-0.0002	0.0005	1.0005	2446.0874	0.0000	
	Forest type -Montane : VPD_{mean}	-0.2173	-0.4864	0.0501	1.0026	2080.7874	0.0030	
	Forest type -Montane : $SPEI_{12}$	-0.0609	-0.0950	-0.0247	1.0013	3255.9556	0.0003	
SM	Intercept (Lowland forest)	8.5366	8.1530	9.0072	1.0010	891.9262	0.0072	208
	T_{mean}	-0.7676	-0.9984	-0.5285	1.0011	574.2816	0.0051	
	Forest type -Montane	0.5009	-0.3478	1.5284	1.0015	941.9919	0.0157	
	$MCWD_{mean}$	0.0028	0.0021	0.0035	0.9998	1866.1656	0.0000	
	VPD_{mean}	-0.5253	-1.8902	0.8604	1.0011	695.6236	0.0272	
	$SPEI_{12}$	-0.1110	-0.1635	-0.0570	0.9997	5028.6035	0.0004	
	CEC	-0.0226	-0.0394	-0.0062	1.0008	2616.8496	0.0002	
	Clay	-0.0527	-0.0643	-0.0402	1.0003	3788.9088	0.0001	
	pH	-0.6598	-0.8801	-0.4476	0.9994	4194.2072	0.0017	
	Sand	-0.0453	-0.0577	-0.0325	1.0010	3958.2863	0.0001	
	T_{mean} : Forest type -Montane	1.2049	0.8253	1.6148	1.0014	476.2563	0.0092	
	Forest type -Montane : $MCWD_{mean}$	0.0047	0.0009	0.0090	1.0015	575.6951	0.0001	
	Forest type -Montane : VPD_{mean}	0.0585	-3.6335	3.2164	1.0018	1349.2457	0.0481	
	Forest type -Montane : $SPEI_{12}$	-0.7203	-1.0519	-0.3913	1.0000	1670.3892	0.0041	
Thickness	Intercept (Lowland forest)	1.5837	1.3548	1.8059	1.0052	1009.8759	0.0036	233
	T_{mean}	-0.2997	-0.4186	-0.1772	1.0000	1633.7252	0.0015	
	Forest type -Montane	0.6806	0.1445	1.2062	1.0023	1683.5906	0.0065	
	$MCWD_{mean}$	0.0012	0.0004	0.0020	1.0033	1876.5630	0.0000	
	VPD_{mean}	0.4430	-0.5044	1.4147	1.0000	1599.4786	0.0122	
	$SPEI_{12}$	0.1278	0.0440	0.2083	0.9995	3003.0033	0.0008	
	CEC	0.0529	0.0336	0.0721	1.0007	2582.3361	0.0002	
	Clay	-0.0345	-0.0514	-0.0179	1.0018	1918.2335	0.0002	
	pH	-0.9349	-1.2432	-0.6219	0.9997	2830.8438	0.0030	
	Sand	-0.0507	-0.0685	-0.0336	1.0026	1780.2317	0.0002	

	T_{mean} : Forest type -Montane	0.3687	0.2051	0.5238	1.0016	1539.3176	0.0021	
	Forest type -Montane : $MCWD_{mean}$	0.0009	-0.0011	0.0030	1.0046	1700.4780	0.0000	
	Forest type -Montane : VPD_{mean}	-1.0442	-2.9867	0.9670	1.0008	1810.7365	0.0235	
	Forest type -Montane : $SPEI_{12}$	-0.0874	-0.3273	0.1715	1.0019	2345.0121	0.0026	
WD	Intercept (Lowland forest)	-0.5009	-0.5298	-0.4731	1.0014	919.1661	0.0005	245
	T_{mean}	0.0208	0.0068	0.0368	1.0010	1276.7469	0.0002	
	Forest type -Montane	-0.0395	-0.1100	0.0319	1.0001	1571.1786	0.0009	
	$MCWD_{mean}$	0.0001	0.0000	0.0002	1.0016	1597.9910	0.0000	
	VPD_{mean}	-0.1290	-0.2469	-0.0180	1.0041	1199.7673	0.0017	
	$SPEI_{12}$	0.0128	0.0035	0.0223	0.9997	3652.9791	0.0001	
	CEC	-0.0044	-0.0065	-0.0024	1.0022	2685.7733	0.0000	
	Clay	0.0067	0.0048	0.0085	1.0022	1921.5880	0.0000	
	pH	0.0214	-0.0130	0.0544	1.0012	2060.3717	0.0004	
	Sand	0.0033	0.0013	0.0052	1.0018	1515.8450	0.0000	
	T_{mean} : Forest type -Montane	-0.0177	-0.0380	0.0021	1.0038	1385.6587	0.0003	
	Forest type -Montane : $MCWD_{mean}$	-0.0002	-0.0004	0.0001	1.0028	1889.3567	0.0000	
	Forest type -Montane : VPD_{mean}	0.1056	-0.1371	0.3588	1.0070	1441.4057	0.0033	
	Forest type -Montane : $SPEI_{12}$	-0.0363	-0.0618	-0.0105	1.0012	2619.0974	0.0003	
C	Intercept (Lowland forest)	3.8685	3.8627	3.8742	0.9999	2893.2401	0.0001	234
	T_{mean}	0.0025	-0.0011	0.0063	1.0000	2808.9929	0.0000	
	Forest type -Montane	0.0003	-0.0147	0.0167	1.0005	4092.0513	0.0001	
	$MCWD_{mean}$	0.0000	0.0000	0.0000	0.9999	3071.5598	0.0000	
	VPD_{mean}	-0.0030	-0.0342	0.0282	1.0011	2654.7914	0.0003	
	$SPEI_{12}$	0.0012	-0.0032	0.0057	1.0000	4762.5490	0.0000	
	CEC	0.0005	-0.0004	0.0013	0.9999	3767.8595	0.0000	
	Clay	0.0006	-0.0001	0.0013	0.9996	3566.6806	0.0000	
	pH	-0.0221	-0.0354	-0.0093	1.0004	3353.1198	0.0001	
	Sand	0.0011	0.0006	0.0016	1.0005	3207.9760	0.0000	
	T_{mean} : Forest type -Montane	-0.0036	-0.0082	0.0010	1.0004	2826.3349	0.0000	
	Forest type -Montane : $MCWD_{mean}$	0.0000	0.0000	0.0001	1.0000	3811.7490	0.0000	
	Forest type -Montane : VPD_{mean}	0.0289	-0.0214	0.0823	1.0004	3118.7511	0.0005	
	Forest type -Montane : $SPEI_{12}$	0.0037	-0.0069	0.0141	1.0002	5165.6972	0.0001	
H_{max}	Intercept (Lowland forest)	3.3156	3.2656	3.3681	1.0000	903.5968	0.0009	212

	T_{mean}	-0.0925	-0.1320	-0.0582	1.0022	806.1841	0.0007	
	Forest type -Montane	-0.3657	-0.6378	-0.1380	1.0032	980.5693	0.0041	
	$MCWD_{mean}$	0.0000	-0.0001	0.0002	1.0008	2175.3765	0.0000	
	VPD_{mean}	-0.2868	-0.4850	-0.0475	1.0026	1326.3783	0.0031	
	$SPEI_{12}$	-0.0568	-0.0689	-0.0446	1.0005	4433.1037	0.0001	
	CEC	0.0088	0.0052	0.0123	1.0002	3604.1356	0.0000	
	Clay	-0.0008	-0.0034	0.0019	0.9997	3807.1423	0.0000	
	pH	0.0446	-0.0038	0.0912	1.0000	2795.3929	0.0005	
	Sand	-0.0015	-0.0041	0.0010	0.9999	3208.3573	0.0000	
	T_{mean} : Forest type -Montane	0.0667	0.0224	0.1127	1.0008	2275.6382	0.0005	
	Forest type -Montane : $MCWD_{mean}$	-0.0005	-0.0009	-0.0001	1.0003	3554.6665	0.0000	
	Forest type -Montane : VPD_{mean}	0.4558	-0.0385	0.9164	1.0008	2162.1707	0.0052	
	Forest type -Montane : $SPEI_{12}$	0.1655	0.1333	0.1983	1.0003	5105.4324	0.0002	
P	Intercept (Lowland forest)	-2.2962	-2.3446	-2.2465	1.0002	1394.4585	0.0007	228
	T_{mean}	-0.0412	-0.0662	-0.0151	1.0007	2303.5428	0.0003	
	Forest type -Montane	0.1291	0.0035	0.2527	1.0005	2063.6288	0.0014	
	$MCWD_{mean}$	0.0002	0.0000	0.0003	0.9997	2966.4003	0.0000	
	VPD_{mean}	0.1610	-0.0405	0.3386	1.0000	2147.1744	0.0021	
	$SPEI_{12}$	0.0225	0.0087	0.0364	1.0007	4356.2301	0.0001	
	CEC	0.0069	0.0035	0.0105	0.9995	4477.8032	0.0000	
	Clay	-0.0158	-0.0188	-0.0128	1.0004	3413.1532	0.0000	
	pH	0.1306	0.0770	0.1845	1.0000	4180.4483	0.0004	
	Sand	-0.0085	-0.0115	-0.0054	1.0001	3009.9365	0.0000	
	T_{mean} : Forest type -Montane	0.0509	0.0132	0.0858	1.0004	2066.1525	0.0004	
	Forest type -Montane : $MCWD_{mean}$	-0.0002	-0.0006	0.0003	0.9997	2524.7185	0.0000	
	Forest type -Montane : VPD_{mean}	-0.1918	-0.6683	0.2544	1.0001	2412.2405	0.0048	
	Forest type -Montane : $SPEI_{12}$	-0.0322	-0.0778	0.0137	0.9997	3125.6231	0.0004	
A_{sat}	Intercept (Lowland forest)	1.5130	1.3867	1.6247	1.0004	1926.7889	0.0014	99
	T_{mean}	0.0612	0.0008	0.1266	1.0000	1804.6109	0.0008	
	Forest type -Montane	-0.1262	-0.5304	0.3219	1.0009	2823.9152	0.0040	
	$MCWD_{mean}$	0.0006	0.0003	0.0009	0.9996	4142.1116	0.0000	
	VPD_{mean}	-0.5675	-0.9851	-0.1958	1.0001	1749.4092	0.0048	
	$SPEI_{12}$	0.0320	0.0141	0.0490	0.9999	4007.2335	0.0001	

	CEC	-0.0156	-0.0218	-0.0098	0.9997	4936.4187	0.0000	
	Clay	0.0122	0.0063	0.0180	1.0005	3141.2515	0.0001	
	pH	0.1369	0.0285	0.2500	1.0001	5066.2339	0.0008	
	Sand	-0.0125	-0.0196	-0.0056	1.0004	2217.9718	0.0001	
	T_{mean} : Forest type -Montane	-0.1362	-0.2550	-0.0308	1.0014	2297.2570	0.0012	
	Forest type -Montane : $MCWD_{mean}$	-0.0016	-0.0029	-0.0003	1.0011	2870.2522	0.0000	
	Forest type -Montane : VPD_{mean}	1.5178	-0.0735	3.2437	1.0008	2718.3461	0.0159	
	Forest type -Montane : $SPEI_{12}$	-0.1507	-0.3478	0.0467	1.0012	3117.2114	0.0018	
FL	Intercept (Lowland forest)	1.7906	1.6562	1.9309	1.0048	938.2483	0.0023	130
	T_{mean}	-0.0228	-0.0995	0.0545	1.0001	2547.7527	0.0008	
	Forest type -Montane	-0.0413	-0.6778	0.6107	0.9999	3698.7647	0.0053	
	$MCWD_{mean}$	0.0005	0.0002	0.0009	1.0005	4393.1284	0.0000	
	VPD_{mean}	-1.9009	-2.4083	-1.4080	1.0000	2374.0443	0.0053	
	$SPEI_{12}$	-0.0701	-0.1150	-0.0268	1.0003	6162.9949	0.0003	
	CEC	0.0091	-0.0047	0.0235	0.9999	4608.8998	0.0001	
	Clay	-0.0108	-0.0193	-0.0024	0.9998	3344.5761	0.0001	
	pH	0.5475	0.3942	0.7013	1.0002	4148.1103	0.0012	
	Sand	-0.0094	-0.0170	-0.0019	0.9997	3004.2522	0.0001	
	T_{mean} : Forest type -Montane	0.1327	-0.0034	0.2757	1.0013	2898.4065	0.0013	
	Forest type -Montane : $MCWD_{mean}$	-0.0006	-0.0028	0.0017	1.0000	4629.3094	0.0000	
	Forest type -Montane : VPD_{mean}	1.4647	-0.0444	2.9688	0.9999	3718.8069	0.0127	
	Forest type -Montane : $SPEI_{12}$	-0.0133	-0.6281	0.6294	1.0002	4182.0887	0.0050	

SLA: Specific leaf area, Area: leaf area, Thickness: leaf thickness, N: leaf nitrogen content, P: leaf phosphorus content, Asat: photosynthetic capacity at light saturated carbon assimilation rates, WD: wood density, Hmax: adult maximum height; DE: deciduous, FM: leaf fresh mass, SM: seed mass, C: leaf carbon content. HDI: Highest Density Interval, pd: Probability of direction, Rhat: Potential scale reduction statistic, ESS: Effective sample size, ROPE: Region of practical equivalency.

Table S6. Mean expected and observed change in trait Community Weighted Mean (CWM) with the changes in temperature and water availability observed across the study period for lowland forests. In the 'Change' column, the 'Expected' outcome (column termed mean) is based on the Trait - Environment relationship obtained from the trait CWM models fitted with data from 1980-2005 (table S5) and then predicted to the environmental data from that period plus the yearly rate changes in climate across the period of the study. The 'Observed' outcome (column termed mean) was obtained from the observed yearly rate changes in trait CWM from the same vegetation plots included in the 1980-2005 model. See methods for full details. Change: either the observed (trait yearly rate change) or expected (based on trait-environment relationship) outcome and the difference between these values. HDI: Highest Density Interval. Analysis: For the full alive assemblage (Full), for the survivors assemblage, i.e. not including recruitment or mortality (Survivor) for the recruits assemblage only (Recruit) or for the mortality assemblage only (Fatality).

				95% HDI				
Trait	**Forest type**	**Change**	**mean**	**Lower**	**Upper**	**Percent tracking**	**Ratio tracking (Observed/Expected)**	**Analysis**
Area	Lowland	Observed	-0.08195	-0.13160	-0.04377			Full
		Expected	-1.60051	-1.81210	-1.41231			
		Difference	1.51857	1.30915	1.72647	5.12	0.05	
Asat	Lowland	Observed	0.00205	-0.00007	0.00374			Full
		Expected	-0.08835	-0.09507	-0.07961			
		Difference	0.09040	0.08247	0.09805	-2.32	-0.02	
C	Lowland	Observed	0.00102	-0.00017	0.00222			Full
		Expected	-0.02683	-0.03096	-0.02291			
		Difference	0.02785	0.02377	0.03317	-3.80	-0.04	
DE	Lowland	Observed	0.01262	-0.01193	0.03803			Full
		Expected	-0.58255	-0.62862	-0.54511			
		Difference	0.59516	0.53893	0.65417	-2.17	-0.02	
FM	Lowland	Observed	-0.00273	-0.00650	0.00045			Full
		Expected	0.11431	0.11060	0.11859			
		Difference	-0.11704	-0.12122	-0.11087	-2.39	-0.02	
Hmax	Lowland	Observed	0.00704	0.00341	0.01215			Full
		Expected	0.99744	0.96106	1.03656			
		Difference	-0.99040	-1.02879	-0.95572	0.71	0.01	
N	Lowland	Observed	0.00011	-0.00012	0.00034			Full
		Expected	-0.03445	-0.03587	-0.03326			
		Difference	0.03456	0.03344	0.03615	-0.32	0.00	
P	Lowland	Observed	0.00001	-0.00001	0.00002			Full

		Expected	0.00079	0.00070	0.00084			
		Difference	-0.00078	-0.00084	-0.00069	0.89	0.01	
SM	Lowland	Observed	0.78316	-0.91303	3.08131			Full
		Expected	66.55646	53.09240	78.08602			
		Difference	-65.77330	-81.52322	-55.91003	1.18	0.01	
SLA	Lowland	Observed	0.00469	-0.01401	0.02219			Full
		Expected	-0.90674	-0.95259	-0.85368			
		Difference	0.91142	0.86079	0.97428	-0.52	-0.01	
Thickness	Lowland	Observed	-0.00529	-0.00998	-0.00055			Full
		Expected	0.10622	0.09499	0.12403			
		Difference	-0.11151	-0.12645	-0.09712	-4.98	-0.05	
WD	Lowland	Observed	0.00002	-0.00004	0.00008			Full
		Expected	-0.00050	-0.00081	-0.00018			
		Difference	0.00052	0.00021	0.00084	-5.03	-0.05	
Area	Lowland	Observed	0.41124	-0.31391	1.36049			Recruit
		Expected	-1.58482	-1.78910	-1.41397			
		Difference	1.99606	1.28176	3.02650	-25.95	-0.26	
Asat	Lowland	Observed	-0.00434	-0.01771	0.01313			Recruit
		Expected	-0.08999	-0.09636	-0.08358			
		Difference	0.08565	0.06893	0.10240	4.82	0.05	
C	Lowland	Observed	-0.00003	-0.01382	0.01088			Recruit
		Expected	-0.02656	-0.03069	-0.02292			
		Difference	0.02653	0.01423	0.03861	0.13	0.001	
DE	Lowland	Observed	-0.17292	-0.28099	-0.00599			Recruit
		Expected	-0.58956	-0.63639	-0.55814			
		Difference	0.41663	0.28566	0.58238	29.33	0.29	
FM	Lowland	Observed	0.03185	-0.00462	0.08104			Recruit
		Expected	0.11429	0.11061	0.11825			
		Difference	-0.08244	-0.12104	-0.03547	27.86	0.28	
Hmax	Lowland	Observed	-0.03586	-0.07138	-0.00066			Recruit
		Expected	0.99065	0.95182	1.03128			
		Difference	-1.02651	-1.07926	-0.96547	-3.62	-0.04	
N	Lowland	Observed	-0.00275	-0.00497	-0.00065			Recruit

		Expected	-0.03467	-0.03579	-0.03352			
		Difference	0.03192	0.02963	0.03457	7.92	0.08	
P	Lowland	Observed	0.00004	-0.00012	0.00015			Recruit
		Expected	0.00079	0.00068	0.00087			
		Difference	-0.00075	-0.00092	-0.00059	4.59	0.05	
SM	Lowland	Observed	2.36476	-11.53377	10.80768			Recruit
		Expected	61.70208	47.86580	72.97449			
		Difference	-59.33732	-73.56833	-40.73164	3.83	0.04	
SLA	Lowland	Observed	-0.12064	-0.27326	0.06328			Recruit
		Expected	-0.90204	-0.93807	-0.85699			
		Difference	0.78141	0.61611	0.96824	13.37	0.13	
Thickness	Lowland	Observed	-0.04305	-0.06951	-0.01208			Recruit
		Expected	0.09830	0.08341	0.10872			
		Difference	-0.14136	-0.17126	-0.10631	-43.80	-0.44	
WD	Lowland	Observed	-0.00068	-0.00122	-0.00013			Recruit
		Expected	-0.00057	-0.00081	-0.00029			
		Difference	-0.00010	-0.00069	0.00056	118.29	1.18	
Area	Lowland	Observed	-0.12016	-0.20834	-0.07674			Survivor
		Expected	-1.63813	-1.84425	-1.46429			
		Difference	1.51796	1.28468	1.72940	7.34	0.07	
Asat	Lowland	Observed	0.00240	-0.00005	0.00542			Survivor
		Expected	-0.08666	-0.09593	-0.07913			
		Difference	0.08907	0.07985	0.09942	-2.77	-0.03	
C	Lowland	Observed	0.00129	-0.00001	0.00261			Survivor
		Expected	-0.02724	-0.03003	-0.02346			
		Difference	0.02853	0.02486	0.03233	-4.72	-0.05	
DE	Lowland	Observed	0.02706	0.00436	0.04598			Survivor
		Expected	-0.58456	-0.63018	-0.53810			
		Difference	0.61162	0.55791	0.66453	-4.63	-0.05	
FM	Lowland	Observed	-0.00341	-0.00642	-0.00095			Survivor
		Expected	0.11344	0.10847	0.11716			
		Difference	-0.11685	-0.12253	-0.11267	-3.01	-0.03	
Hmax	Lowland	Observed	0.01037	0.00717	0.01434			Survivor

		Expected	0.99108	0.95481	1.02448			
		Difference	-0.98071	-1.01527	-0.94615	1.05	0.01	
N	Lowland	Observed	0.00018	-0.00002	0.00036			Survivor
		Expected	-0.03432	-0.03537	-0.03312			
		Difference	0.03450	0.03338	0.03570	-0.54	-0.01	
P	Lowland	Observed	0.00001	0.00000	0.00002			Survivor
		Expected	0.00080	0.00073	0.00087			
		Difference	-0.00079	-0.00085	-0.00071	1.27	0.01	
SM	Lowland	Observed	1.11456	-0.88774	2.82662			Survivor
		Expected	66.19724	53.03030	76.66838			
		Difference	-65.08268	-75.50261	-51.24504	1.68	0.02	
SLA	Lowland	Observed	0.00955	-0.00836	0.02566			Survivor
		Expected	-0.91413	-0.95541	-0.86894			
		Difference	0.92368	0.88086	0.97375	-1.04	-0.01	
Thickness	Lowland	Observed	-0.00458	-0.00840	-0.00039			Survivor
		Expected	0.11042	0.09207	0.12511			
		Difference	-0.11500	-0.12870	-0.09592	-4.15	-0.04	
WD	Lowland	Observed	0.00005	-0.00001	0.00010			Survivor
		Expected	-0.00048	-0.00079	-0.00019			
		Difference	0.00053	0.00022	0.00085	-10.79	-0.11	

SLA: Specific leaf area, Area: leaf area, Thickness: leaf thickness, N: leaf nitrogen content, P: leaf phosphorus content, Asat: photosynthetic capacity at light saturated carbon assimilation rates, WD: wood density, Hmax: adult maximum height; DE: deciduous, FM: leaf fresh mass, SM: seed mass, C: leaf carbon content. HDI: Highest Density Interval, pd: Probability of direction, Rhat: Potential scale reduction statistic, ESS: Effective sample size, ROPE: Region of practical equivalency.

Table S7. Mean expected and observed change in trait Community Weighted Mean (CWM) with the changes in temperature and water availability observed across the study period for montane forests. In the 'Change' column, the 'Expected' outcome (column termed mean) is based on the Trait - Environment relationship obtained from the trait CWM models fitted with data from 1980-2005 (table S5) and then predicted to the environmental data from that period plus the yearly rate changes in climate across the period of the study. The 'Observed' outcome (column termed mean) was obtained from the observed yearly rate changes in trait CWM from the same vegetation plots included in the 1980-2005 model. See methods for full details. Change: either the observed (trait yearly rate change) or expected (based on trait-environment relationship) outcome and the difference between these values. HDI: Highest Density Interval. Analysis: For the full alive assemblage (Full), for the survivors assemblage, i.e. not including recruitment or mortality (Survivors) for the recruits assemblage only (Recruit) or for the mortality assemblage only (Mortality).

Trait	Forest type	Change	mean	95% HDI		Percent tracking	Ratio tracking (Observed/Expected)	Analysis
				Lower	Upper			
Area	Montane	Observed	-0.01886	-0.04140	0.01201			Full
		Expected	0.20547	0.11062	0.31311			
		Difference	-0.22433	-0.32729	-0.12480	-9.18	-0.092	
Asat	Montane	Observed	-0.00188	-0.00623	0.00407			Full
		Expected	-0.10440	-0.14730	-0.06524			
		Difference	0.10253	0.05837	0.14771	1.80	0.018	
C	Montane	Observed	0.00138	0.00050	0.00264			Full
		Expected	-0.12510	-0.13240	-0.12008			
		Difference	0.12647	0.12093	0.13383	-1.10	-0.011	
DE	Montane	Observed	0.04900	0.00313	0.08291			Full
		Expected	-1.77330	-1.94938	-1.64532			
		Difference	1.82230	1.67986	2.01481	-2.76	-0.028	
FM	Montane	Observed	0.00008	-0.00069	0.00121			Full
		Expected	0.02466	0.01700	0.03325			
		Difference	-0.02458	-0.03342	-0.01678	0.34	0.003	
Hmax	Montane	Observed	-0.00452	-0.01179	0.00374			Full
		Expected	0.45995	0.40671	0.51596			
		Difference	-0.46447	-0.52196	-0.40738	-0.98	-0.010	
N	Montane	Observed	0.00018	-0.00036	0.00060			Full
		Expected	-0.00510	-0.00644	-0.00367			
		Difference	0.00528	0.00391	0.00662	-3.50	-0.035	
P	Montane	Observed	0.00002	0.00000	0.00005			Full
		Expected	0.00200	0.00194	0.00207			

		Difference	-0.00197	-0.00205	-0.00190	1.22	0.012	
SM	Montane	Observed	-0.08721	-0.18387	0.01156			Full
		Expected	0.32927	0.29737	0.35978			
		Difference	-0.41648	-0.51227	-0.30656	-26.49	-0.265	
SLA	Montane	Observed	-0.01111	-0.03925	0.03642			Full
		Expected	-2.72829	-2.76363	-2.69169			
		Difference	2.71718	2.65872	2.76659	0.41	0.004	
Thickness	Montane	Observed	-0.00460	-0.01989	0.00923			Full
		Expected	0.25614	0.23891	0.26871			
		Difference	-0.26074	-0.28036	-0.23877	-1.79	-0.018	
WD	Montane	Observed	-0.00011	-0.00025	0.00002			Full
		Expected	-0.00159	-0.00186	-0.00129			
		Difference	0.00149	0.00119	0.00178	6.64	0.066	
Area	Montane	Observed	0.11816	-0.11067	0.38408			Recruit
		Expected	0.21987	0.04152	0.36791			
		Difference	-0.10172	-0.35918	0.13484	53.74	0.537	
Asat	Montane	Observed	0.02606	-0.01742	0.06888			Recruit
		Expected	-0.09647	-0.14798	-0.04125			
		Difference	0.12253	0.02934	0.19777	-27.02	-0.270	
C	Montane	Observed	-0.01429	-0.02701	-0.00419			Recruit
		Expected	-0.11774	-0.12693	-0.11104			
		Difference	0.10345	0.08996	0.11585	12.14	0.121	
DE	Montane	Observed	-0.20307	-0.58781	0.09421			Recruit
		Expected	-1.63301	-1.85332	-1.42804			
		Difference	1.42994	1.02320	1.75051	12.44	0.124	
FM	Montane	Observed	0.00051	-0.01100	0.01482			Recruit
		Expected	0.02870	0.02278	0.03670			
		Difference	-0.02819	-0.04056	-0.00891	1.79	0.018	
Hmax	Montane	Observed	0.04307	-0.02606	0.11453			Recruit
		Expected	0.48849	0.42022	0.56023			
		Difference	-0.44542	-0.55488	-0.33703	8.82	0.088	
N	Montane	Observed	0.00268	-0.00216	0.00672			Recruit
		Expected	-0.00591	-0.00708	-0.00418			

		Difference	0.00859	0.00434	0.01393	-45.39	-0.454	
P	Montane	Observed	-0.00013	-0.00030	0.00016			Recruit
		Expected	0.00197	0.00188	0.00207			
		Difference	-0.00210	-0.00235	-0.00183	-6.65	-0.067	
SM	Montane	Observed	0.07601	-1.79726	1.77630			Recruit
		Expected	0.31322	0.27022	0.35426			
		Difference	-0.23721	-2.05871	1.46429	24.27	0.243	
SLA	Montane	Observed	0.20473	-0.15224	0.54813			Recruit
		Expected	-2.72869	-2.77050	-2.67508			
		Difference	2.93342	2.61535	3.29898	-7.50	-0.075	
Thickness	Montane	Observed	0.02298	-0.09402	0.14230			Recruit
		Expected	0.24948	0.22973	0.27503			
		Difference	-0.22650	-0.33922	-0.09632	9.21	0.092	
WD	Montane	Observed	0.00059	-0.00078	0.00186			Recruit
		Expected	-0.00134	-0.00177	-0.00087			
		Difference	0.00193	0.00055	0.00329	-43.92	-0.439	
Area	Montane	Observed	-0.01621	-0.04171	0.01444			Survivor
		Expected	0.21513	0.12181	0.33128			
		Difference	-0.23133	-0.33826	-0.12243	-7.53	-0.075	
Asat	Montane	Observed	-0.00180	-0.00689	0.00345			Survivor
		Expected	-0.09322	-0.15450	-0.04988			
		Difference	0.09141	0.04834	0.15376	1.94	0.019	
C	Montane	Observed	0.00163	0.00057	0.00237			Survivor
		Expected	-0.12544	-0.13070	-0.11857			
		Difference	0.12707	0.12073	0.13246	-1.30	-0.013	
DE	Montane	Observed	0.05891	0.03053	0.09371			Survivor
		Expected	-1.72598	-1.86122	-1.48067			
		Difference	1.78489	1.54767	1.94942	-3.41	-0.034	
FM	Montane	Observed	0.00015	-0.00061	0.00115			Survivor
		Expected	0.02599	0.01798	0.03135			
		Difference	-0.02584	-0.03114	-0.01761	0.57	0.006	
Hmax	Montane	Observed	-0.00016	-0.00675	0.00705			Survivor
		Expected	0.46207	0.39452	0.51605			

		Difference	-0.46223	-0.51364	-0.39526	-0.03	0.000	
N	Montane	Observed	0.00004	-0.00041	0.00057			Survivor
		Expected	-0.00535	-0.00654	-0.00392			
		Difference	0.00539	0.00392	0.00674	-0.69	-0.007	
P	Montane	Observed	0.00002	0.00001	0.00004			Survivor
		Expected	0.00200	0.00193	0.00208			
		Difference	-0.00197	-0.00204	-0.00189	1.17	0.012	
SM	Montane	Observed	-0.04570	-0.15597	0.03815			Survivor
		Expected	0.32608	0.30318	0.35300			
		Difference	-0.37178	-0.48160	-0.28313	-14.02	-0.140	
SLA	Montane	Observed	-0.02182	-0.05692	0.00322			Survivor
		Expected	-2.72914	-2.76374	-2.69115			
		Difference	2.70732	2.65463	2.75293	0.80	0.008	
Thickness	Montane	Observed	-0.00356	-0.01624	0.01442			Survivor
		Expected	0.25310	0.23696	0.26973			
		Difference	-0.25666	-0.28741	-0.23262	-1.41	-0.014	
WD	Montane	Observed	-0.00006	-0.00018	0.00008			Survivor
		Expected	-0.00160	-0.00190	-0.00121			
		Difference	0.00153	0.00114	0.00190	3.98	0.040	

SLA: Specific leaf area, Area: leaf area, Thickness: leaf thickness, N: leaf nitrogen content, P: leaf phosphorus content, Asat: photosynthetic capacity at light saturated carbon assimilation rates, WD: wood density, Hmax: adult maximum height; DE: deciduous, FM: leaf fresh mass, SM: seed mass, C: leaf carbon content. HDI: Highest Density Interval, pd: Probability of direction, Rhat: Potential scale reduction statistic, ESS: Effective sample size, ROPE: Region of practical equivalency.