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01 INTRODUCTION

Objective: Evaluate the potential of photo-interpretation in creating the most accurate vegetation cover map for the xerophilous shrublands of southwestern Madagascar

The ecosystems of southwestern Madagascar are complex, and the region faces a critically alarming deforestation rate. As a result, maps of these ecosystems often involve uncertainties, particularly because aerial imagery tends to confuse xerophilous shrublands with herbaceous vegetation.

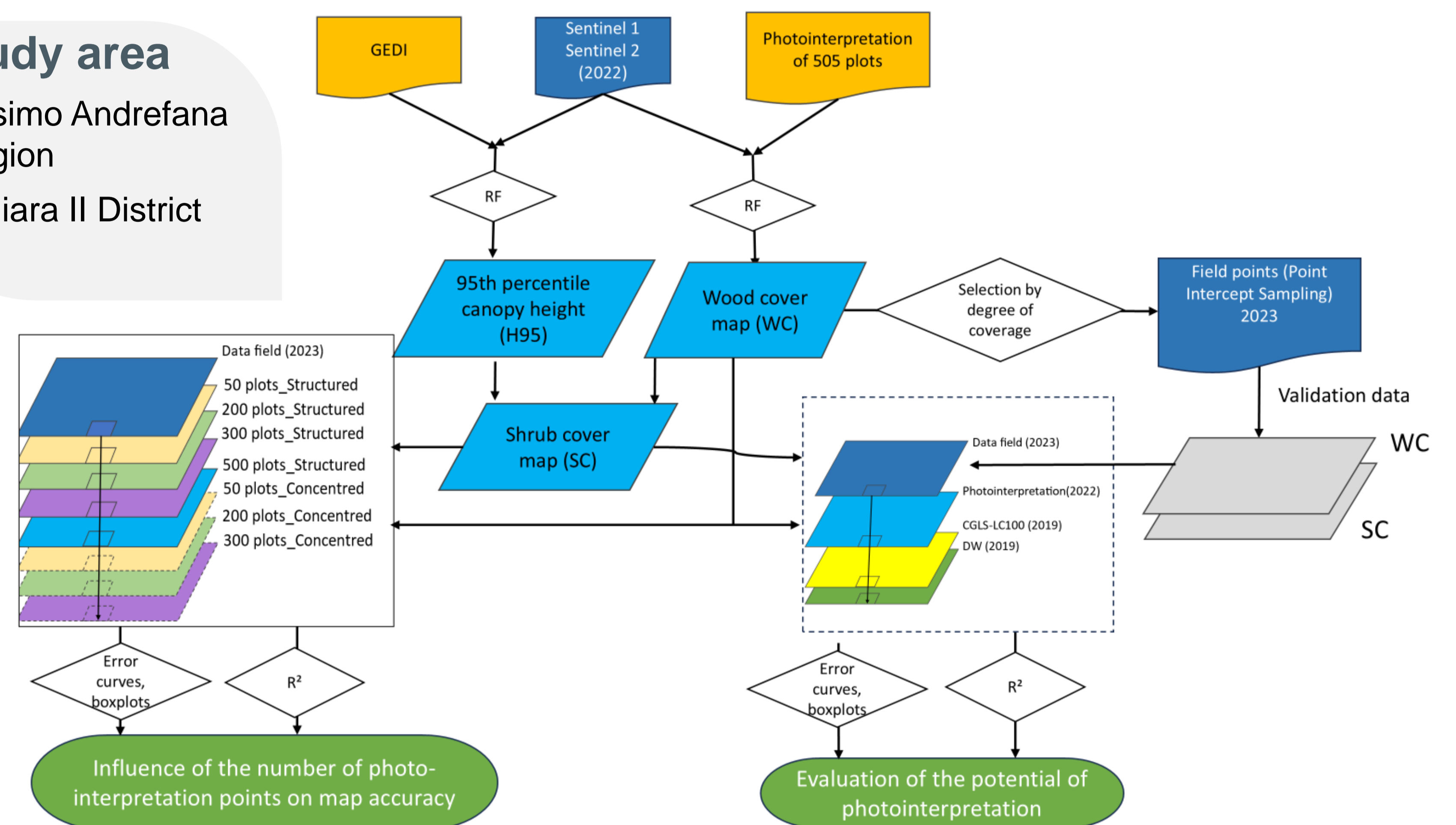
Existing cartographic studies on these ecosystems are limited to traditional remote sensing methods and classifications of forests versus non-forests. When compared to global reference maps such as DW (Dynamic World) and CGLS (Copernicus Global Land Cover), how does the accuracy of photo-interpretation-calibrated maps measure up? Does the number of photo-interpreted points affect the precision of these maps?



02 MATERIALS AND METHODS

Study area

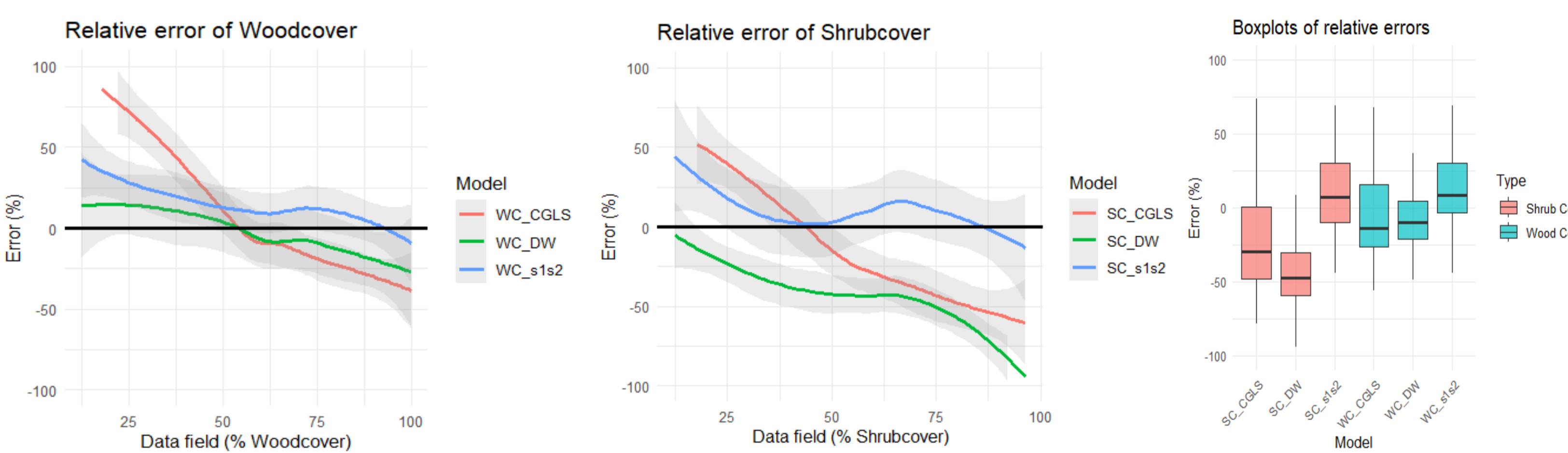
- Atsimo Andrefana Region
- Toliara II District



03 RESULTS

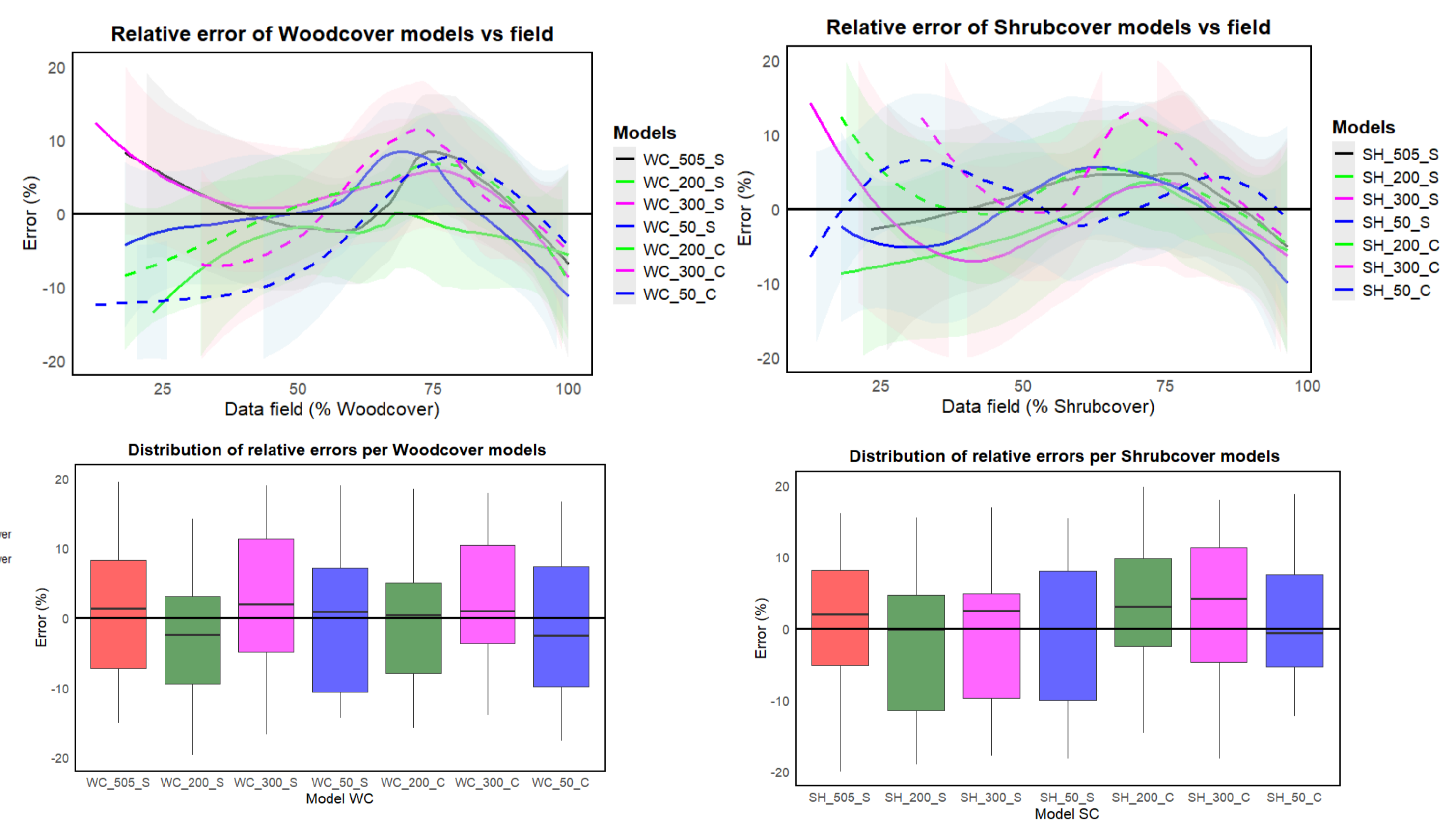
Comparison of Wood Cover and Shrub Cover Data with DW and CGLS-LC100

- Relative errors for wood and shrub cover with photo-interpretation maps are lower compared to global reference data.
- In our study area, where deforestation is more likely than reforestation, data from 2019 and 2022 should be greater than or equal to the more recent 2023 data. However, this is not the case for global reference datasets such as DW and CGLS-LC100.
- For wood cover, both DW and CGLS tend to underestimate areas with over 50% cover. Similarly, CGLS underestimates shrub cover, while DW shows a significant underestimation of shrub cover. Our maps show an overestimation of both wood and shrub cover, with an R^2 of 0.85 for wood cover (WC) and 0.78 for shrub cover.



Influence of the Number of Photo-Interpreted Points on Map Accuracy

For photo-interpretation data, relative errors remain below 10%, whether using 50 scattered or concentrated points. However, maps with well-distributed points (..._S) are closer to field data than those with points concentrated (..._C) in a single area.



04 CONCLUSION

- Photo-interpretation proves effective in mapping xerophilous shrublands in southwestern Madagascar, with lower relative errors compared to global reference datasets (DW and CGLS-LC100).
- While some overestimation is observed in our maps, photo-interpretation shows strong potential for more accurate vegetation cover mapping in complex ecosystems and areas with high deforestation rates.
- The number and distribution of photo-interpretation points significantly influence map accuracy, with well-distributed points yielding results closer to field data.
- Our findings highlight the importance of an appropriate sampling strategy to improve the precision of vegetation maps in dynamic environments.



References

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