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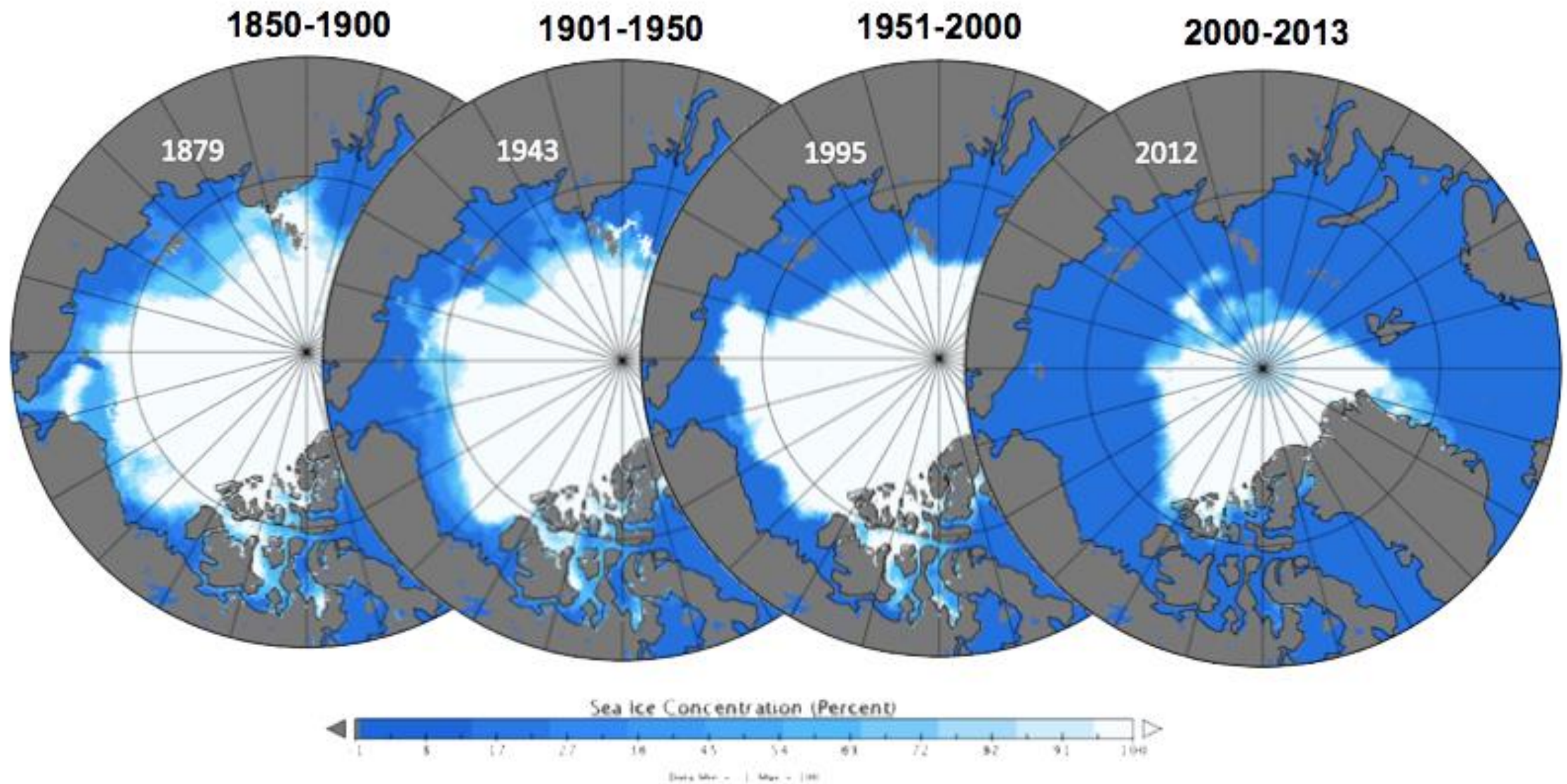
Methane seeps from Svalbard fjord sediments

Martin Liira

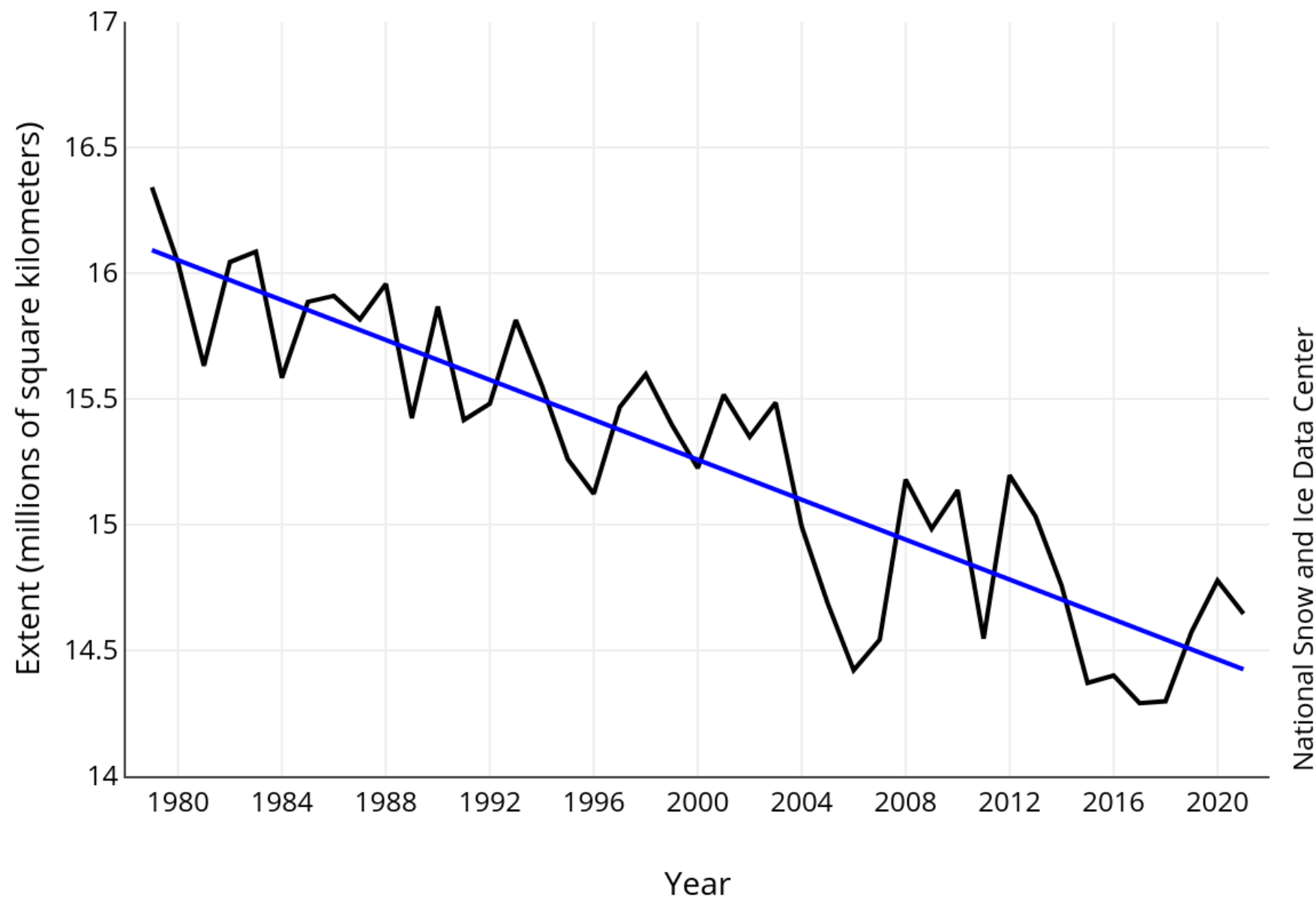
Estonian Geological Survey
University of Tartu, Department of Geology

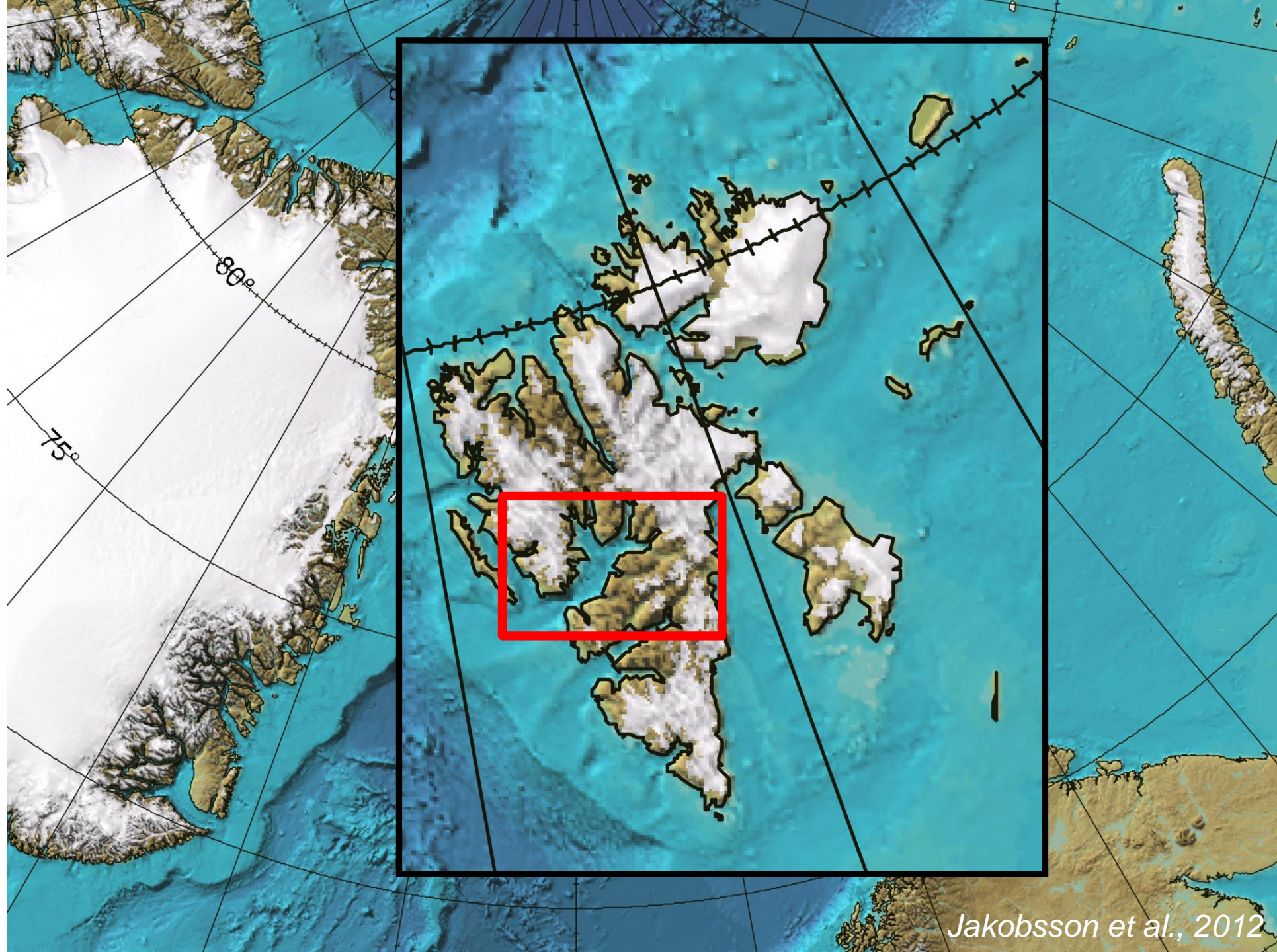


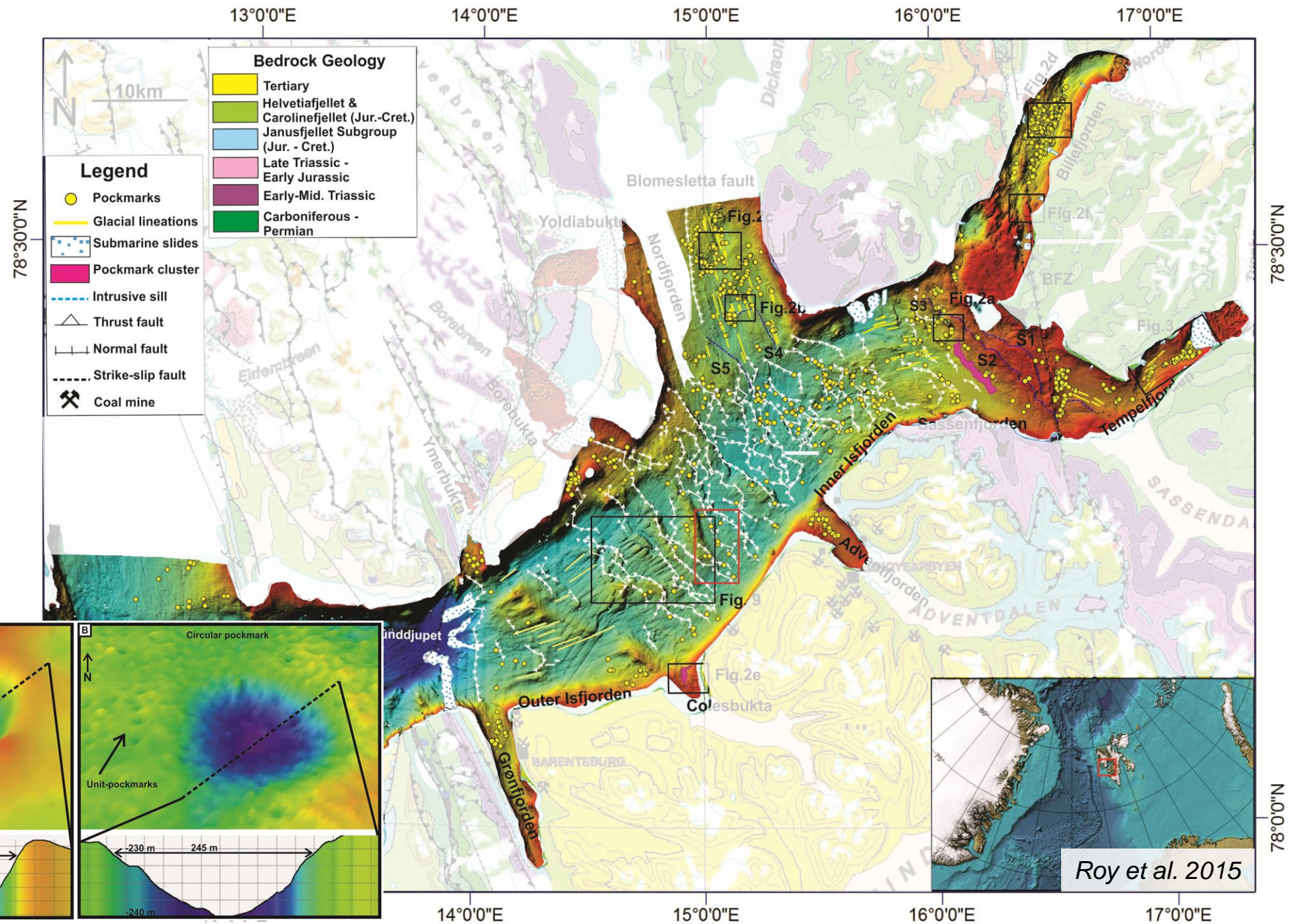
Lowest September minimum Arctic sea ice extents



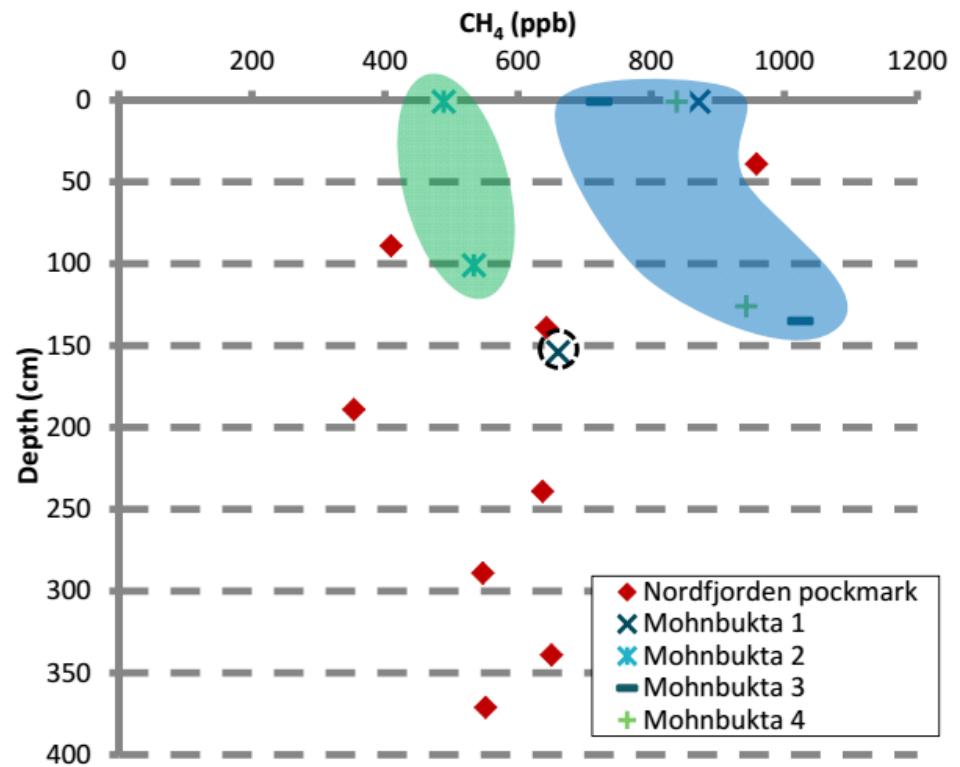
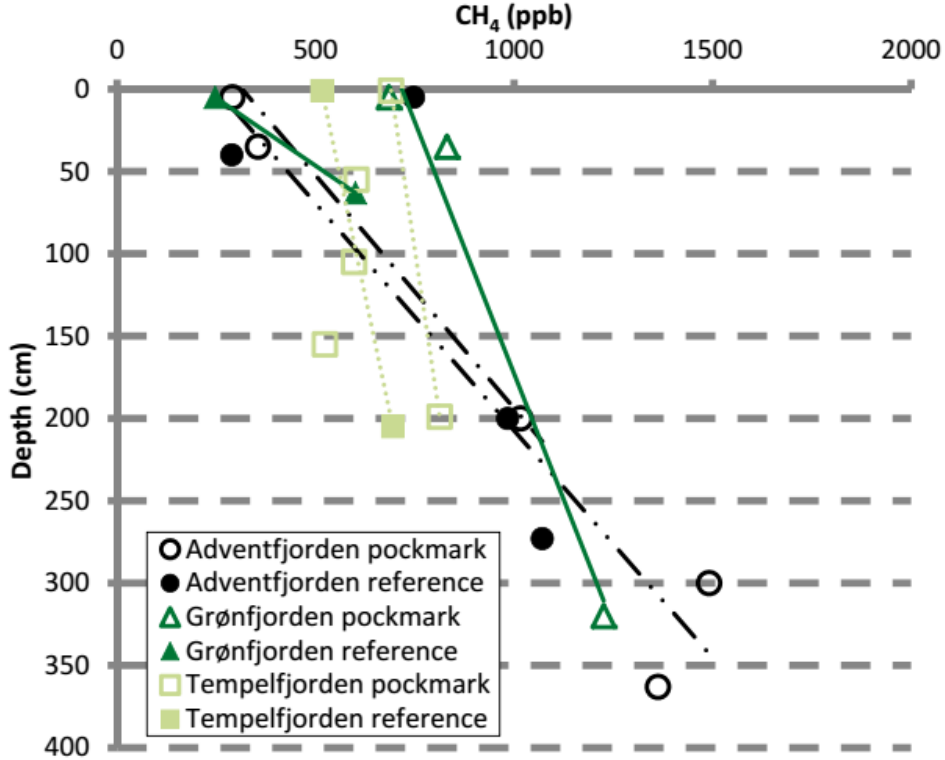
Average Monthly Arctic Sea Ice Extent March 1979 - 2021







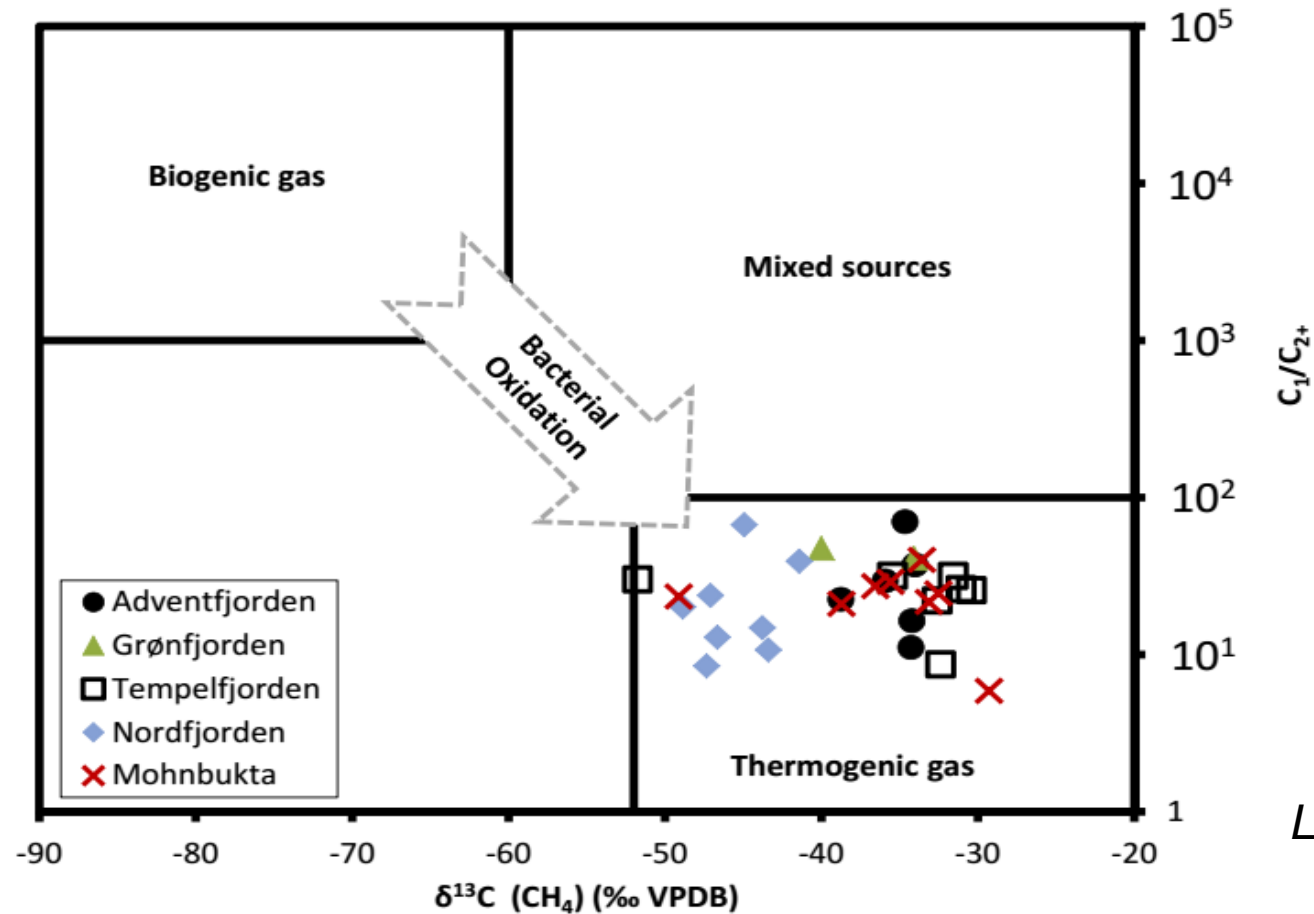
Methane concentration (ppb)



Liira et al. (2019)

Methane concentration in all cores increases somewhat with depth and showed little differences between pockmarks and undisturbed seabed (only exceptions are Mohnbukta and Adventfjorden site)

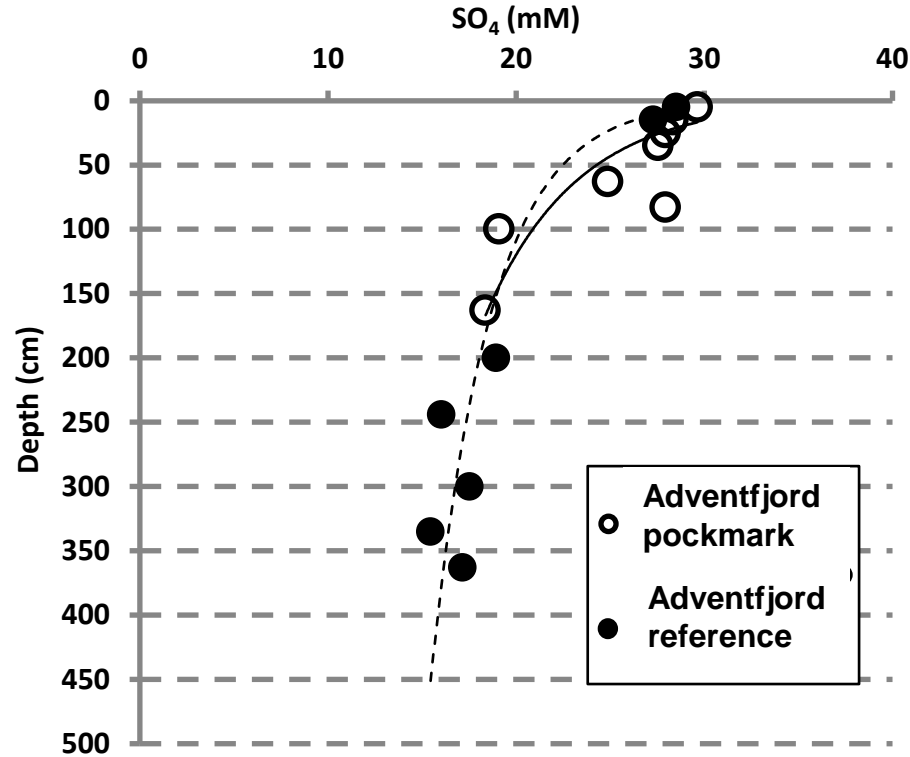
The ratio of methane (C_1) to higher hydrocarbons (C_{2+}) plotted against the carbon isotopic composition of methane (from Claypool and Kvenvolden 1983)



Liira et al. (2019)

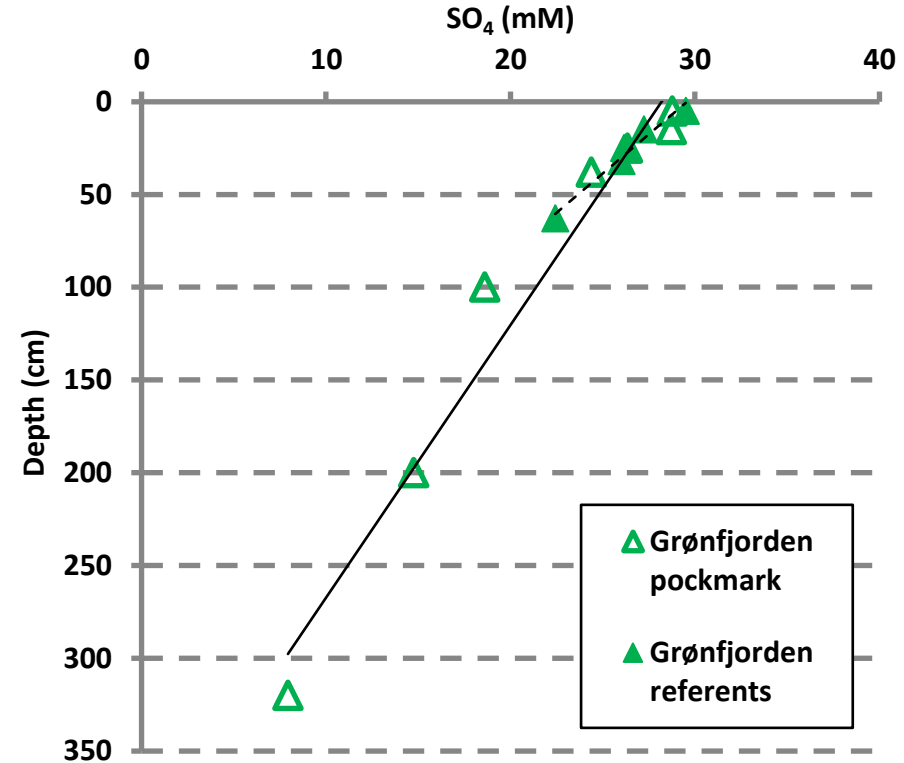
- Bacteria tend to consume methane with lighter carbon isotope (^{12}C) more readily compared to that with heavier isotope (^{13}C) and methane compared to higher molecular weight hydrocarbon gases (e.g. ethane, propane), thus shifting gas composition towards “heavier” (thermogenic) methane
- Elevated concentrations of ethane/propane in our samples indicate, at least to some extent, input from thermogenic sources

Adventfjorden site



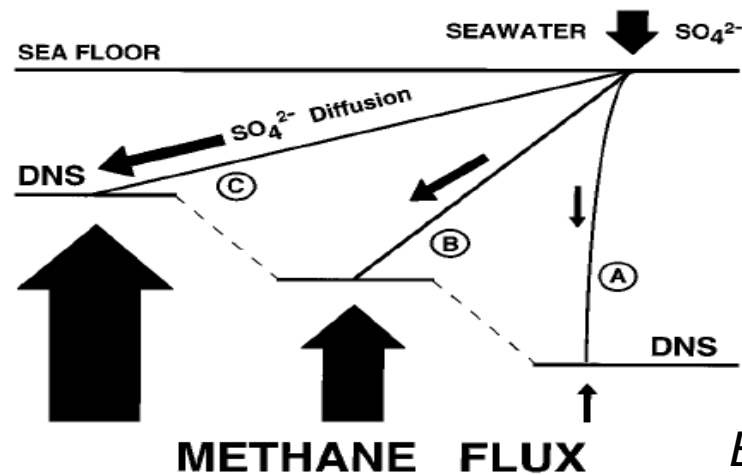
Sulfate consumption by sulfate-reducing microbes

Grønfjorden site

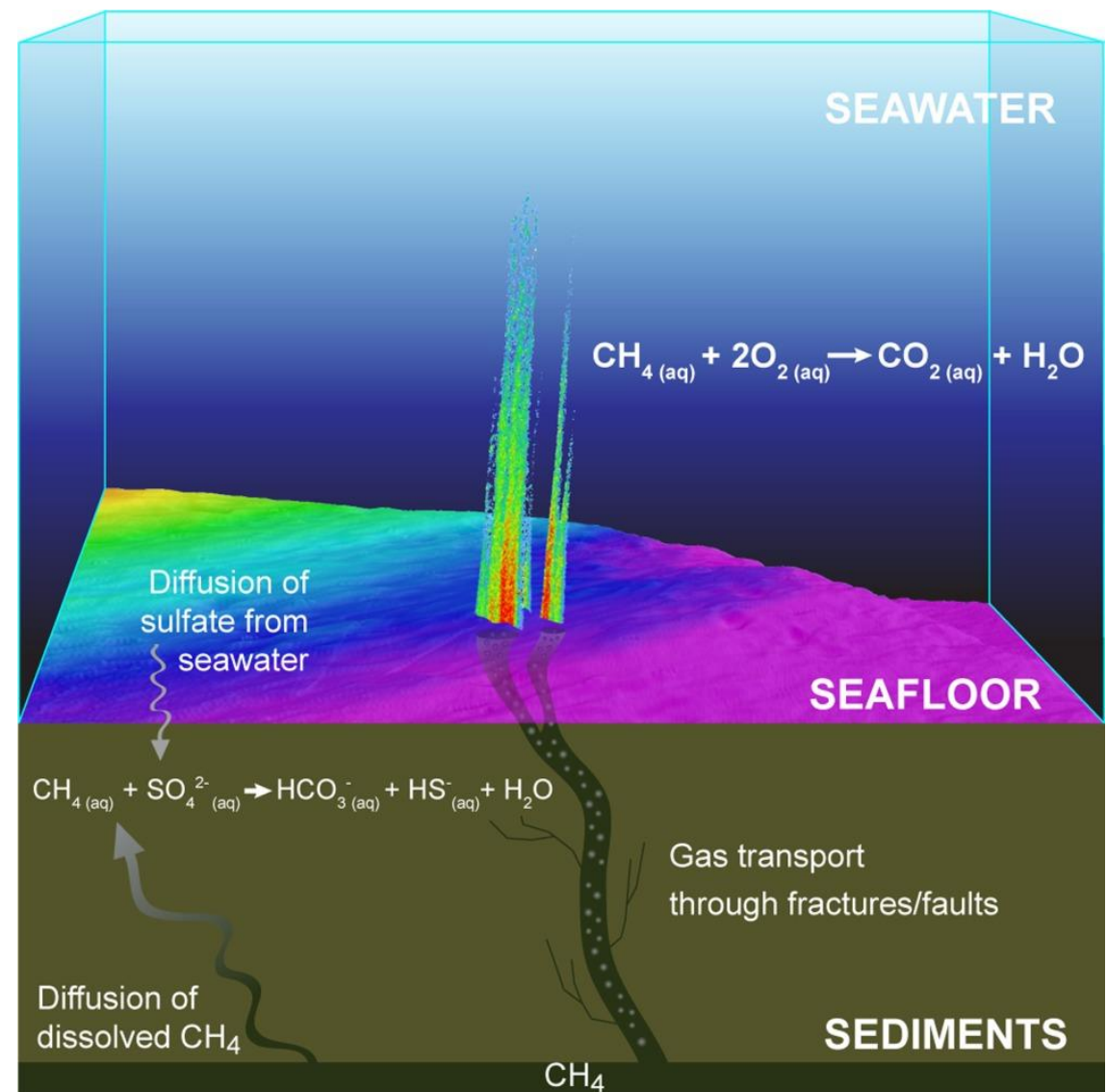
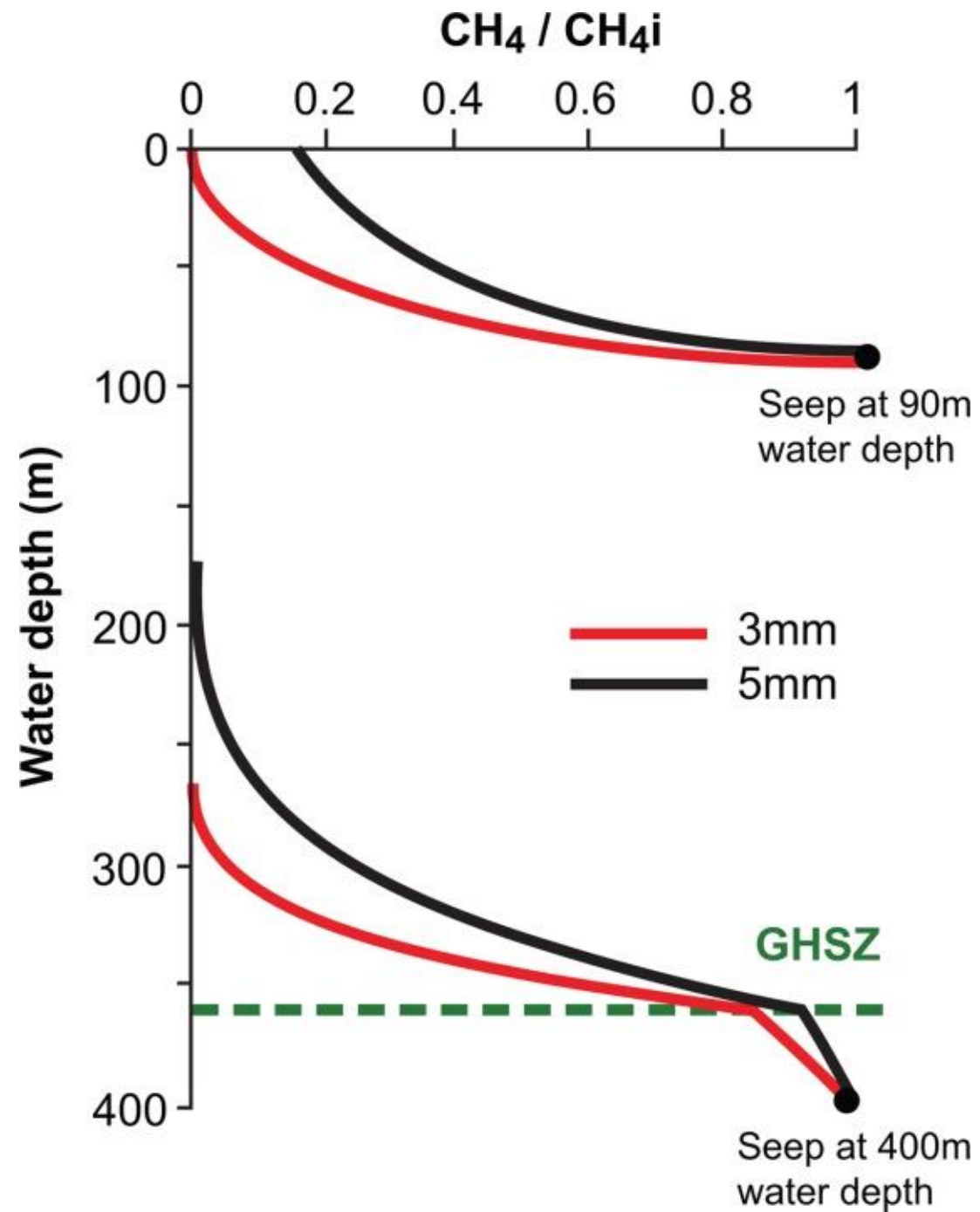


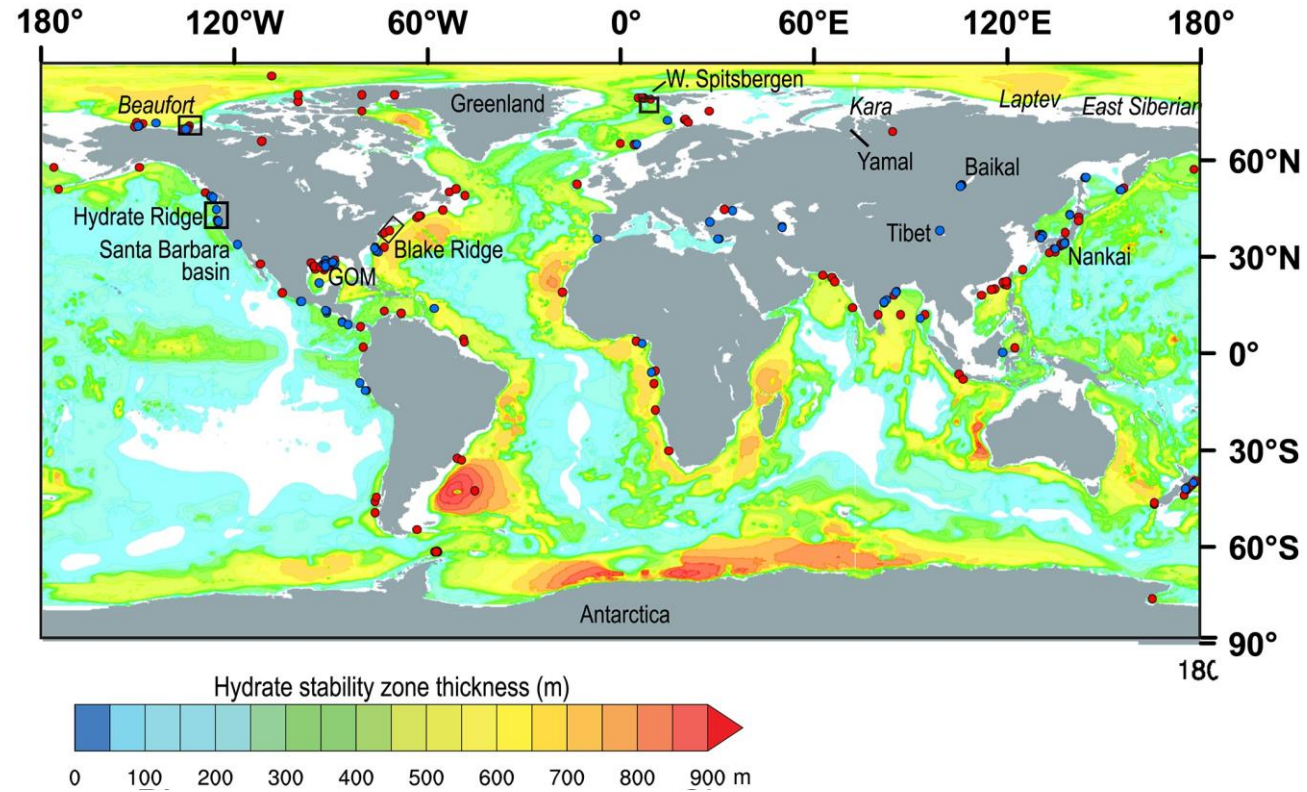
Anaerobic methane oxidation

Liira et al. In prep.

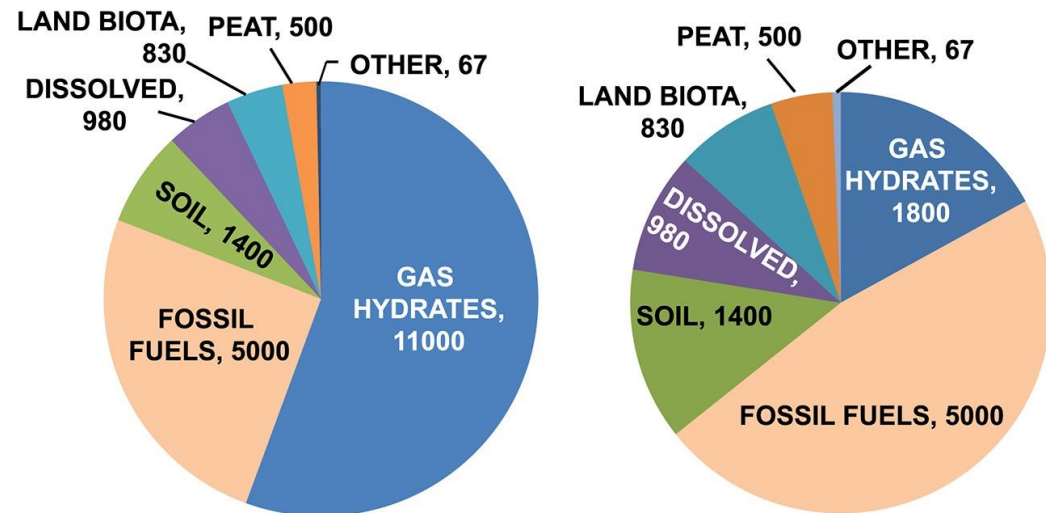


Borowski et al 1996





A.



Ruppel & Kessler (2016)

