



Impact of glacier meltwater on methane concentration in the West Antarctic Peninsula

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INTRODUCTION

During the late Austral summer of 2023, we surveyed the **West Antarctic Peninsula (WAP)** to investigate the **drivers shaping the response of shallow benthic communities to contrasting glacial regimes** in a fast-warming region of the Southern Ocean. This included the investigation of the **carbon cycle** regarding changing sea ice conditions. Here, we present **CH₄** spatial variability and assess the impact of the glacier type and streams.

TANGO EXPEDITION



Survey took place in the West Antarctic Peninsula in February and March 2023 aboard the **sailing boat (Australis)**. This boat allowed us to be more **agile**, to reach really shallow area (+- 10m), to **adapt** to our sampling strategy and to reduce our **carbon footprint**.

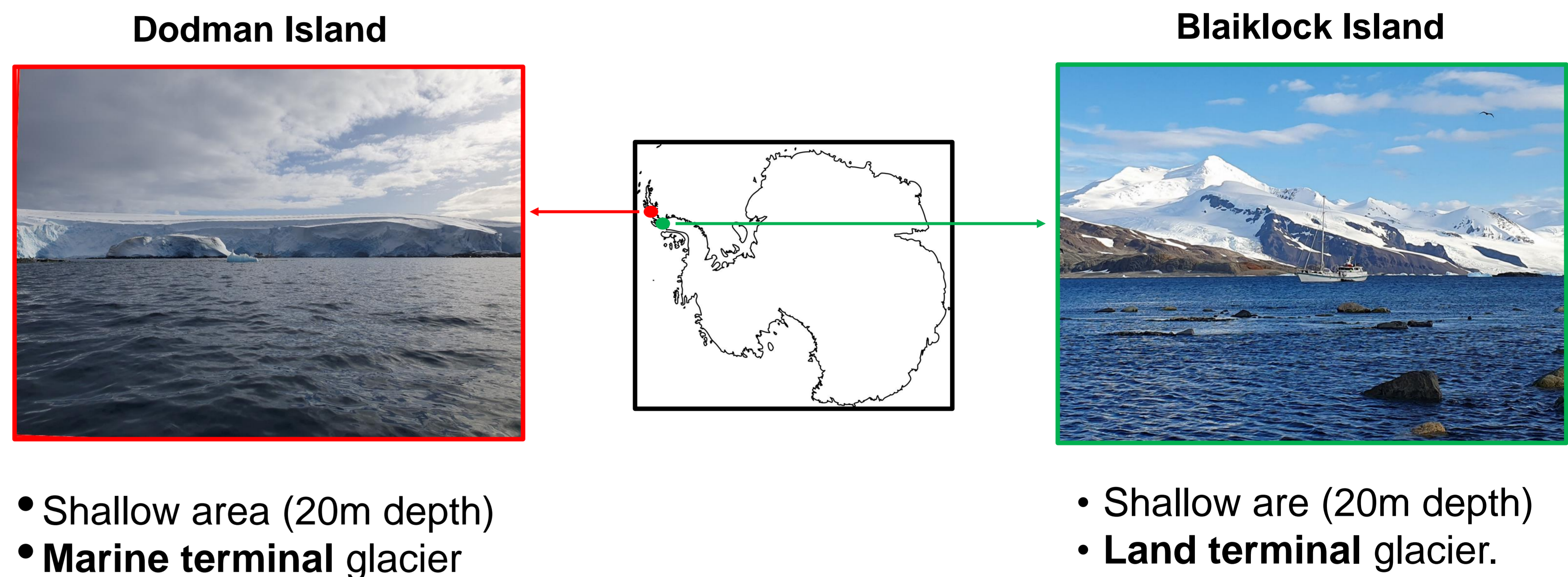
METHODOLOGY

Samples were collected with a 2,5l Niskin and analysed by gaz chromatography (GC).

CONCLUSION

Glacier meltwater could be a source of methane in Southern Ocean coastal waters, but this seems to depend on the type of glacier and also have a special variability. We also need more investigation of the surface water at different glaciers and especially larger ones which are more representative of the WAP.

STUDY AREA



RESULTS

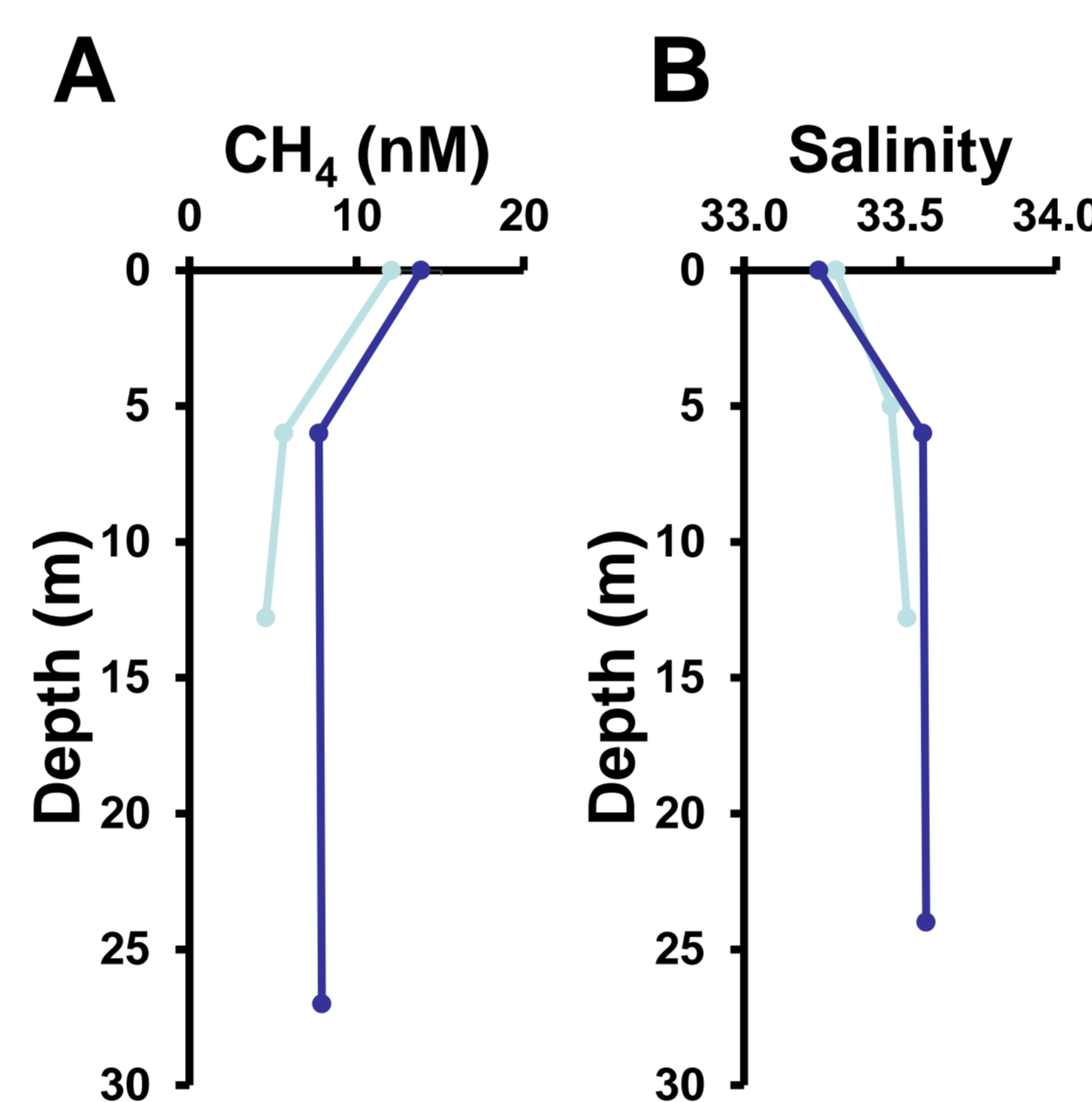


Figure 2. Concentration of methane (A) and salinity (B) in the water column at Dodman Island

Dodman Island (Marine Terminating Glacier)

- More methane at the top of the water column
 - Source at the surface and not from the sediment
 - Drop of salinity at the surface → input of fresh water
- ➔ Potential impact on the methane concentration from the glacier meltwater

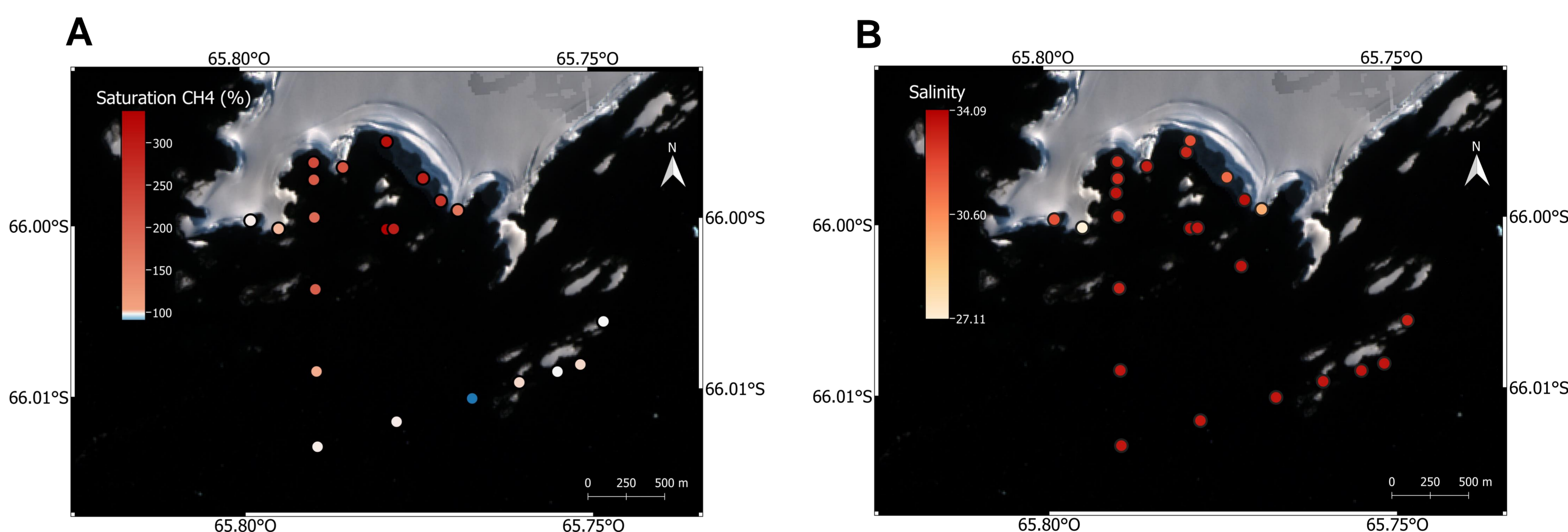


Figure 3. Saturation of methane (A) and salinity (B) in the seawater at Dodman Island

- Oversaturation of CH₄ inside the bay (up to 400%)
 - Saturation or under in the open water
 - Low salinity point with just saturated methane
- ➔ Spatial variability along one glacier

Dodman + Blaiklock islands

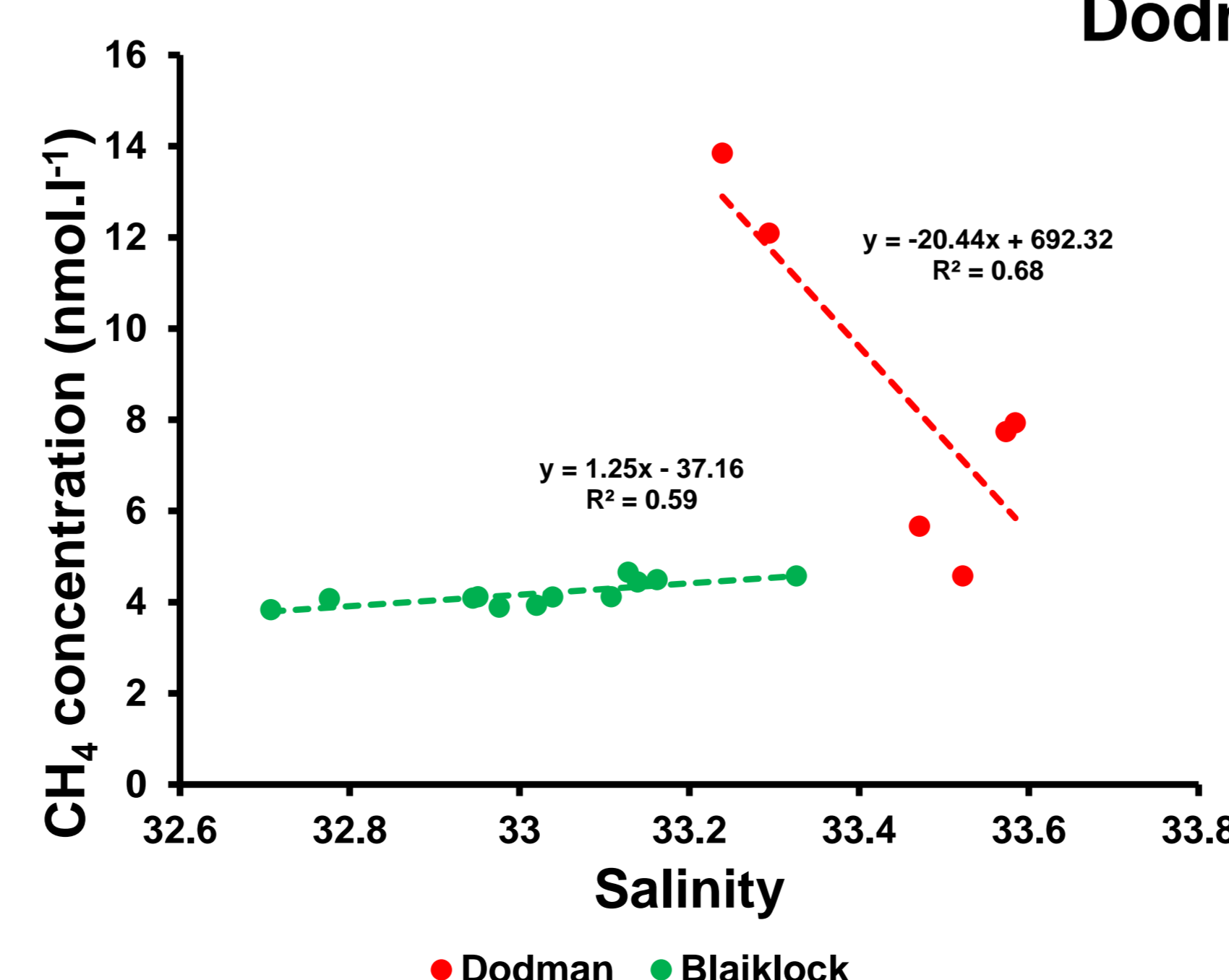


Figure 4. Comparison of the two stations regarding methane concentration over salinity

- Variation of salinity but not in methane at Blaiklock Island
 - Inversely proportional relationship between methane concentration and salinity at Dodman Island
- ➔ Input of methane in the water column from glacial meltwater seems dependent on the glacier type