

# Flux towers, chambers and peat cores in the South Atlantic: Towards understanding peatland



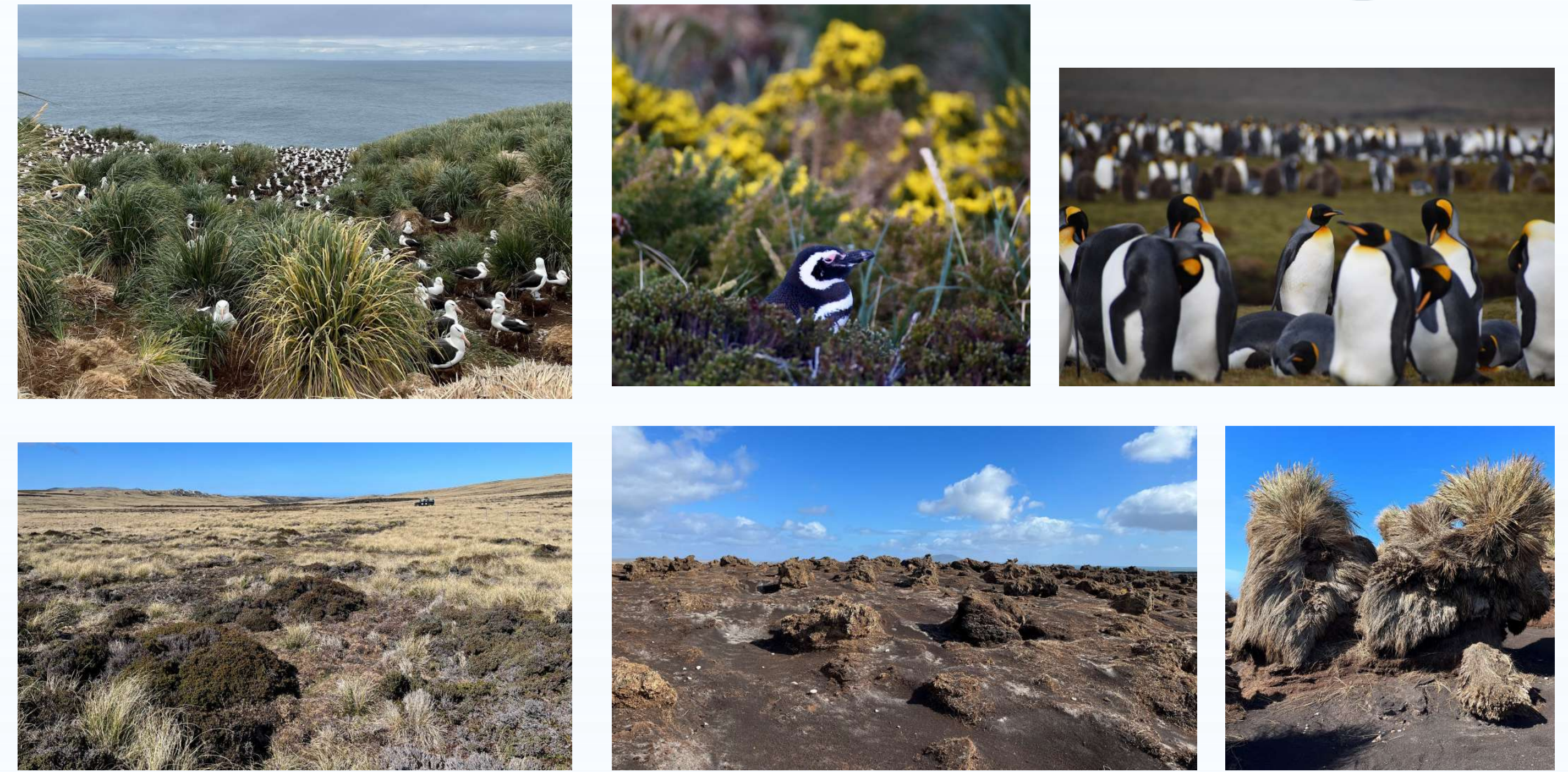
## GHG flux and carbon offsetting potential on the Falkland Islands

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The Falkland Islands; an archipelago in the South Atlantic, lying beyond 51° south, 300 miles east of South America, are a UK Overseas Territory with a cool temperate oceanic climate - experiencing average temperatures between 2°C and 9°C, high average wind speeds of 19+ mph, and low average precipitation of less than 600 mm per year. The Islands have some of the highest proportional coverages of peat across anywhere in the UK (and OTs) - most recent estimates being 38% peat over the land area (Carter, S., unpub.) and some of the fastest known peat accumulation rates (139 g C m<sup>-2</sup> yr<sup>-1</sup>) globally within its tussock grass habitat (Payne et al., 2019).

Sheep grazing plays a major role in shaping the landscape of the modern day Falklands. A significant challenge facing the Islands terrestrial environment is one of a drying landscape. Factors such as climate change and land management pressures combine to result in reduced vegetation cover, changes in vegetation composition, reduced soil moisture and a lower water table.

The impact of such change on peatlands — and the carbon they store — is not fully understood, which this project will address.



### Improving Falkland peatland GHG data: understanding carbon sequestration and offsetting feasibility

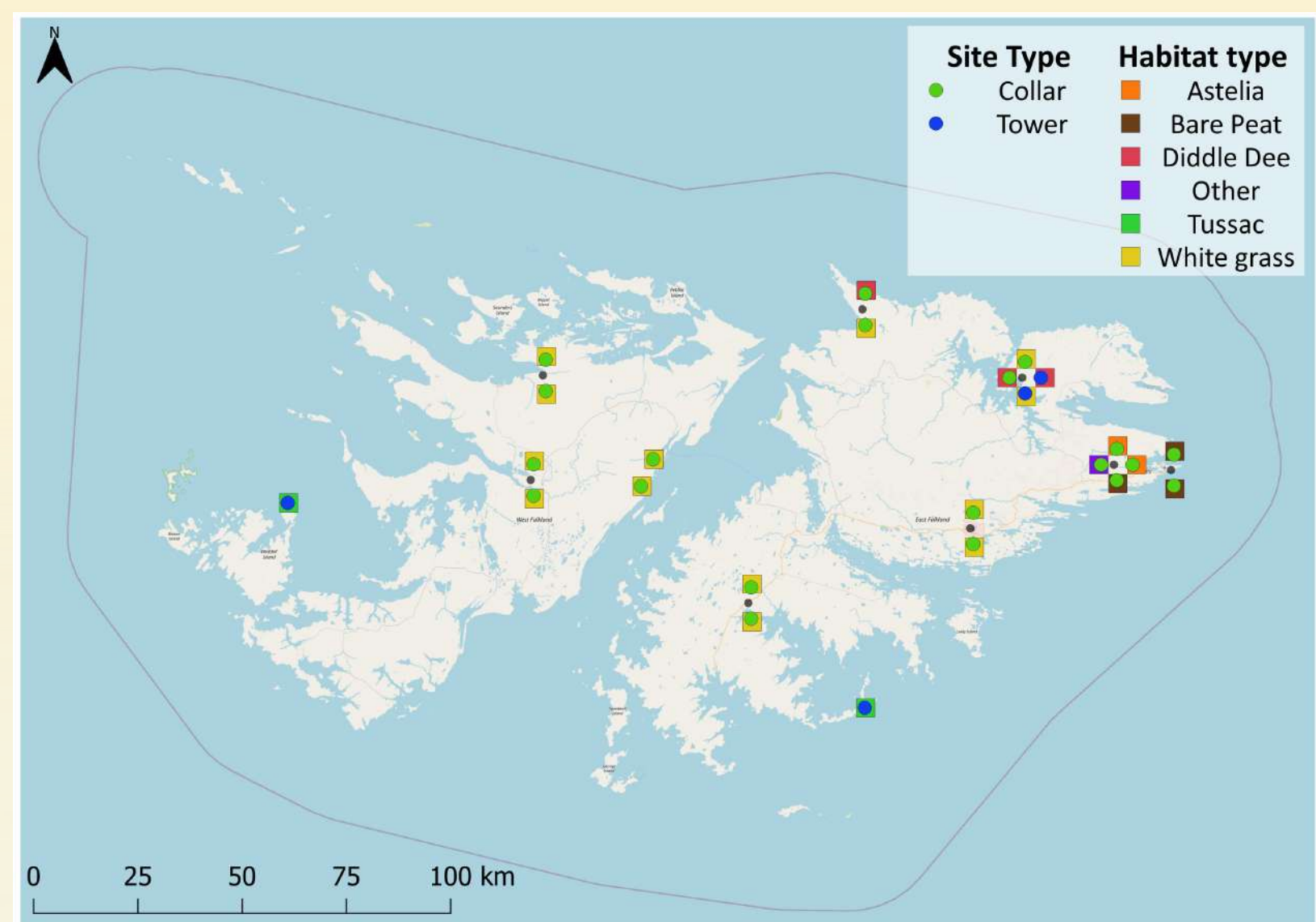
GHG flux measurements and peat core data will improve our understanding of peatland GHG flux and their carbon storage. These data will be utilised in assessing the feasibility of carbon offsetting opportunities.

Tussock and white grass habitats of different conditions are studied to inform their emission factors and carbon storage potential, contributing to national carbon accounting and emission reduction possibilities.

#### GHG data collection

Four flux towers and 20 flux chamber sites across the Islands provide GHG flux data over the 2 year project - including CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, water vapour, soil moisture & temperature, water table, rainfall, NDVI and PAR.

Data will inform the specific habitat condition emission factors.



#### Flux collars/chambers

Data is collected across habitat conditions from bare peat to healthy 'near-natural' white grass. Sites are geographically paired comparing habitat condition within environmentally similar situations.

Sites have 4 collars, sampled monthly, measuring GHG flux under natural light, ~30% shade, ~60% shade and full dark.

#### Flux towers

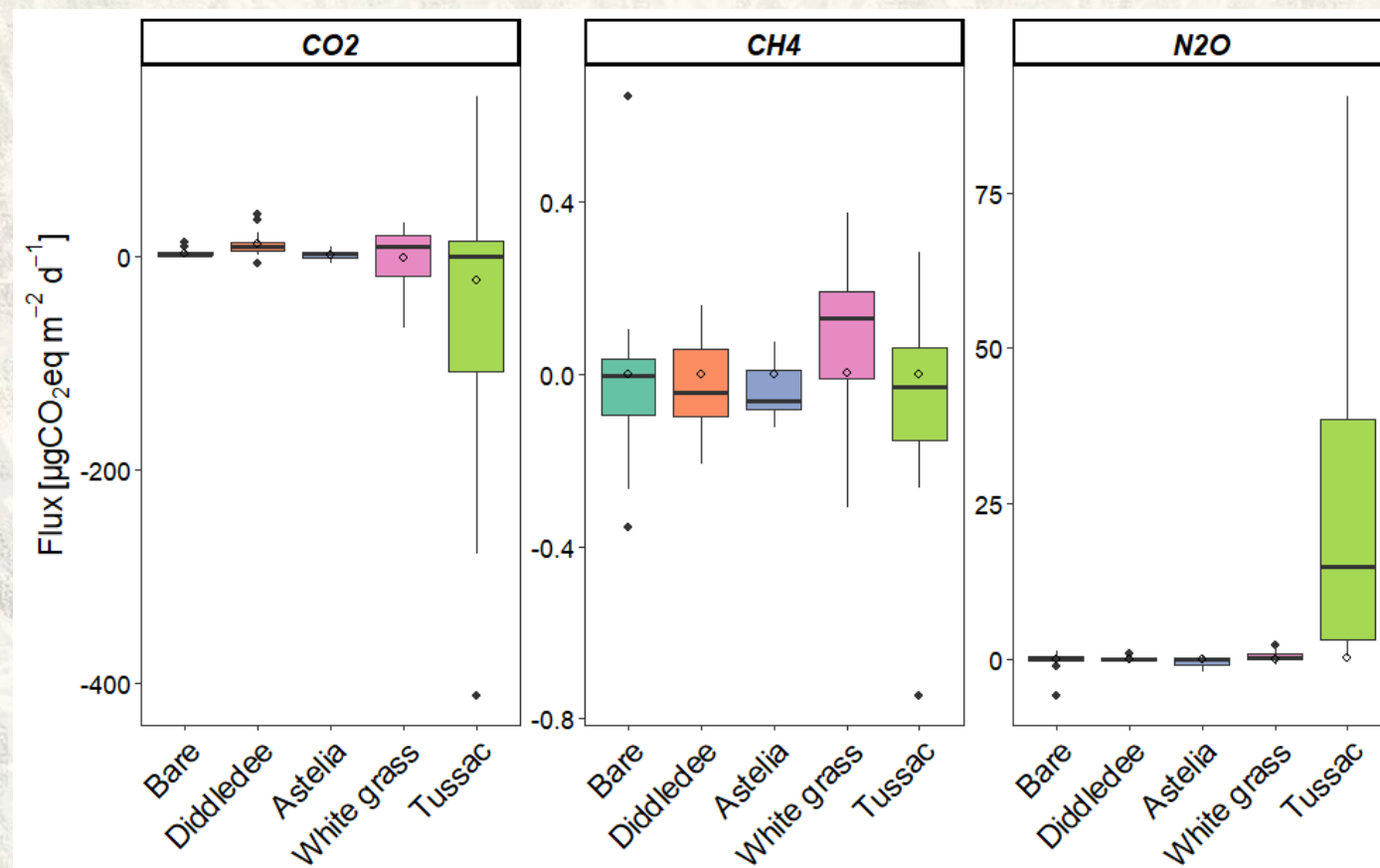
Flux towers were installed in February 2024, providing data on:

- White grass vs modified diddle-dee site, and;
- A comparison of two tussock restoration sites.

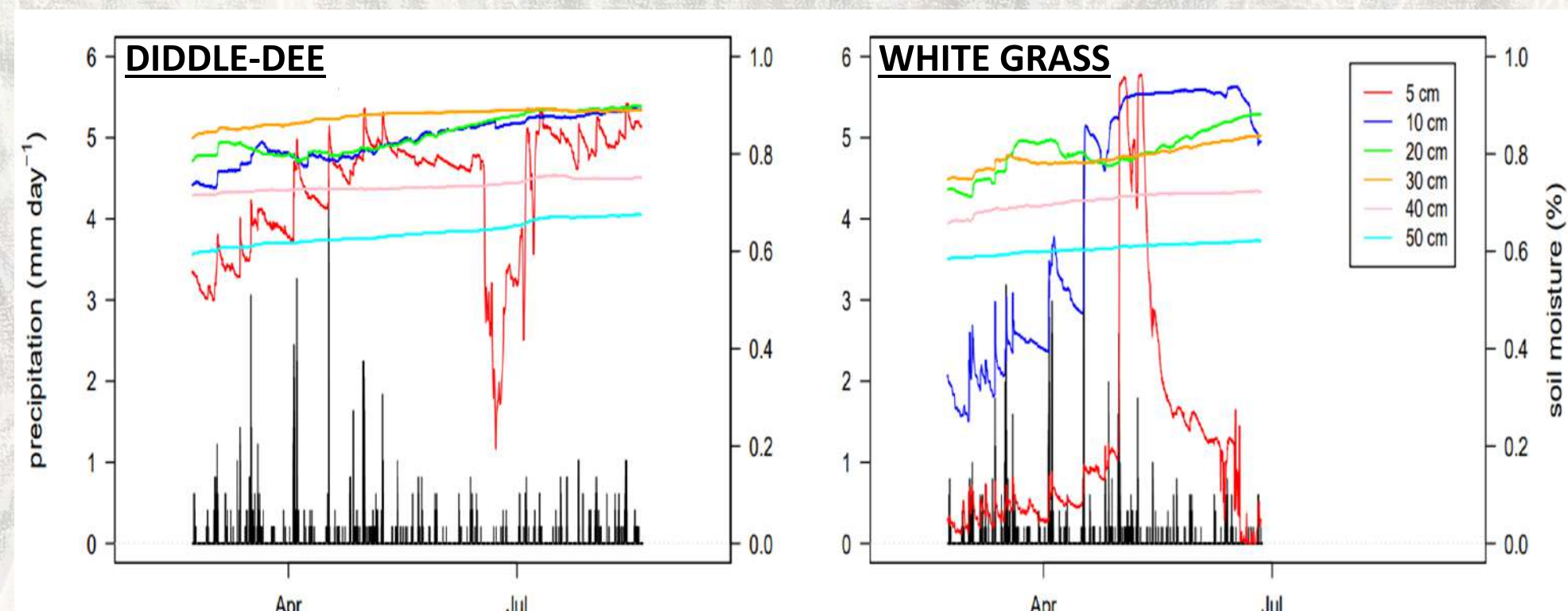
These conditions represent some of the key habitats for emissions accounting and restoration opportunity.

#### Initial chamber and tower data

Representative data from chamber network of single site types during a winter month with shade treatments combined.



Monthly rainfall and soil moisture data from closely located flux towers over different habitat types from March to July 2024.



#### Peat formation and carbon storage

Peat cores have been collected at flux tower locations, providing information on the peat which the towers sample.

The cores provide data on peat formation rates and carbon storage.

#### Core sampling

Peat cores were collected in February 2024. Surface layers were sampled using a box core, followed by 50 cm overlapped core sections (10cm overlap), to mineral clay layer. Sections are analysed in the UK.

Topographic and peat depth surveys were conducted during sampling along eight 50m long radial spokes from the flux tower location. These survey data provide a high-resolution peat depth map of the focal flux sampling area and inform carbon storage assessments.

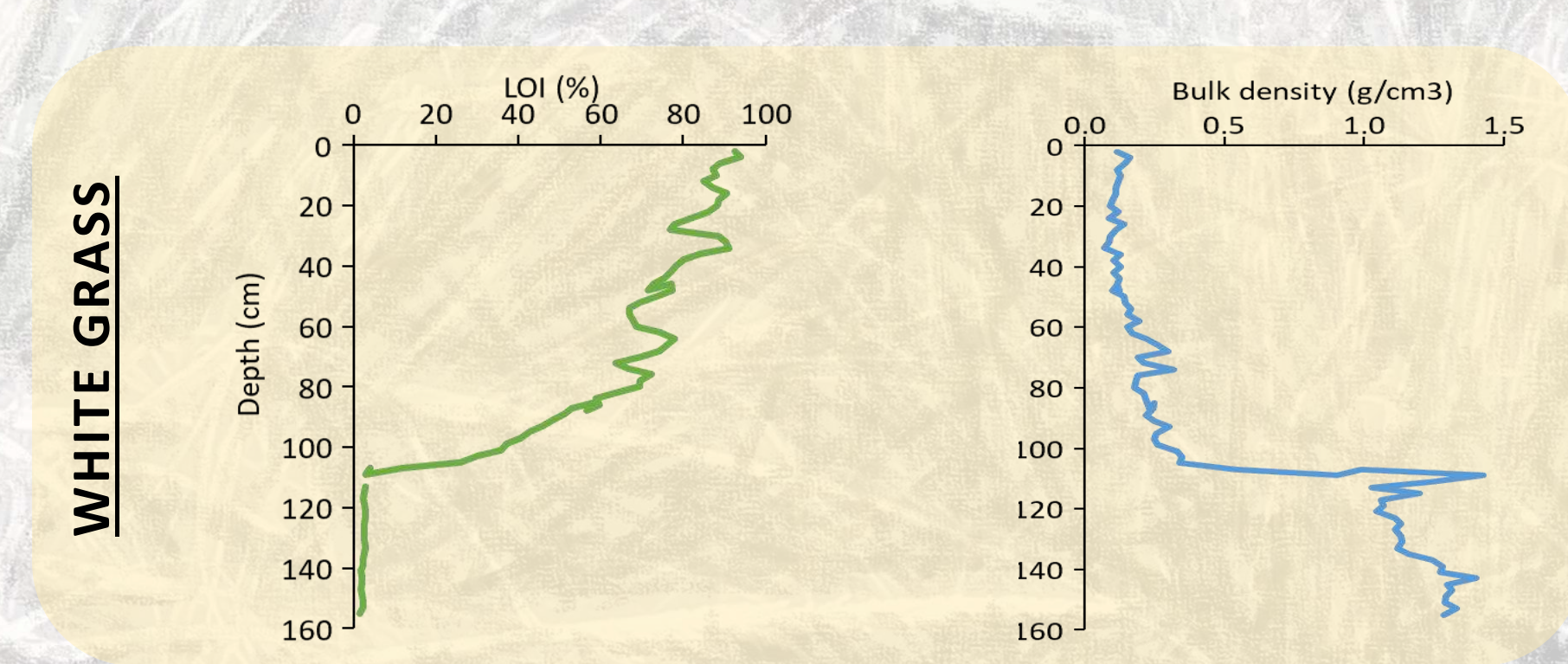
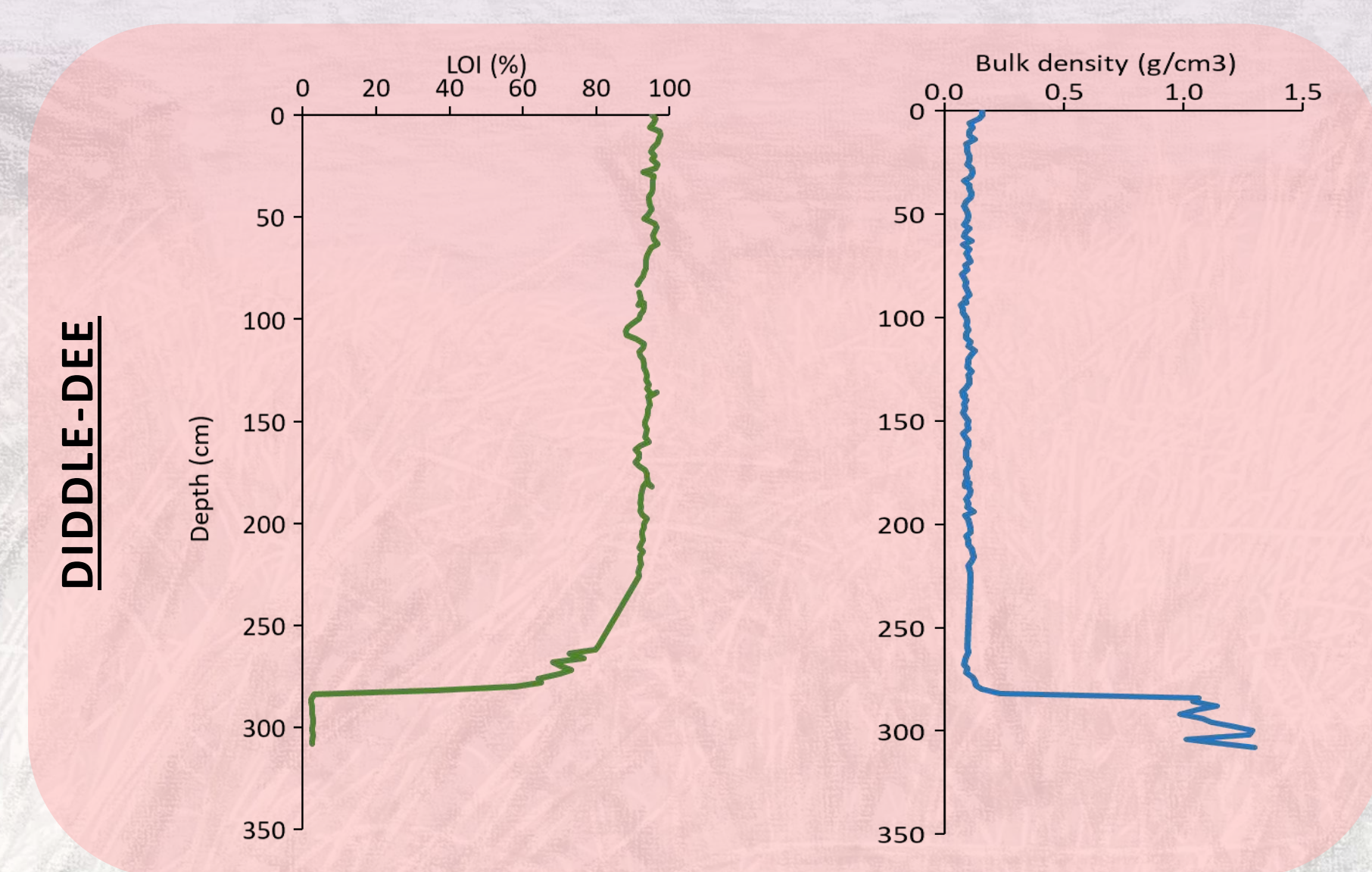


Core analysis Core samples are processed using a multi-system core logger followed by further destructive sampling, obtaining:

- Palaeoecological record
- Bulk density
- C:N ratios
- Organic and carbon content
- Radiocarbon dating - basal dating for all cores with additional higher-resolution dating on selected cores being conducted.

#### Initial core data

Loss-on-Ignition and Bulk Density data of cores collected in February 2024 from corresponding flux tower sites.



#### Carbon offsetting feasibility assessment

Emission factor data, carbon storage and socio-economic factors will be combined to assess the feasibility of carbon offsetting opportunity in the Falklands.

Improved understanding of restoration interventions applicability and impact will further inform offsetting potential.

#### Intervention possibilities

Environmental restoration options, and their impact on emissions, need to be better understood and tested.

Monitoring of real-world restoration interventions and their influence on GHG flux will take place.

Data will help contextualise defined condition category emission factors with applied examples and inform how restoration could be achieved.

#### Community opinion

Carbon offsetting, and other alternative land-use approaches, are broadly 'new' to the Falkland's Community. Understanding their thoughts and feelings are crucial to successful future delivery.

Community input includes topics such as:

- Understanding of carbon offsetting
- Interest in future offsetting possibilities
- Amount and type of land which would be used for offsetting
- Perceived costs with developing a project
- Level of return required or expected
- Possible barriers to accessing or implementation
- Risks to tradition or social structures

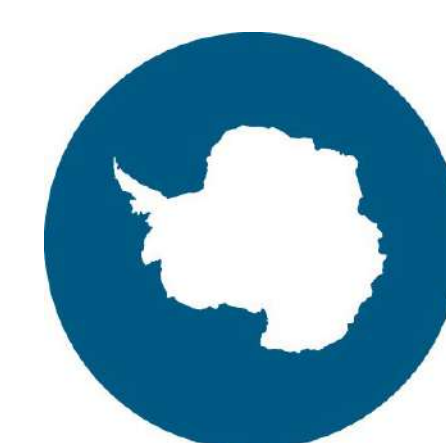


#### Request for input...

Peatland specialists, carbon offsetting practitioners, restoration deliverers, policy developers your knowledge is invaluable. It would be great to hear your input on:

- \* Consideration for environmental data and emission factors linked to habitat conditions.
- \* Community engagement approaches, lessons learnt and key questions.
- \* Approaches to assessment of carbon offsetting and possible future scheme developments.
- \* Any other advice...?

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