

# **Vegetation structure and species diversity coupled to soil water heterogeneity in a Cerrado core area**

**Joice Ferreira  
Mercedes Bustamante  
Pedro Luiz Simpson-Junior  
Eric Davidson**

# Objective

Investigate possible links between woody vegetation structure and species diversity with soil water availability at Cerrado landscapes



# Study site



**Águas Emendadas  
Ecological Station**

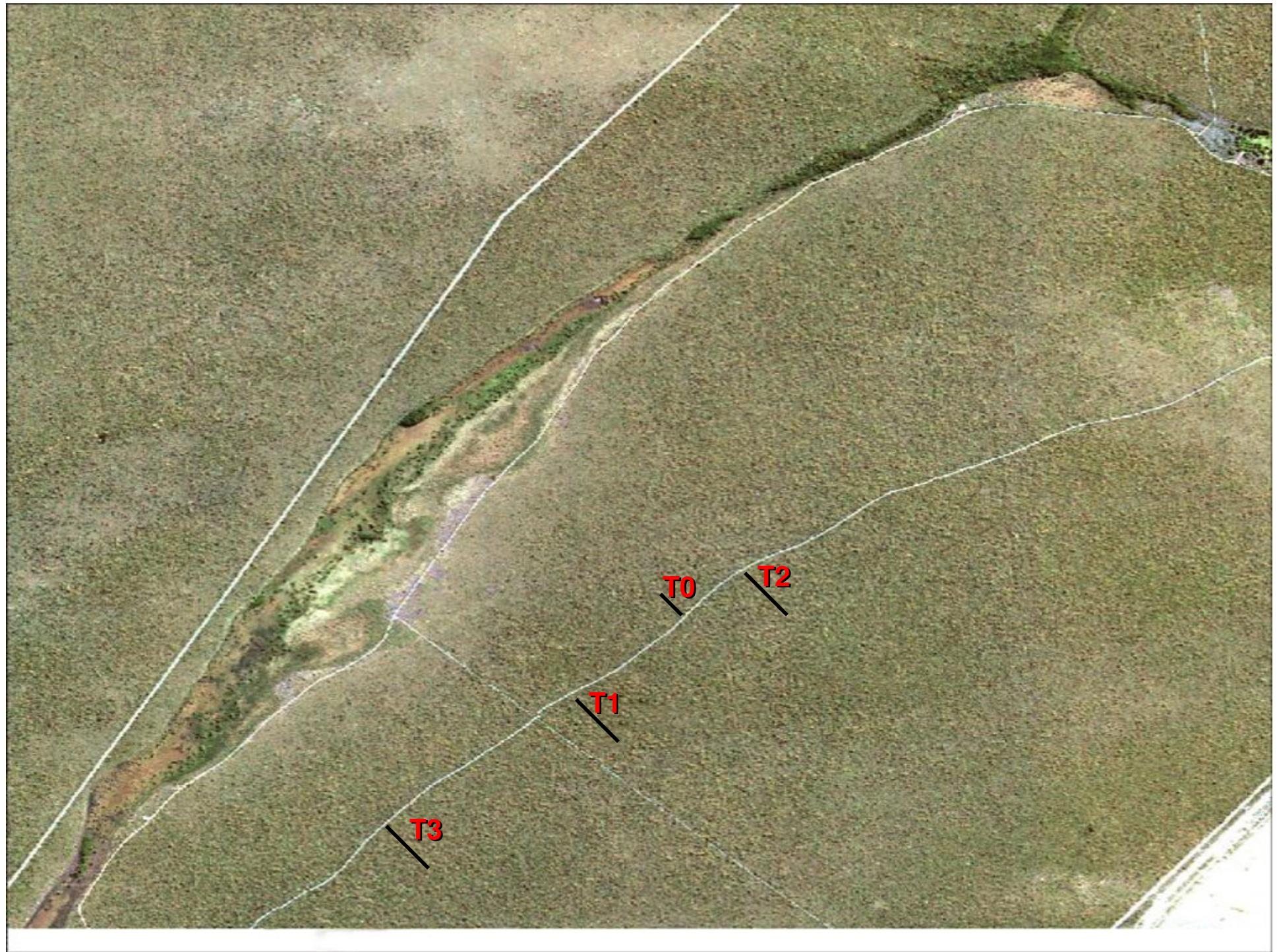




**Wet season**



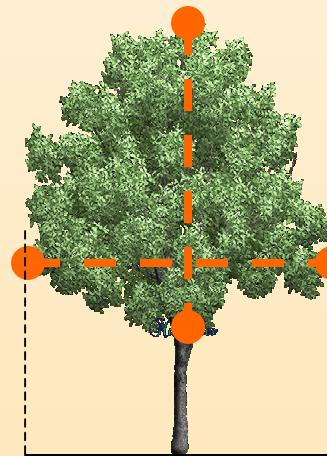
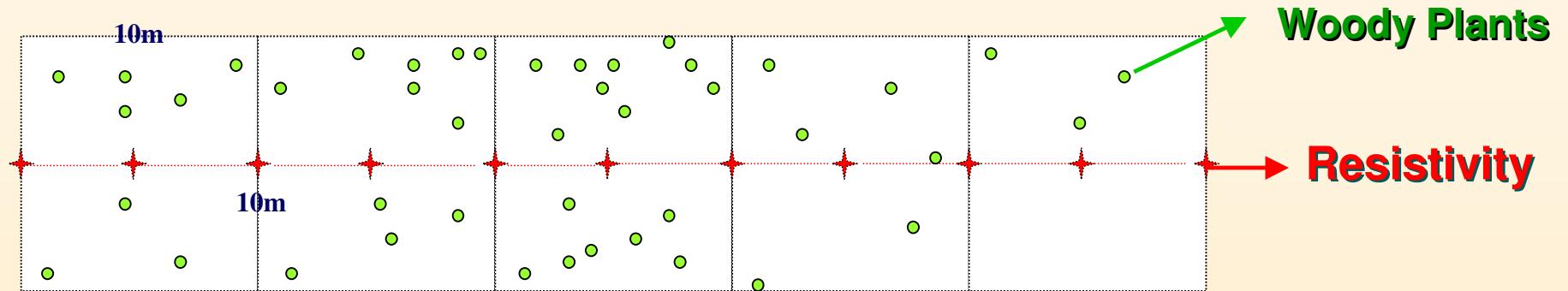
**Dry season**



# **Assessing soil water content through soil electrical resistivity profiling**



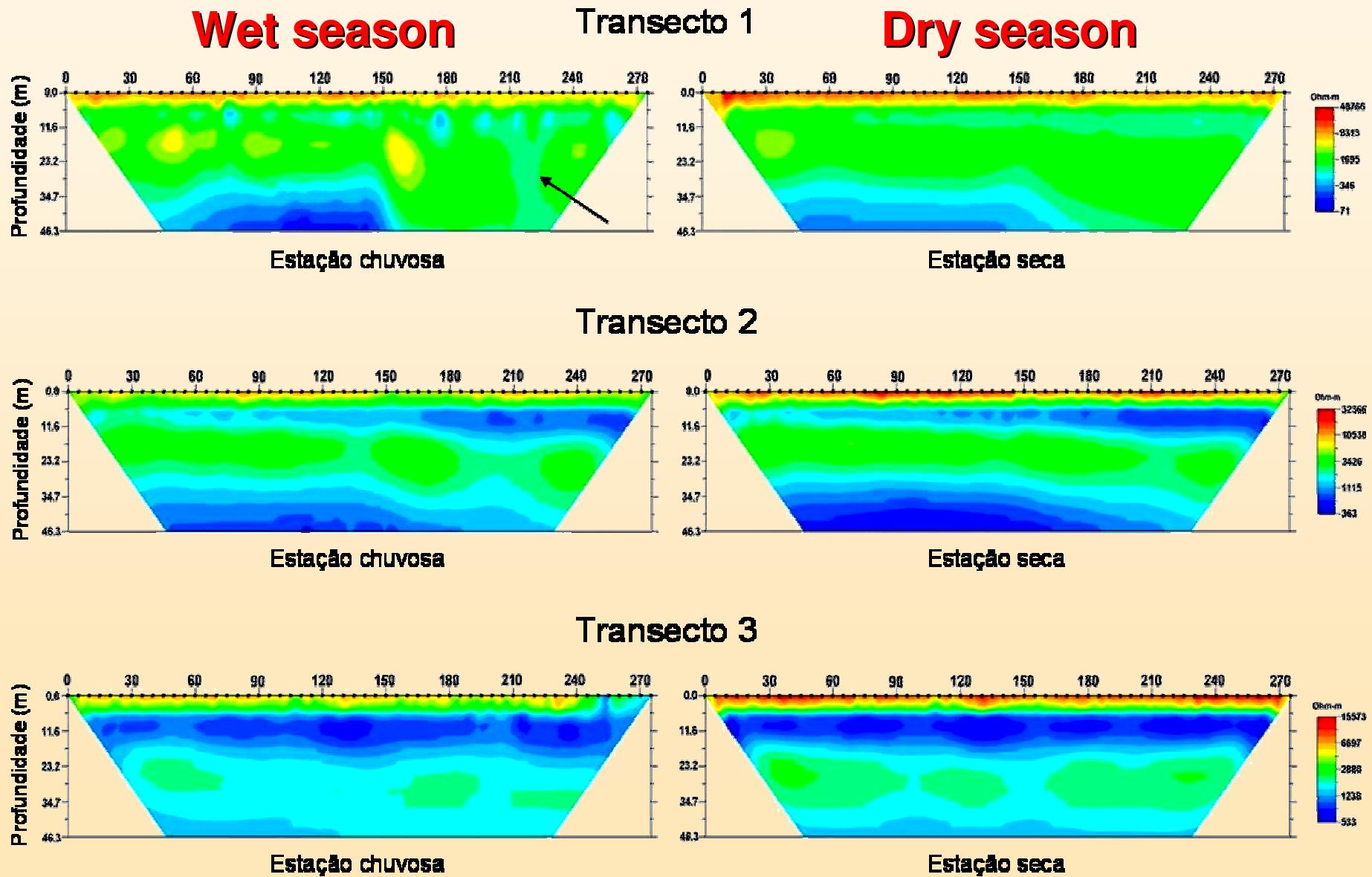
# Vegetation measurements



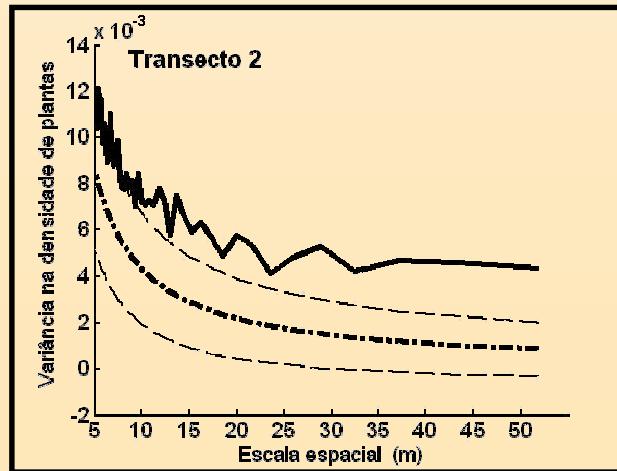
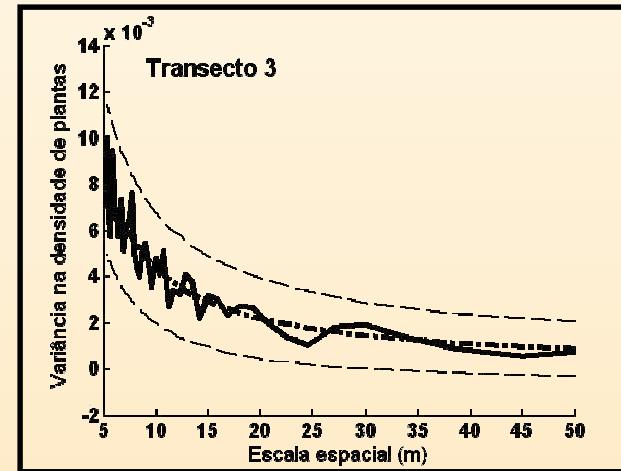
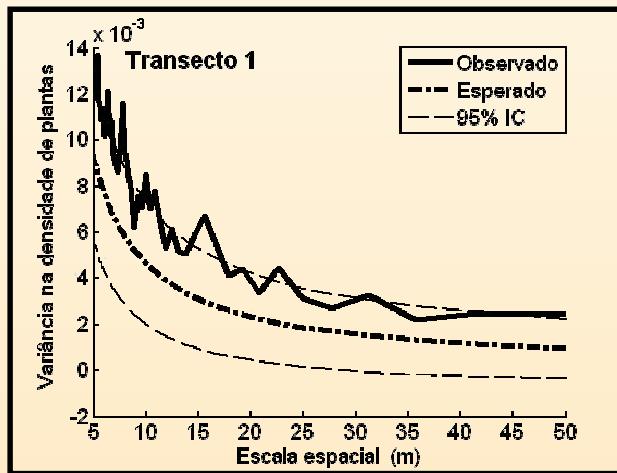
Plant measurements  
Leaf Area Index  
Species identification



# **Soil electrical resistivity profiling**



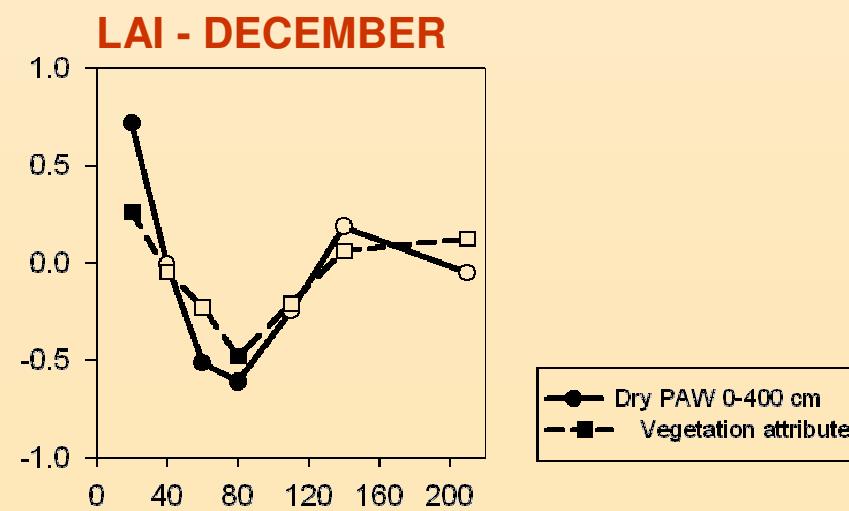
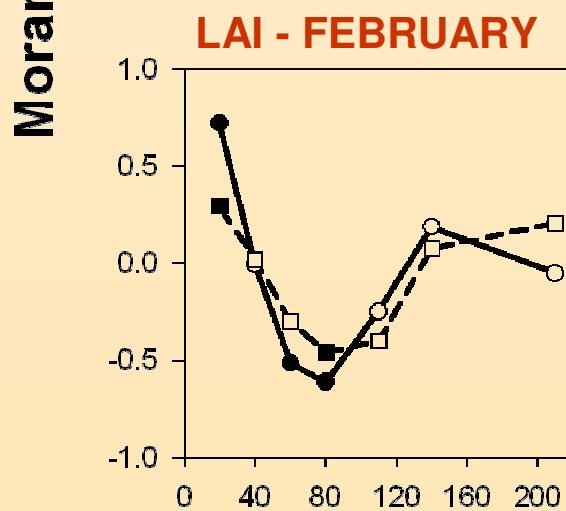
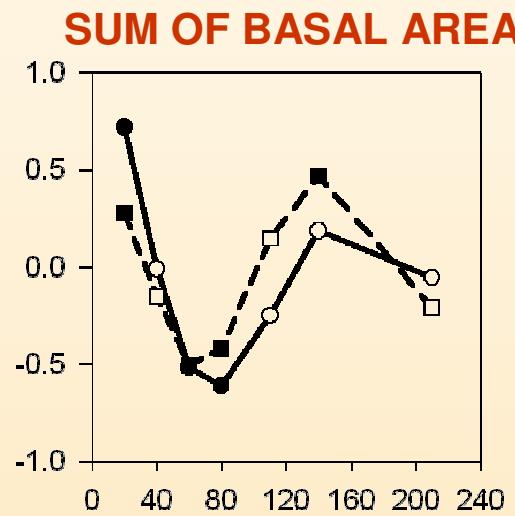
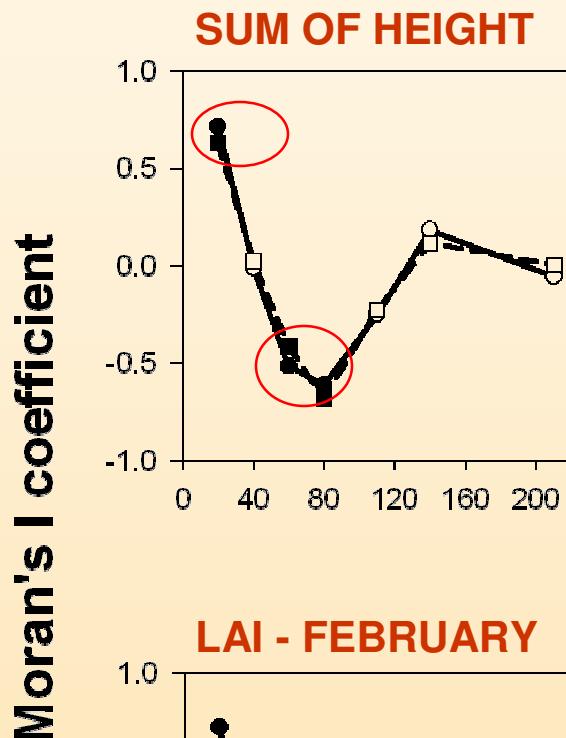
# Spatial patterns in plant distribution



## Null models approach

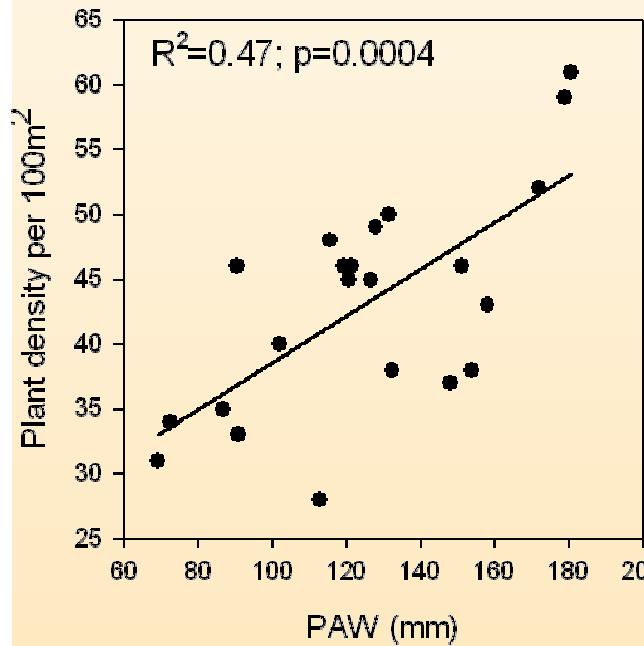
- 6000 simulations for random distribution

# Congruence in spatial distribution of vegetation and plant available water

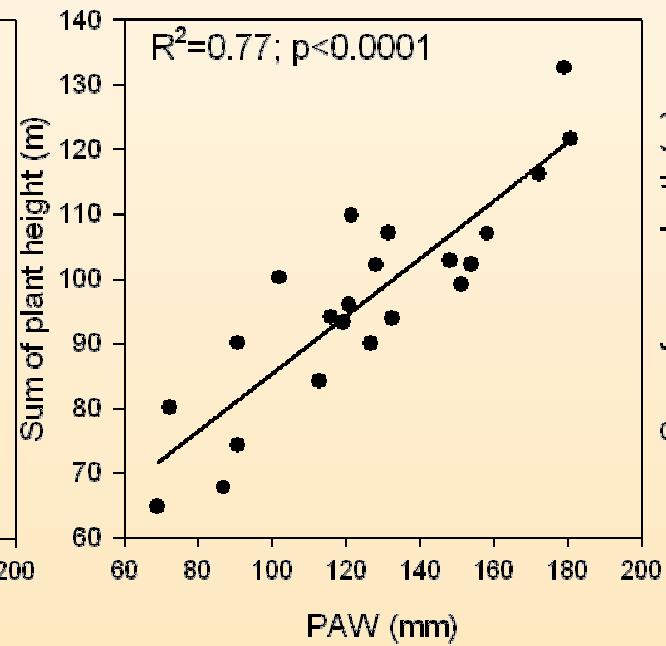


# Vegetation attributes and PAW 0-400 cm

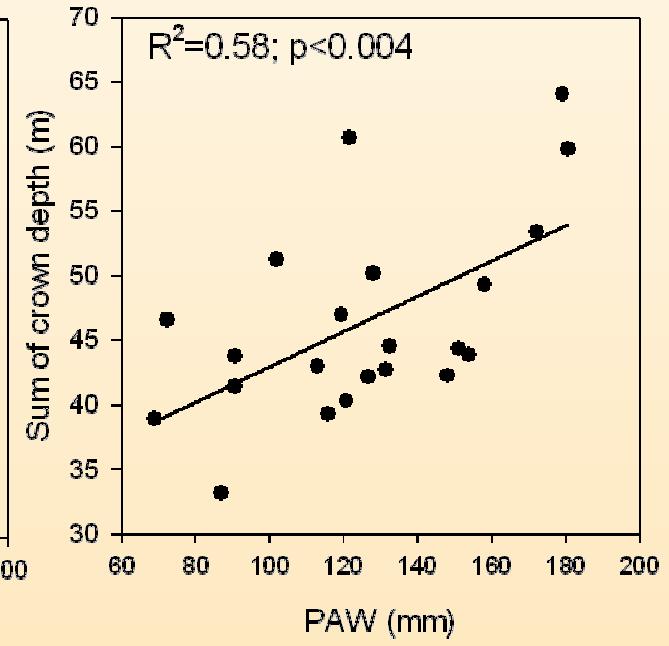
**Plant density**



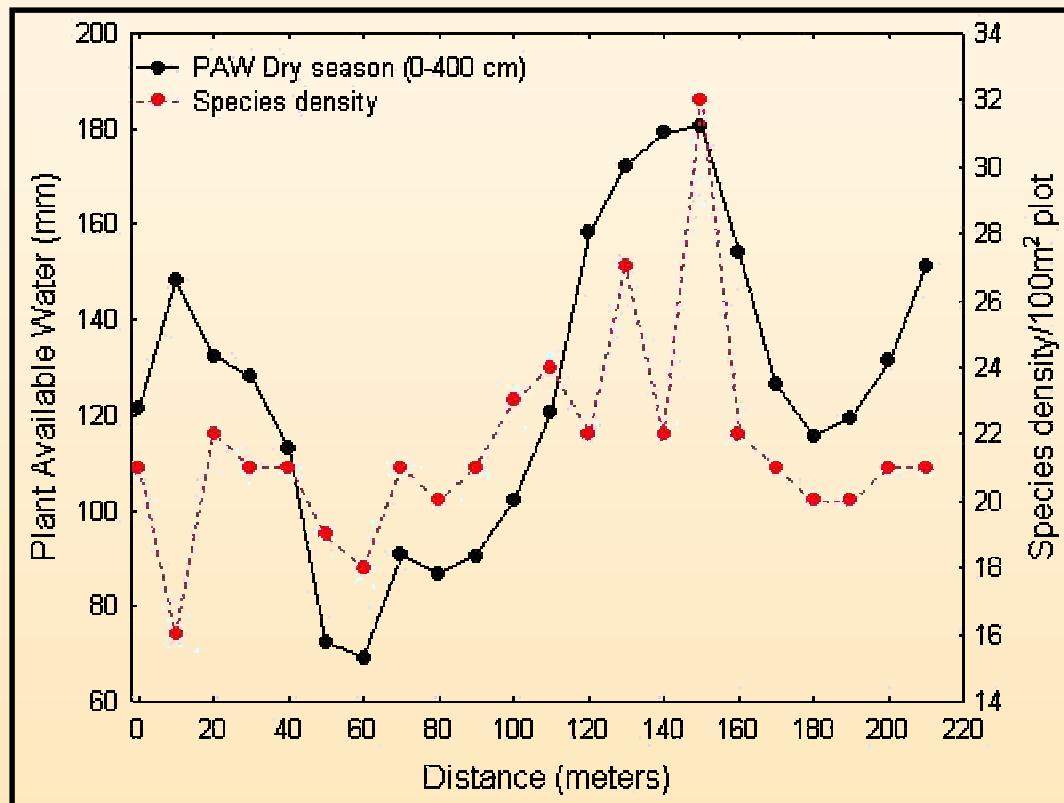
**Height**



**Crown depth**



## Co-variation between species density and PAW

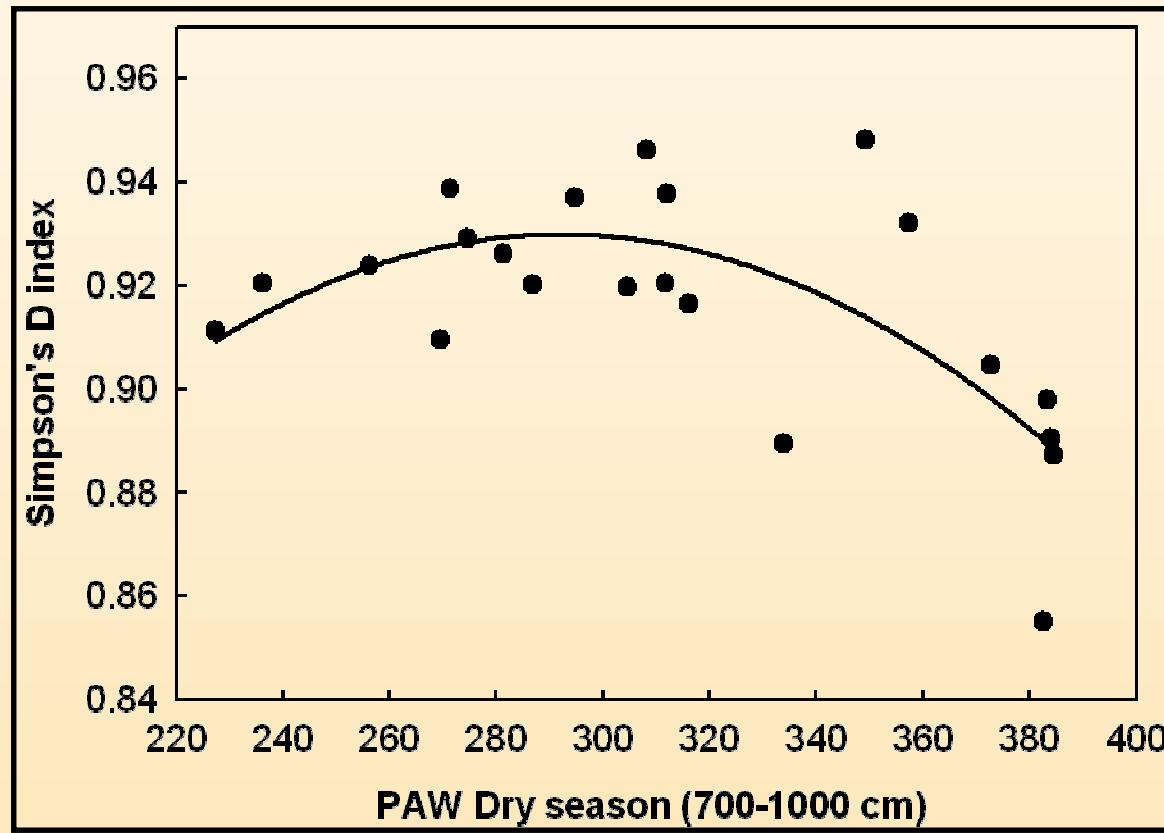


Mantel correlation

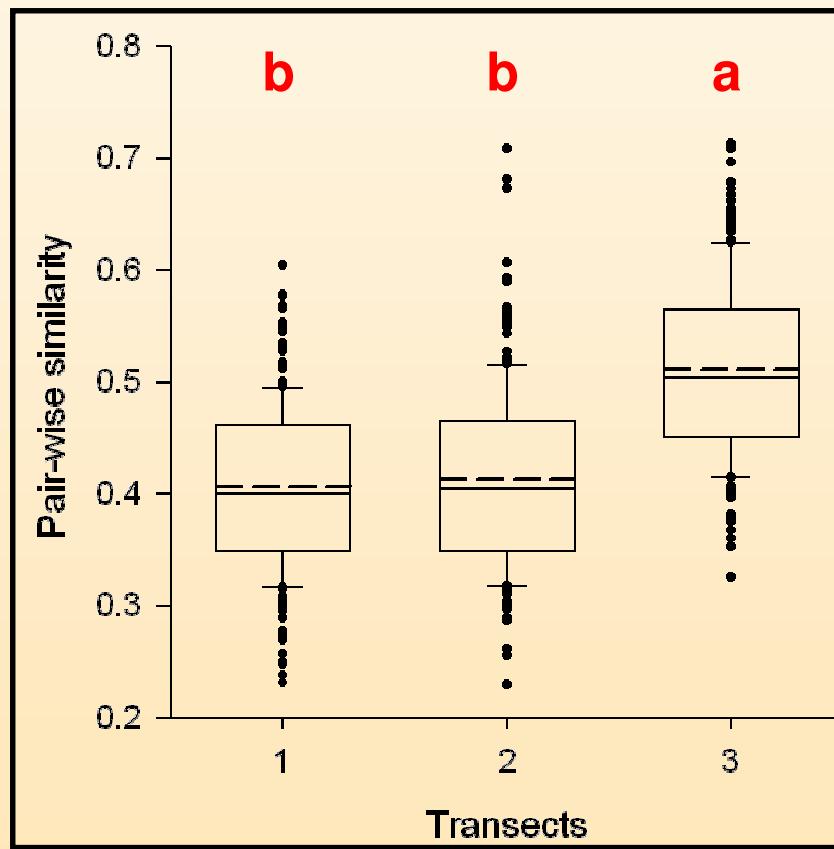
PAW 0-4 m - Dry season:  $r=0.35^{**}$

Wet season:  $r=0.31^{**}$

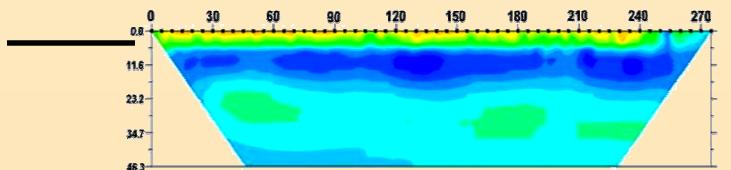
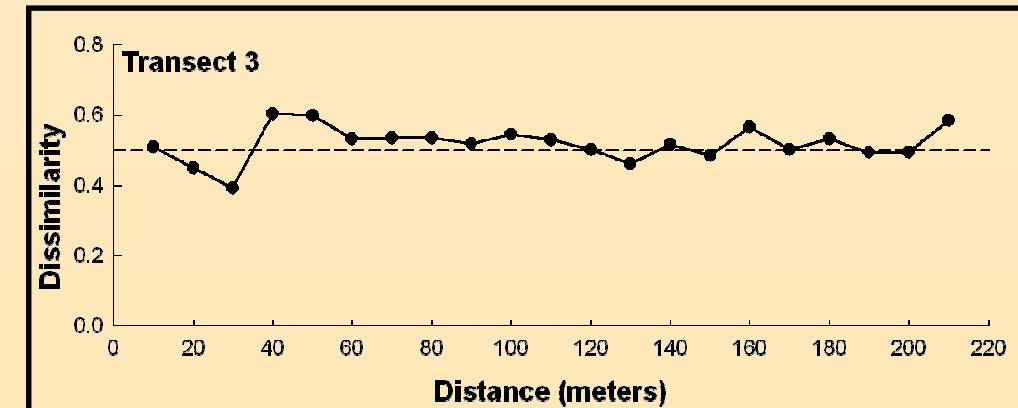
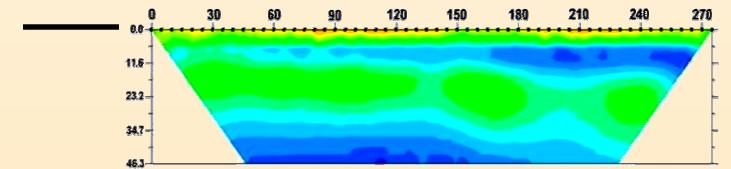
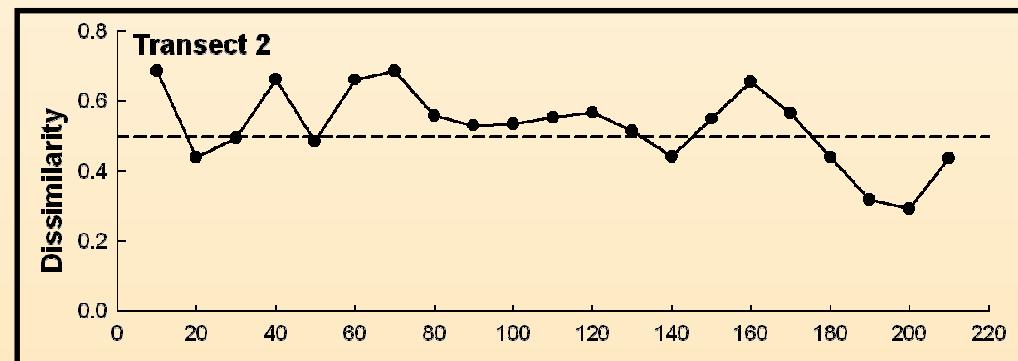
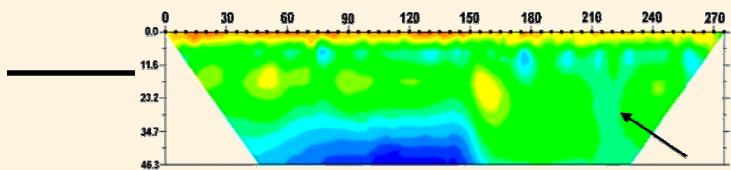
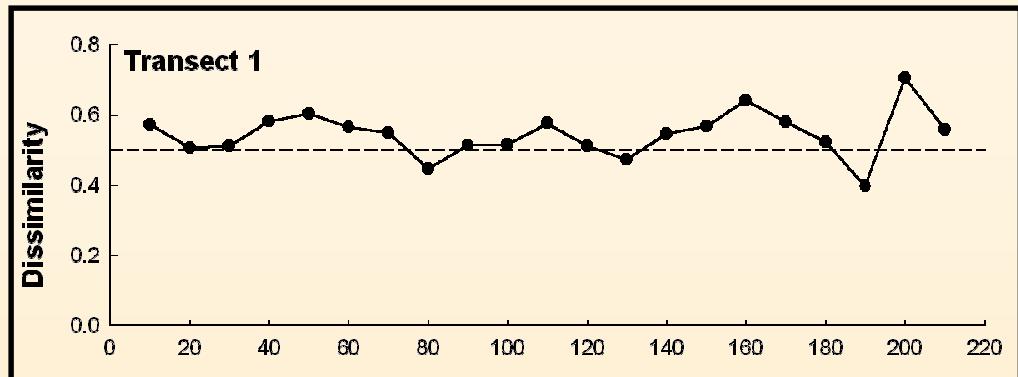
# Species diversity and plant available water

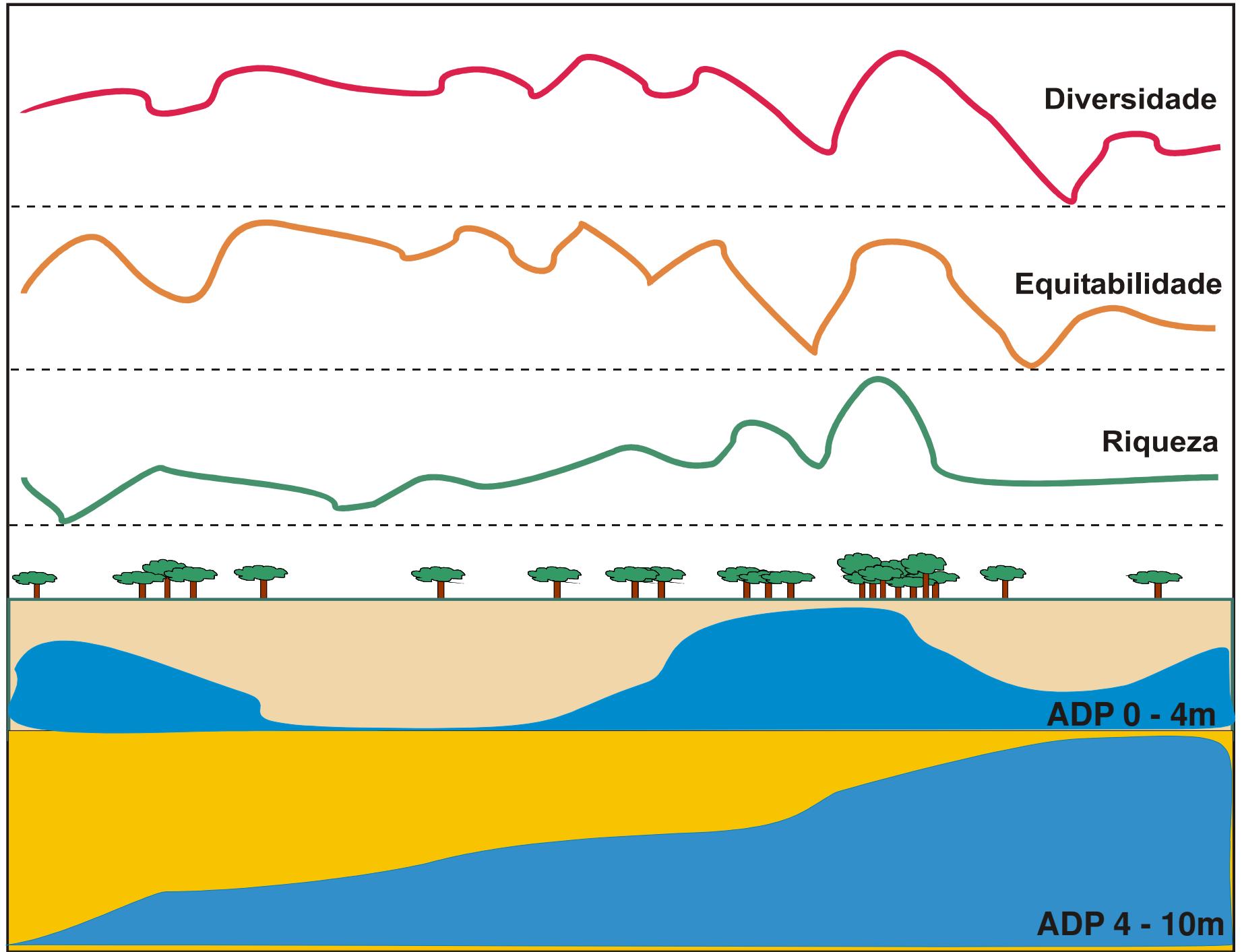


# Spatial variation on species composition (Beta-diversity)



# Spatial variation on species composition





# Conclusions

Strong co-organization between vegetation structure and plant available water at a fine scale;

Species composition and thus species diversity co-varied with plant available water ;

Soil water availability is an important structuring factor at fine scale in the studied Cerrado.

