

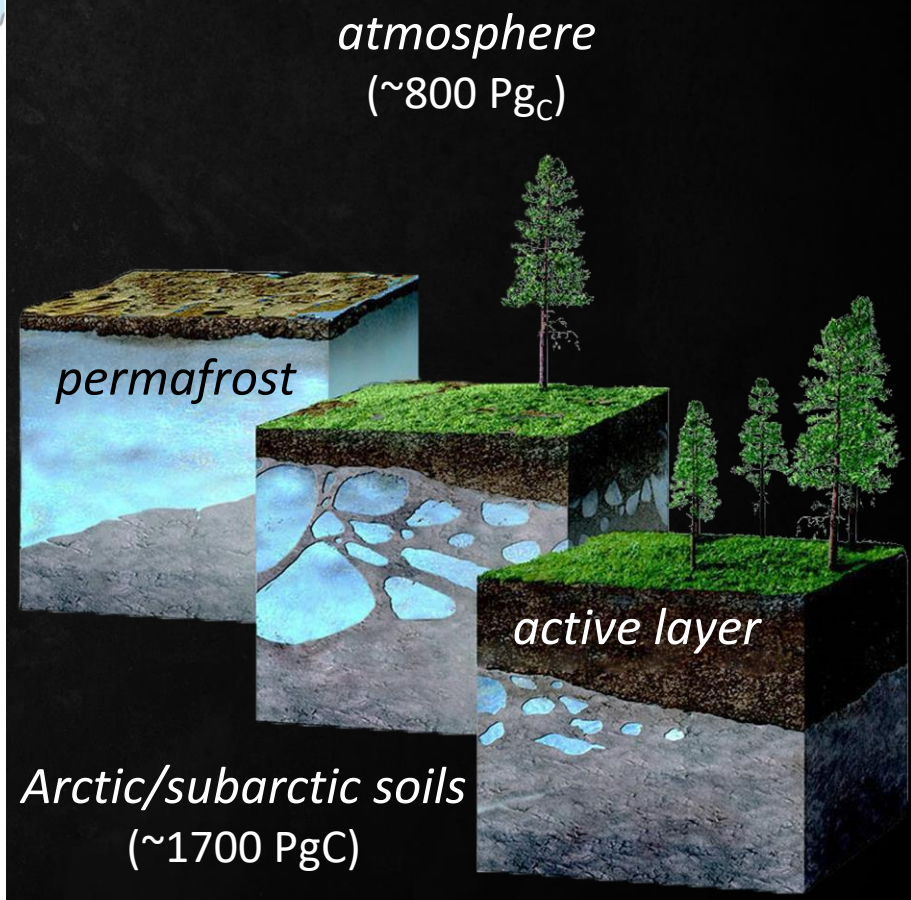
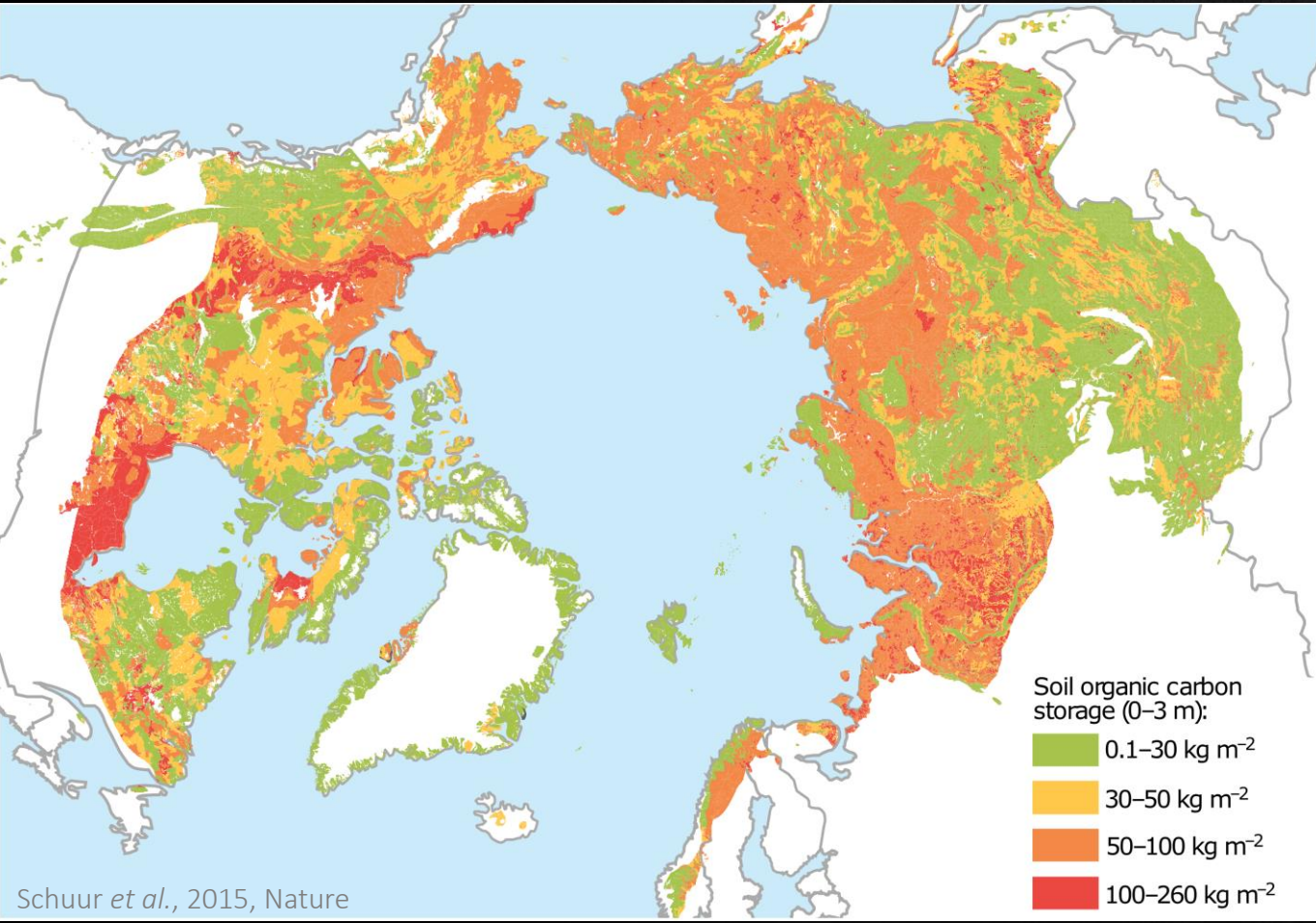


A wide-angle photograph of an Arctic landscape at night. In the foreground, a small, light-colored research station with a blue door sits on a grassy plain. To the left, a tall metal tower with various instruments is visible. The background shows rolling hills under a dark sky with a vibrant green aurora borealis. A long, dark, segmented object, possibly a pipeline or road, stretches across the middle ground.

Arctic soil organic matter under climate change: a key component for environmental processes

Agnan Y., Alexis M.A., Kohli A., Parlanti E., Derenne S., Sourzac M., Anquetil D., Obrist D., Castrec-Rouelle M.

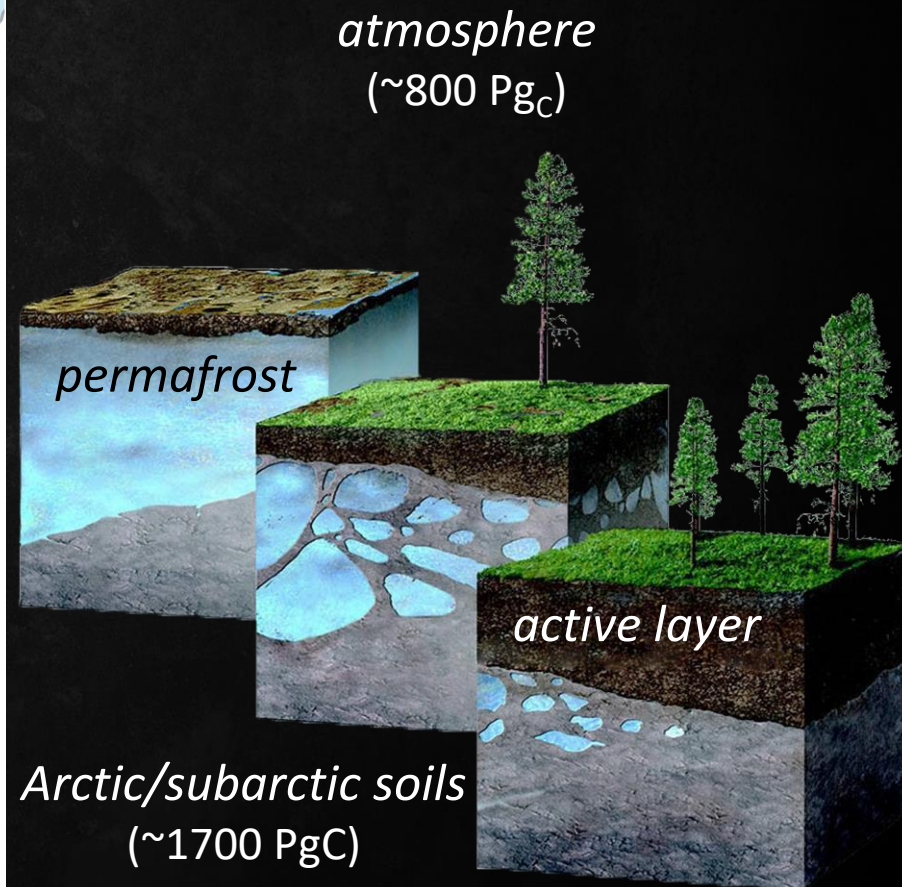
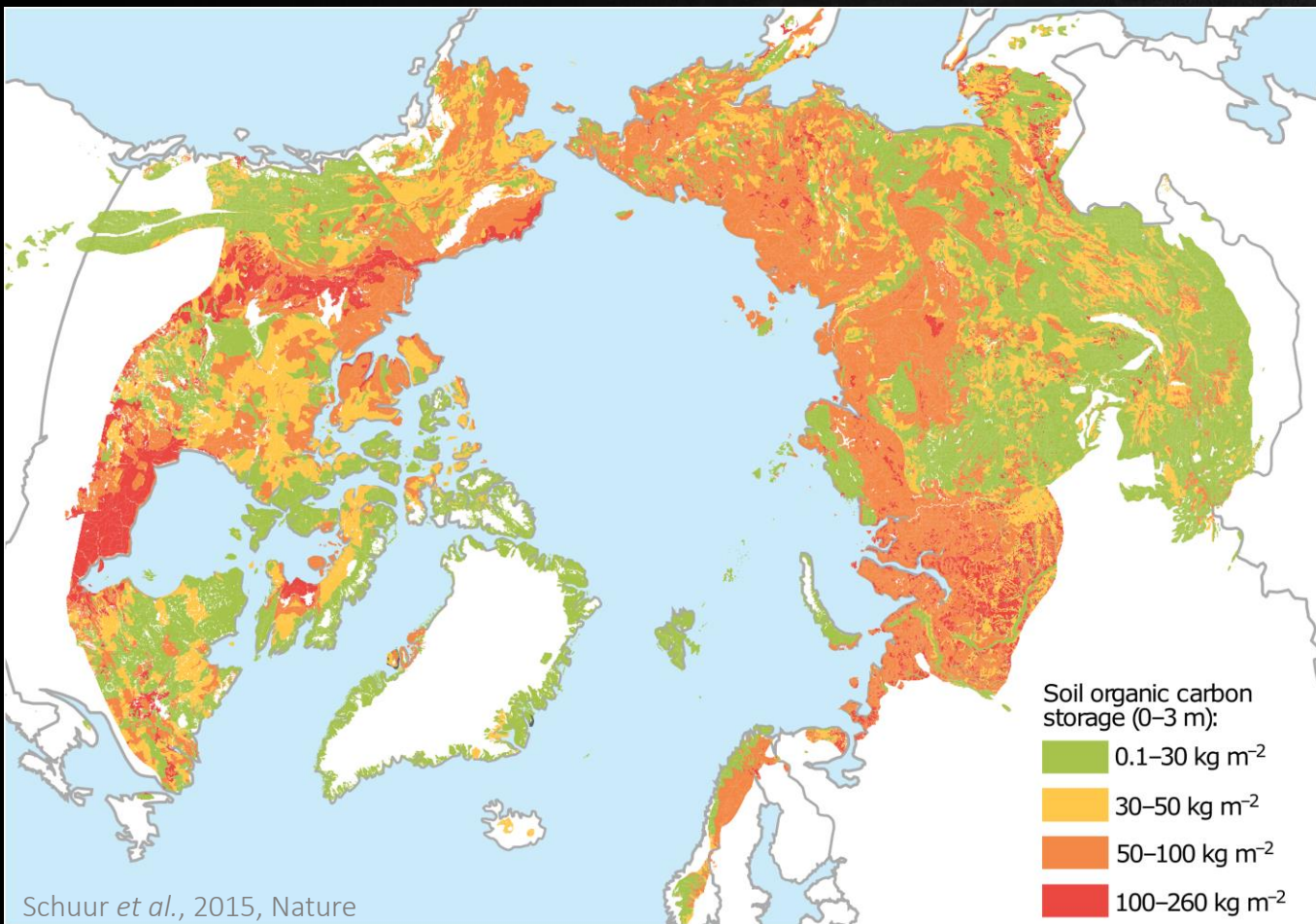
SOIL ORGANIC MATTER IN THE ARCTIC



1/3 of the global surface soil organic carbon is stored in the Arctic.



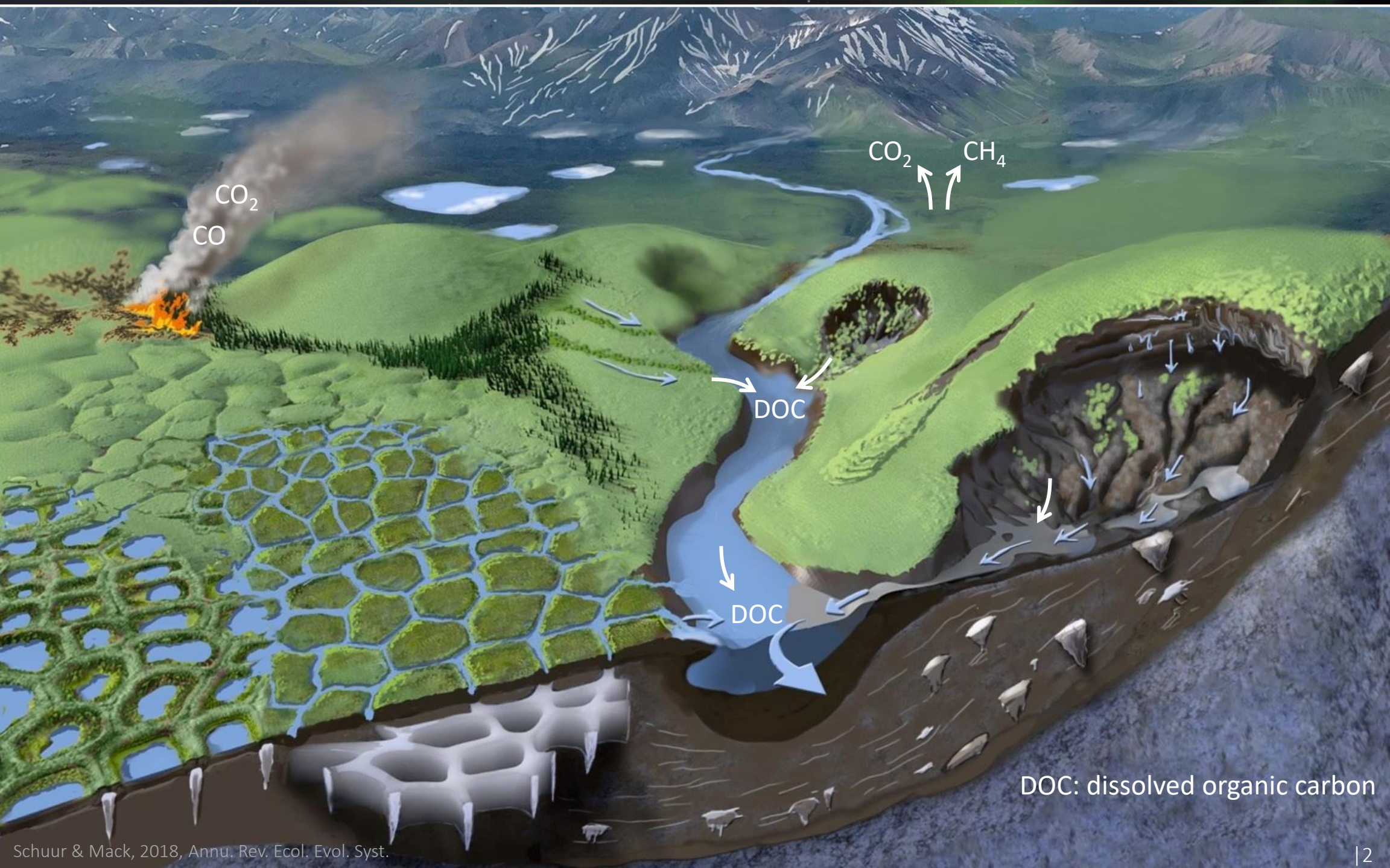
SOIL ORGANIC MATTER IN THE ARCTIC



1/3 of the global surface soil organic carbon is stored in the Arctic.
Permafrost environments represent two times the atmospheric carbon pool resulting from a long-term vegetation accumulation.



SOIL ORGANIC MATTER FATE?



SOIL ORGANIC MATTER ORIGIN?



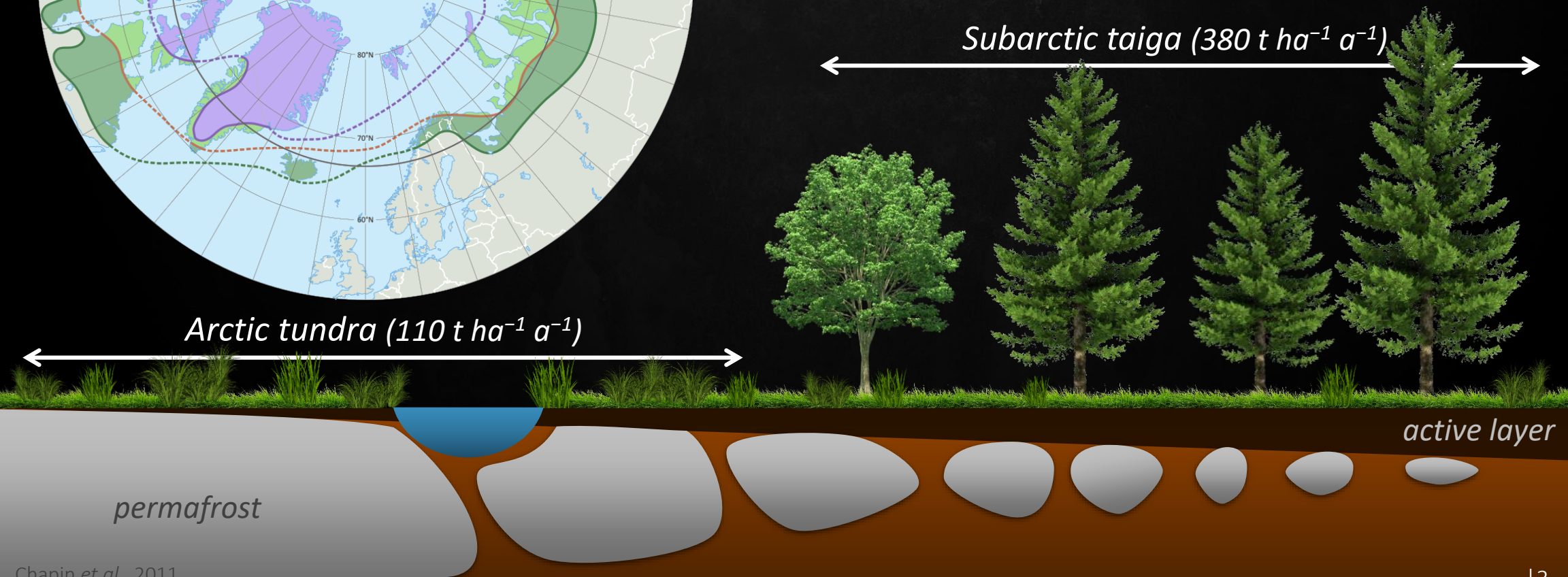
Arctic tundra and subarctic taiga constitute the main biomes in the high latitudes.

Vegetation plays a key role in the soil organic matter quality (carbon/nitrogen composition).



Arctic tundra ($110 \text{ t ha}^{-1} \text{ a}^{-1}$)

Subarctic taiga ($380 \text{ t ha}^{-1} \text{ a}^{-1}$)





Abisko Research Station (Sweden)



Toolik Field Station (Alaska, USA)

68° 21' N

310 mm a⁻¹

tundra

-1 °C

discontinuous

LATITUDE

PRECIPITATION

BIOME

TEMPERATURE

PERMAFROST

68° 27' N

304 mm a⁻¹

tundra

-8 °C

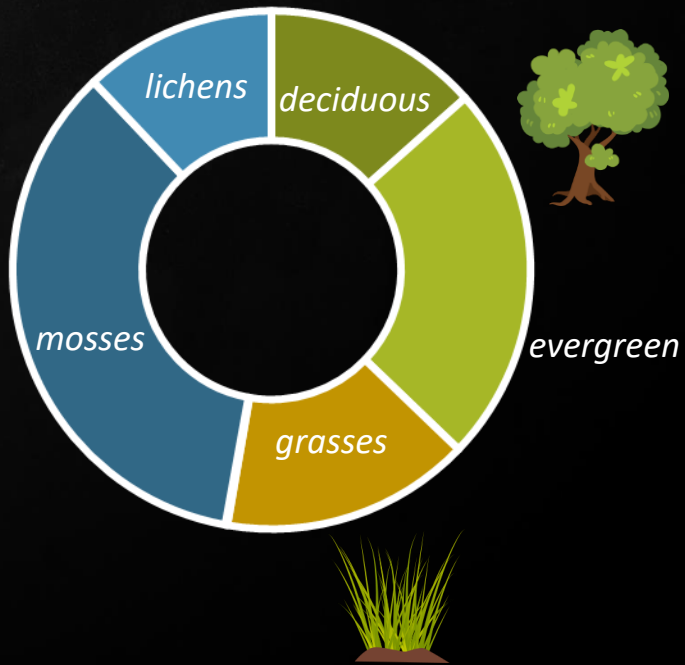
continuous



Abisko Research Station (Sweden)



Toolik Field Station (Alaska, USA)

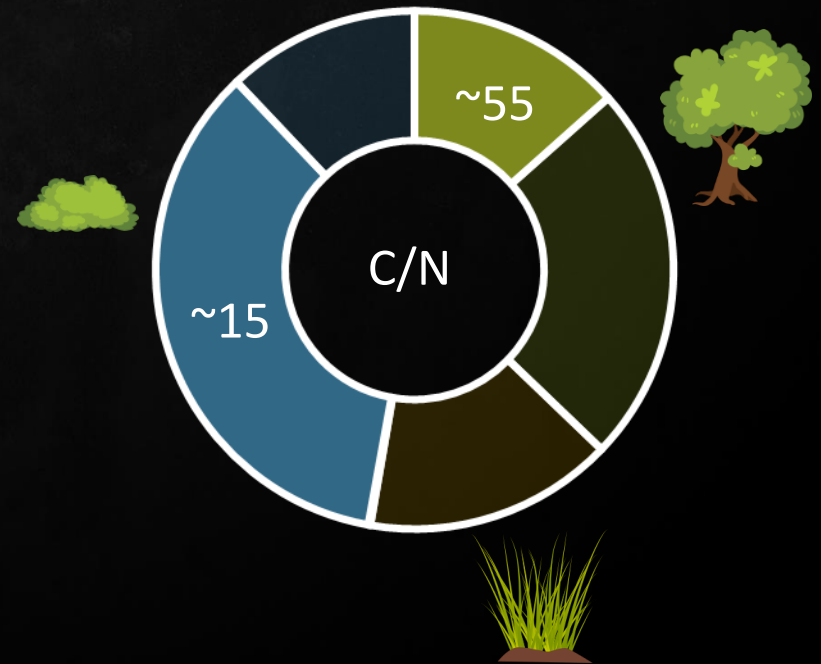
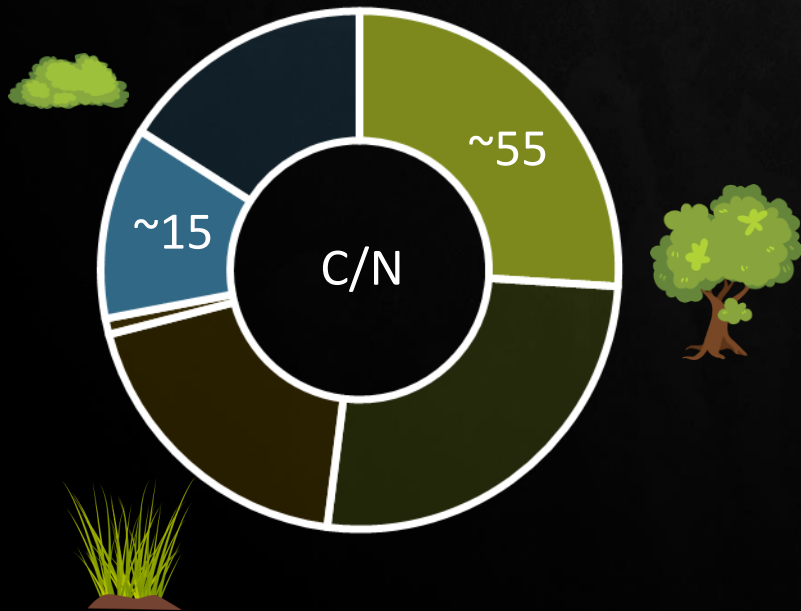




Abisko Research Station (Sweden)



Toolik Field Station (Alaska, USA)



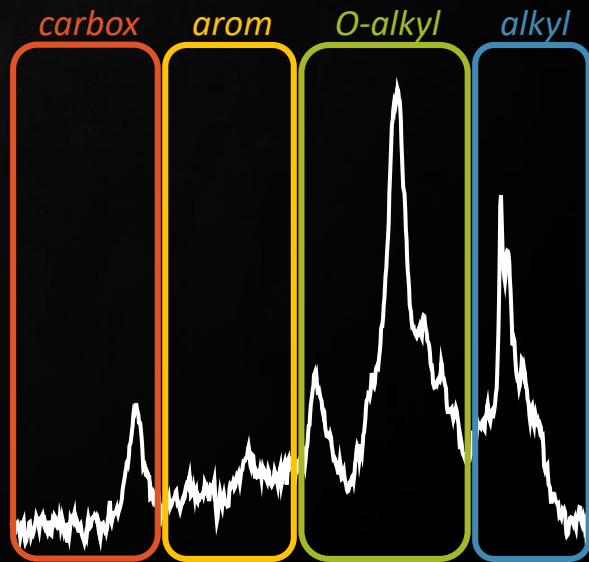
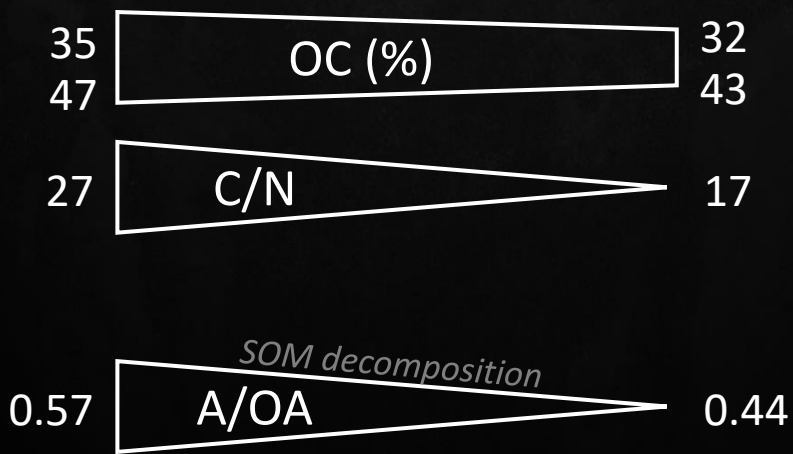
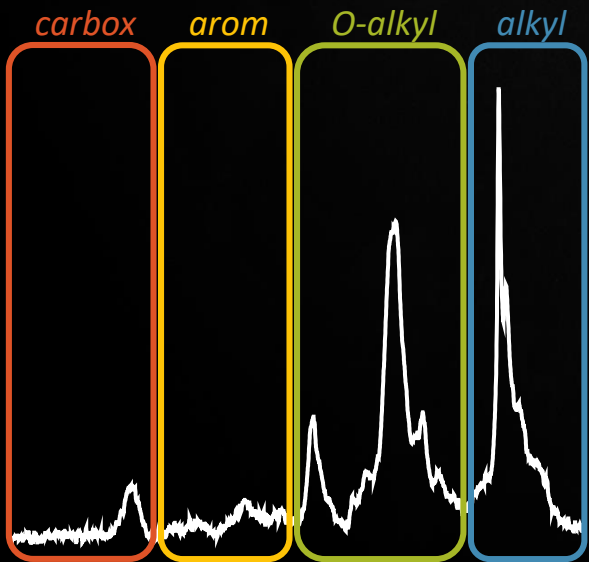




Abisko Research Station (Sweden)



Toolik Field Station (Alaska, USA)

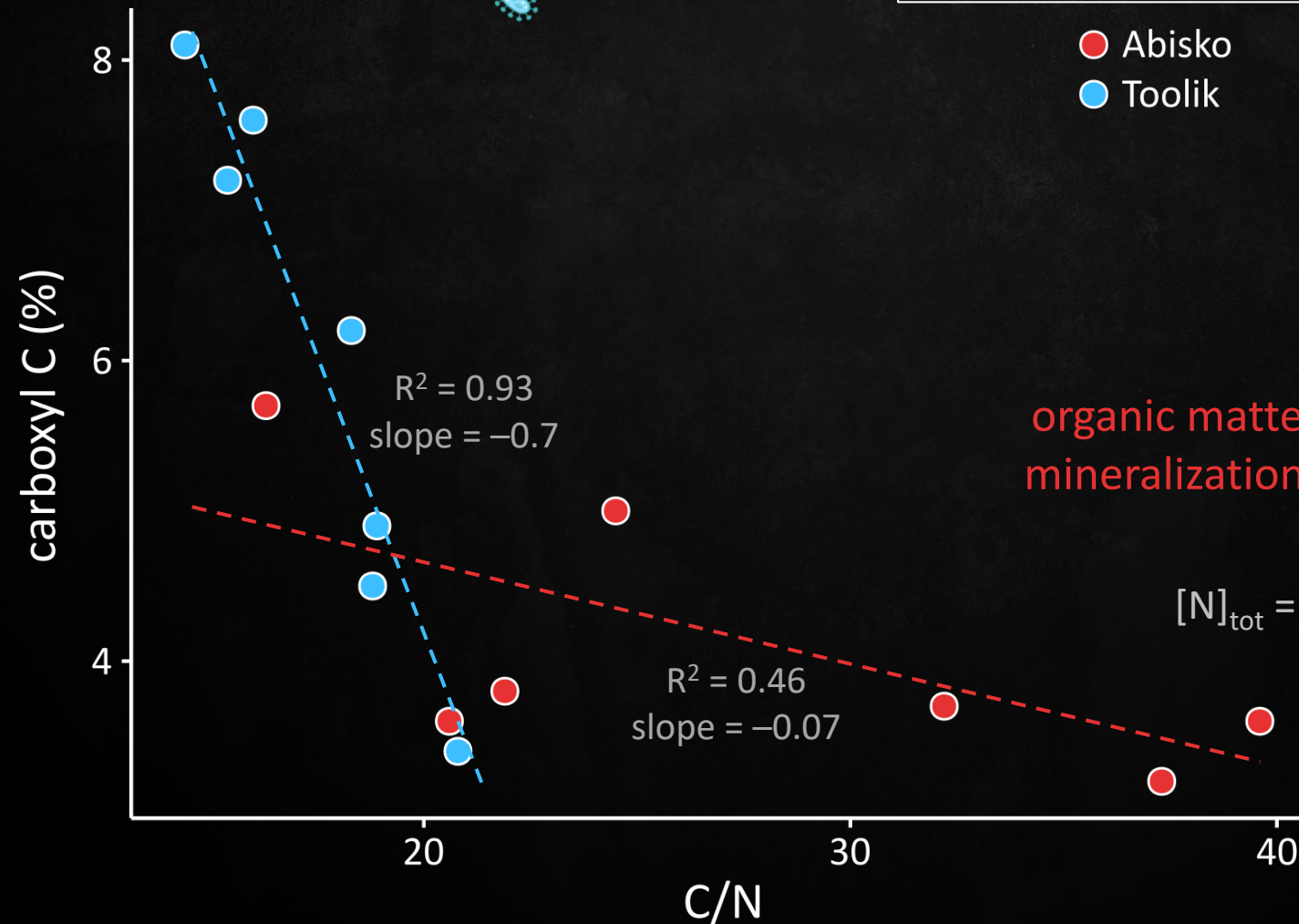




Different organic nitrogen compositions in soil link to distinct processes?

● Abisko
● Toolik

microbial biomass
production?



organic matter
mineralization?

$$[N]_{\text{tot}} = [N]_{\text{orga}} + [NH_4^+], [NO_3^-], [NO_2^-]?$$

nitrogen availability



Abisko Research Station (Sweden)



Toolik Field Station (Alaska, USA)



$(C/N)_{\text{extractable}}$

=

22

2.7
 $\text{mg g}_{\text{soil}}^{-1}$

DOC

4.4
 $\text{mg g}_{\text{soil}}^{-1}$

$(C/N)_{\text{extractable}}$

=

17

0.13
 $\text{mg g}_{\text{soil}}^{-1}$

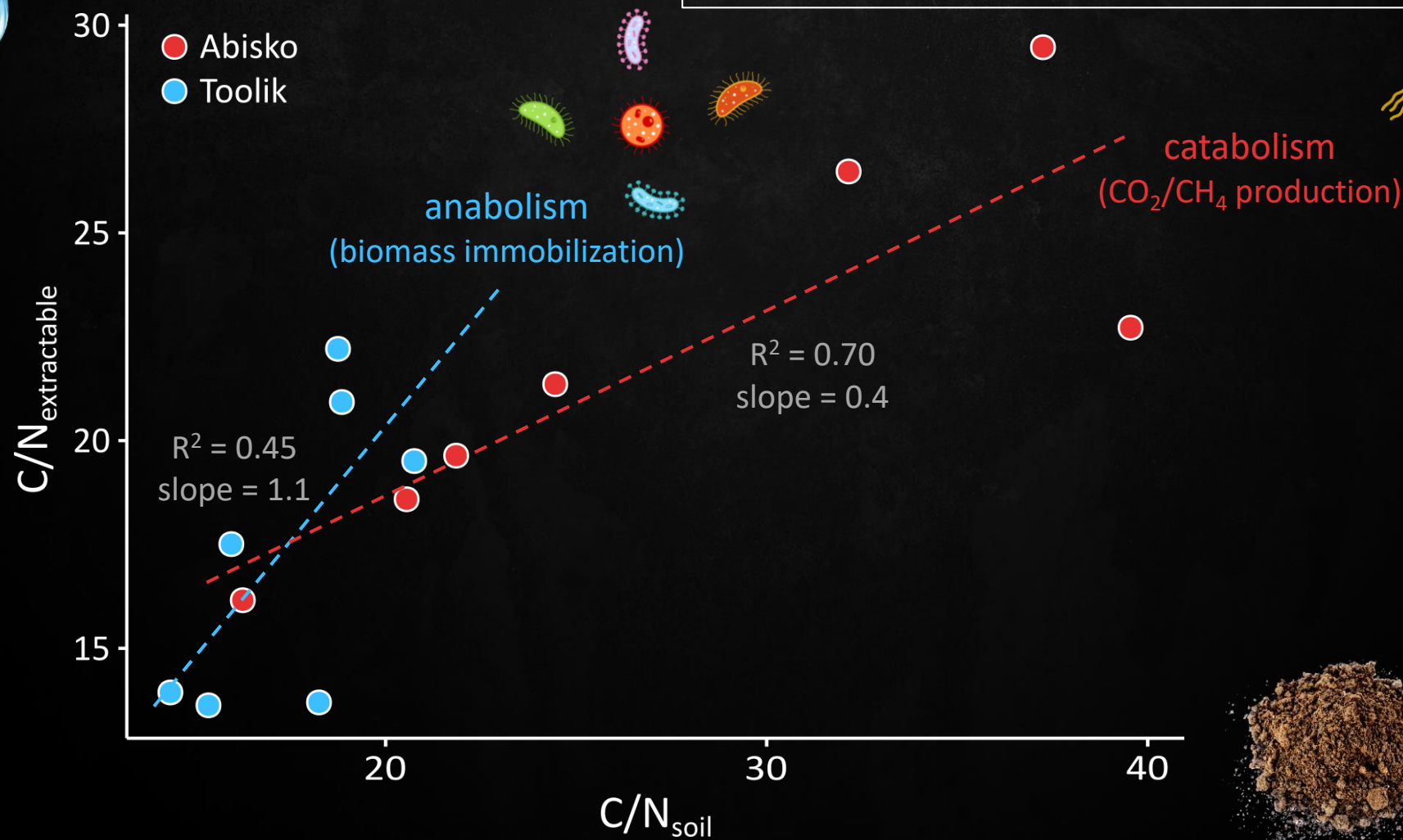
DTN

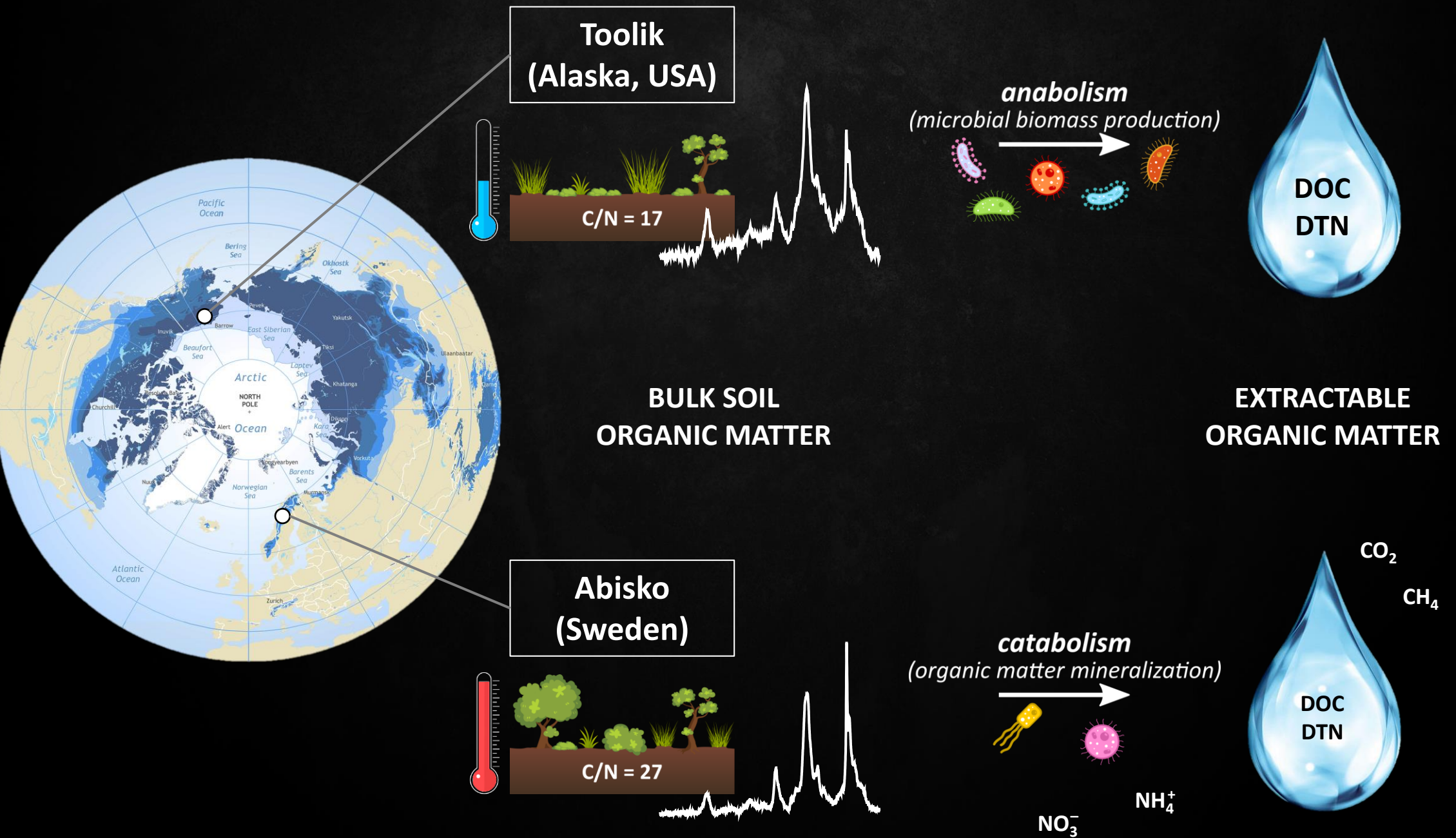
0.24
 $\text{mg g}_{\text{soil}}^{-1}$

EXTRACTABLE ORGANIC MATTER



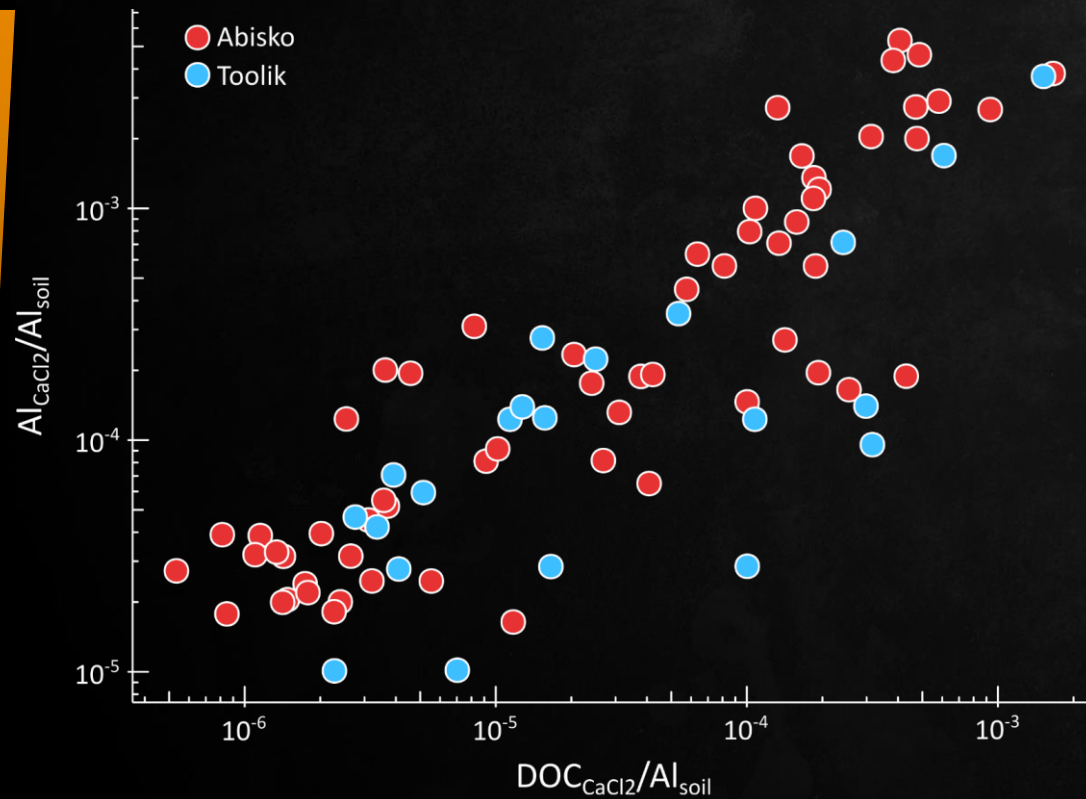
Different dissolved organic matter compositions result from distinct microbial metabolisms?



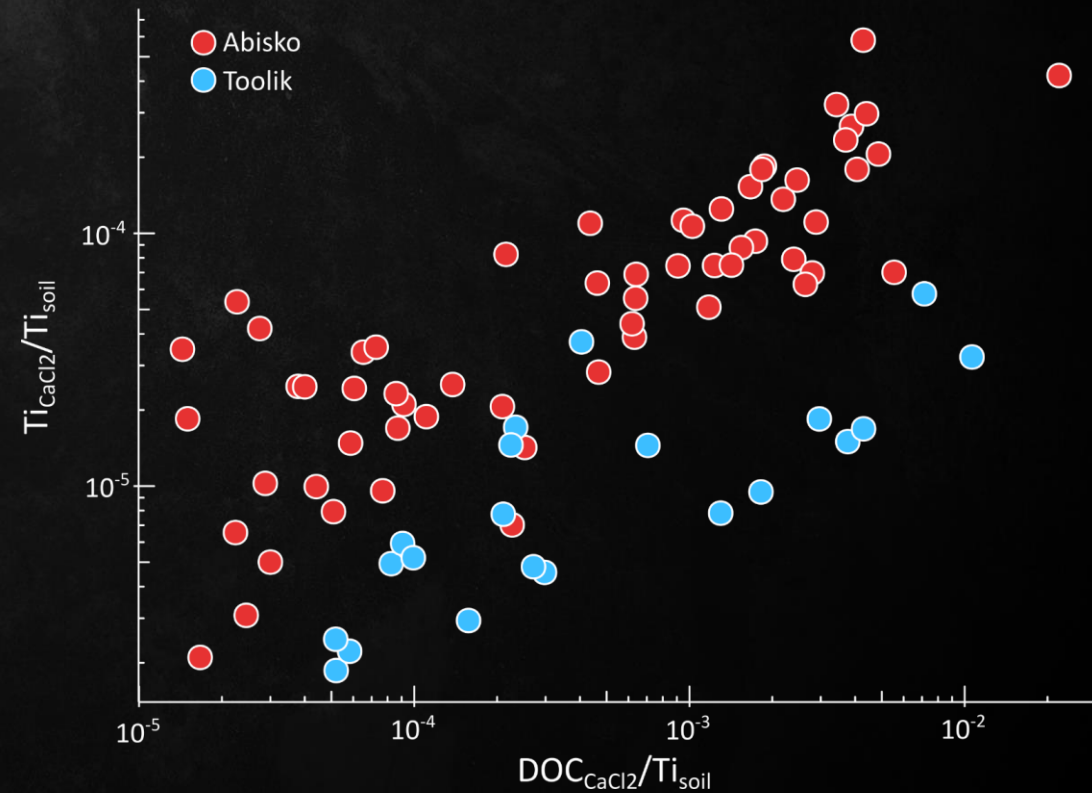


PERSPECTIVES FOR CONTAMINANT DYNAMICS

aluminum



titanium



normalized DOC

DOC partly promotes metal extractability.

What is the influence of permafrost thawing on the metal transfer?



thanks!

