

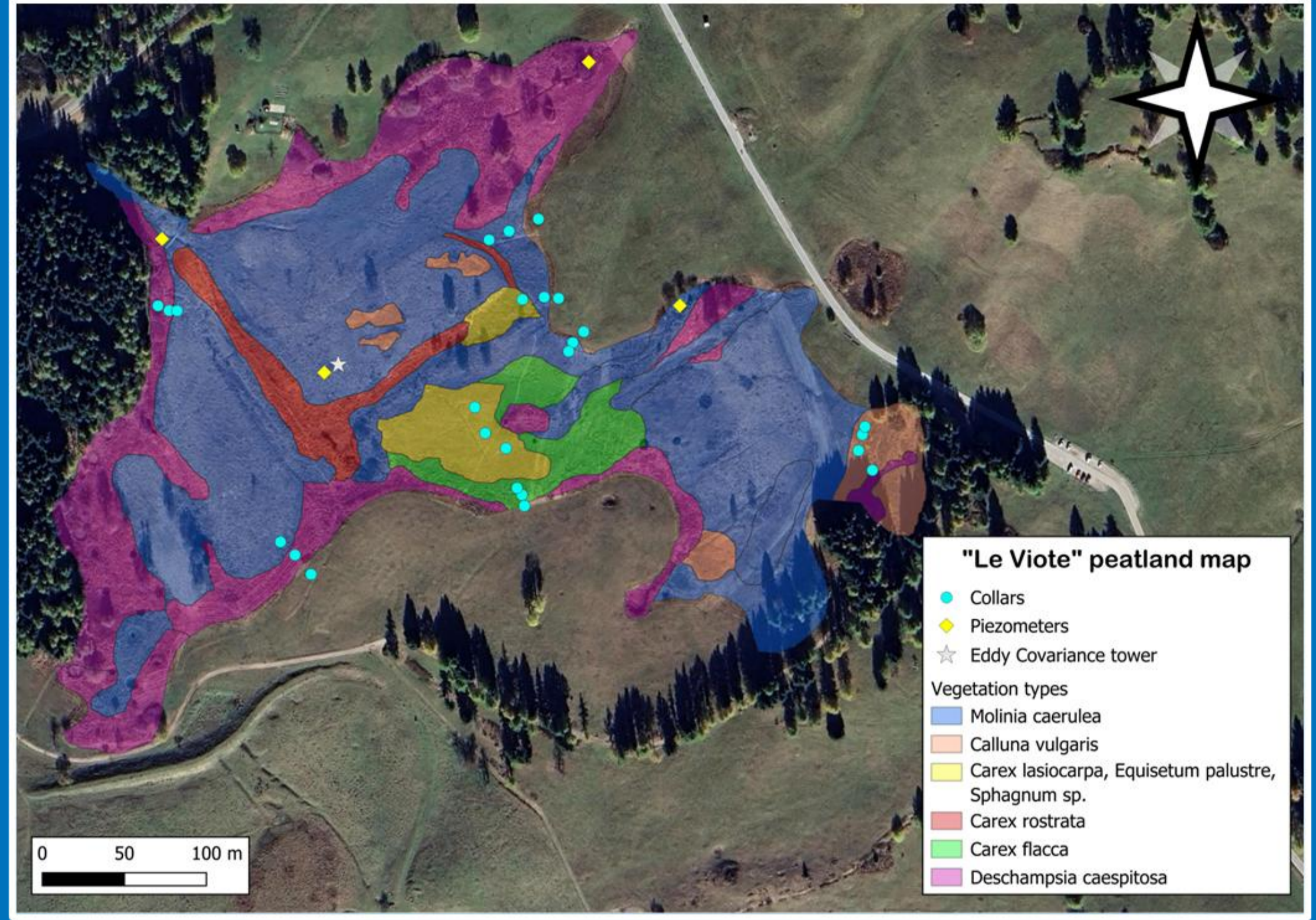
Large spatial variability of GHG emissions from an alpine peatland detected by chamber based measurements.

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1. Background

- Alpine peatlands poorly studied compared to boreal/tropical ones.
- Climate warming amplification in the Alpine region.
- High plant biodiversity at community level.
- Protected area since 2014 - Special Area of Conservation, Natura (2000).
- Known GHG net source to the atmosphere (Pullens et al., 2017).
- 'Le Viote' GHG fluxes studied using both Eddy Covariance (Pullens et al., 2017) and chamber based technique (Carbognani et al., 2023).

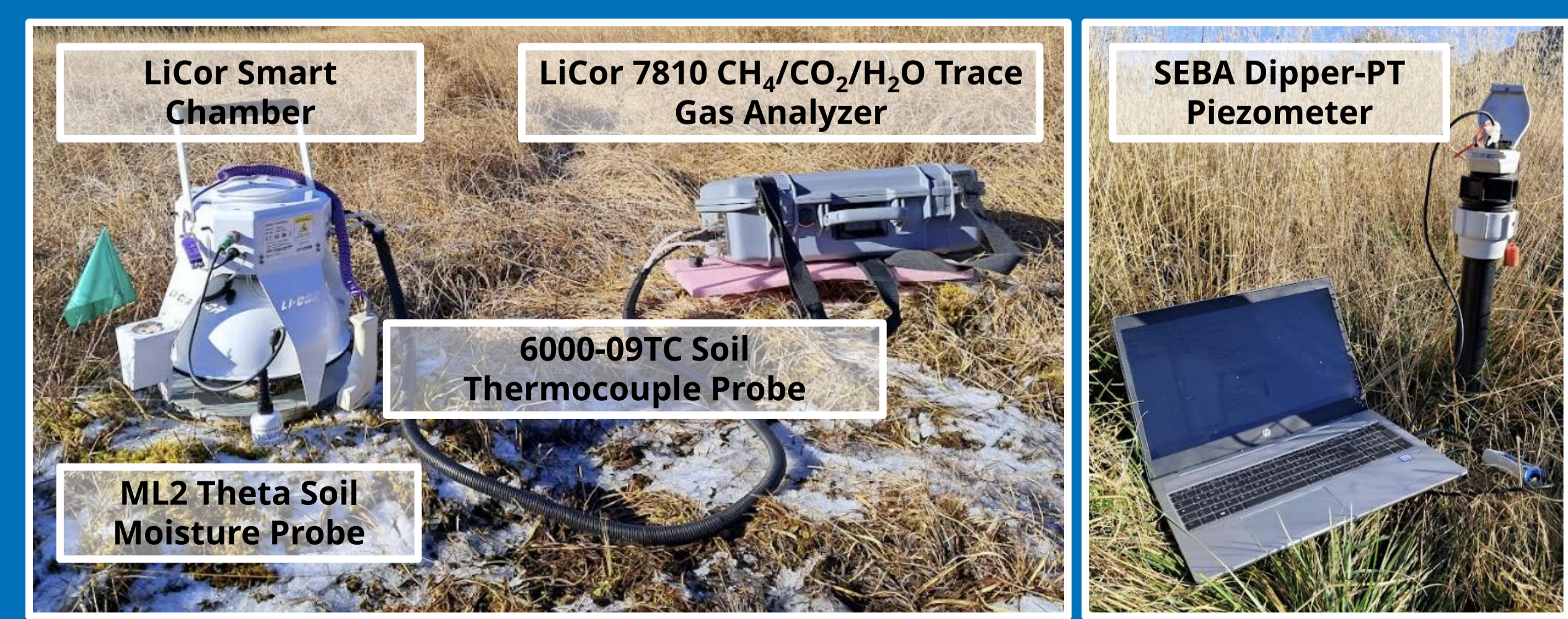


3. Study site

- Mt. Bondone plateau in eastern Italian Alps (46°01'03"N, 11°02'27"E, 1560 m a.s.l.)
- Minerotrophic nutrient-poor fen in a relict glacial lakebed.
- Variety in microtopography, soil moisture levels and vegetation cover types.
- Measurements period: May-November 2025.

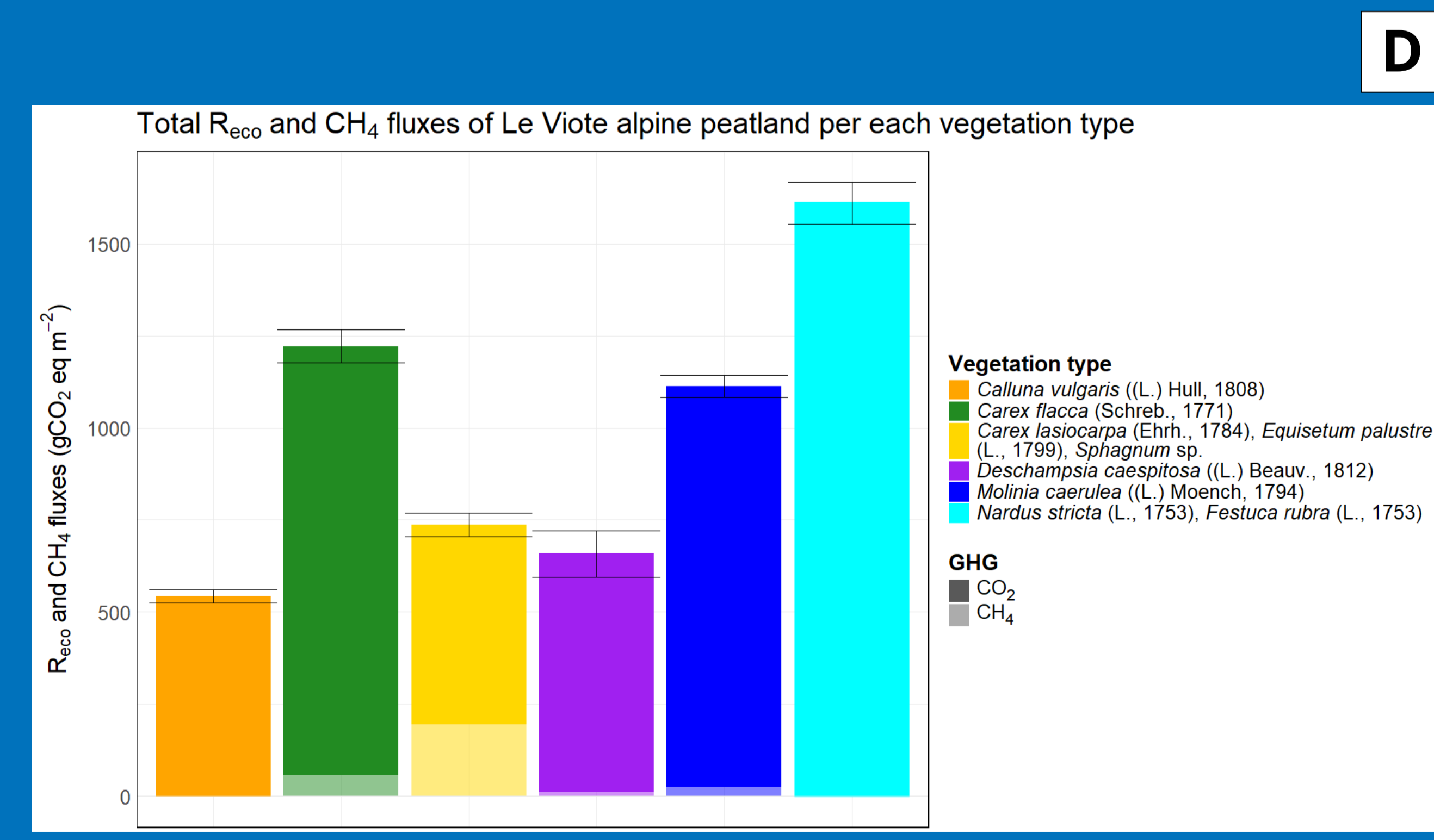
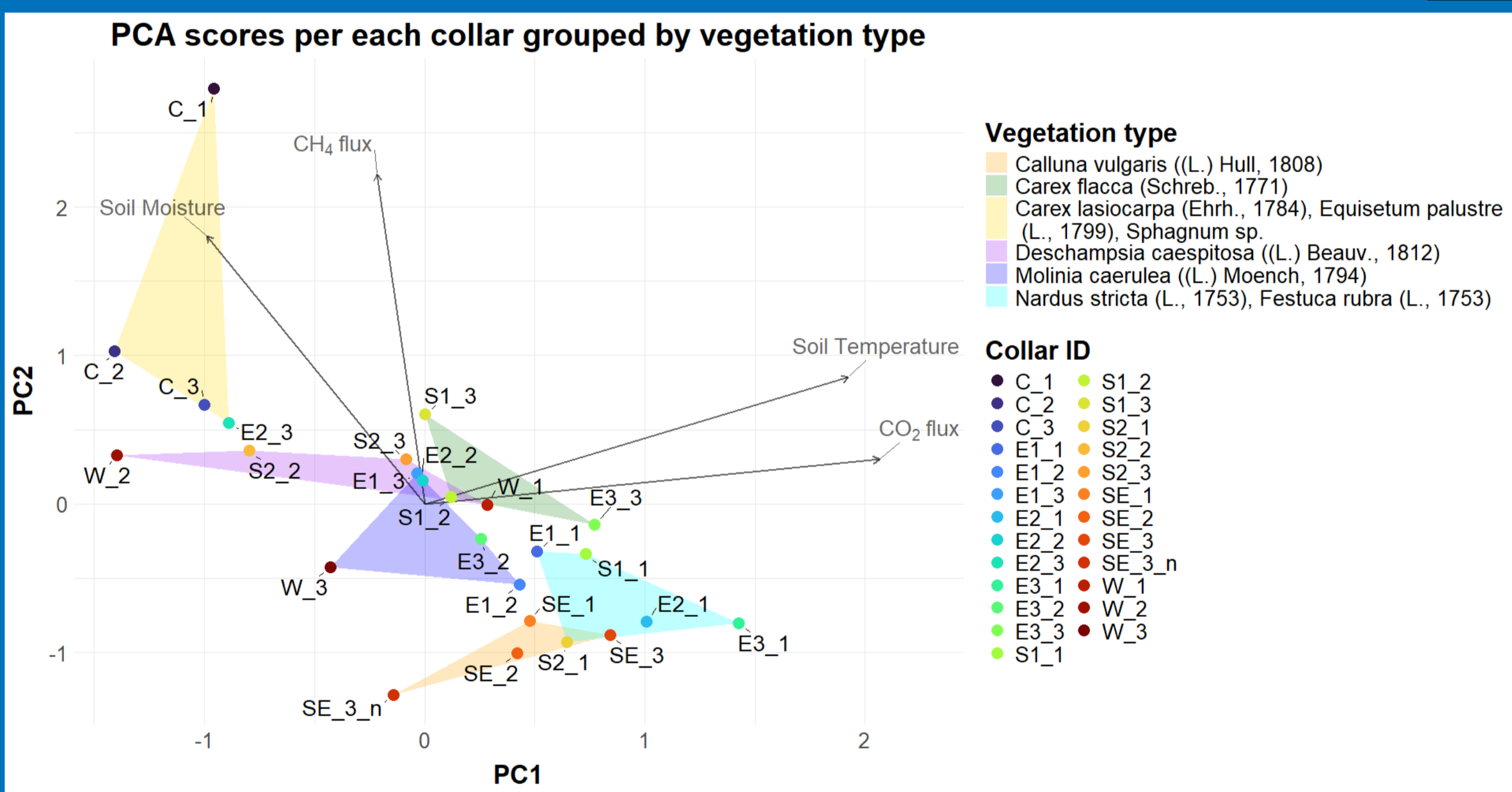
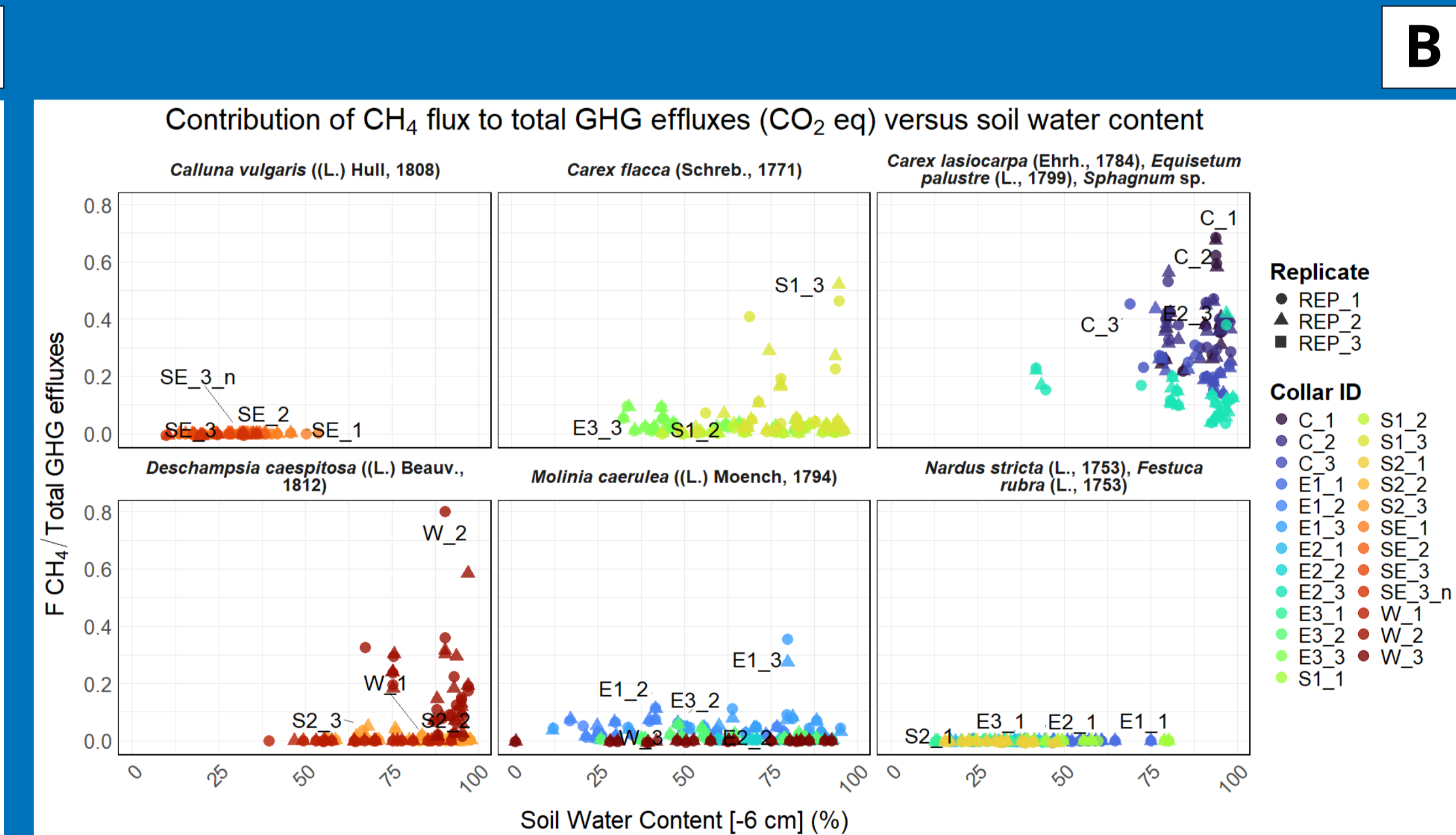
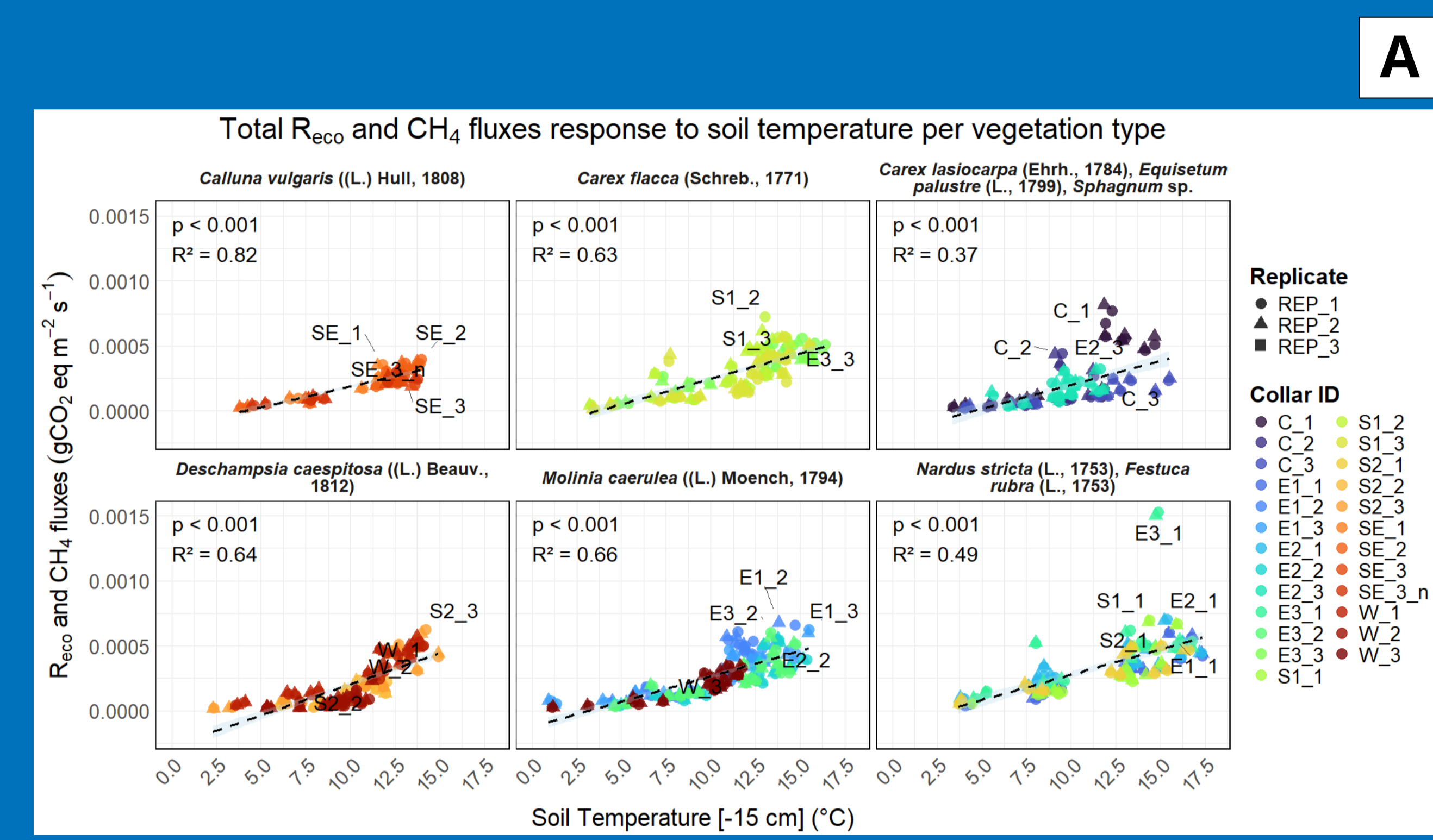
4. Sensors and Instruments

- Closed dynamic chamber (CH₄ and R_{eco}) system.
- 4 piezometers (continuous measurements every 30 minutes).



5. Results and Conclusions

- Large spatial variability for both CO₂ and CH₄ fluxes, even into the same vegetation type (Fig. A-D).
- Up to 80% of CH₄ contribution to total emissions in the wettest areas (Fig. B).
- PCA identification of data clusters corresponding to vegetation types, distributed along clear soil water content and temperature gradients (Fig. C).
- Mean cumulated GHG effluxes of ~942.27 gCO₂eq m⁻² for the whole peatland area (~0.99 km²) (Fig. D).



2. Objectives

- Monitor total ecosystem respiration (R_{eco}) and CH₄ fluxes by chamber technique across different peatland vegetation types and surrounding grassland:
- Characterize fluxes spatial and temporal variability.
- Analyze their response to environmental drivers.
- Quantify the cumulated GHG emissions in the peatland area.