



UiT The Arctic University of Norway



Methane release and variability offshore Svalbard

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CAGE

Motivation

Arctic continental shelves and land areas host vast amounts of methane trapped within permafrost and gas hydrates

What will happen to these frozen stores of greenhouse gas when the temperature is increasing and the seafloor is thawing?



Centre for
Arctic Gas Hydrate
Environment and Climate

CAGE uses trans-disciplinary methods and technologies to investigate Arctic methane hydrate systems through time



FOCUS: environment and climate

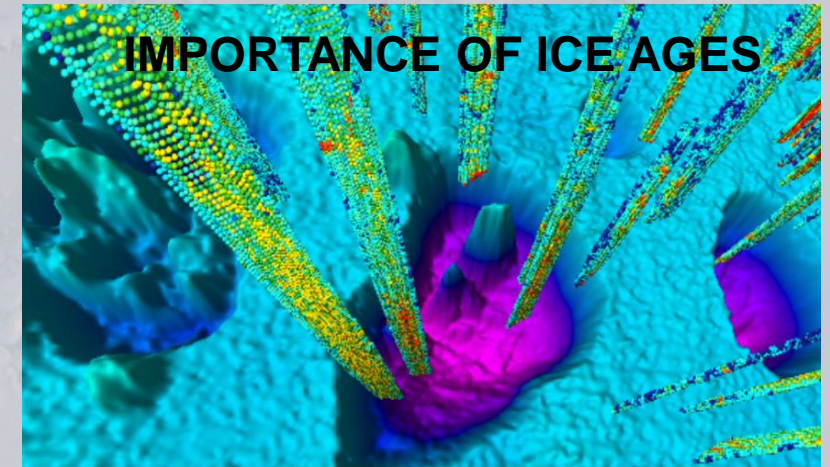
ATMOSPHERE



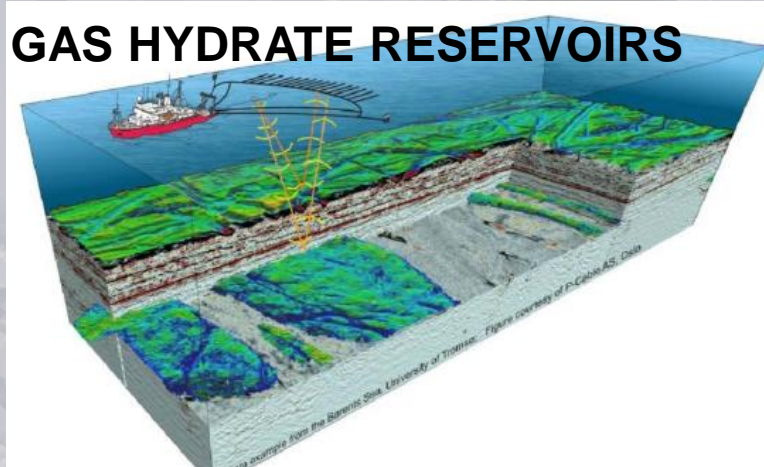
METHANE LEAKAGE HISTORY



IMPORTANCE OF ICE AGES



GAS HYDRATE RESERVOIRS



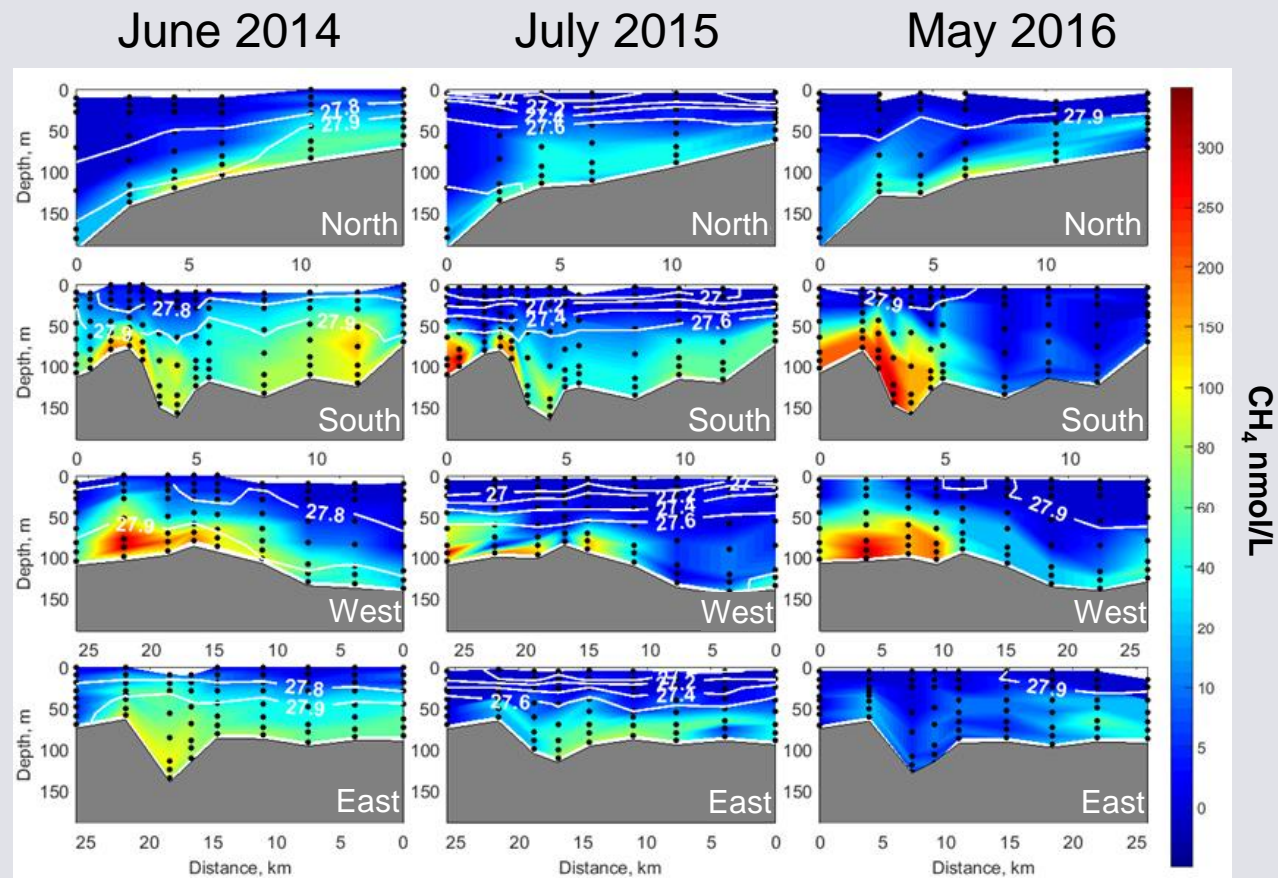
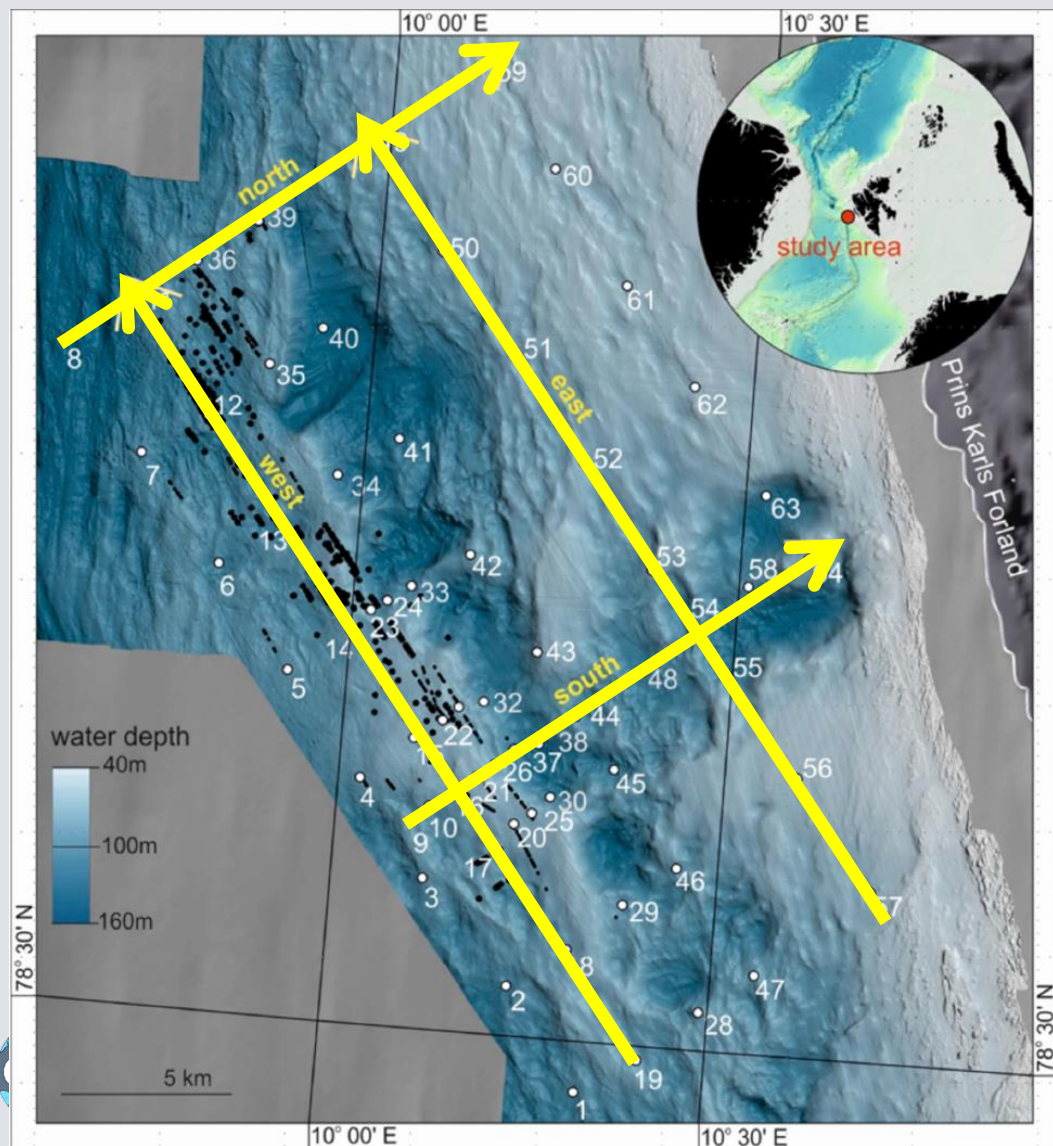
MICROBIOLOGY



WATER COLUMN

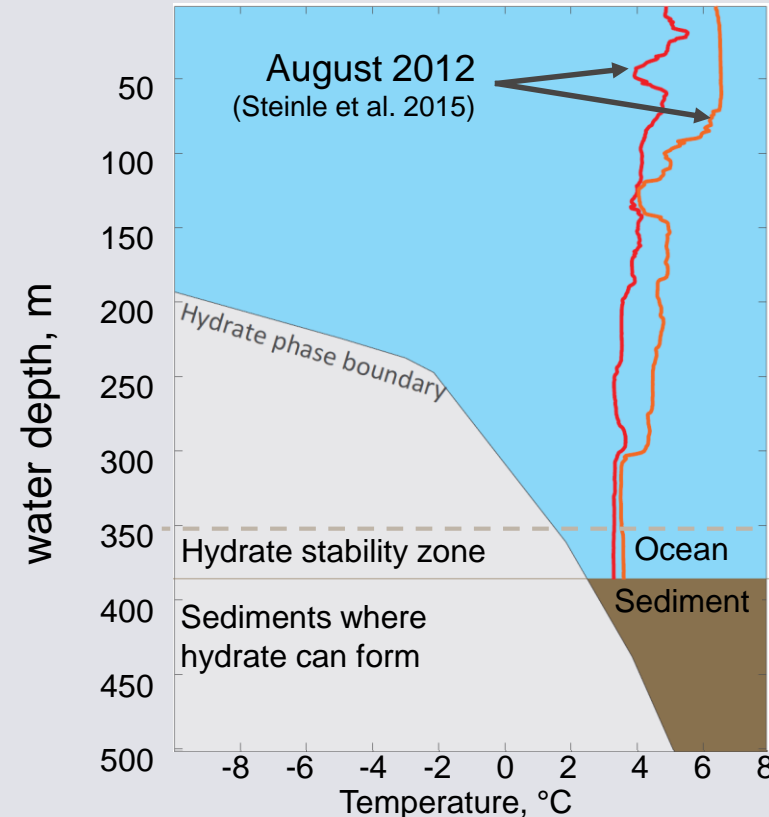
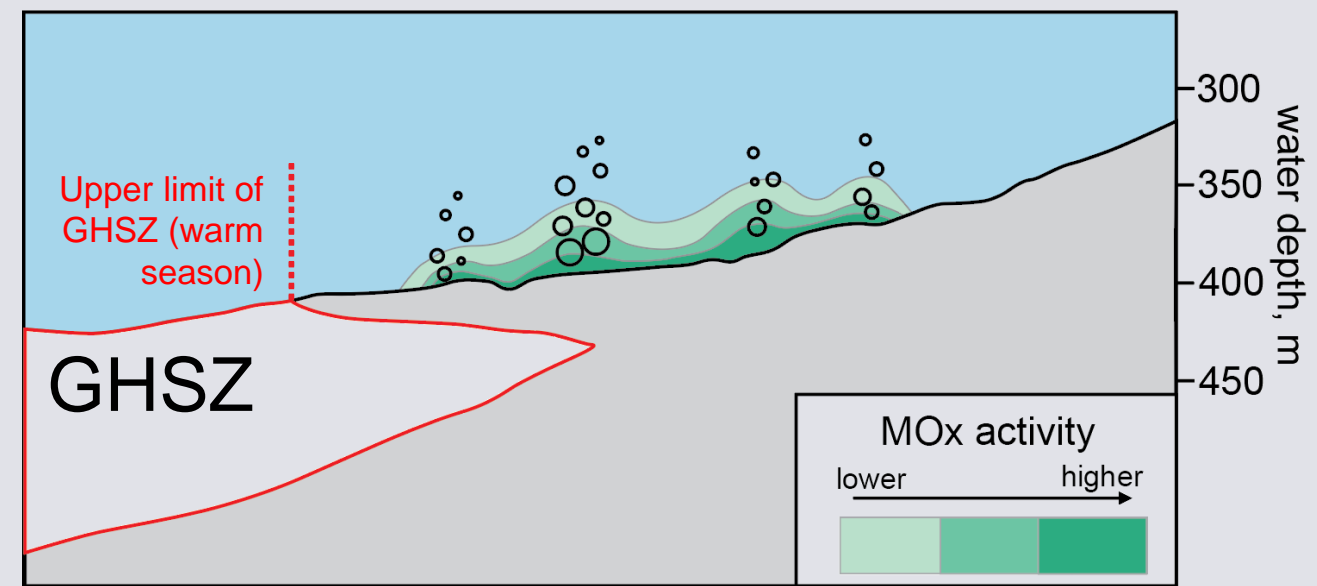
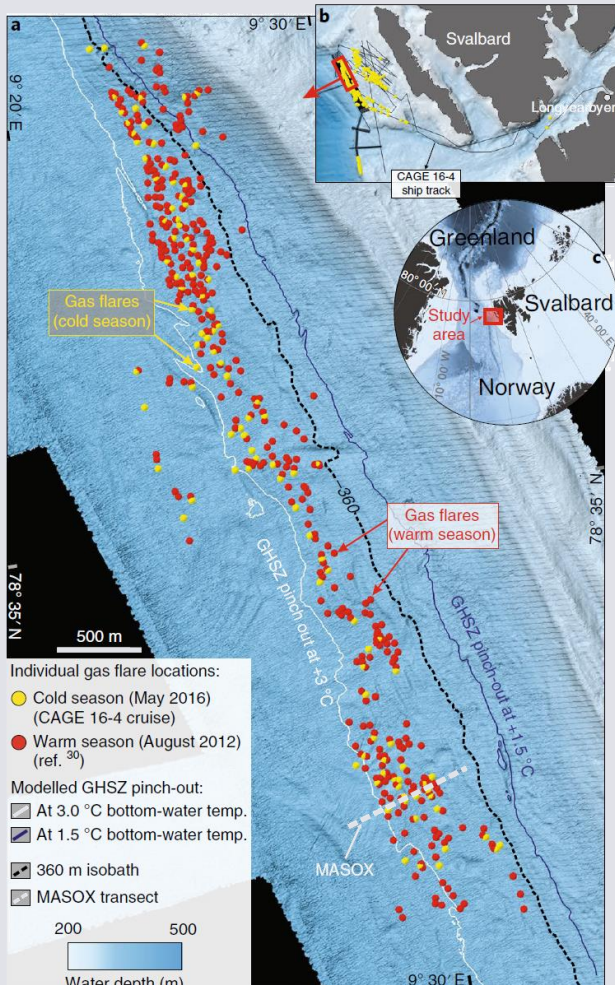


Oceanographic control on methane transport



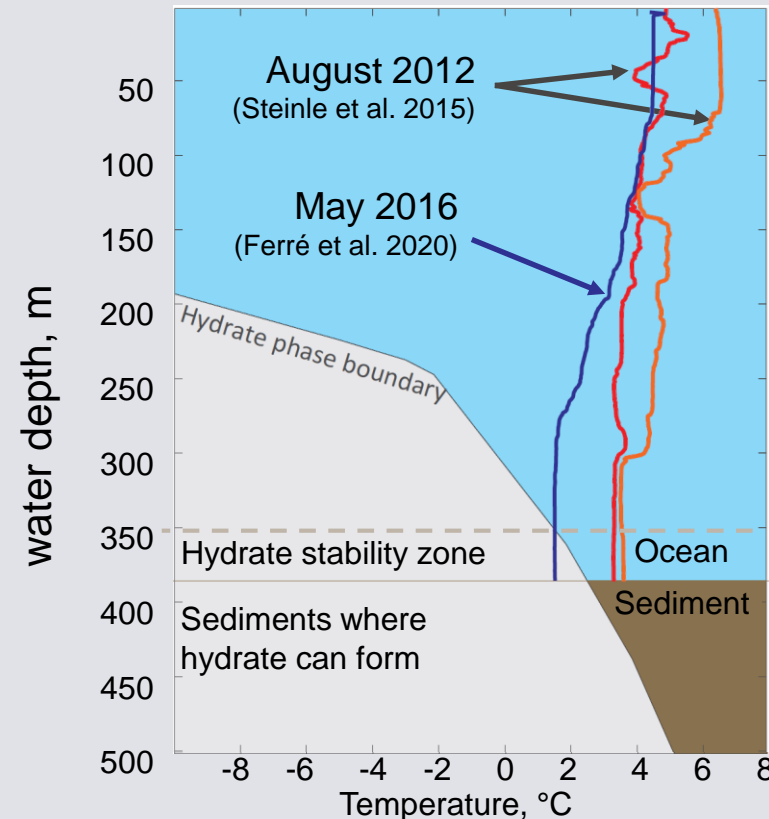
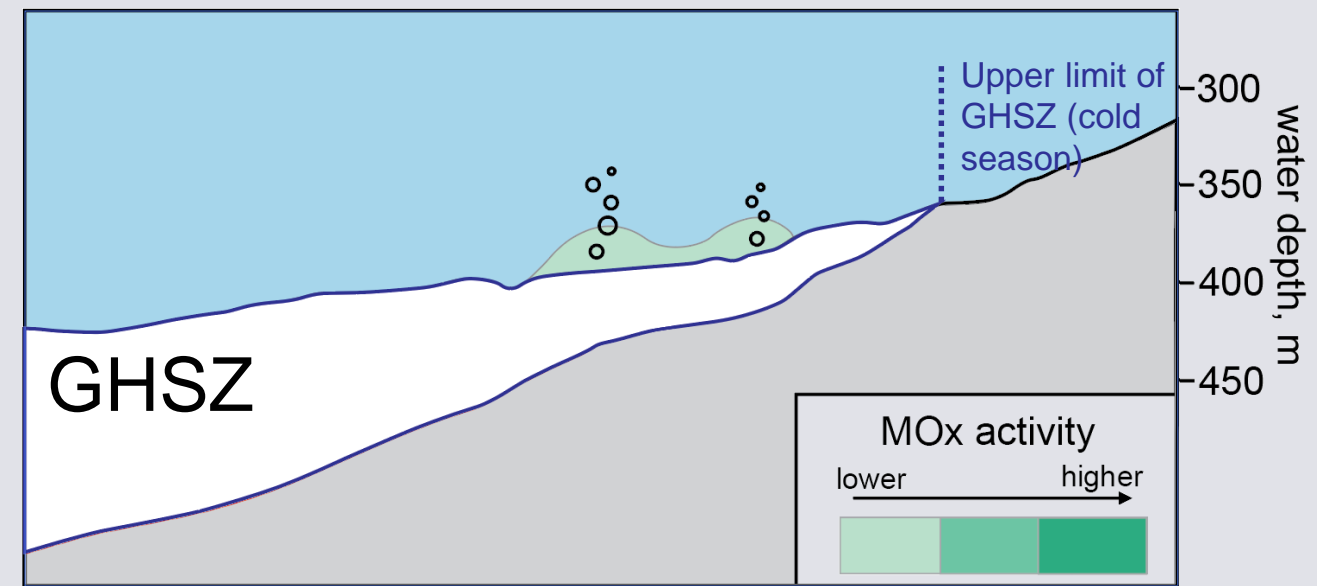
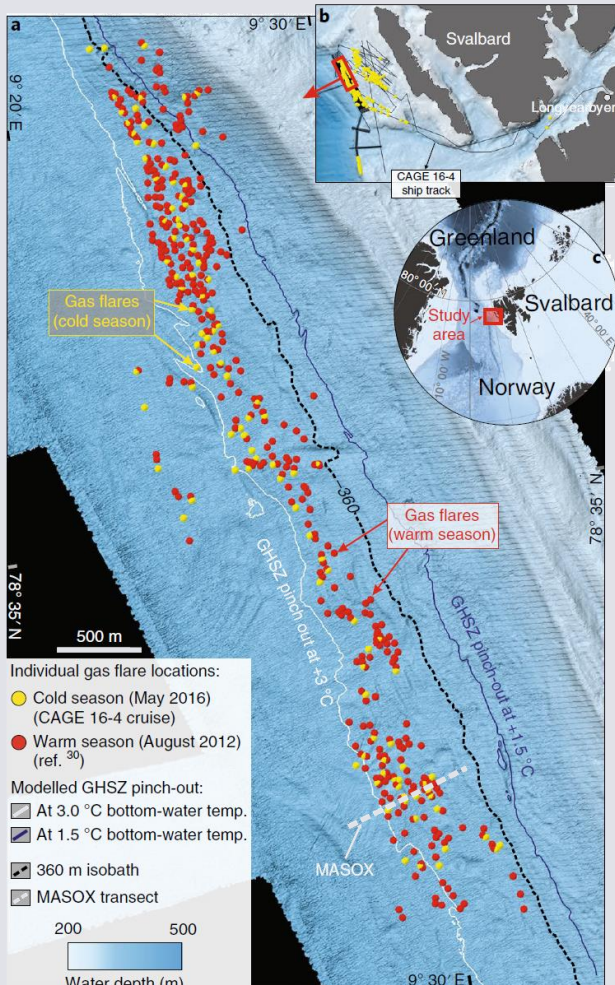
- Seepage intensity and transport control CH_4 content
- Vertical methane transport limited without stratification
- Eddies play a key role in CH_4 transport

Large seasonal variations in methane seeps in the Arctic Ocean



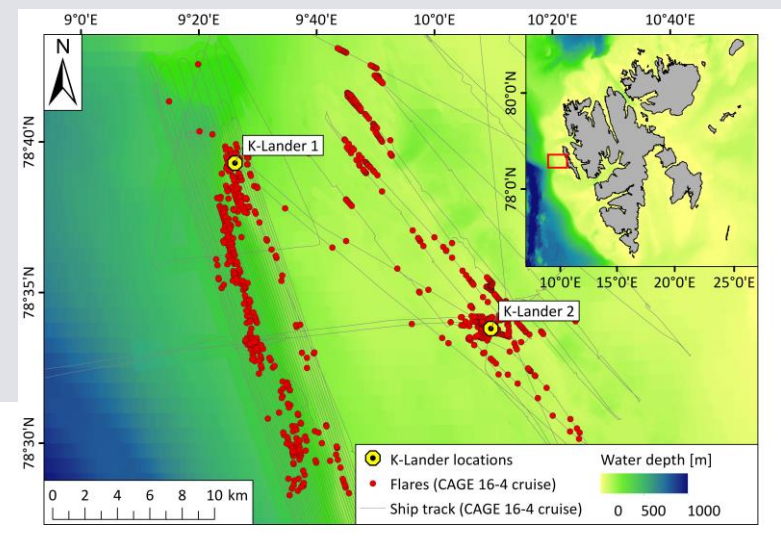
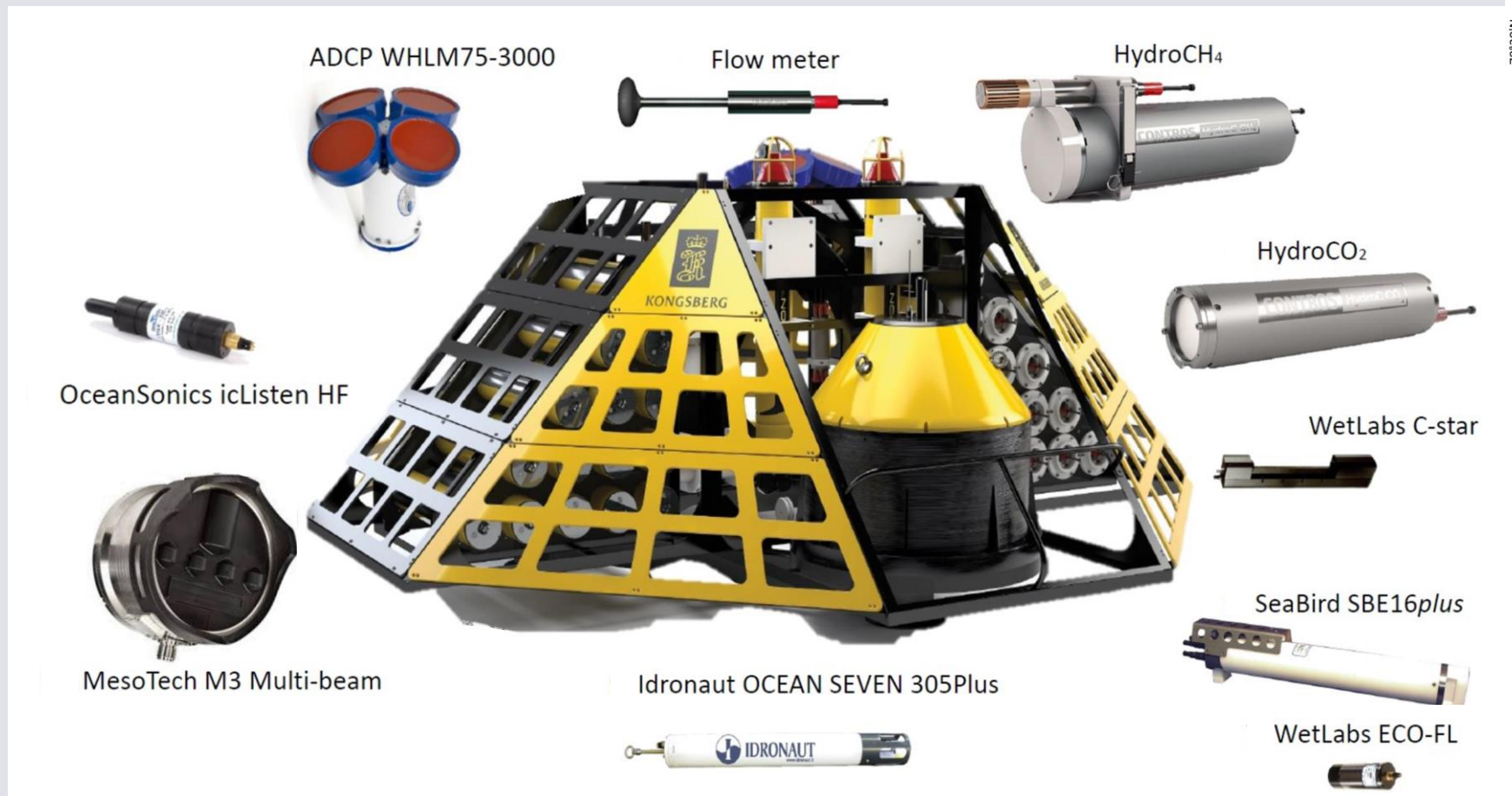
- A thin cap of gas hydrates seals shallow methane reservoirs when temperatures are cold, and half the leakages
- Sediment as greenhouse gas capacitor
- Overestimation of current global fluxes

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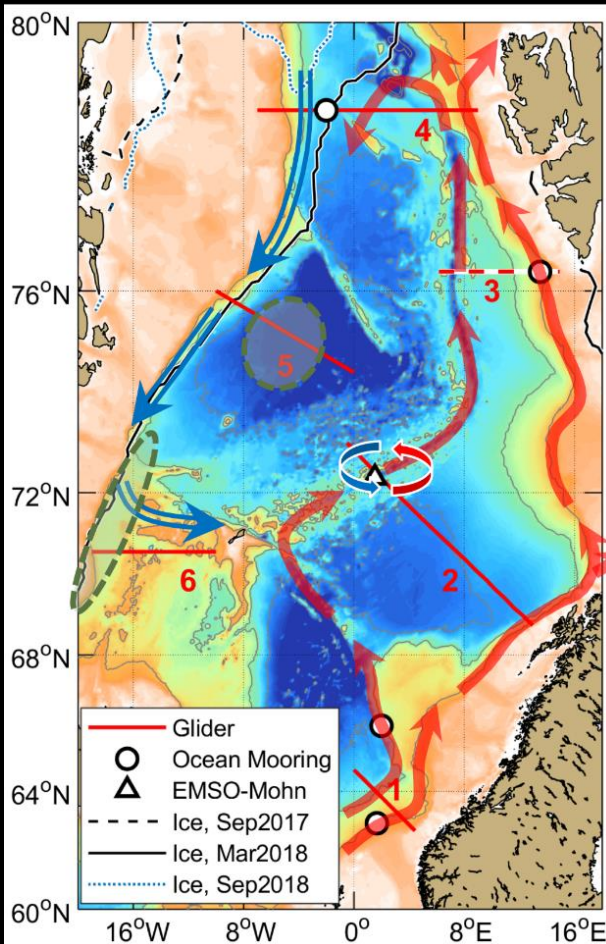
Long term methane variability



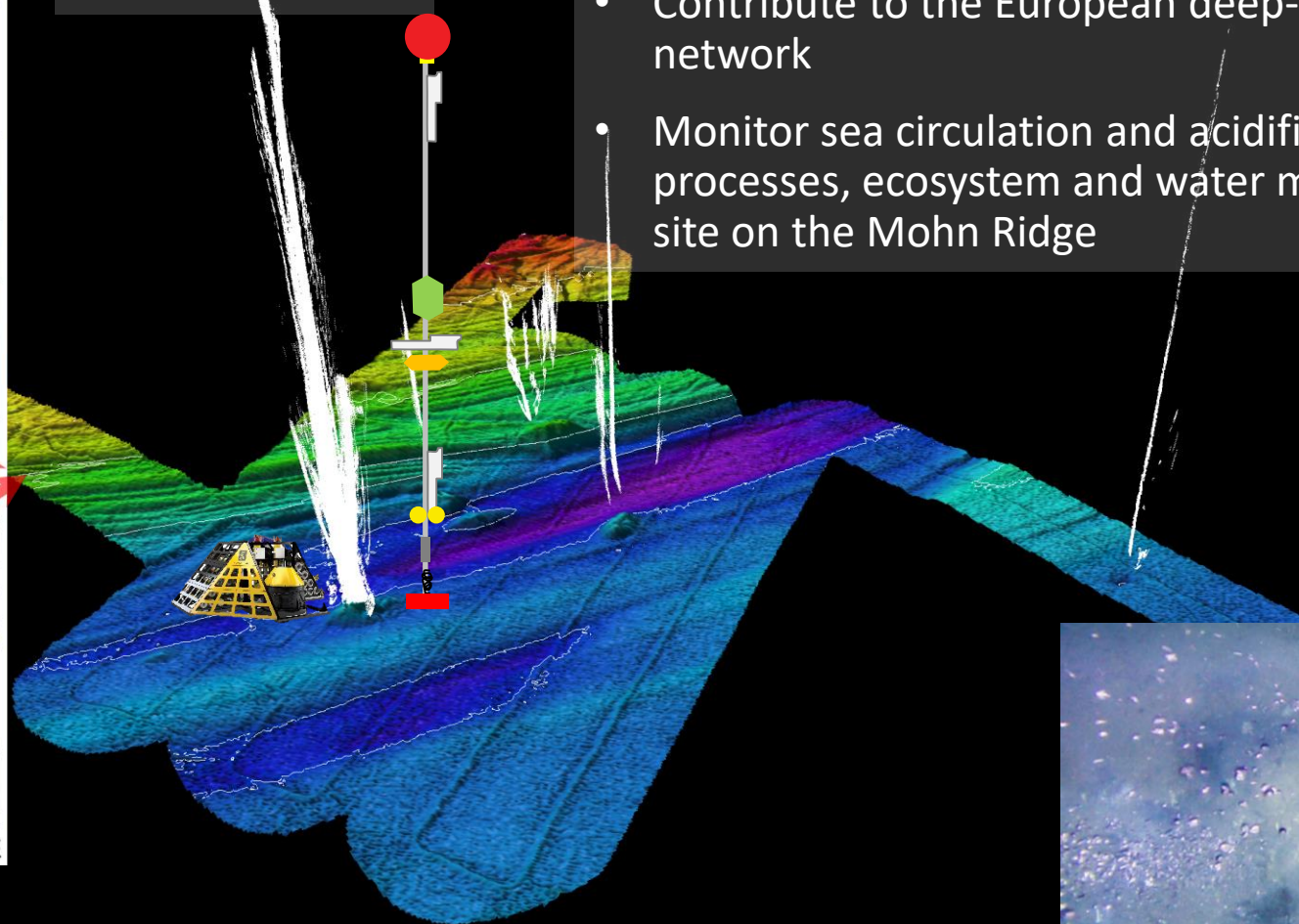
The Norwegian node for the European Multidisciplinary Seafloor and water column Observatory - NorEMSO



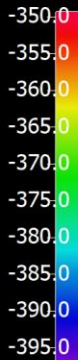
Install a new sub-surface mooring at South Cape site for monitoring of CH₄



Methane plume
~360m high



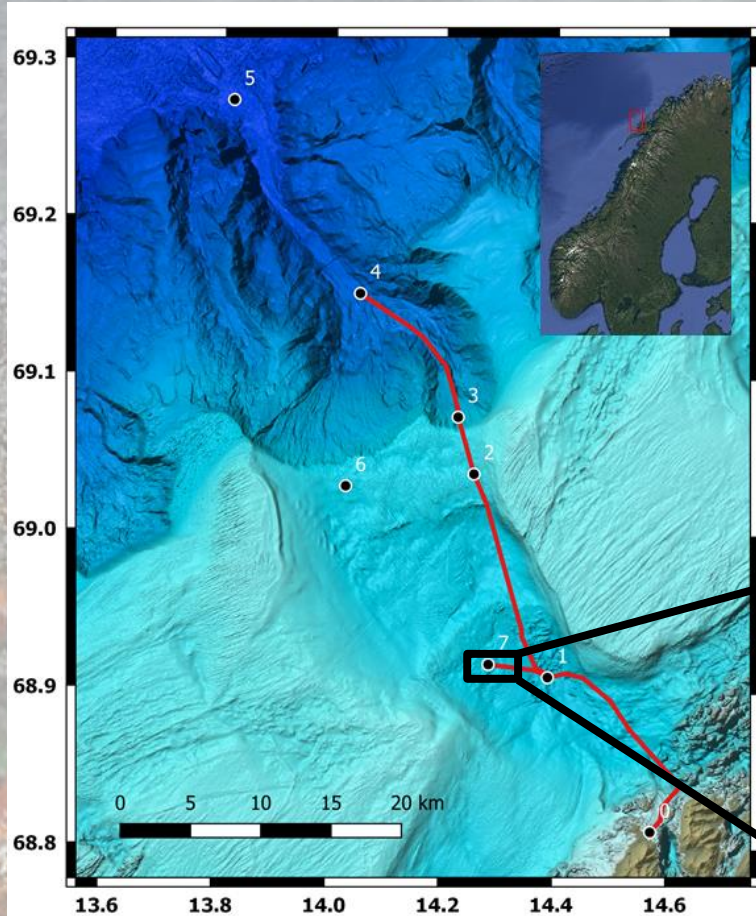
- 60 mnok (NFR)
- Contribute to the European deep-sea observation network
- Monitor sea circulation and acidification, physical processes, ecosystem and water masses hydrothermal site on the Mohn Ridge



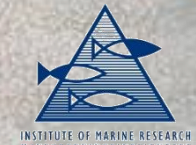
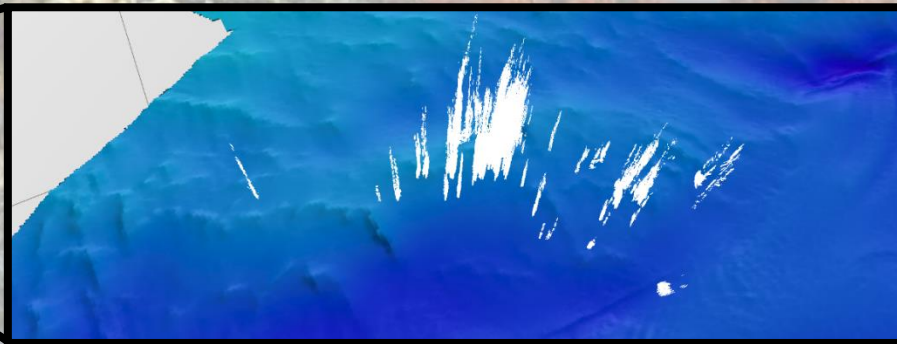
EMAN7: Environmental impact of Methane seepage and seabed characterization at LoVe – Node 7

Main objective: Shed light on how oceanic parameters and climate change influence methane seepage from the seafloor, and the subsequent impacts on ecosystem health and carbon fluxes

LoVe – Lofoten Vesterålen



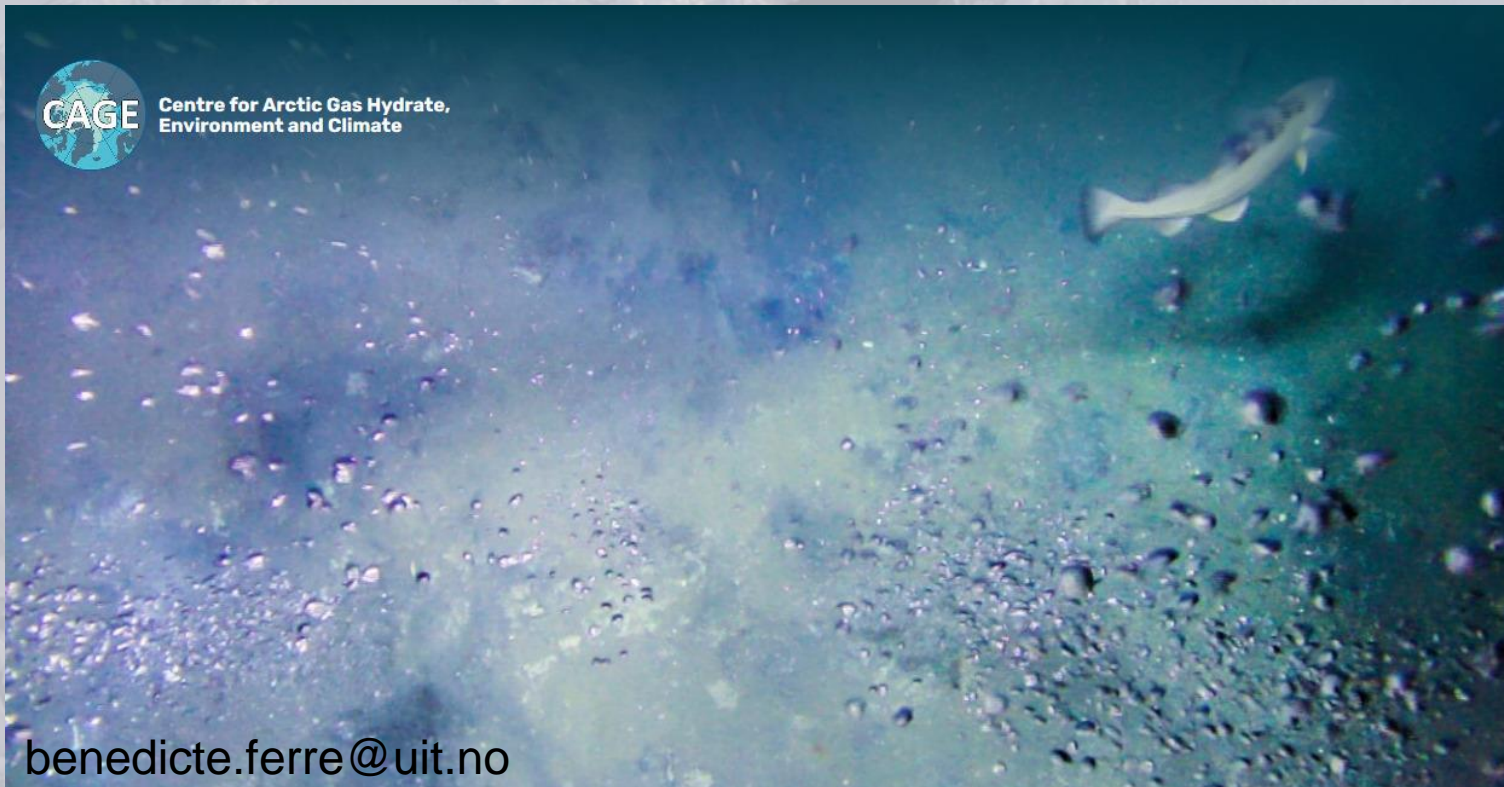
- 23.5 mnok funding (NFR + industry) / 4 years project
- CH₄ versus oceanic parameters?
- Fate of CH₄ in water column?
- Effect on ocean acidification and CWC reef?
- Fluid flow and carbon fluxes?
- How did the seepage evolve in the past?



Thank you



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Environment and Climate



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