

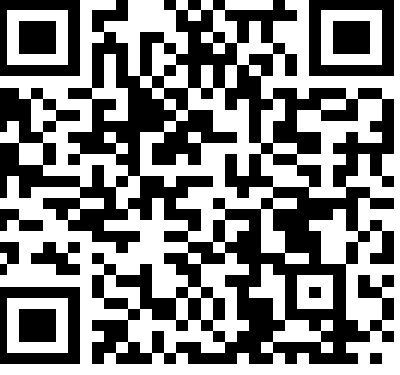
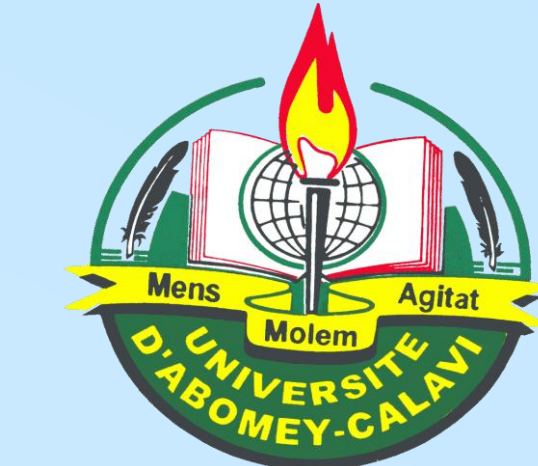
Ten years of carbon dioxide fluxes and carbon balance at a cultivated savannah and an open clear forest in a tropical humid climate in West Africa



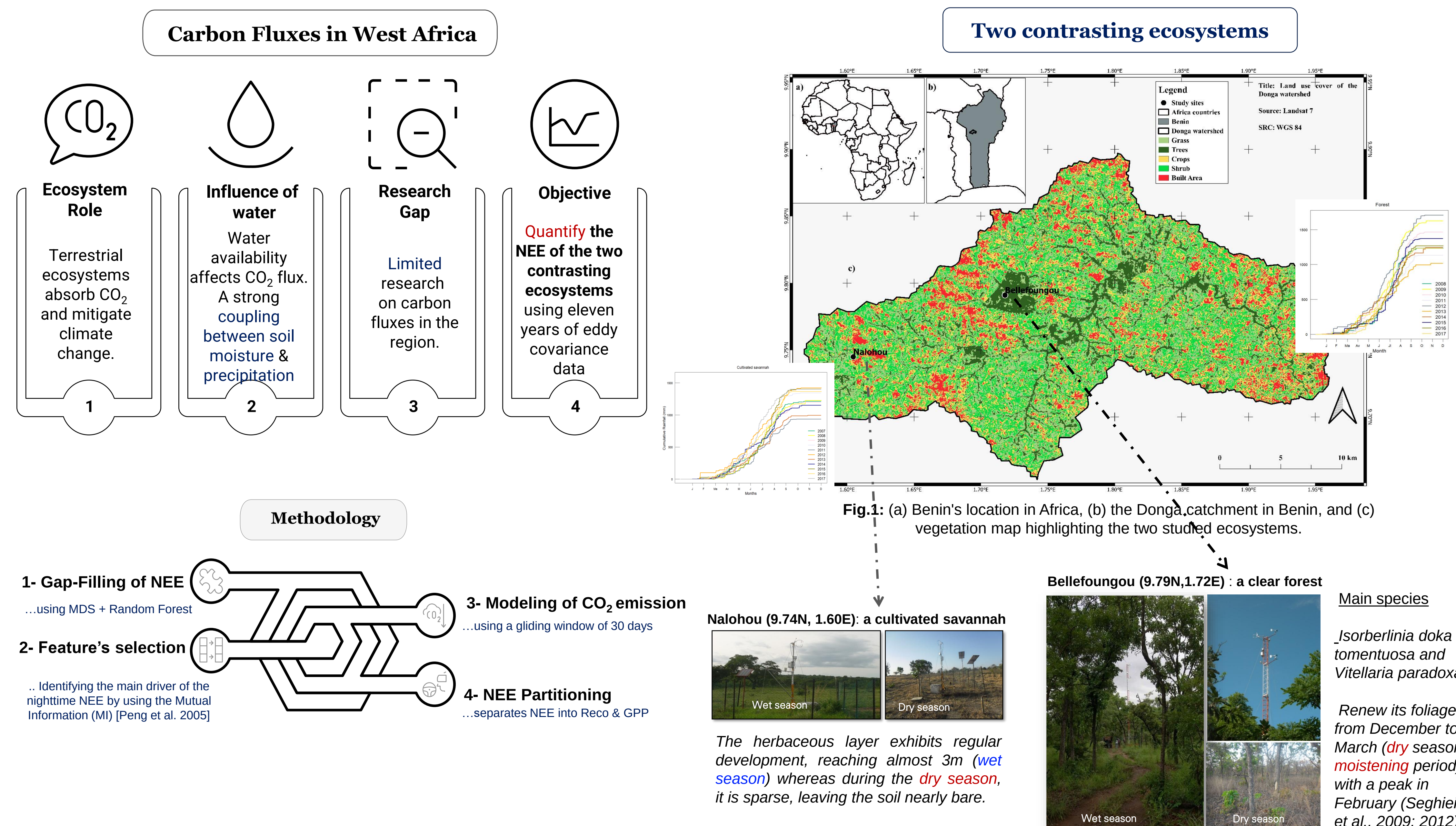
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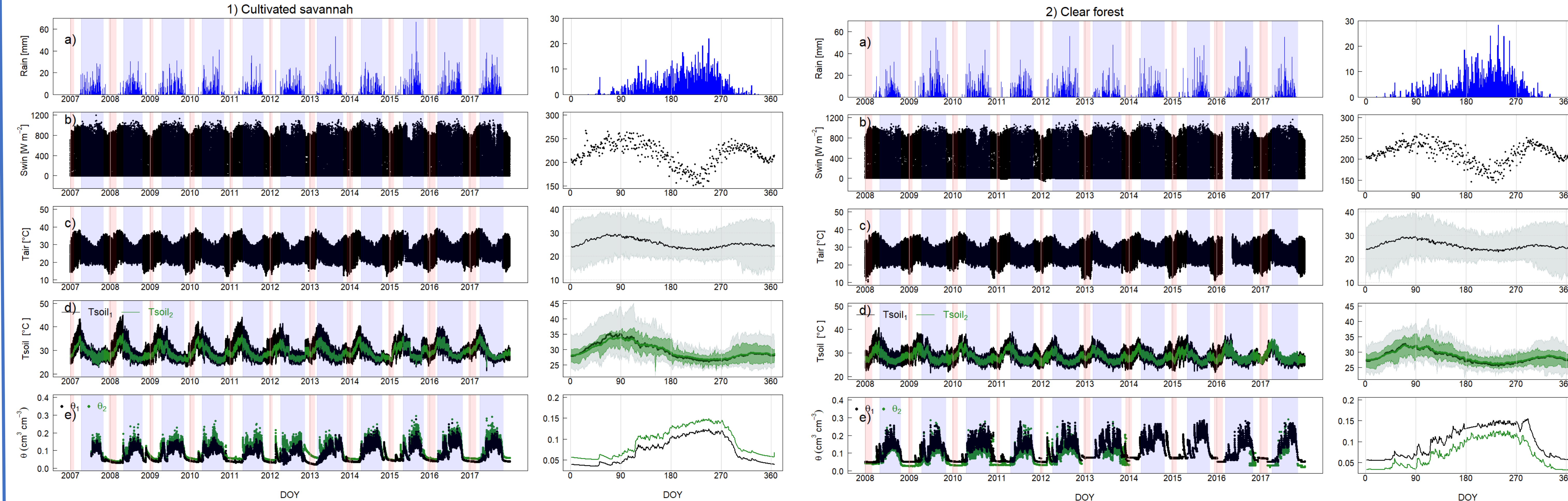


A) INTRODUCTION



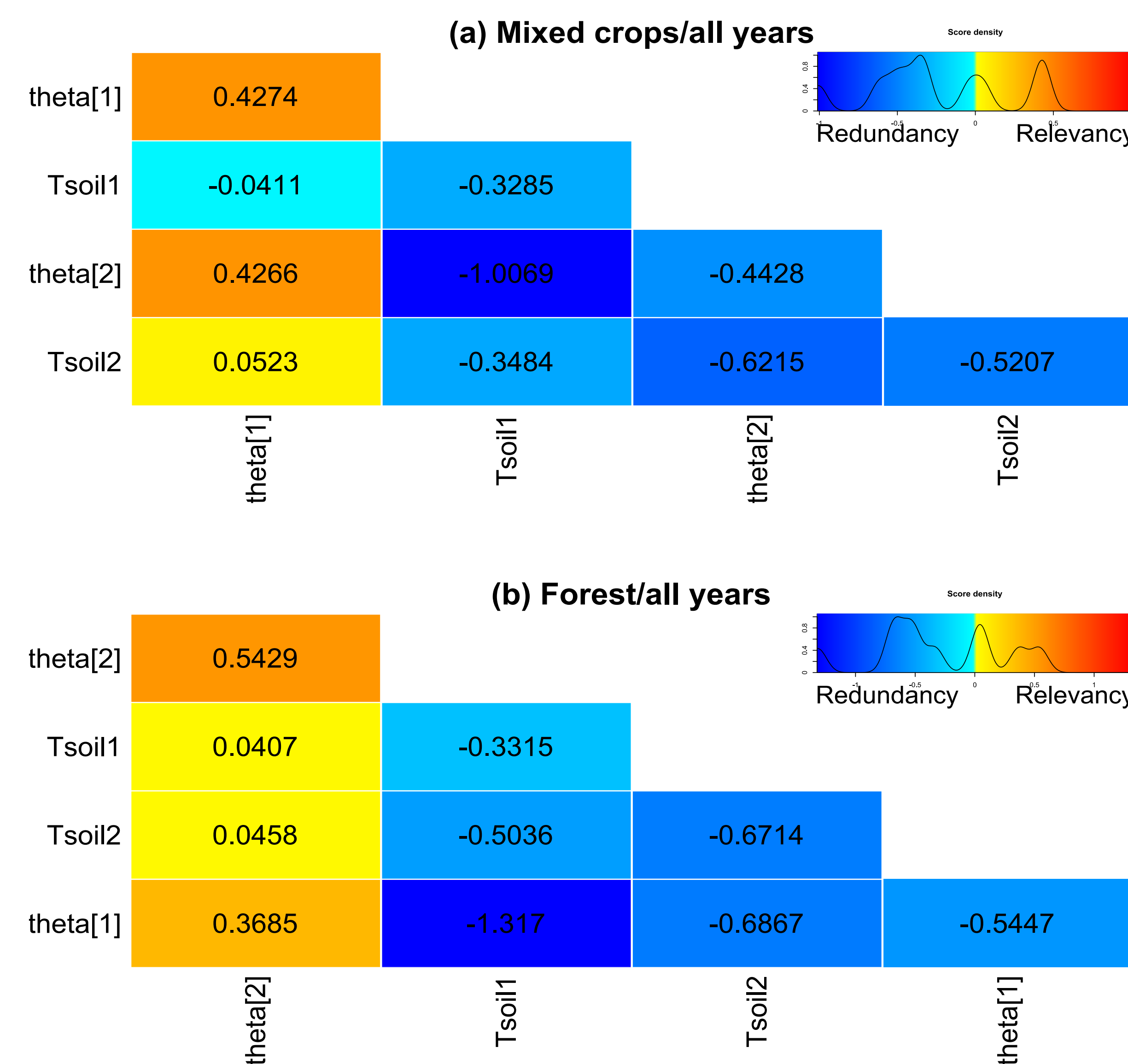
B) GENERAL METEOROLOGY

The Sudanian climate of Northern Benin: A monsoon regime driven by the ITCZ



- One **Dry** and One **Wet** seasons, separated by two transition periods (the moistening and the drying phases of the atmosphere);
- A **strong seasonal** variability
- Clouds** reduced more SWin during **wet season** (up to ~ 50 W.m⁻²) compared to the impact of **aerosol dusts** in the **dry season**
- Avg. rainfall : ~ 1200 mm / y
- High 30min airT (~ 12°C < airT < ~ 39°C)
- Daily Tsoil below 35 °C with a highest diurnal range of ~ 16 °C during the **moistening phase of the atmosphere**
- Soil moisture dynamics driven by precipitation
- The soil moisture began to dry up at the beginning of the **drying period**.

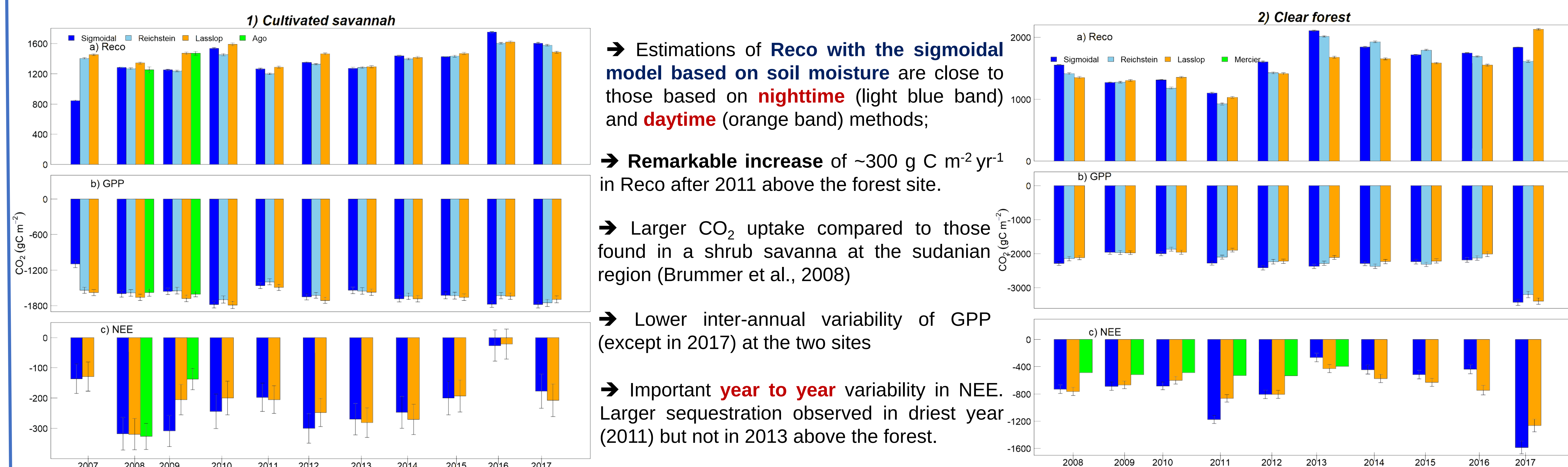
C) FEATURE SELECTION & MODELING



- (1) The mutual information revealed that **soil moisture is the most relevant driver** while Tsoil was shown to be less important/more redundant (**Fig. 3**)

- (2) **Next step**: Compare seven (07) modelling approaches that integrate soil moisture as an input (**Table 1**).

D) BOTH ECOSYSTEMS ACT AS A NET SINK OF CO₂



These ecosystems were observed to be, during all years analyzed, a net sink of atmospheric CO₂ with an average annual NEE of :
- 626 ± 62 g C m⁻² yr⁻¹ (Reco = 1589 ± 8 g C m⁻² yr⁻¹, GPP = - 2215 ± 63 g C m⁻² yr⁻¹) at the clear forest site
- 251 ± 53 g C m⁻² yr⁻¹ (Reco = 1380 ± 9 g C m⁻² yr⁻¹, GPP = -1631 ± 55 g C m⁻² yr⁻¹) at the cultivated savannah site.

TAKE - HOME MESSAGES

- Soil moisture** is the **main driver** of nighttime NEE variation for both ecosystems
- The **sigmoidal model** showed partitioning performance comparable to the established **literature standards**.
- The **two ecosystems** act as net sink of atmospheric CO₂.
- The forest CO₂ sequestration is **2.5 times** the cultivated site one.
- These results constitute a paramount information for earth system models regarding carbon budget of these typical and understudied African ecosystems.

REFERENCES

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ABOUT ME

