Termite mounds as refugia for plant communities under varying disturbance

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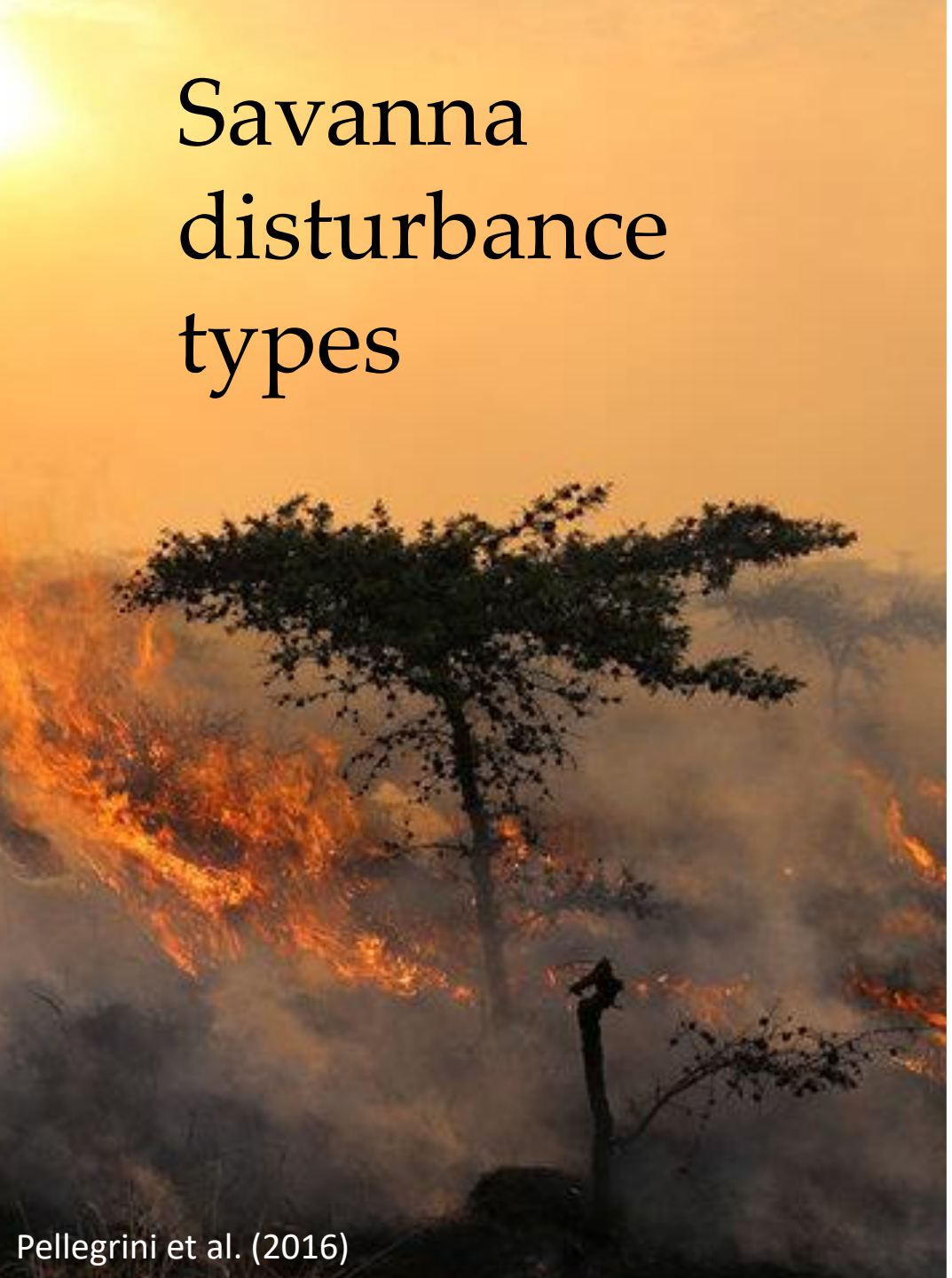
Savanna disturbance types



Pellegrini et al. (2016)

Image courtesy of Riley Wadehra

Estimating vegetation complexity on and off termite mounds with disturbance

Q1. Do termite mounds provide refugia for vegetation with different disturbance types?

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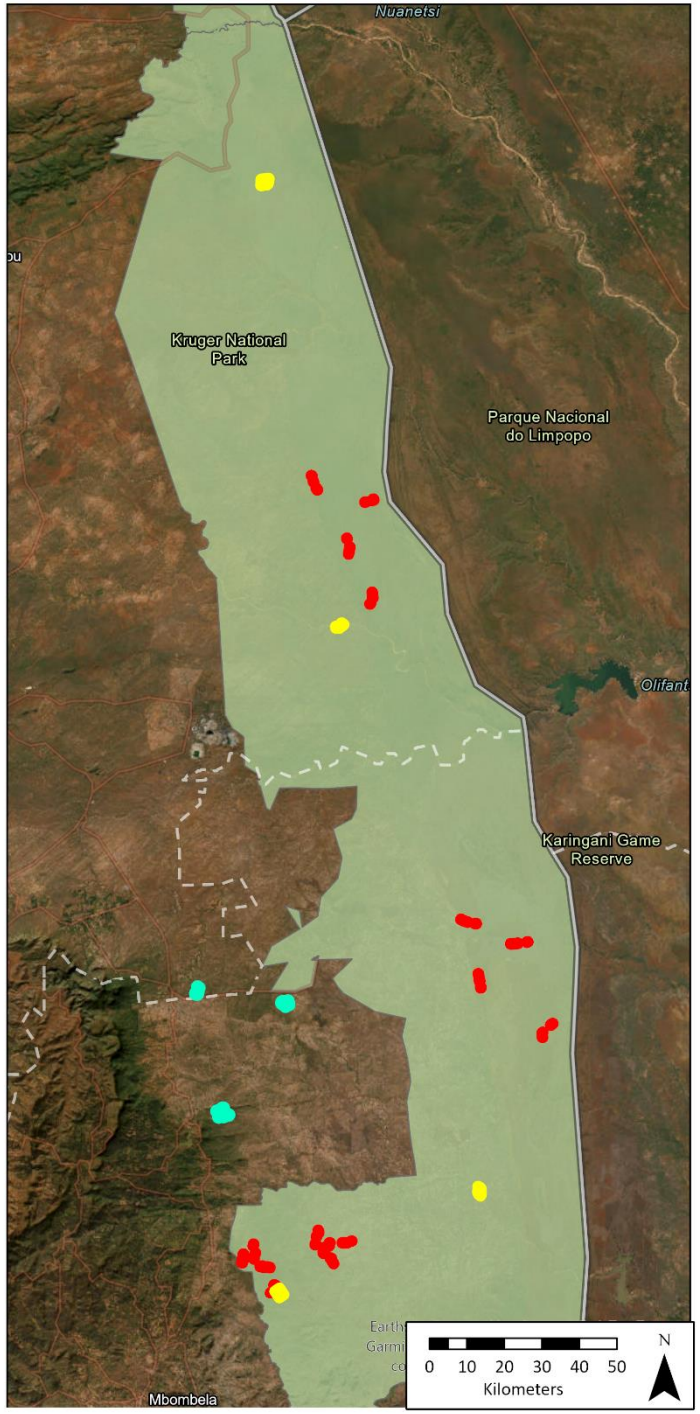
Q2. Are these patterns consistent across spatial gradients experiencing disturbance?

Q3. Do termite mounds support unique floristic diversity with disturbance?

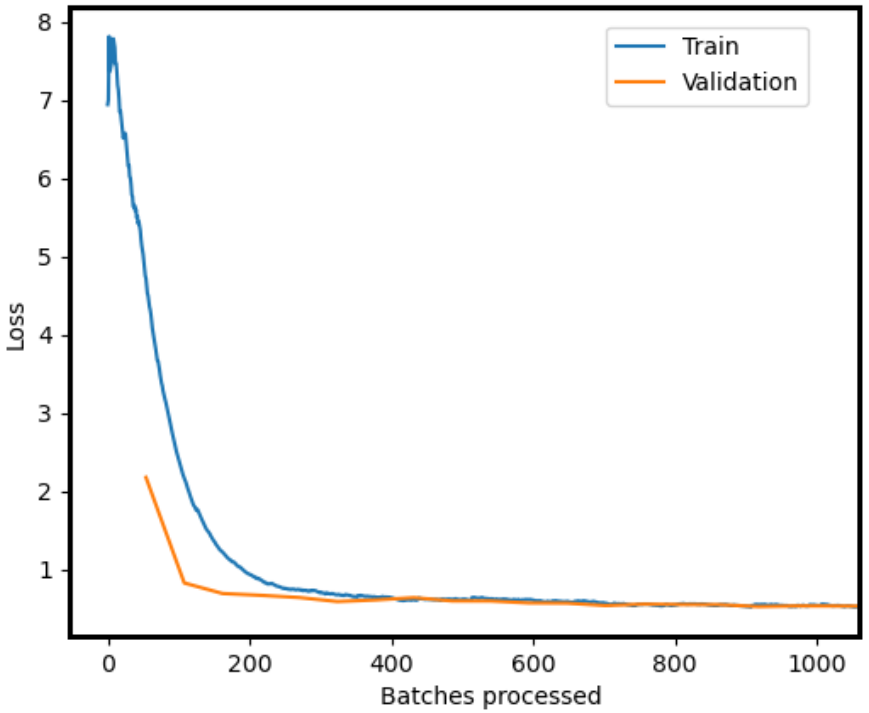
Q4. Are there differences in adaptive plant traits?

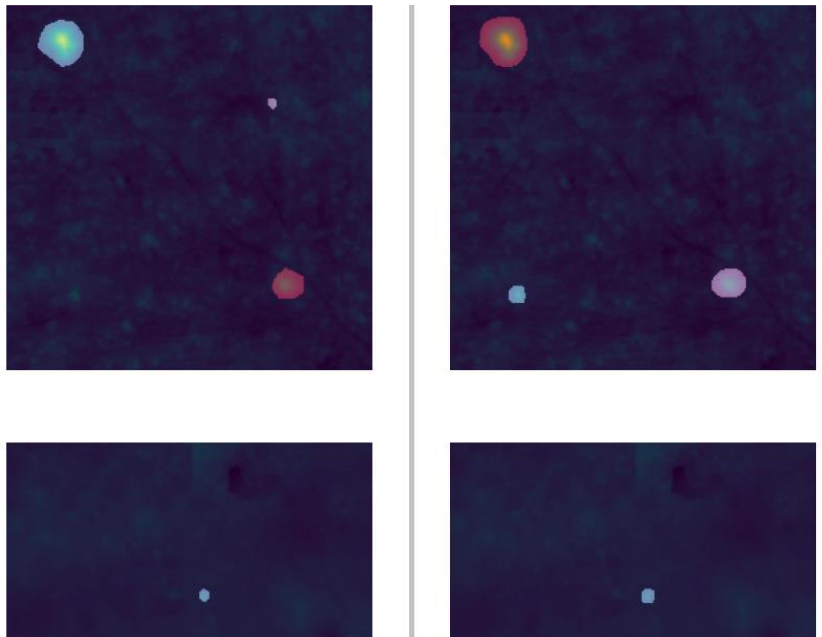
Methods

- Disturbance type, across rainfall gradients and varied geologies
  - **Experimental burn plots = red**
  - **Herbivore exclosures = yellow**
  - **Human disturbance gradient = blue**
- Very-high resolution LiDAR drone capture (~ 25 cm)
- 17 x Vegetation Structural Complexity (VSC) metrics
- Machine learning to detect termite mounds

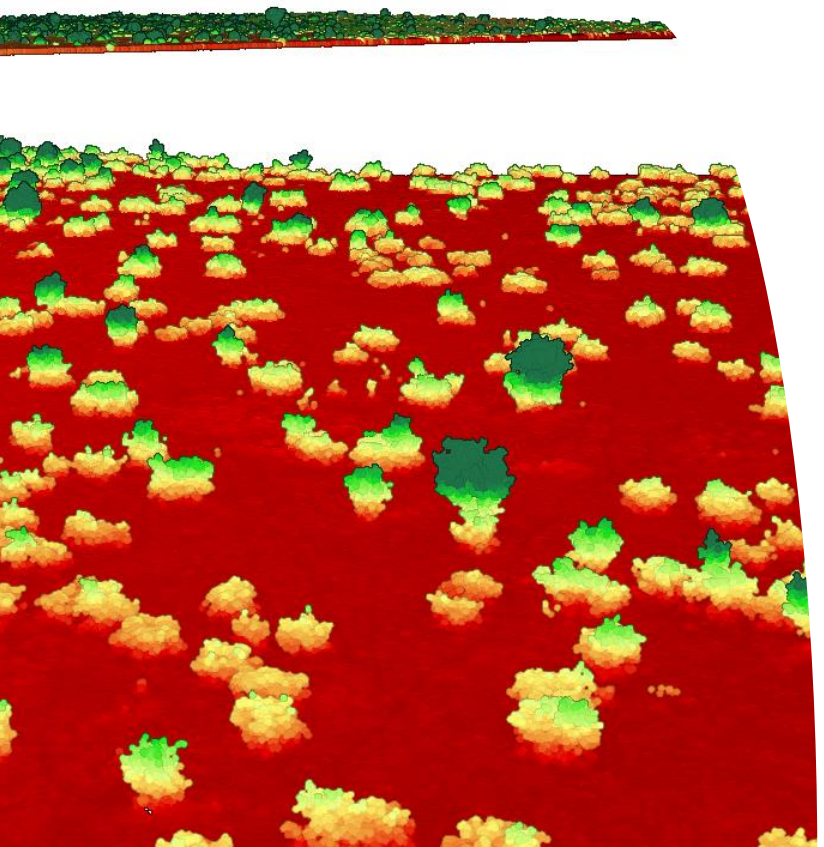


Mask R-CNN results





Herbivory findings



On Mound
Adjacent Mound
Matrix

Nwaswitshumbe (Roan)

Letaba

Nkuhlu

Hlangwine

Fractional Woody Cover

Stem Density

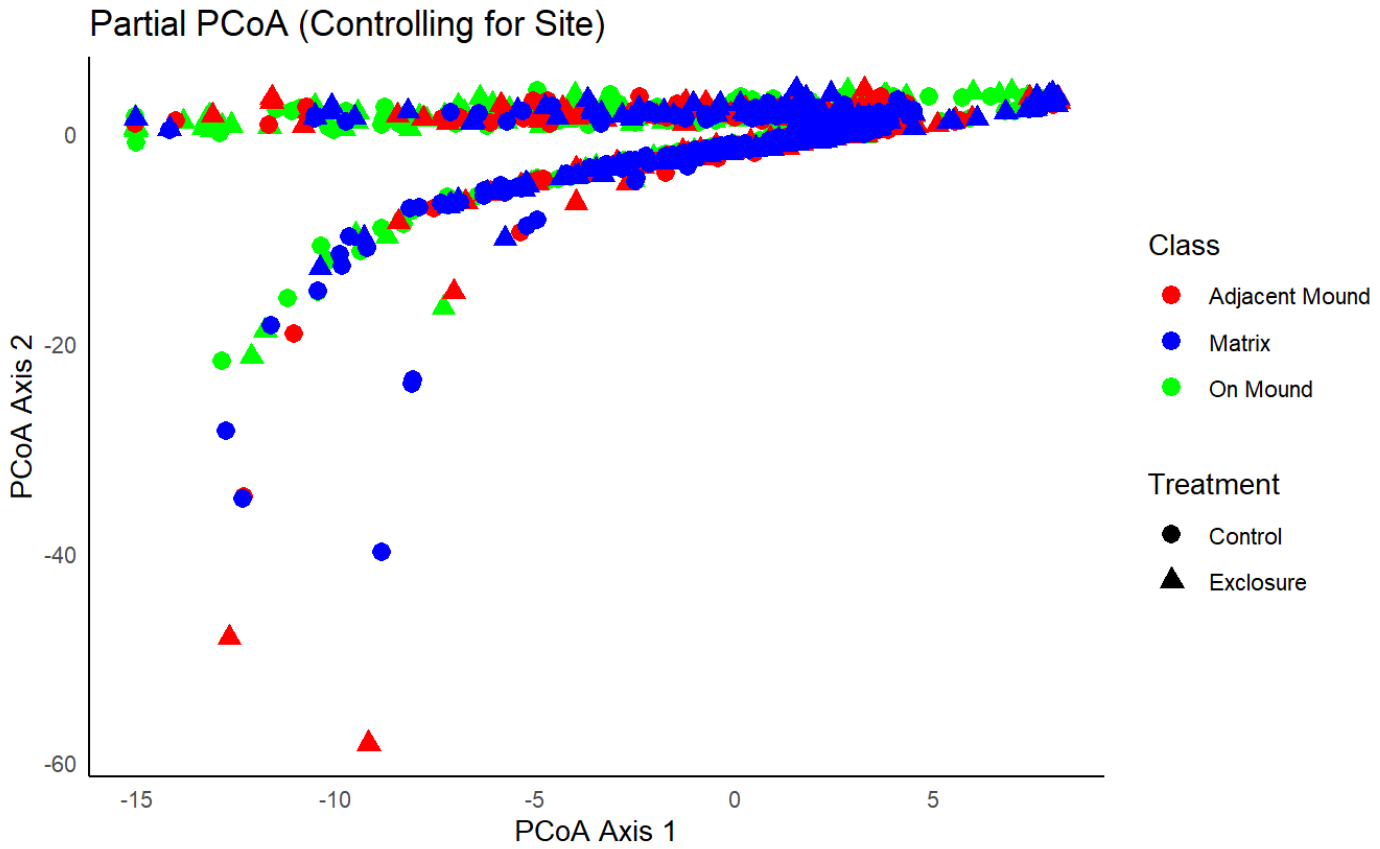
Woody Cover (%)

Stem:area

Outside **Inside** **Outside** **Inside**

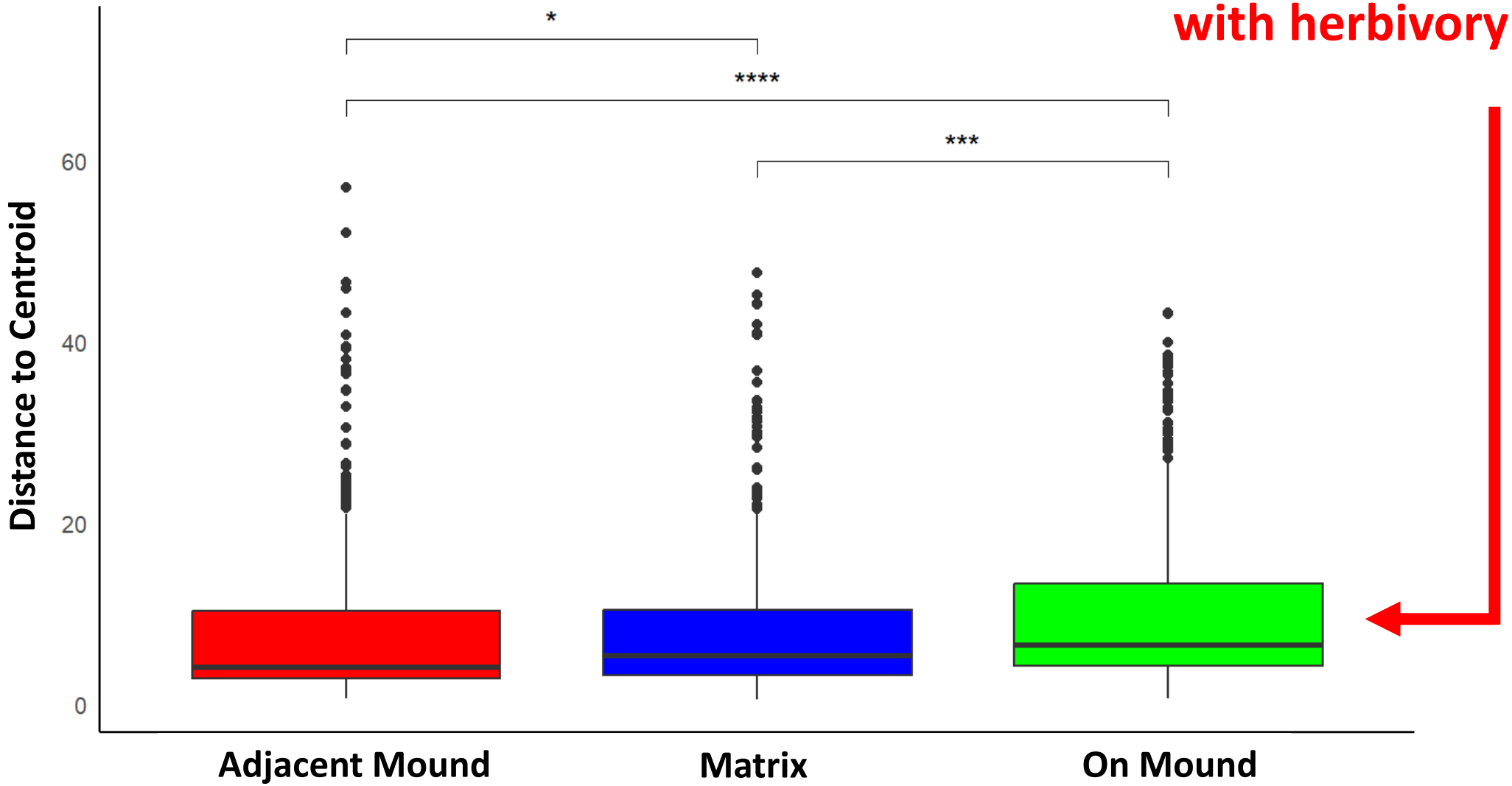
Herbivory findings

- PERMANOVA controlling for site - *p*-value = 0.001***
- Axis 1 Eigenvalue – 96.56%
- Post-hoc ANOVA for Axis 1
  - Treatment: *p*-value = 0.21
  - Class: *p*-value = 0.01*
- **VSC linked to class and not treatment**

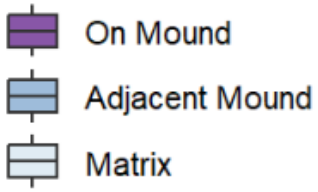


Herbivory findings

Termite mounds <u>are</u> sites of increased vegetation structural complexity with herbivory



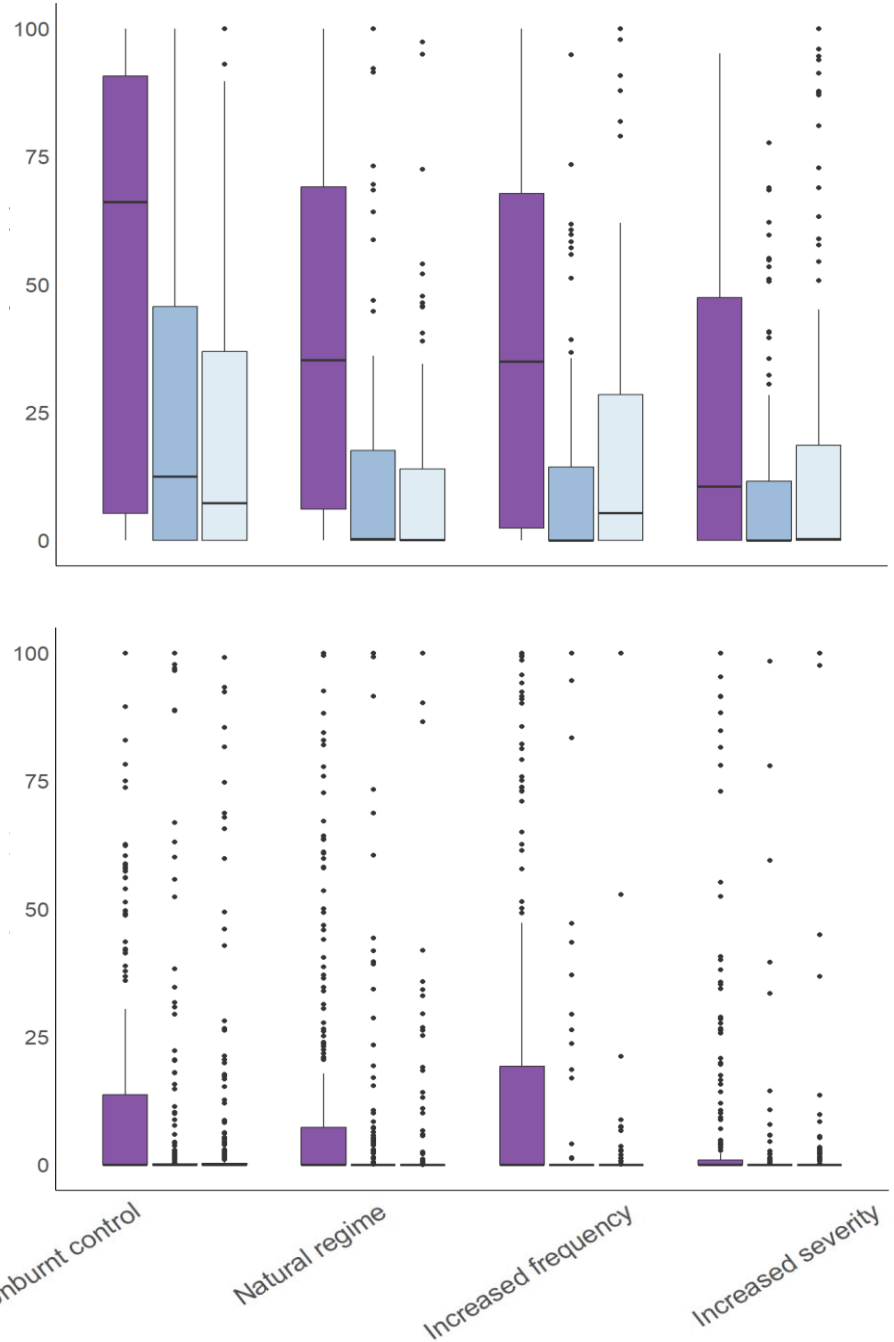
Fire regime findings



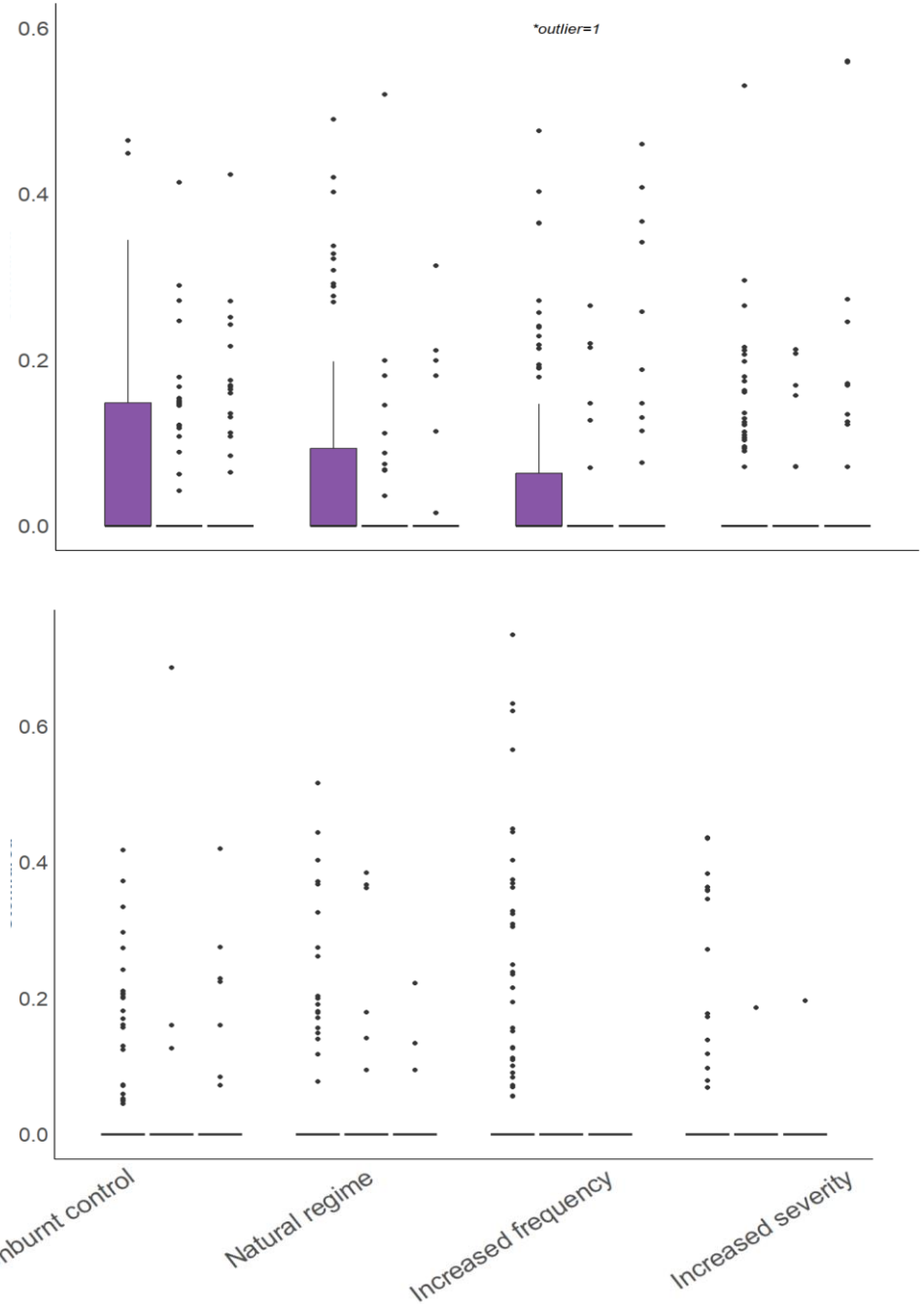
Mopani

Satara

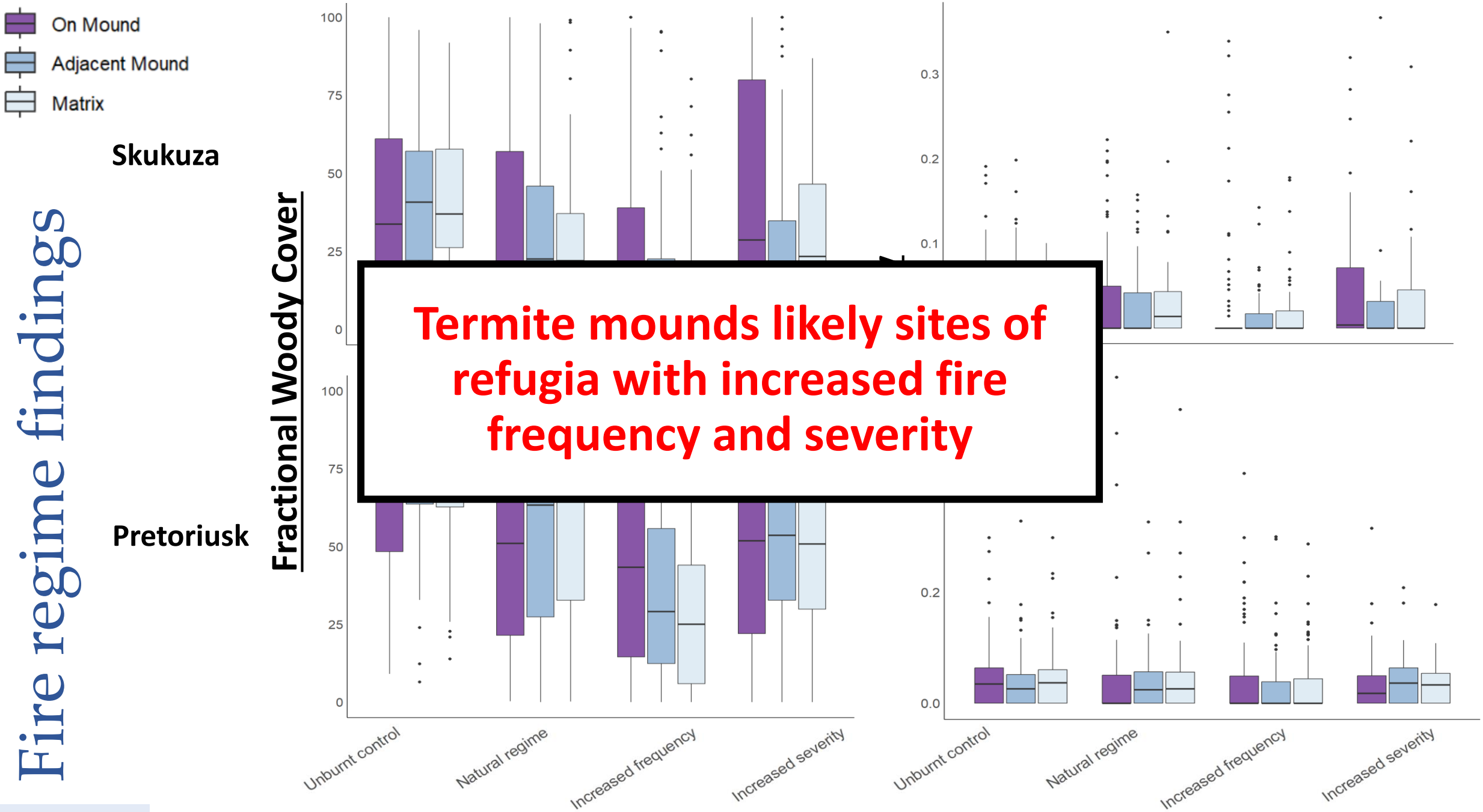
Fractional Woody Cover



Stem Density



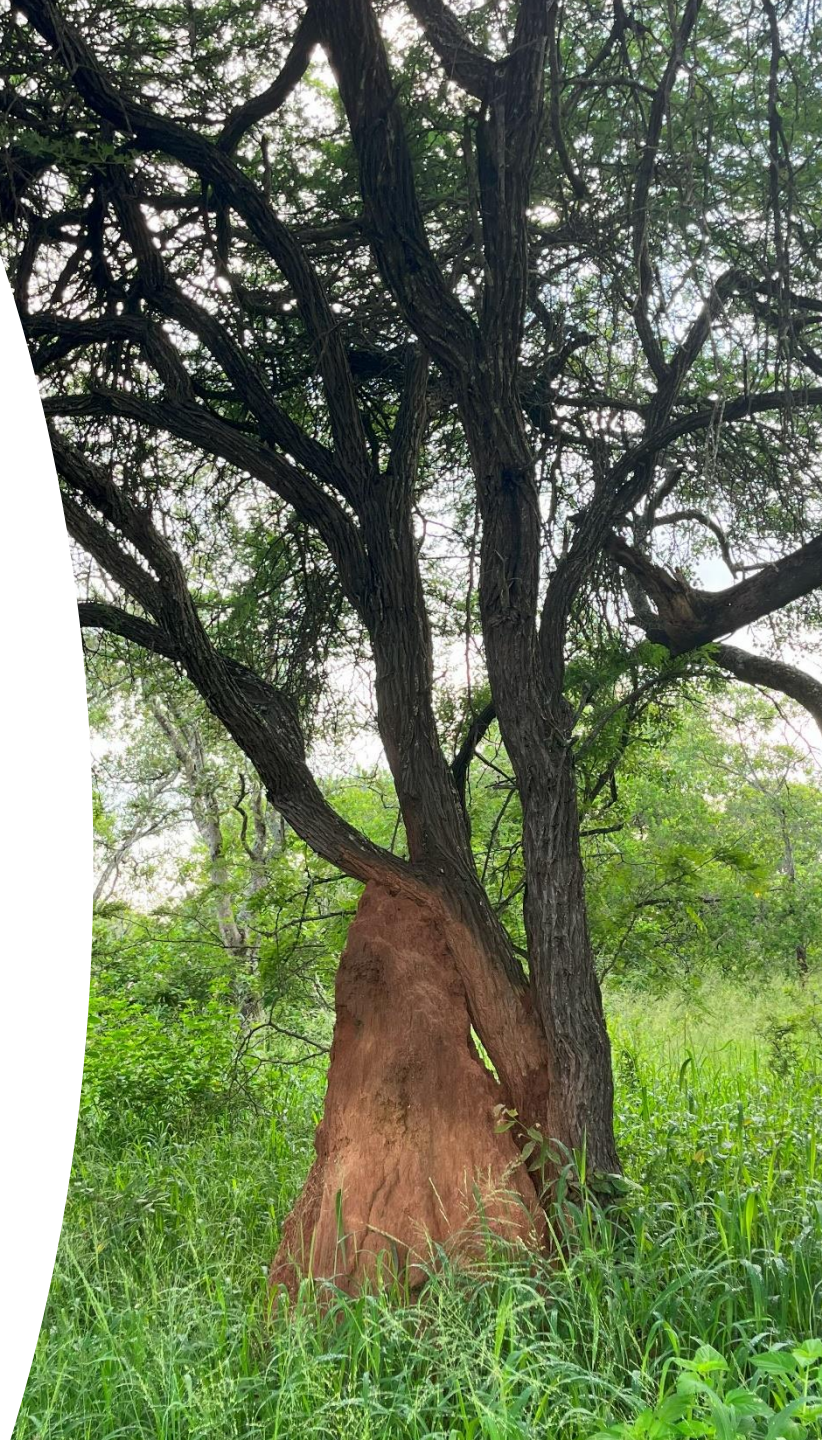
Fire regime findings



Termite mounds likely sites of refugia with increased fire frequency and severity

Future research

- Complete vegetation complexity analysis for rural disturbance
- Field surveys for plant species diversity and adaptive traits
- Mesofauna diversity
- Collembola traits
- Physical soil properties



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