

Rapid permafrost carbon degradation at the land-ocean-interface

George Tanski, S. Ruttor, H. Lantuit, C. Knoblauch, J. Ramage, B. Radosavljevic, G. Mollenhauer, and M. Fritz

ArcticNet

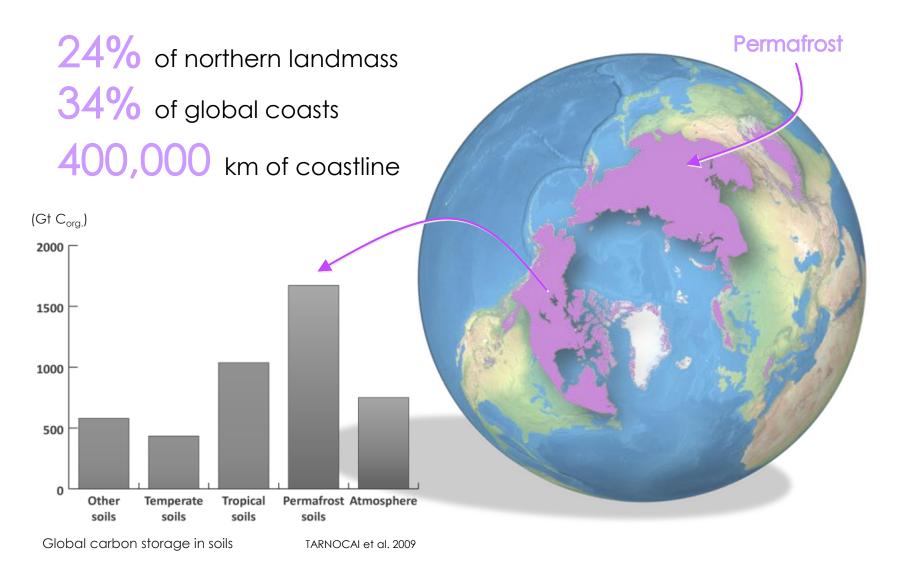
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Annual Scientific Meeting 2015 7 to 11 December - The Westin Bayshore - Vancouver, BC



Background



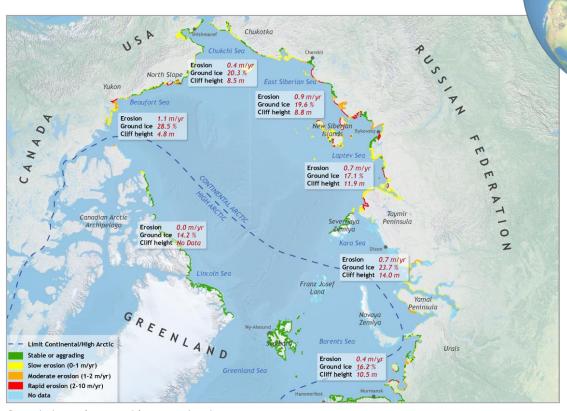


Background



2/3 of the coast are unlithified

Erosion rates up to 10 m yr^{-1}





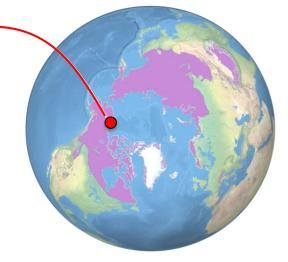
LANTUIT et al. 2012

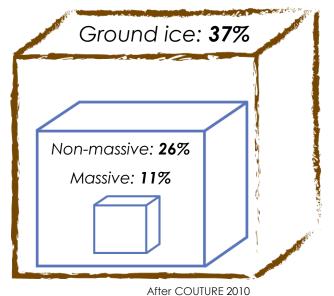




Yukon coast, Canada











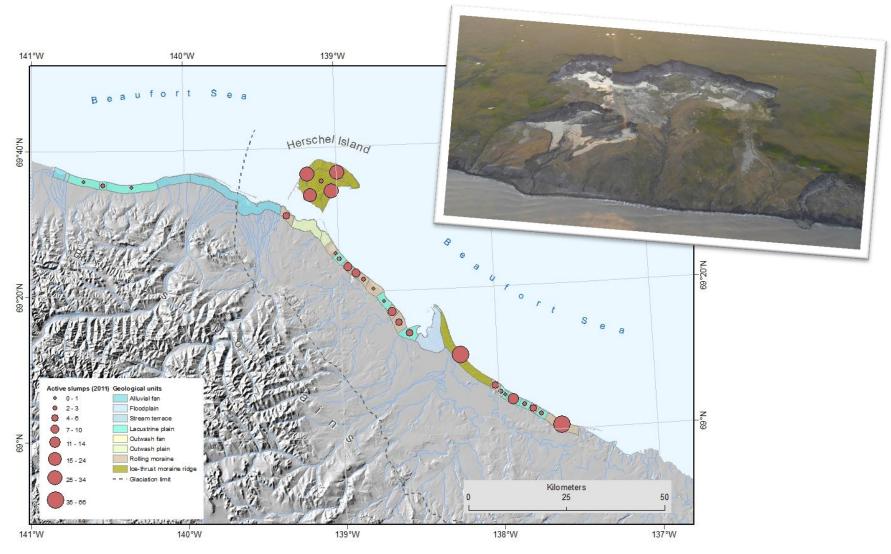






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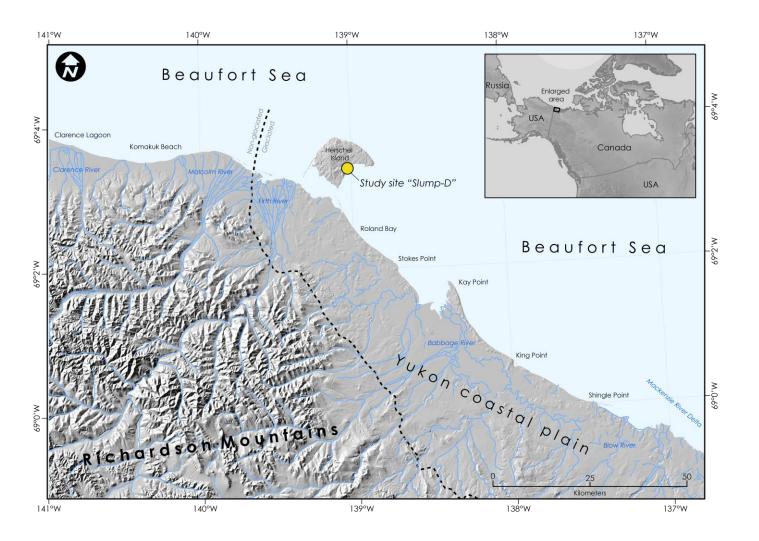




Active thaw slumps

RAMAGE et al. (in prep.)







Objectives



- Differences in carbon and nitrogen through slumping
- Degradation of organic matter before entering the ocean
- Fate of slump material in the ocean



Topic II: Degradation of organic matter

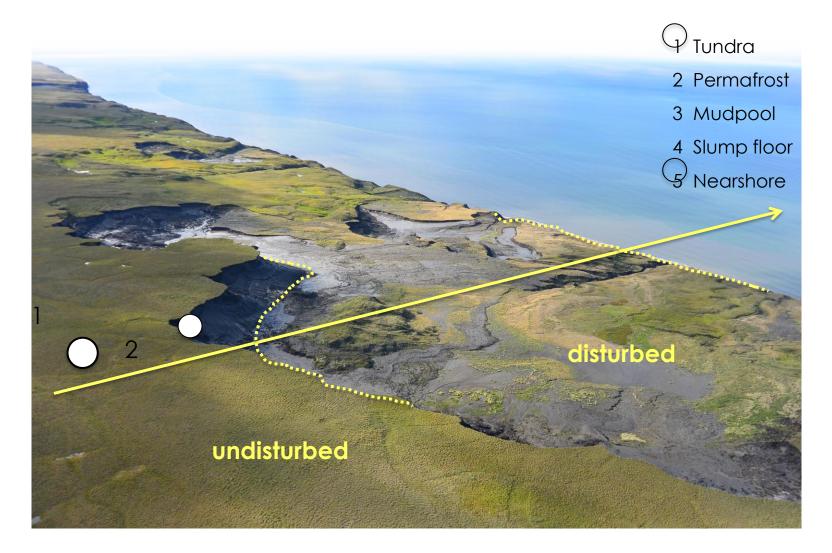




Retrogressive thaw slump: "Slump D"

Topic II: Degradation of organic matter

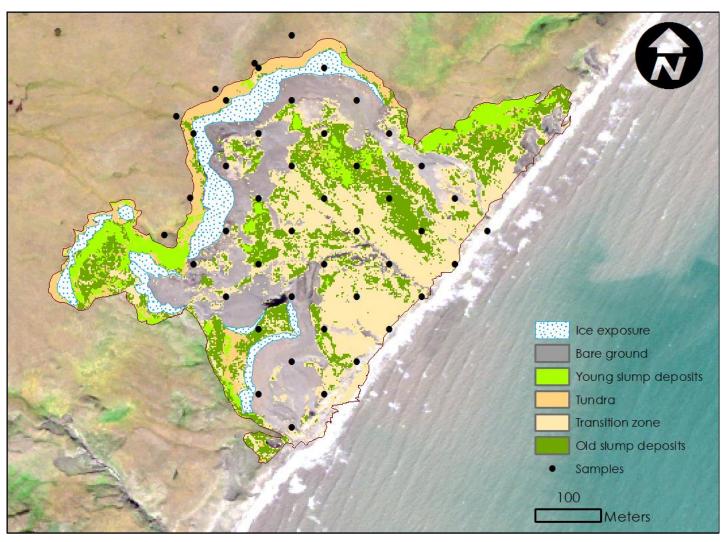




Retrogressive thaw slump: "Slump D"

Background





Vegetation classification of "Slump D" based on NDVI



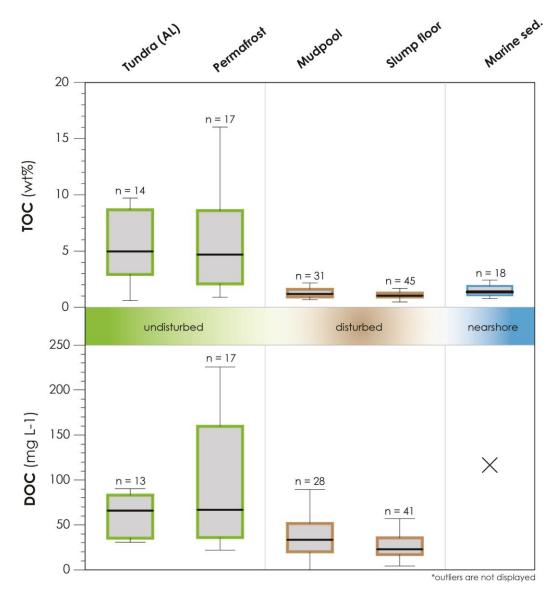
Background





Organic matter inventory (TOC and DOC)

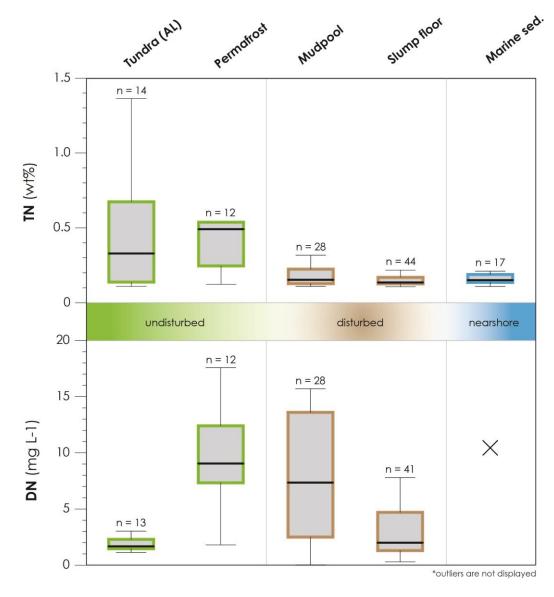






Organic matter inventory (TN and DN)

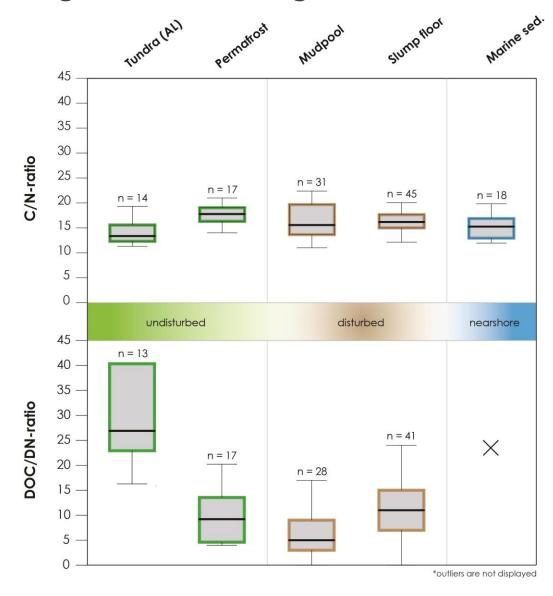






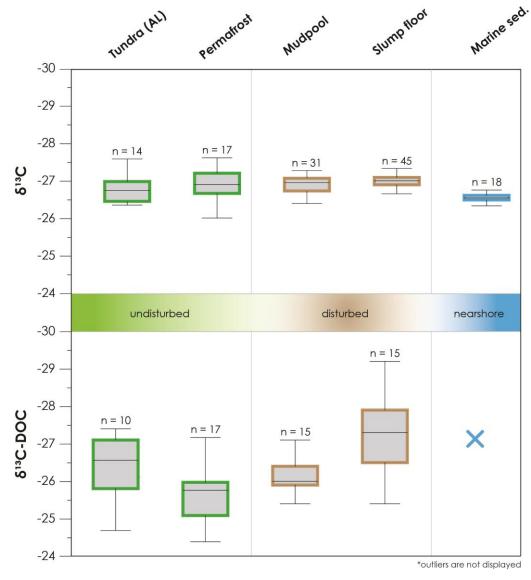
Degradation of organic matter





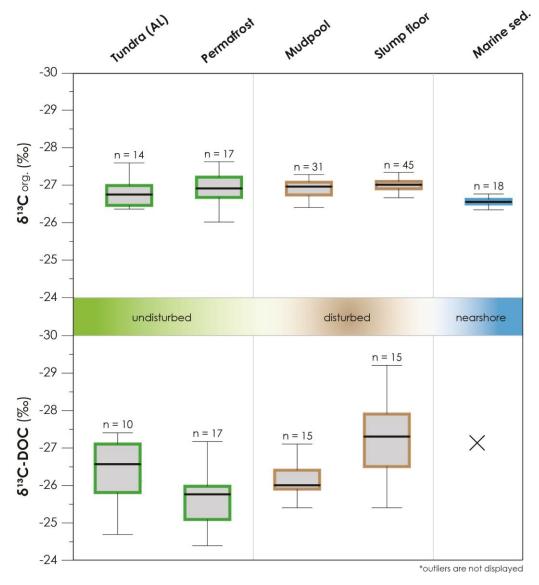


Degradation of organic matter (d13C, d13C-DO@)\\\\\\



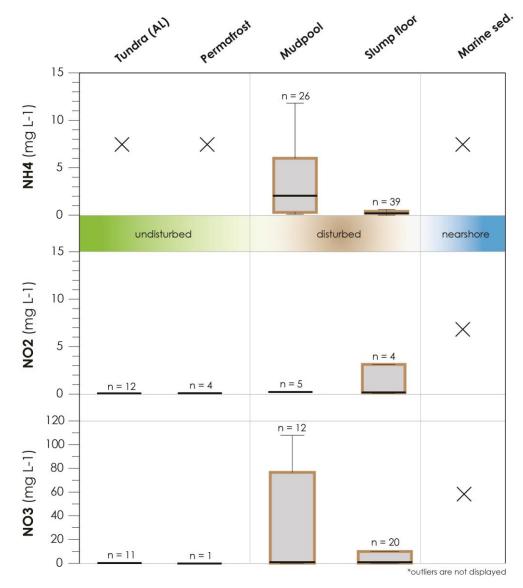
Degradation of organic matter (Nutrients)





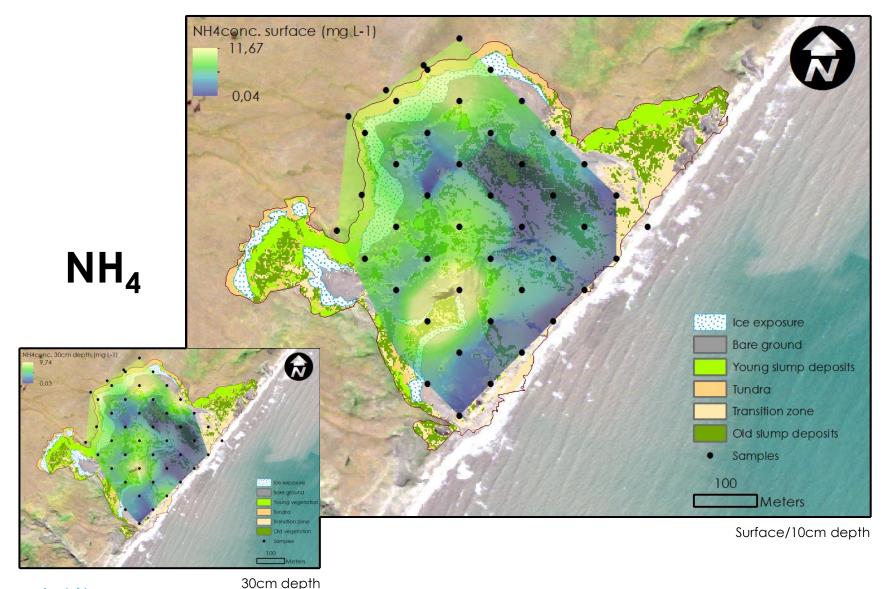
Degradation of organic matter (Nutrients)





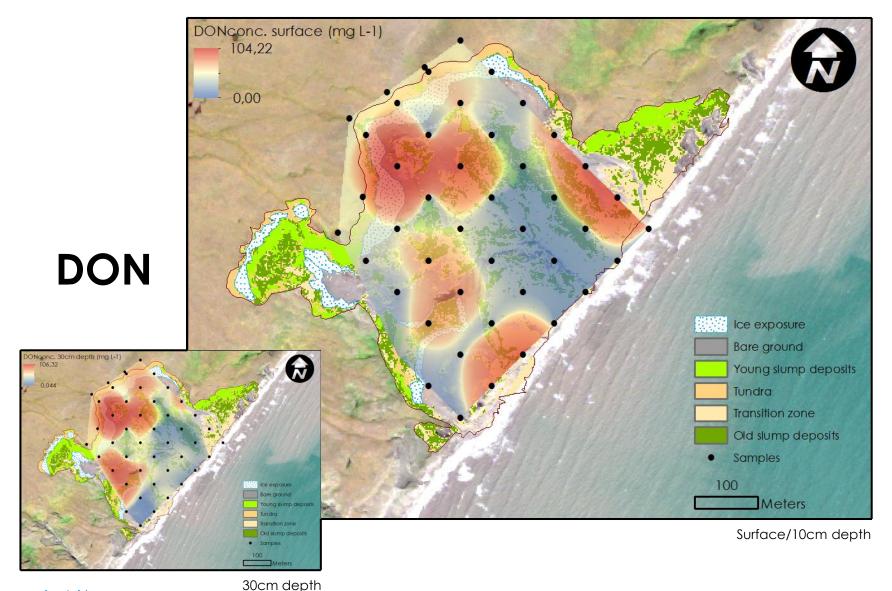
Topic II: Degradation of organic matter





Topic II: Degradation of organic matter

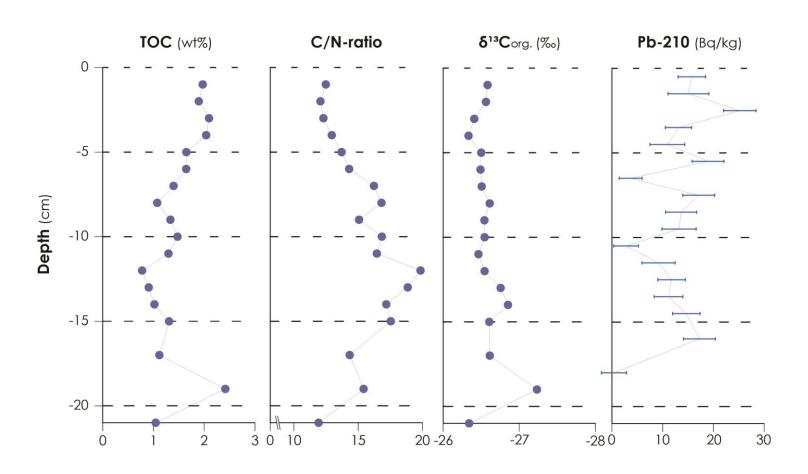




Topic II: Fate of organic matter



Marine short core, CTD: Pb-210, TOC, d13Corg., C/N



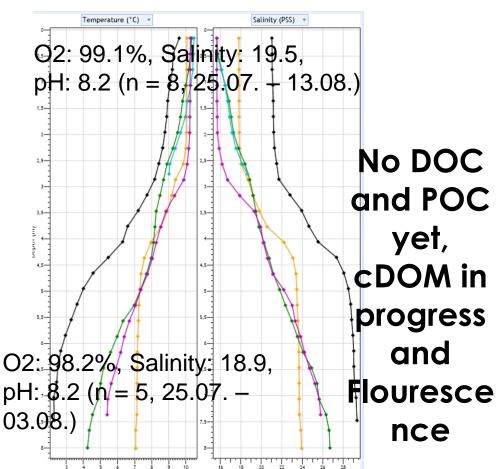
Topic II: Fate of organic matter

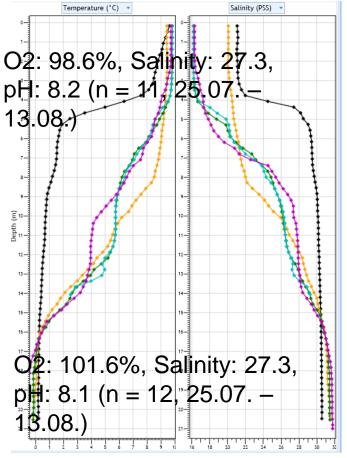


CTD

Close to shore

Further from shore





Topic II: Conclusion



- DOC conc. gradient from permafrost headwall to slump deposits
 - → Degradation of DOC right after thawing
- High ammonium conc. directly after thawing
 - → Indicator for quick depletion of organic material
- Strong degradtion of organic material at the land-ocean interface

Outlook and open questions



What are the degradation mechanisms?

What are the **degradation** patterns of **POC**?

What happens with permafrost carbon after transport into the ocean?

What are possible impacts on nearshore marine nearshore ecosystem?

How is OC incorporated into local food webs?

Thank you very much for the attention!

Questions?

























Topic II: Origin of organic matter



