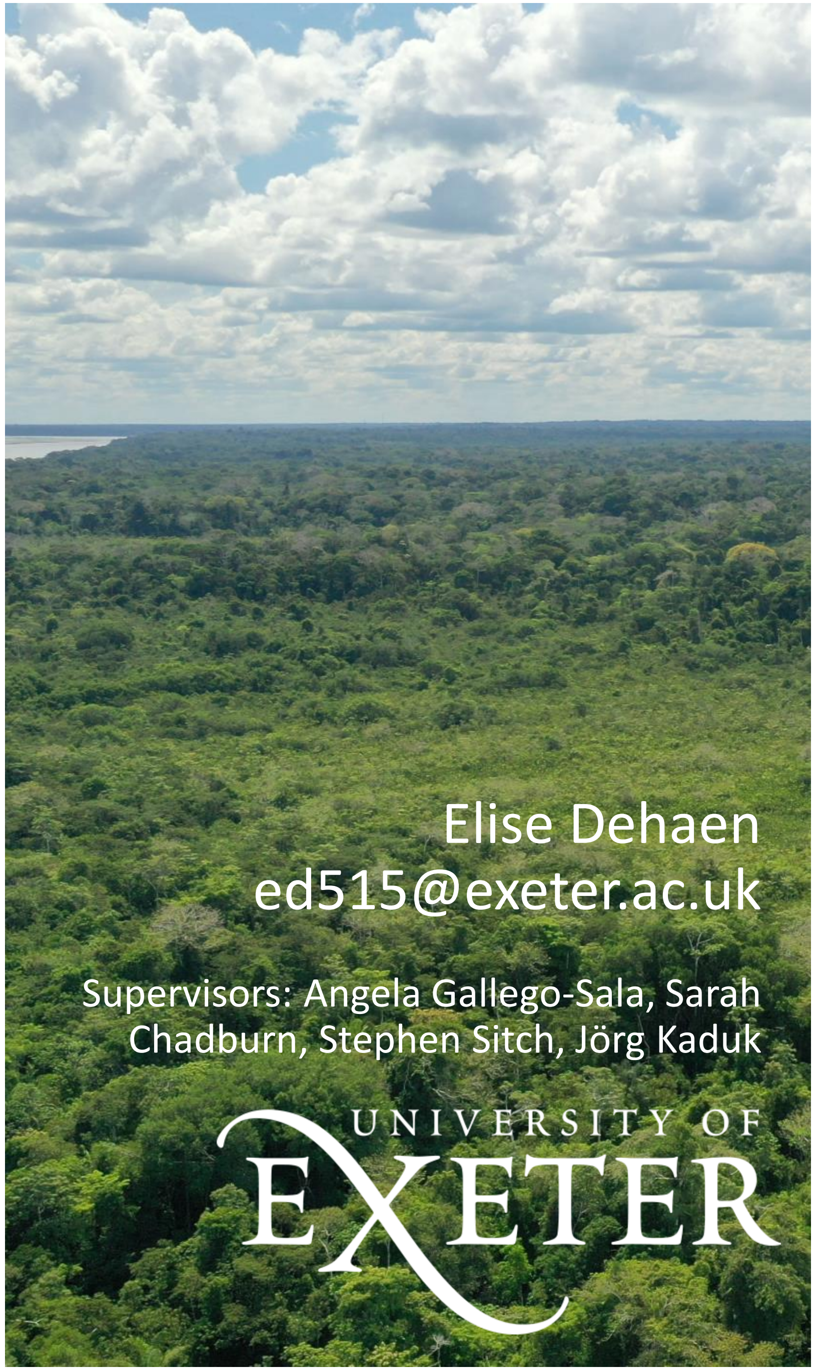
Modelling the tropical peatland carbon sink



Elise Dehaen
ed515@exeter.ac.uk

Supervisors: Angela Gallego-Sala, Sarah Chadburn, Stephen Sitch, Jörg Kaduk

UNIVERSITY OF EXETER

Tropical peatlands

Introduction

Carbon accumulation rate: 24 - 300 g C m^{-2} y^{-1}

(A Gallego-Sala)

Peat swamp forest
Amazon

(A Gallego-Sala)

Papyrus peatland
Uganda

(Maldonado Fonkén, 2014)

Bofedales
High Andes, Peru

Tropical Peatlands and the Carbon Cycle (TroPeaCC)

Tropical peatlands carbon sink and its drivers → Pan-tropical carbon accumulation database

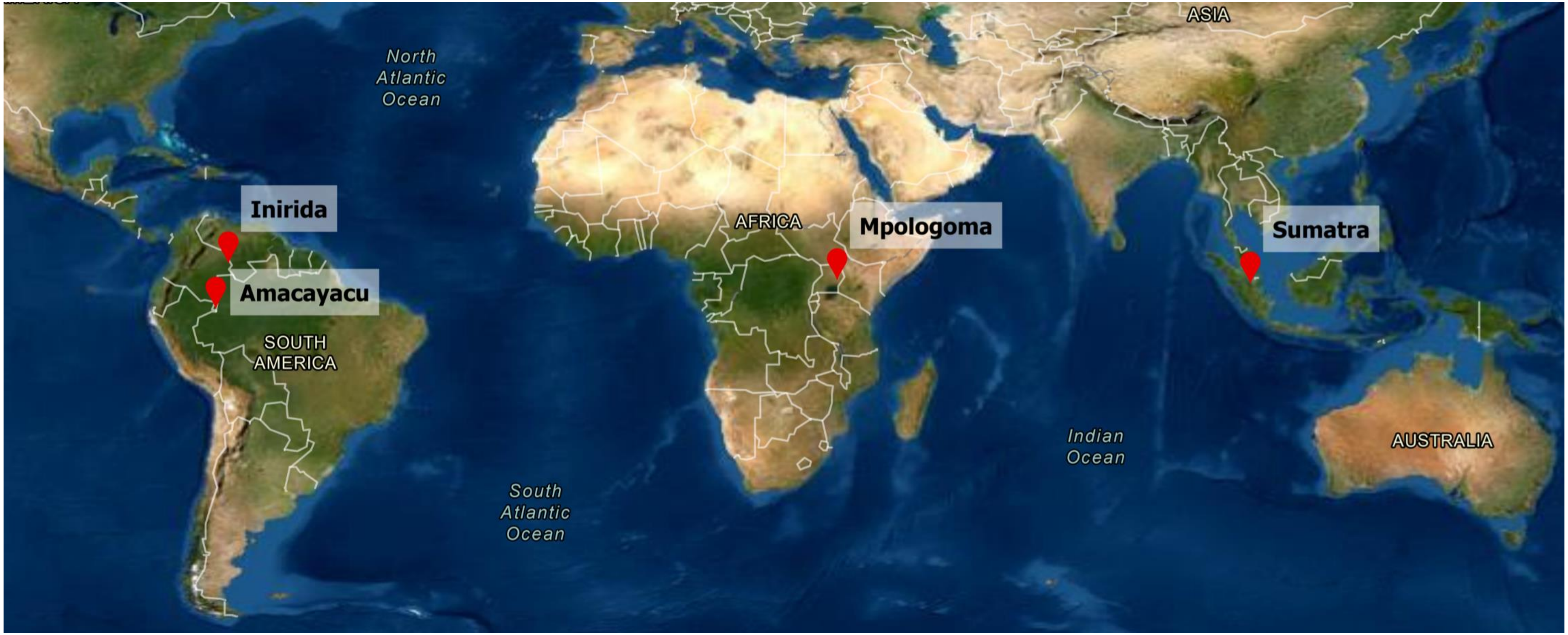
Carbon accumulation modelling → JULES-peat

Future?

JULES-peat

Default JULES-peat

- JULES-peat **standard** and **dynamic soils**
- 4 tropical sites



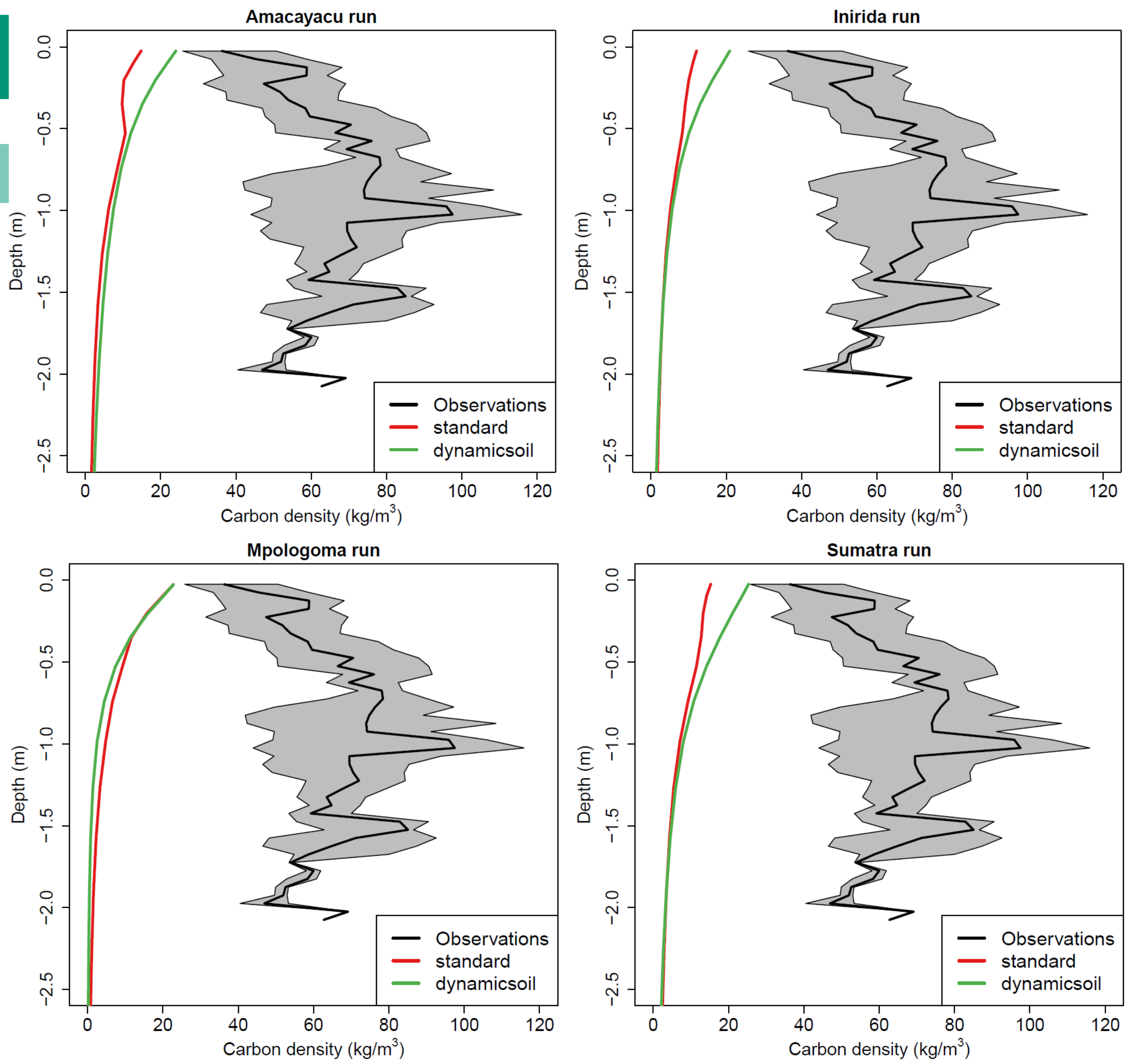
JULES-peat

Default JULES-peat

- JULES-peat **standard** and **dynamic soils**:
  - Low carbon density
  - Low soil moisture

JULES-peat changes for the tropics

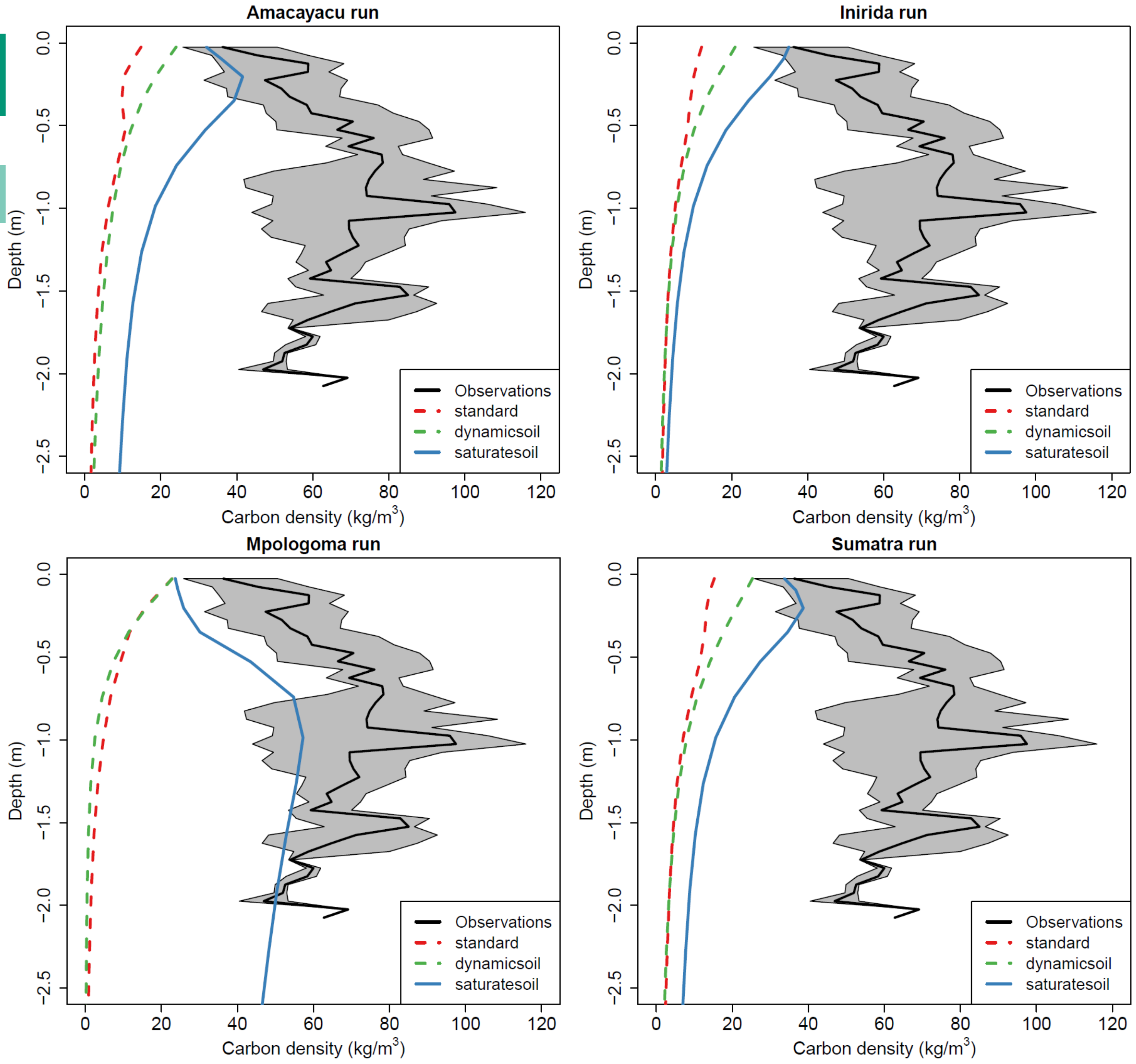
- Hydrology
  - Hydraulic conductivity
  - No baseflow
  - Saturation
- Litter
  - DPM/RPM
  - Tau lit
- Temperature
  - Q10



Hydrology

Saturation

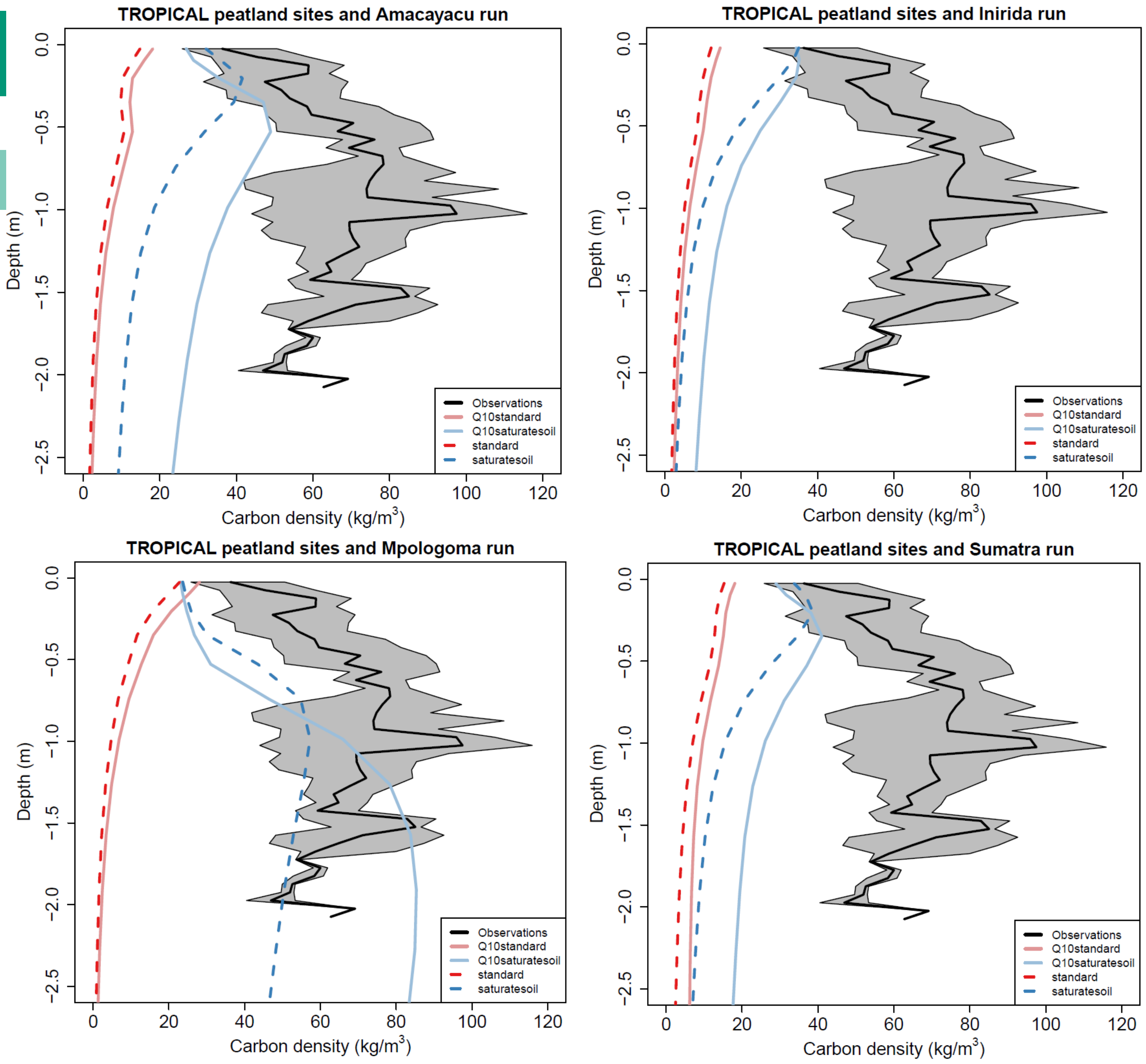
- **Saturated**
  - Improved carbon density
  - Mpologoma: peat accumulation



Temperature

Temperature-respiration function

- Q10 standard & Q10 saturated:
    - Increased carbon density



Conclusion

JULES-peat changes for the tropics

- Hydrology
  - No baseflow
  - **Saturation**
  - Hydraulic conductivity
- Litter
  - DPM/RPM
  - Tau lit
- Temperature
  - **Q10**

Next steps

- Weather driving data
- Vegetation cover & productivity