

丰富多样的冠层热力环境

林华，欧雯 2025.8.28

中国科学院西双版纳热带植物园



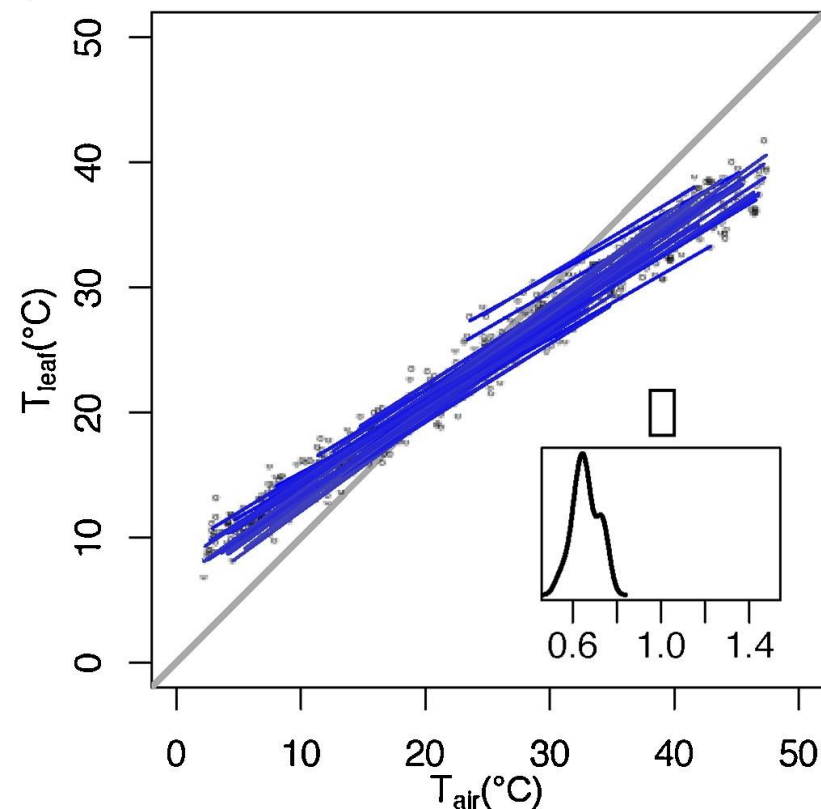
提纲

- 林冠温度的重要性
- 林冠温度vs.空气温度
- 初步探索
- 初步结果
- 小结



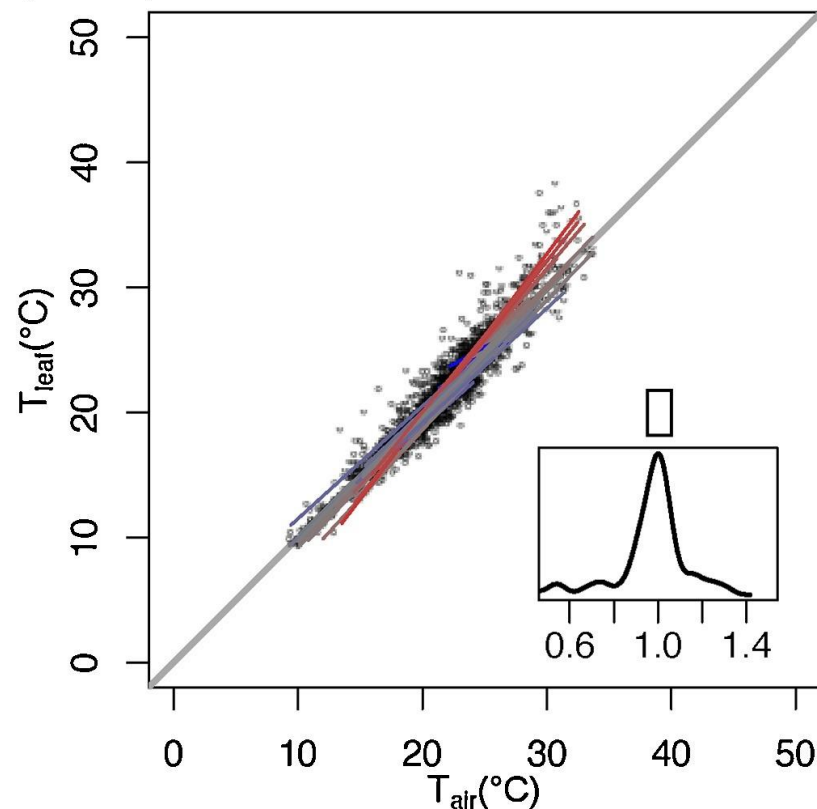
$$R_n = LE + H$$

A) Forests and meadows



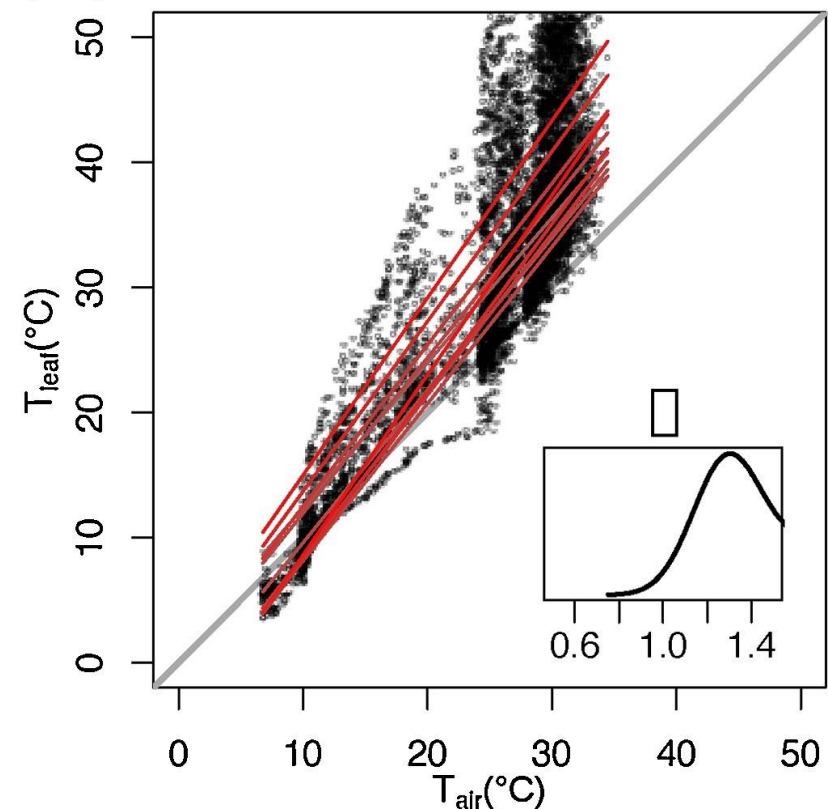
Limited homeothermy ($\beta < 1$)

B) Subalpine meadows

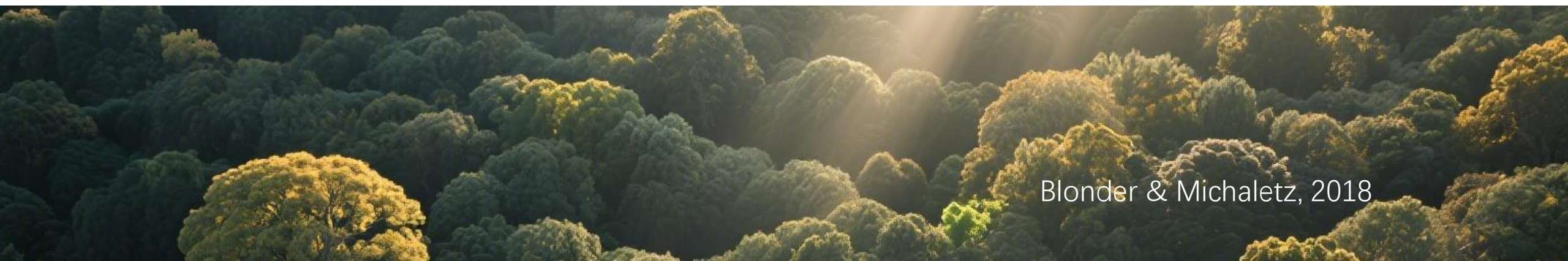


Poikilothermy ($\beta = 1$)

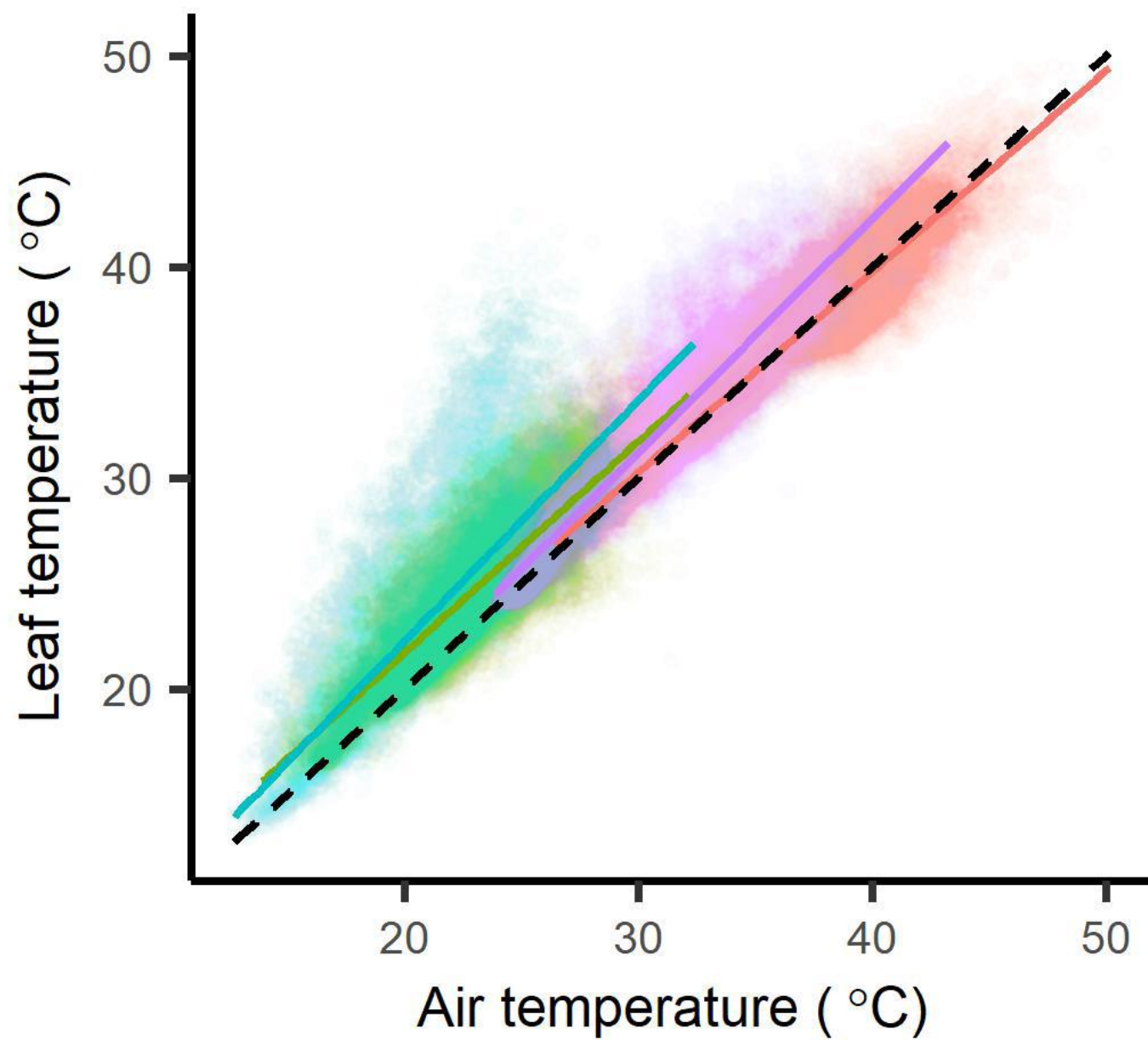
C) High desert



Megathermy ($\beta > 1$)

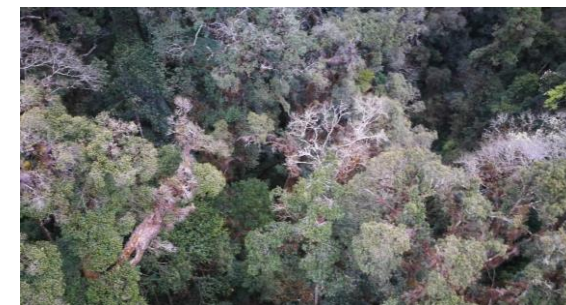
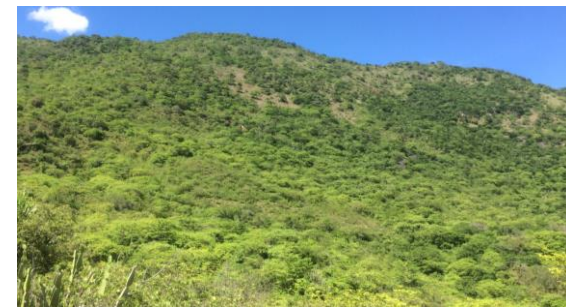


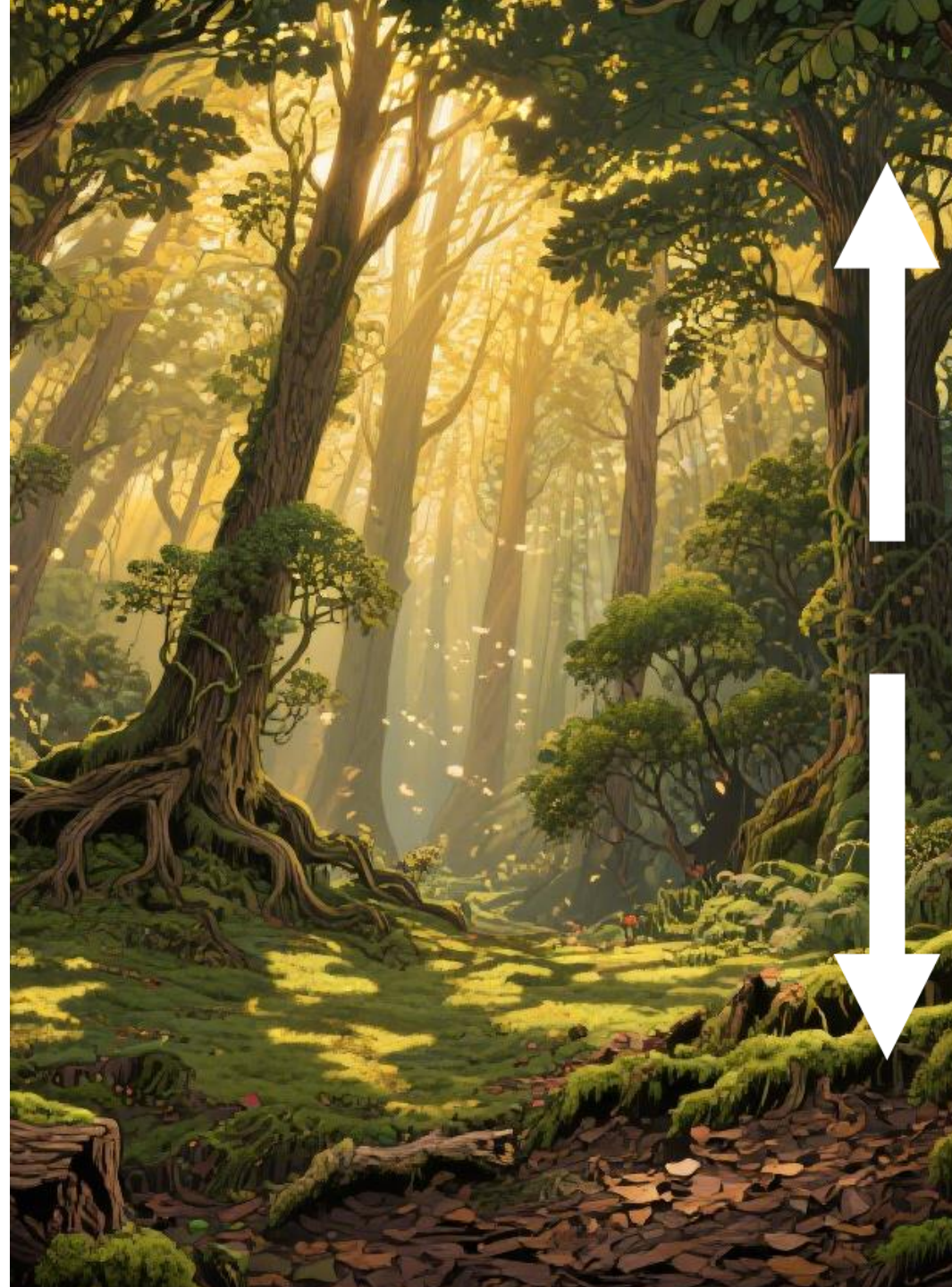
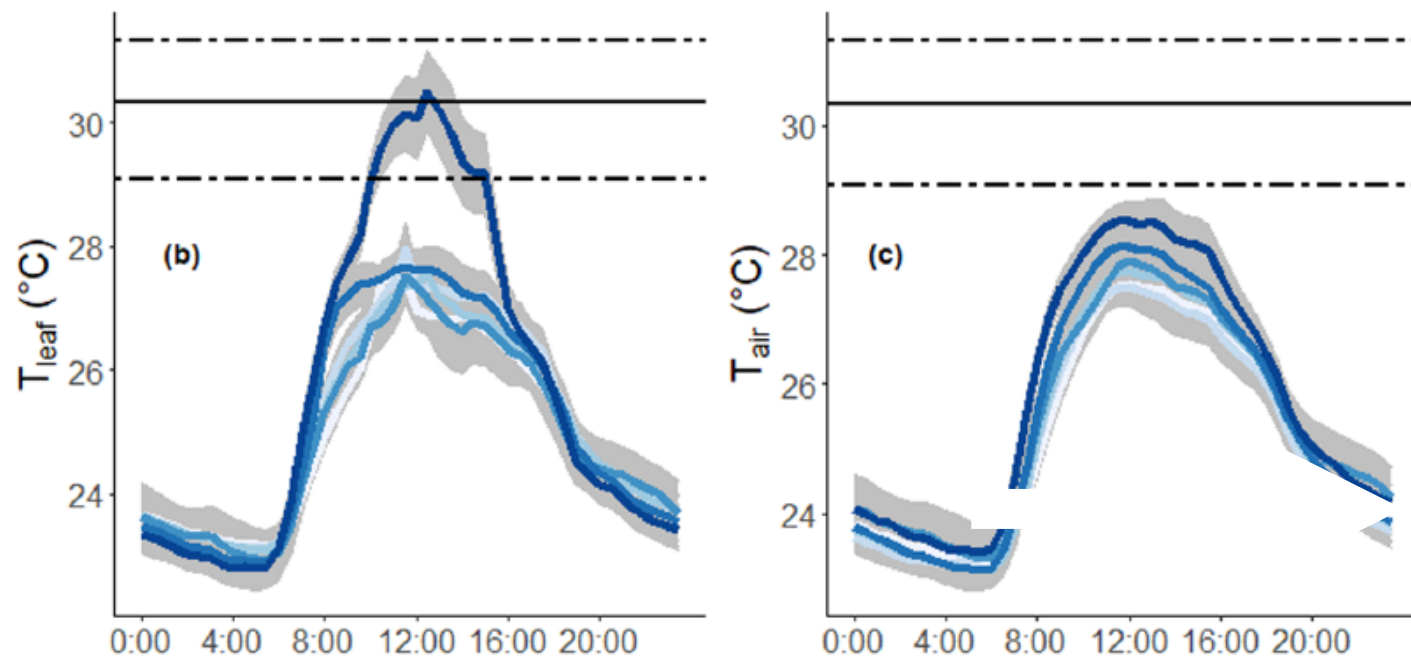
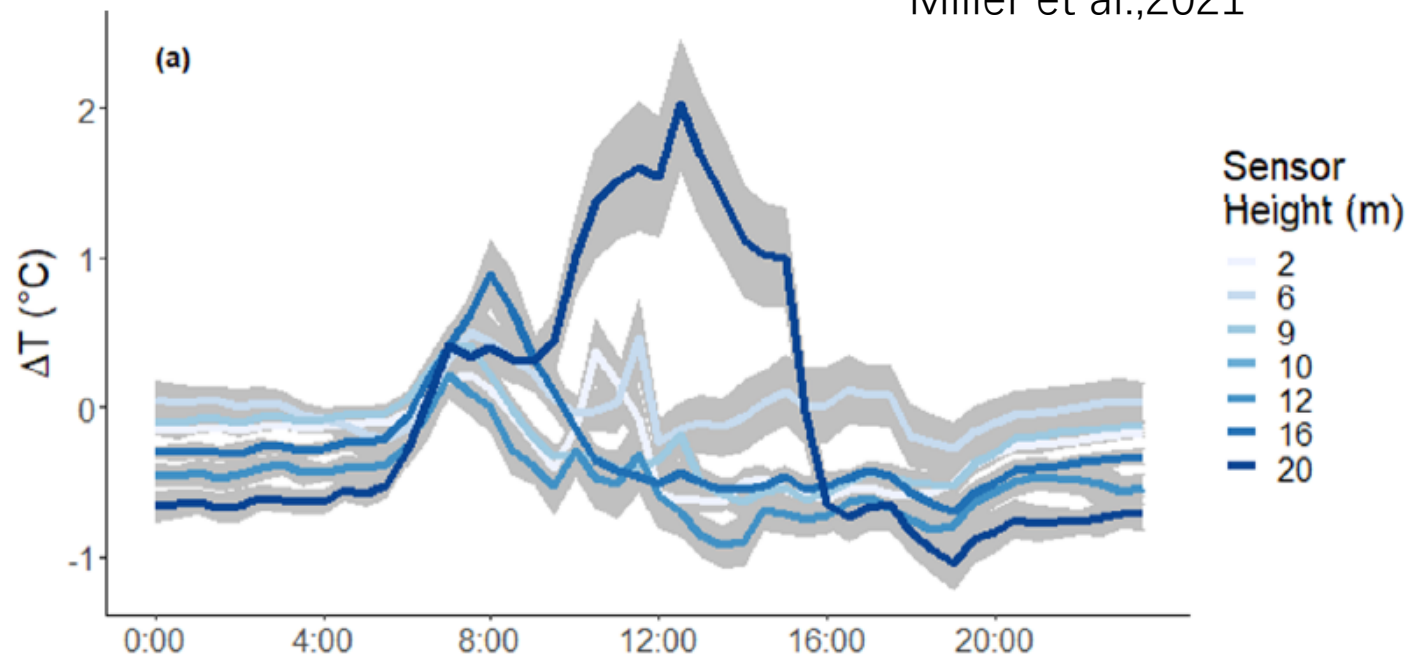
Blonder & Michaletz, 2018

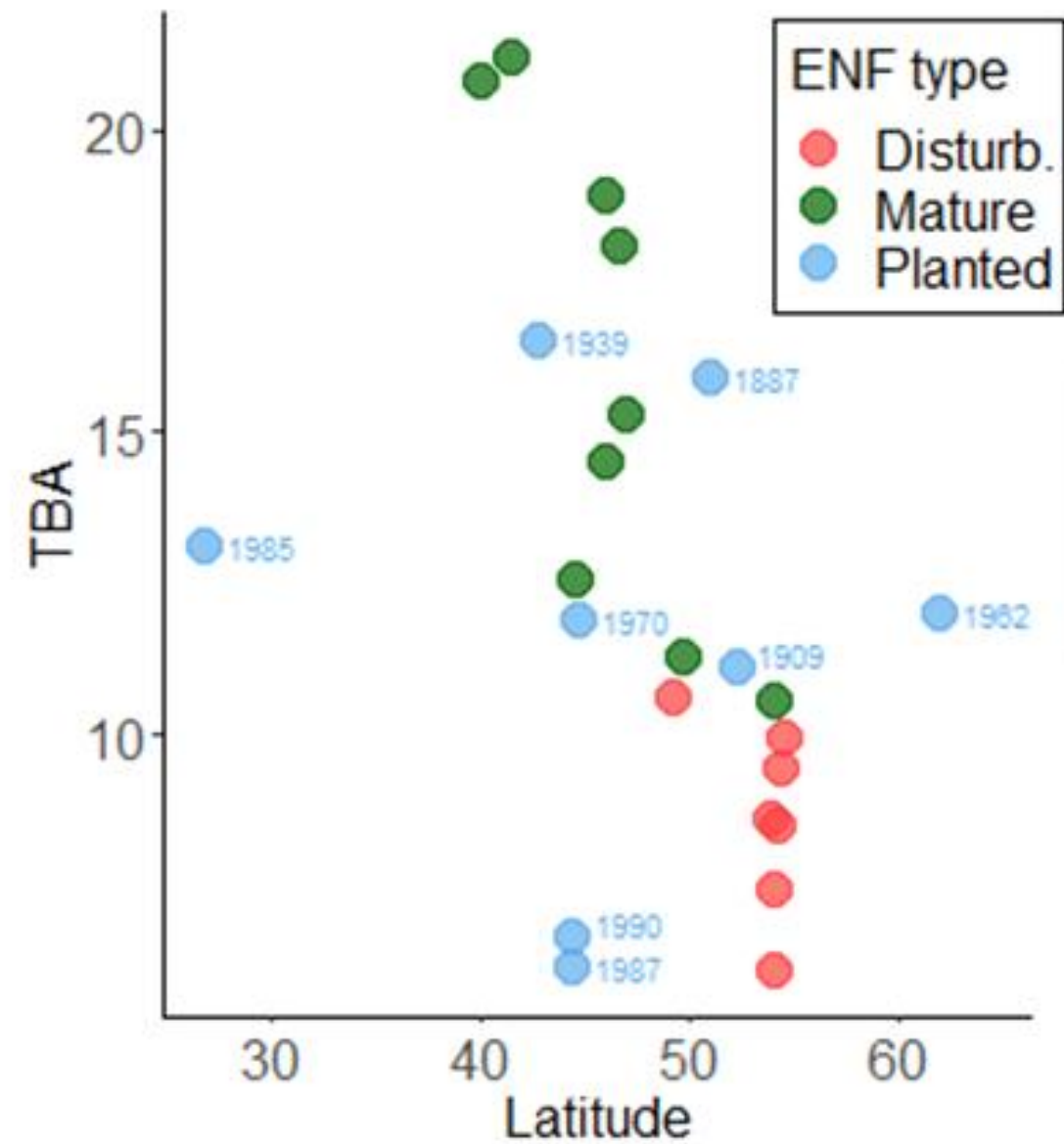
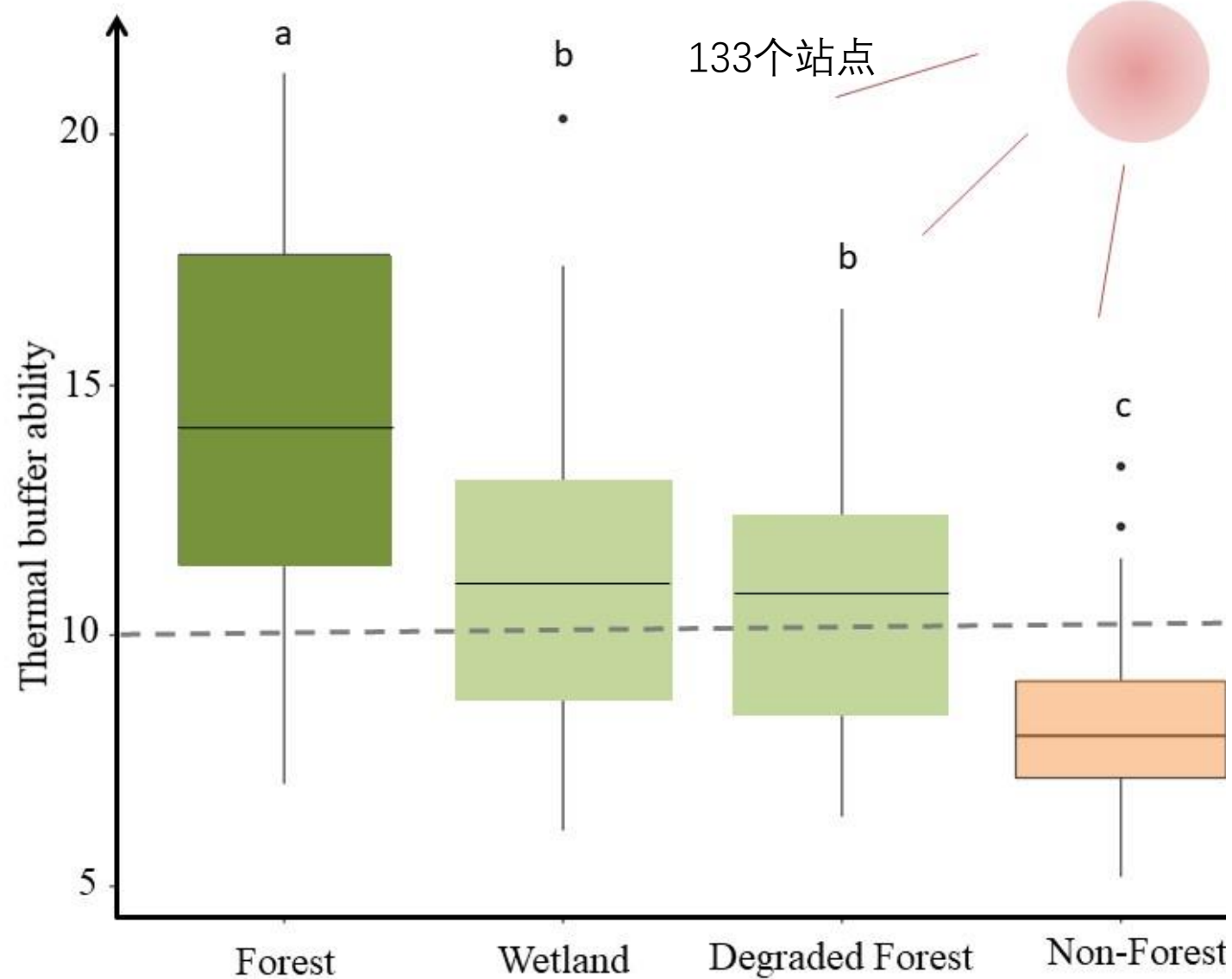


Site

- SAV
- TRF
- STF
- TEF



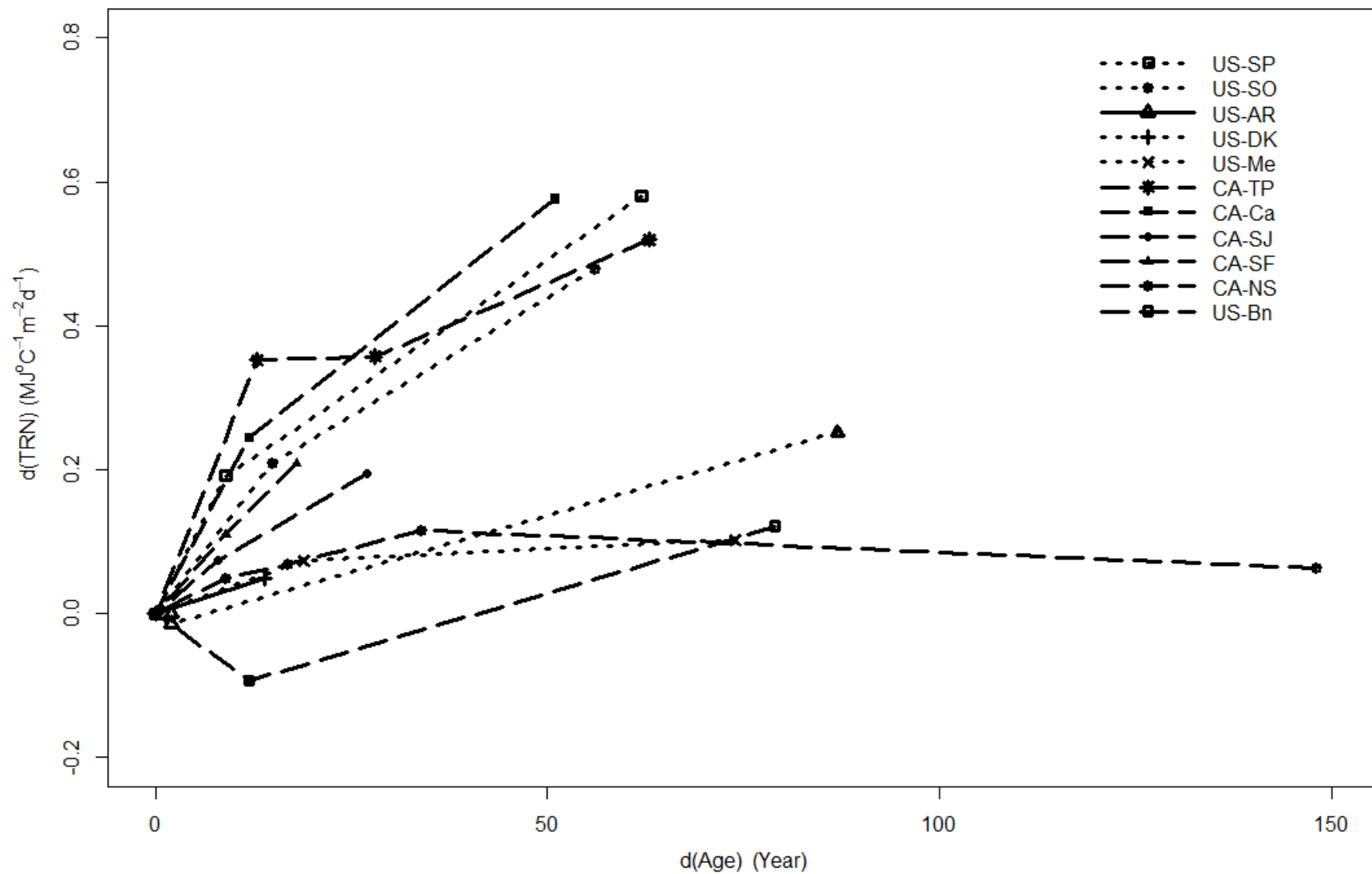




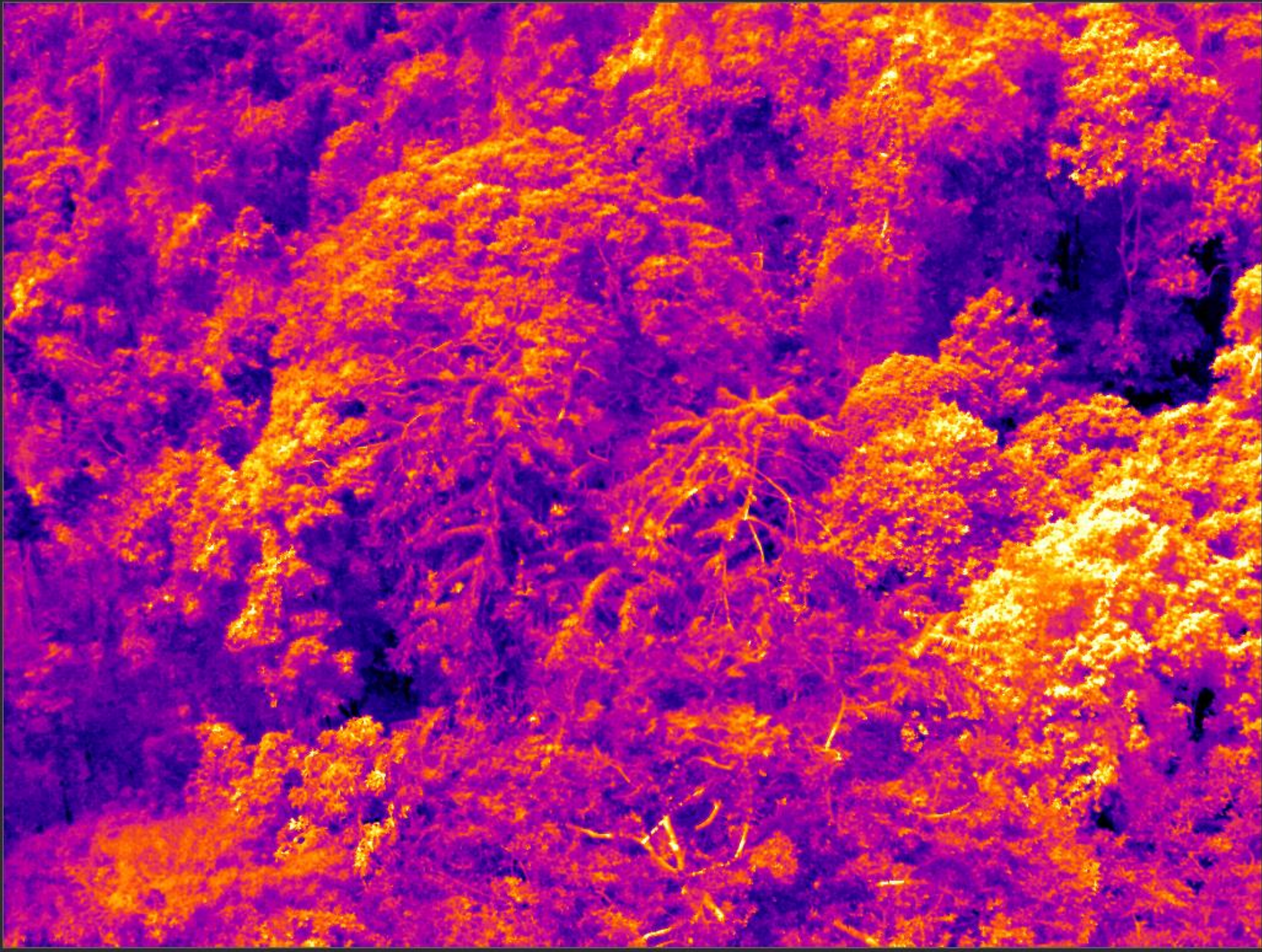
-- Boundary of thermal buffer ability (TBA) between forest and non-forest
 Alphabet a, b, and c indicate statistic difference among vegetation types.

Lin et al., 2020

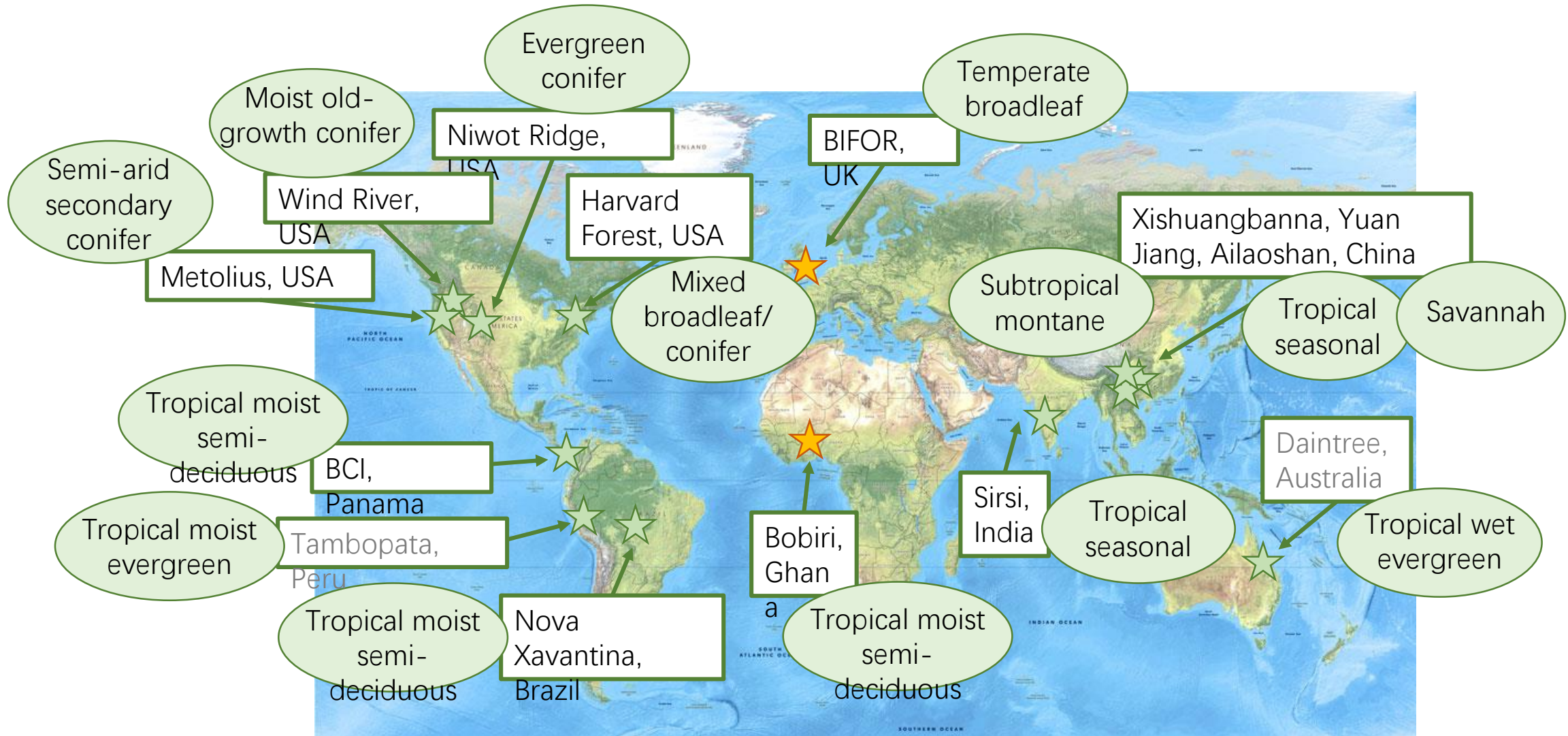
演替



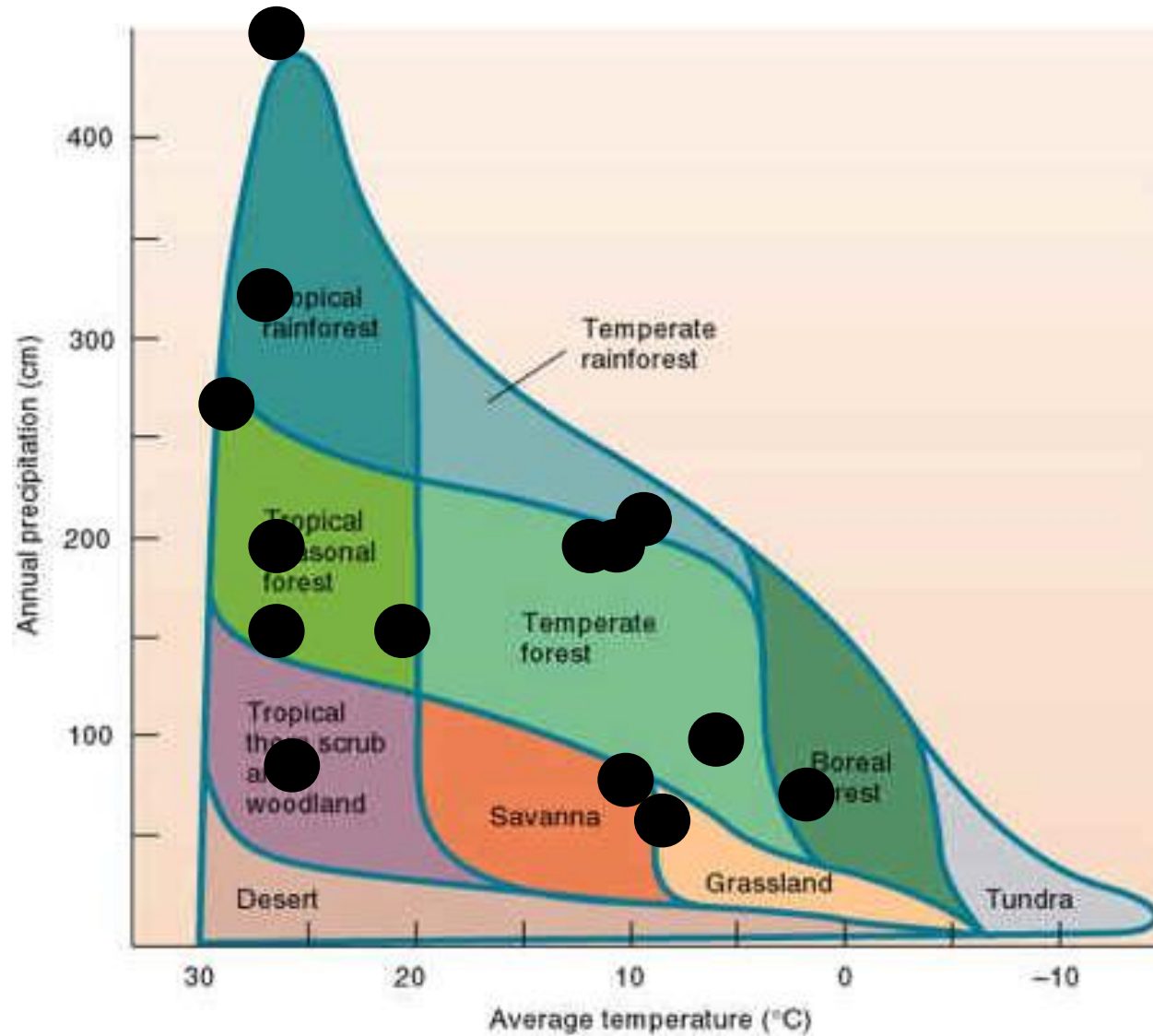
林冠温度监测网络

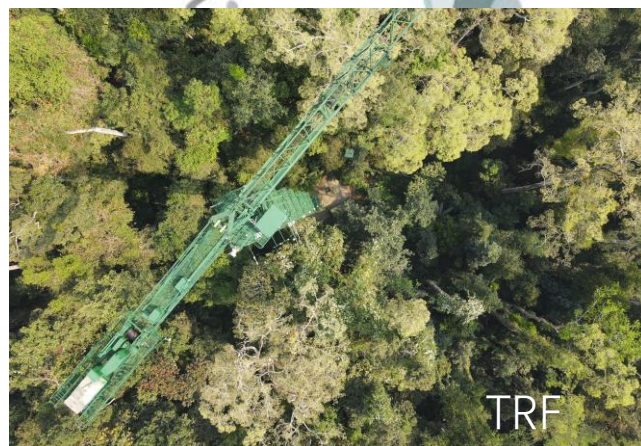


Sites (14)



Sites (14)





ATF

相机参数

- 分辨率1024*768
- 测温精度
 - $\pm 1.0 \text{ K} @ 0 \sim 100^\circ \text{C}$
 - $\pm 1.5 \text{ K or } \pm 1.5 \% @ > 100^\circ \text{C}$
 - $\pm 2.0 \text{ K} @ < 0^\circ \text{C}$
- 工作波段:
 - $8 \mu\text{m} \sim 14 \mu\text{m}$
- $\text{NETD} \leq 40\text{mk}, 0.04^\circ\text{C}$
- 云台可设预置位

Select
ROI

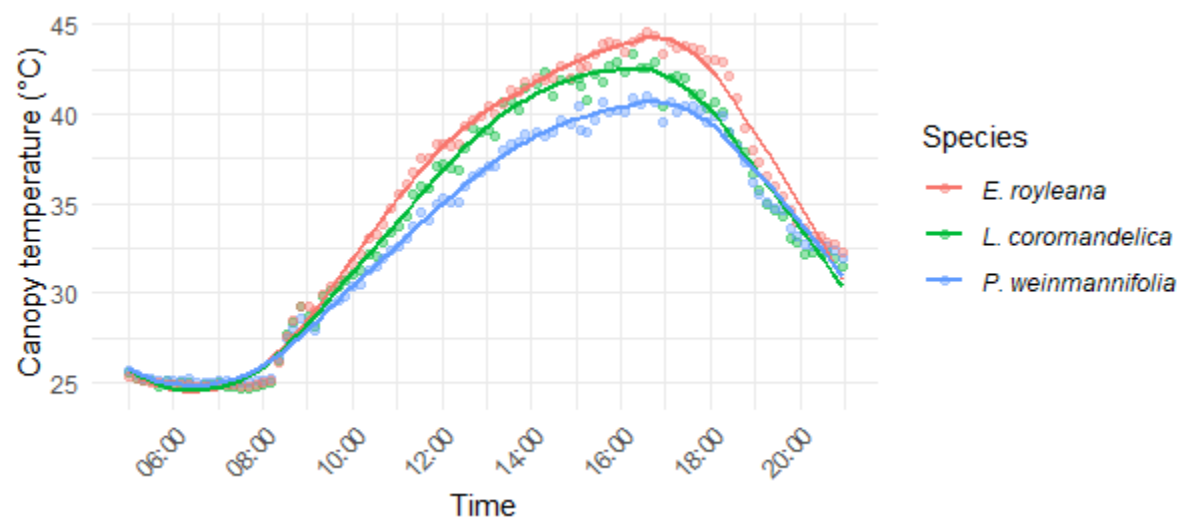
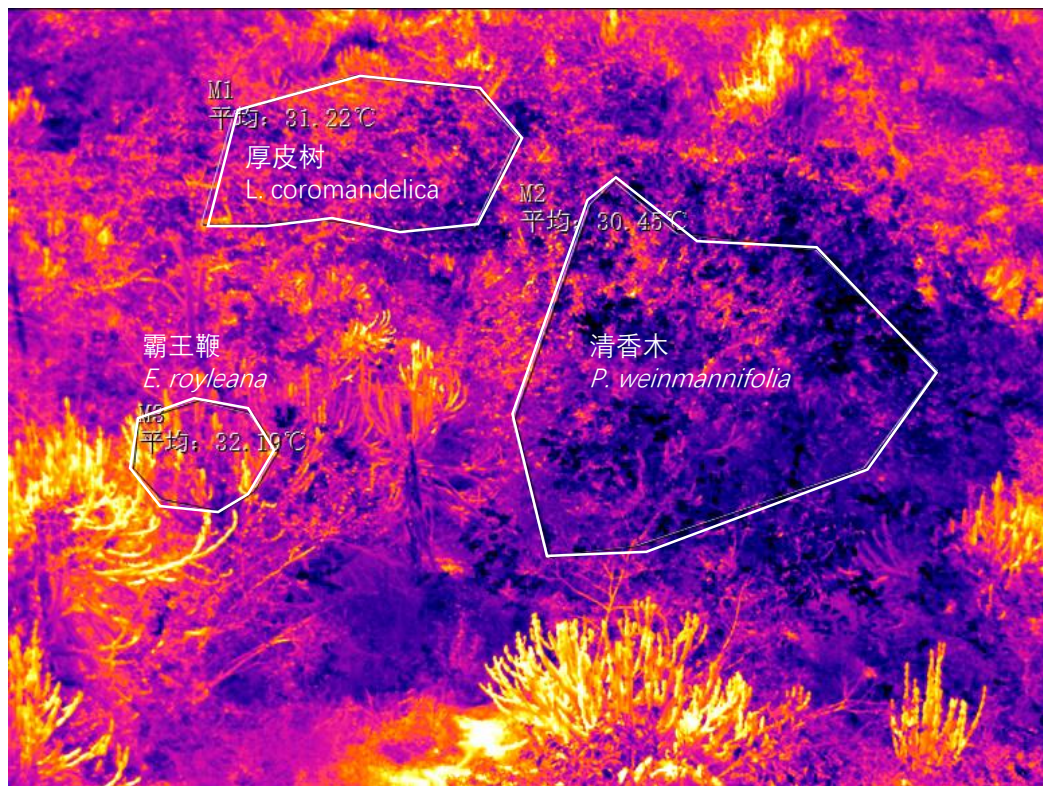
Image-
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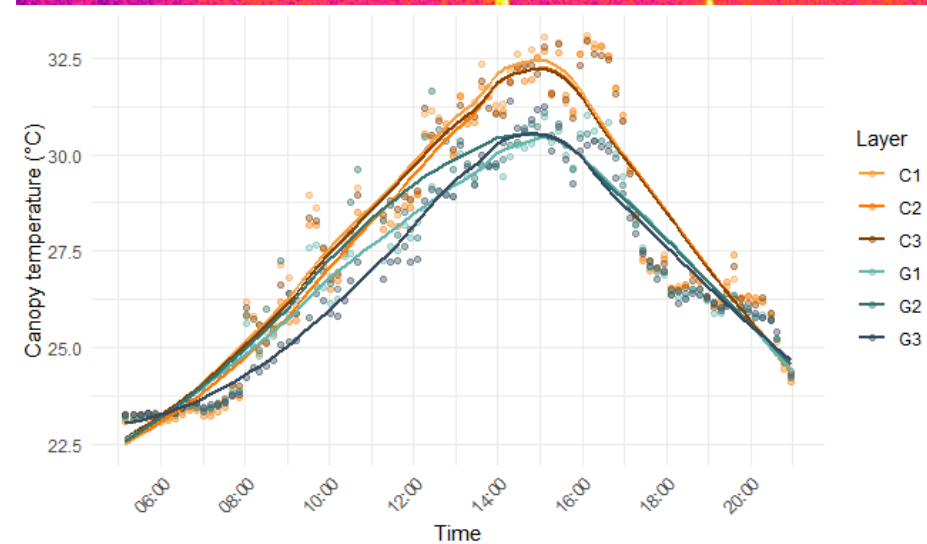
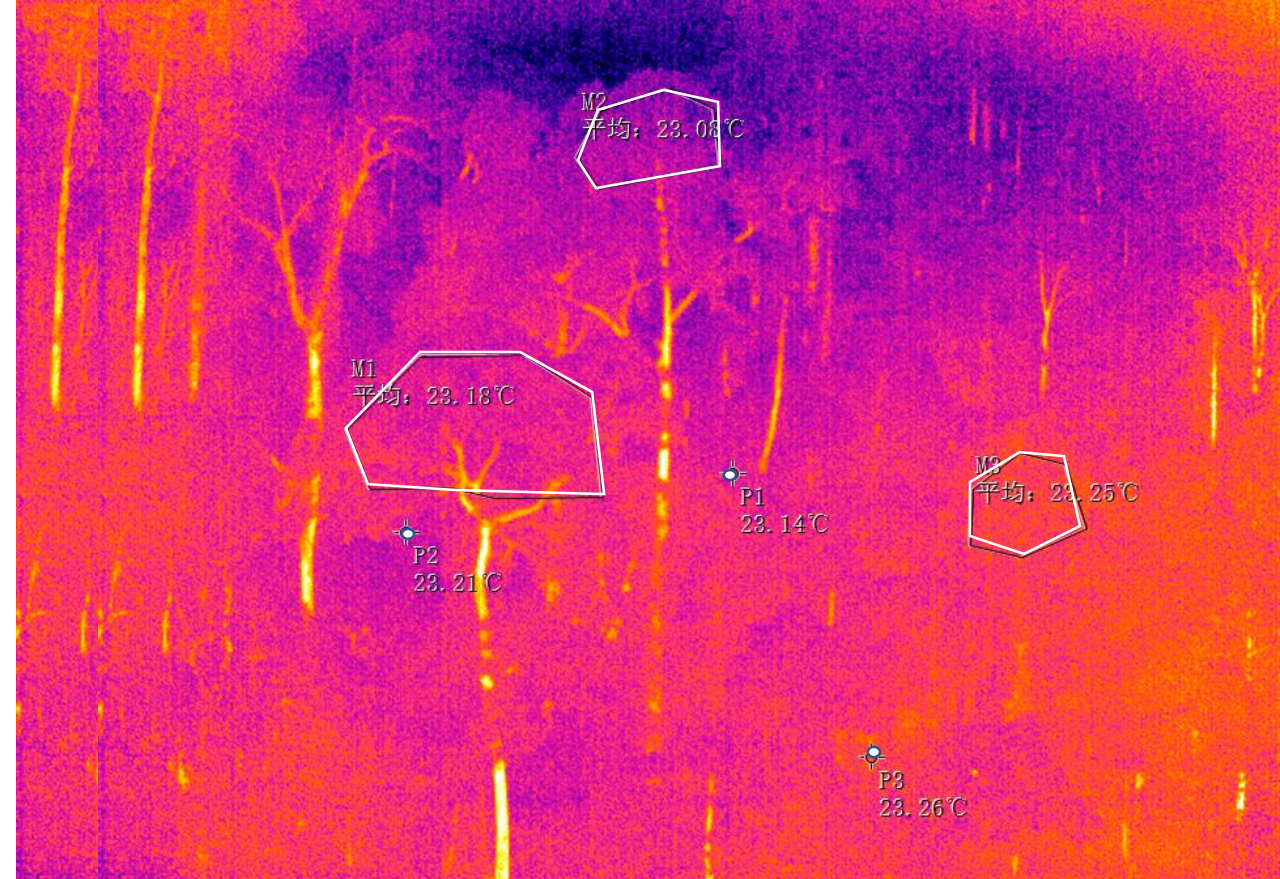


元江干热河谷植被

不同物种间的冠

2022.8.23





热带雨林

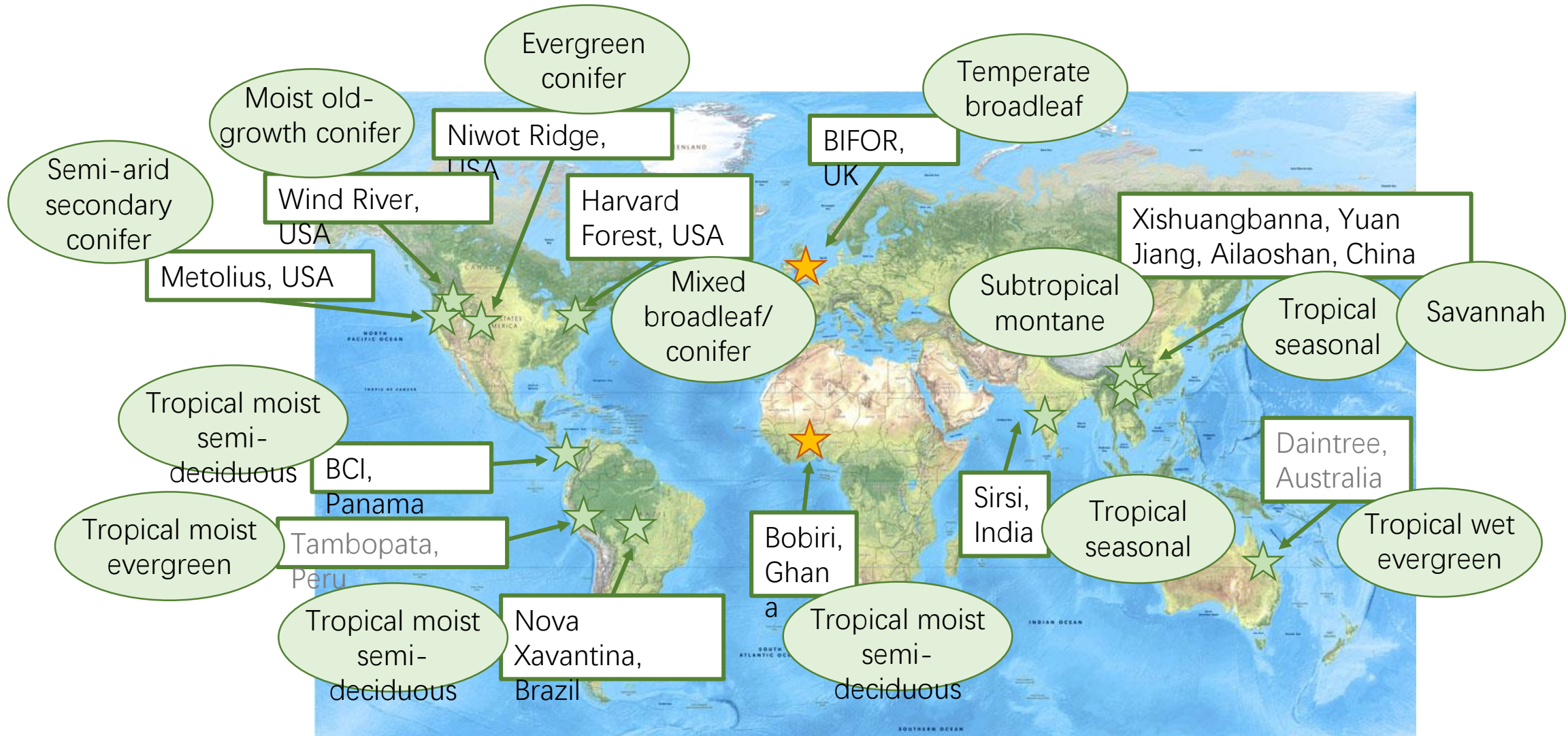
不同冠层间的温度差异
2021.7.24日

小 结

- 冠层温度与空气温度的可能呈现不一致的规律，反映了植物的温度调节能力
- 冠层温度与植被的健康、受干扰程度相关
- 冠层温度在物种之间可能具有很大的差异，反映了不同物种的能量交换以及冠层结构的差异
- 冠层温度能反映植被的干旱程度，水汽交换特征



Sites (14)



请批评指正，欢迎合作！

lh@xtbg.ac.cn！

