Universität Zürich

EGU General Assembly 2022

Fate of pyrogenic and organic matter in permafrost-affected soils: A two years *in-situ* incubation

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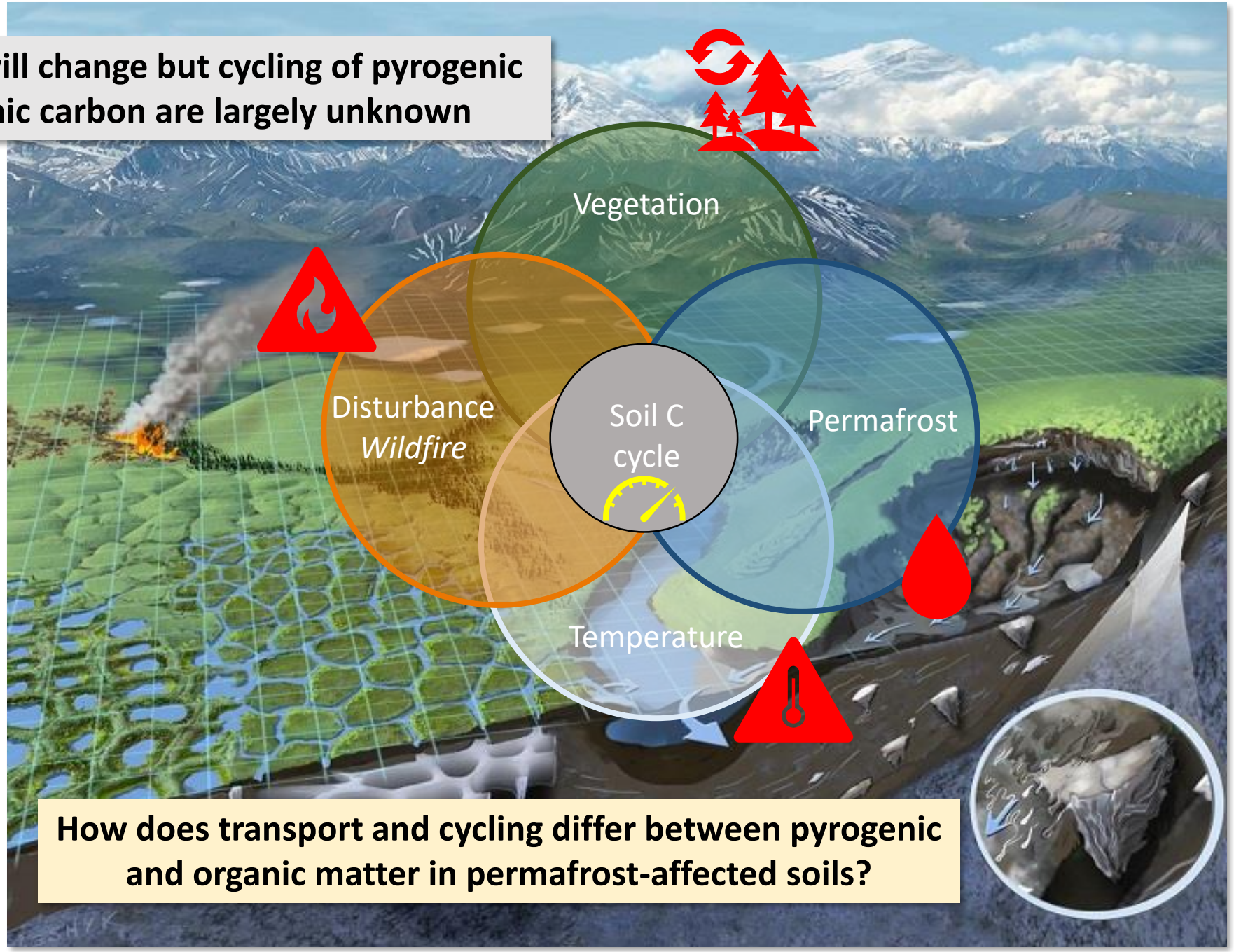
Conditions will change but cycling of pyrogenic and organic carbon are largely unknown



How does transport and cycling differ between pyrogenic and organic matter in permafrost-affected soils?

IPCC, 2019; Schuur et al., 2015; Turetsky et al., 2020

Adapted from Schuur and Mack (2018)
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Study sites

- Eleven sample locations in two regions **NORTH** and **SOUTH**
- Permafrost: Continuous and discontinuous/sporadic
- Wildfire: Return intervals of around 50-550 yrs
  (Rogers *et al.*, 2013; Van Der Werf *et al.*, 2017)

Contents lists available at ScienceDirect

Catena

journal homepage: www.elsevier.com/locate/catena

Organic carbon stocks, quality and prediction in permafrost-affected forest soils in North Canada

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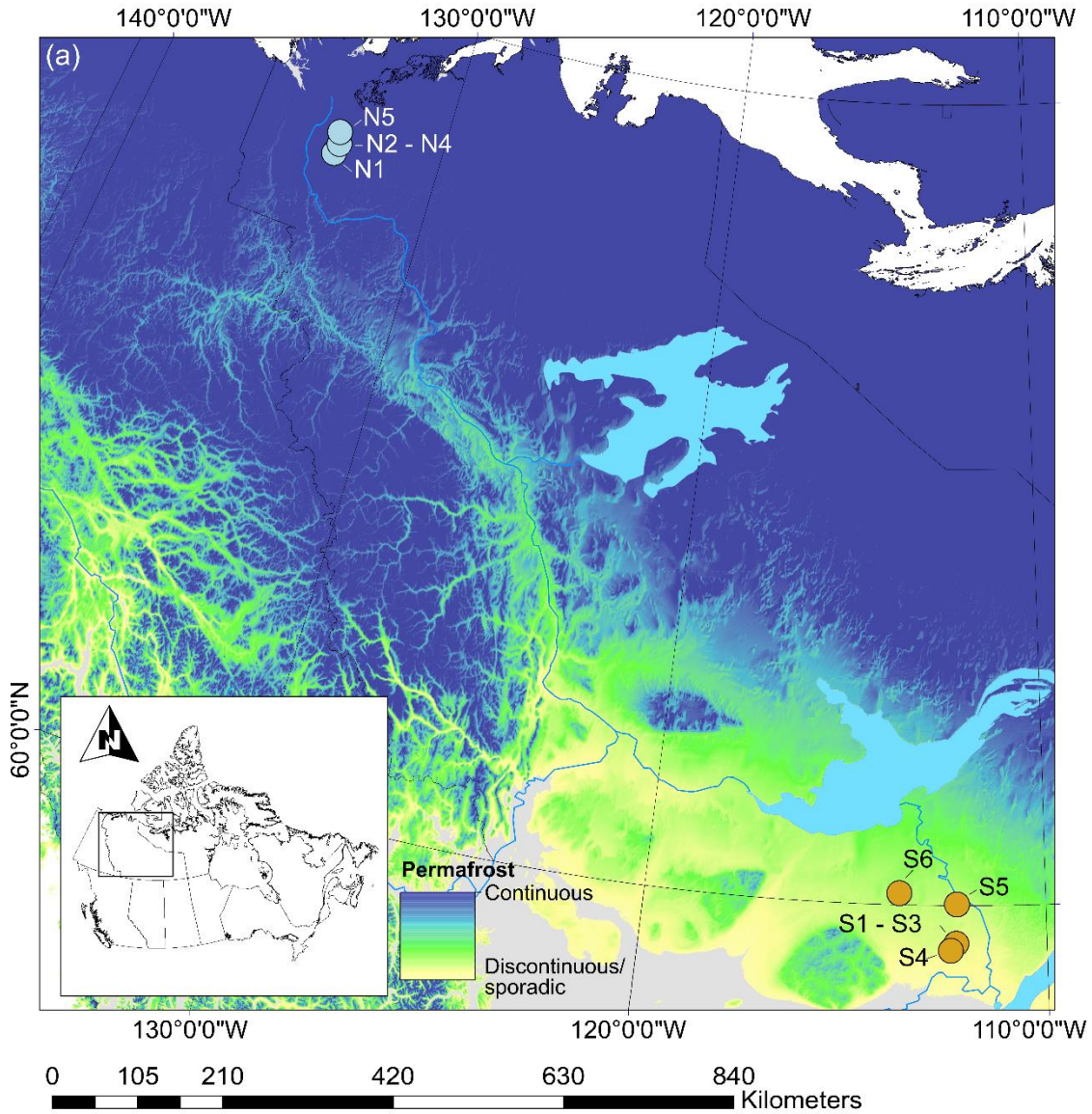
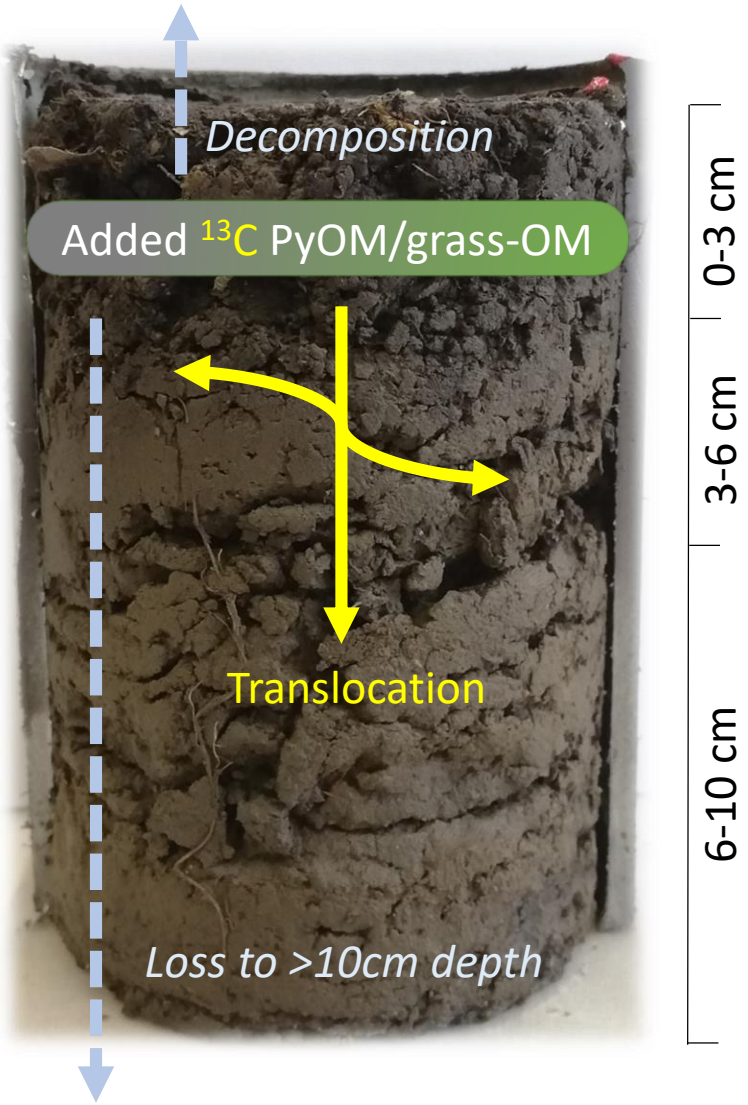
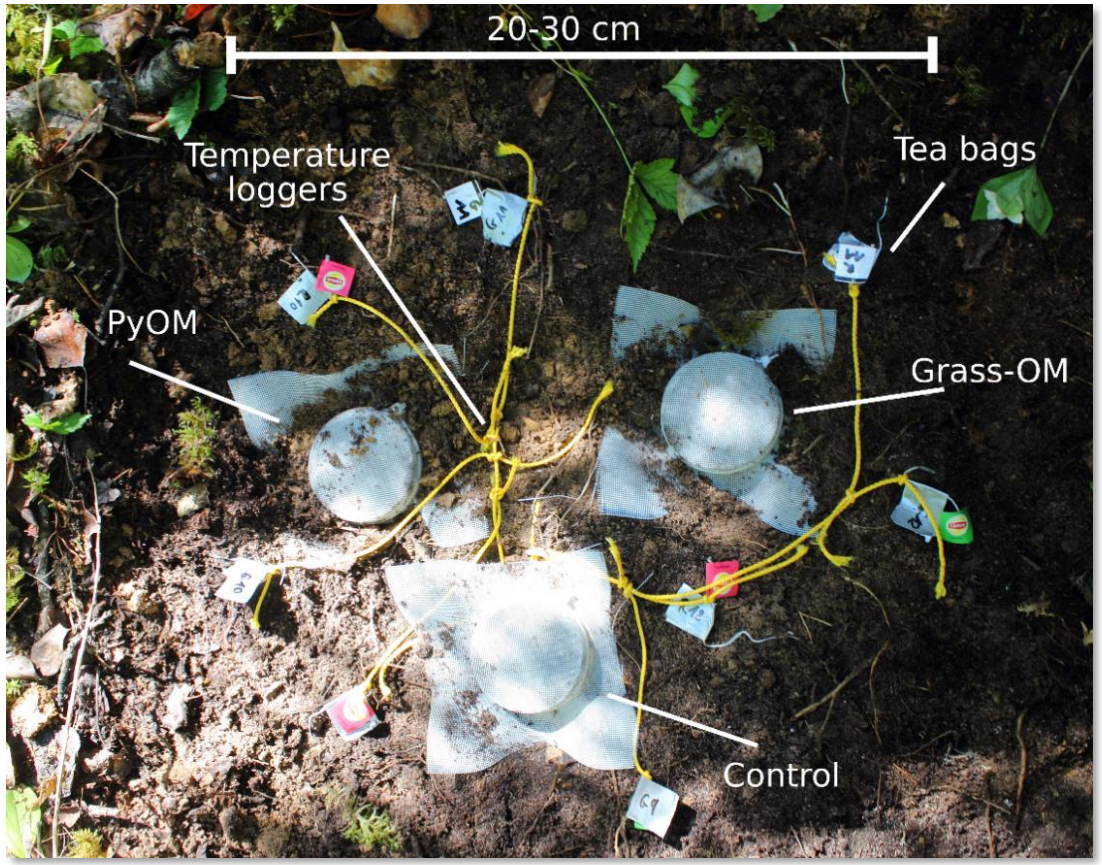


Schiedung *et al.*, 2022, Catena; Permafrost map: Gruber (2012)

Short-term cycling – two years mesocosm experiment





Mesocosms in 0-10 cm depth

^{13}C labelled fresh and pyrolyzed ryegrass (>3 atm%)

Tracing in bulk soil and fractions

Six set-ups per site (225 cores)

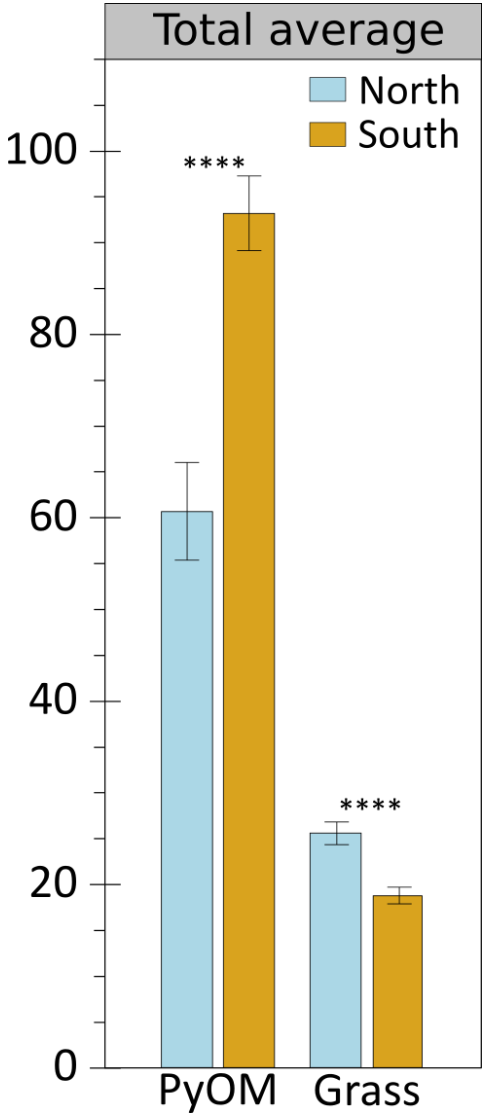
Fate of PyOM and grass-OM

- Large PyOM and grass-OM loss in northern soils
- Little PyOM and large grass-OM loss in southern soils
- Up to 40% of remained PyOM is mineral associated (e.g. Schiedung et al., 2020; Singh et al., 2014 and Vasilyeva et al., 2014)
- Up to 70% of remained grass-OM is associated to mineral fraction in the southern soils

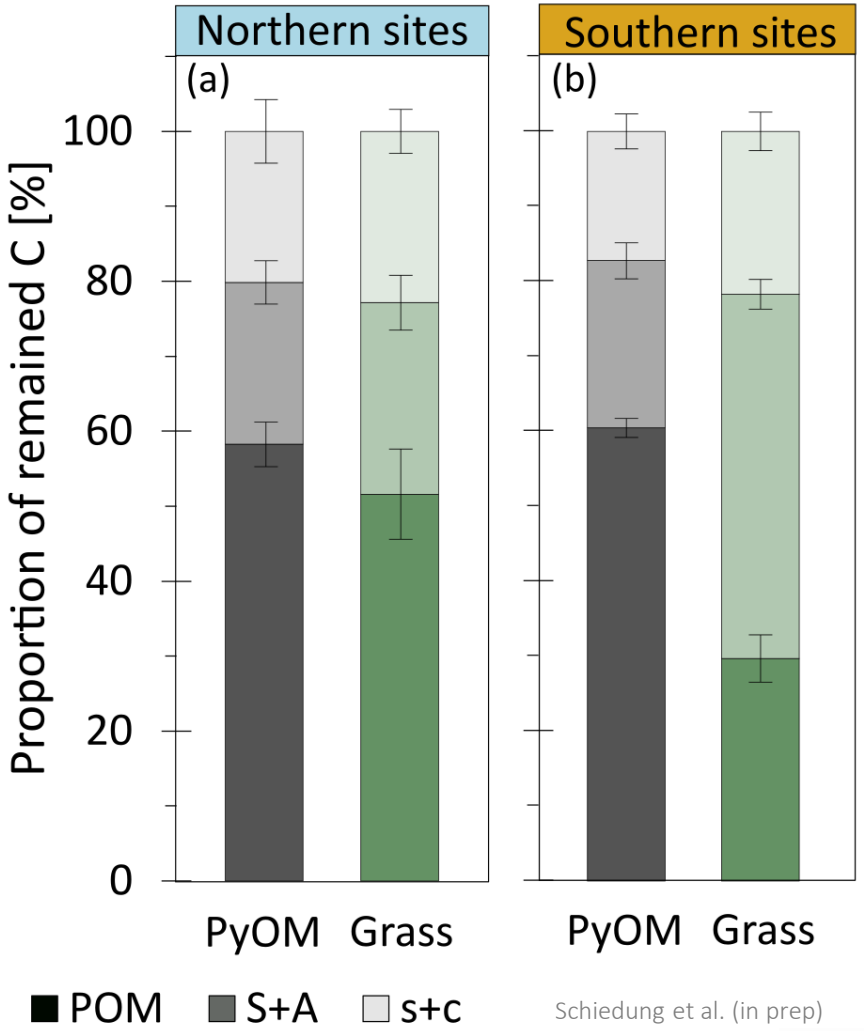
Permafrost soils react quickly to fresh OM

Different controlling factors depending on OM

Abiotic and biotic process are important



In upper 0-3 cm with >90% of remained



Schiedung et al. (in prep)

Thank you for your attention

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