

RC2: 'Comment on egusphere-2025-2835', Samuel Villarreal, 07 Sep 2025 reply

We thank the reviewer for the careful reading and the positive and constructive assessment of our manuscript. Below we provide a point-by-point reply, where reviewer comments are indicated with “C” and our responses with “R.”

C1 - *General assessment: This study provides a valuable perspective on how to evaluate diversity in ecosystem functional patterns through the classification of Ecosystem Functional Types (EFTs). EFTs are surface-based classifications derived from key functional attributes of ecosystems, and here they are compared against more conventional classifications that emphasize composition and structure, such as Plant Functional Types (PFTs).

R1 - We appreciate this recognition. Our objective was precisely to examine whether classifications based on EFTs could complement or match PFTs classifications, offering a dynamic characterization that could be updated annually and was feasible to measure at the global scale. We were pleased that this comparison was considered valuable.

C2 - *The comparison is grounded on in situ measurements obtained with the eddy covariance technique, one of the most robust and reliable approaches for quantifying ecosystem-level functional processes. The analysis further benefits from the use of the highly reputable FLUXNET2015 database.

R2 - We thank the reviewer for highlighting this. These datasets are indeed essential for ensuring reliability, and we are glad that their inclusion strengthens confidence in the study.

C3 - *The methodological design is rigorous, offering a well-balanced comparison between EFTs and PFTs prior to subjecting them to discriminant analysis.

R3 - We appreciate this comment. Our intention was to establish the correct framework for comparing EFTs and PFTs, and we are pleased that this was recognized.

C4 - *Although results did not reveal statistically significant differences, the study successfully validates the effectiveness of EFTs in representing functional patterns at the ecosystem scale. A key advantage is that EFTs provide more dynamic insights than classifications based solely on compositional or structural traits.

R4 - We agree with this interpretation. The comparable performance of EFTs and PFTs shows that EFTs are able to capture functional patterns reliably. Furthermore, a key advantage is that EFTs provide more dynamic insights than classifications based solely on compositional or structural traits.

C5 - *The authors also acknowledge the limitations of EFTs, particularly regarding spatial resolution and the fact that not all EFT classes were represented in the study area. These issues are appropriately addressed in Section 4.3.

R5 - We are glad that our discussion of these limitations was found appropriate. While some classes were missing, we agree that the coverage of >70% provides robust support for our conclusions.

C6 - * Furthermore, the manuscript is well-written, demonstrating good coherence, cohesion, and flow.

R6 - We are very grateful for this positive feedback on the clarity of the manuscript.

C7 - *Concluding remarks:

This work makes an important contribution to the representation of spatial functional patterns and their comparison against more conventional classification systems, validated with in situ flux measurements. The choice of the study domain is appropriate given the high density of flux tower sites. However, due to the diversity of EFTs, not all classes were represented by field observations. Nevertheless, more than 70% of the spatial coverage of EFTs was captured within the study area.

R7 - We thank the reviewer for acknowledging this. We are pleased that the coverage achieved is considered sufficient.

C8 - *Overall, I consider this manuscript to be in a publishable form as it stands.

R8 - We sincerely thank the reviewer for this positive conclusion.