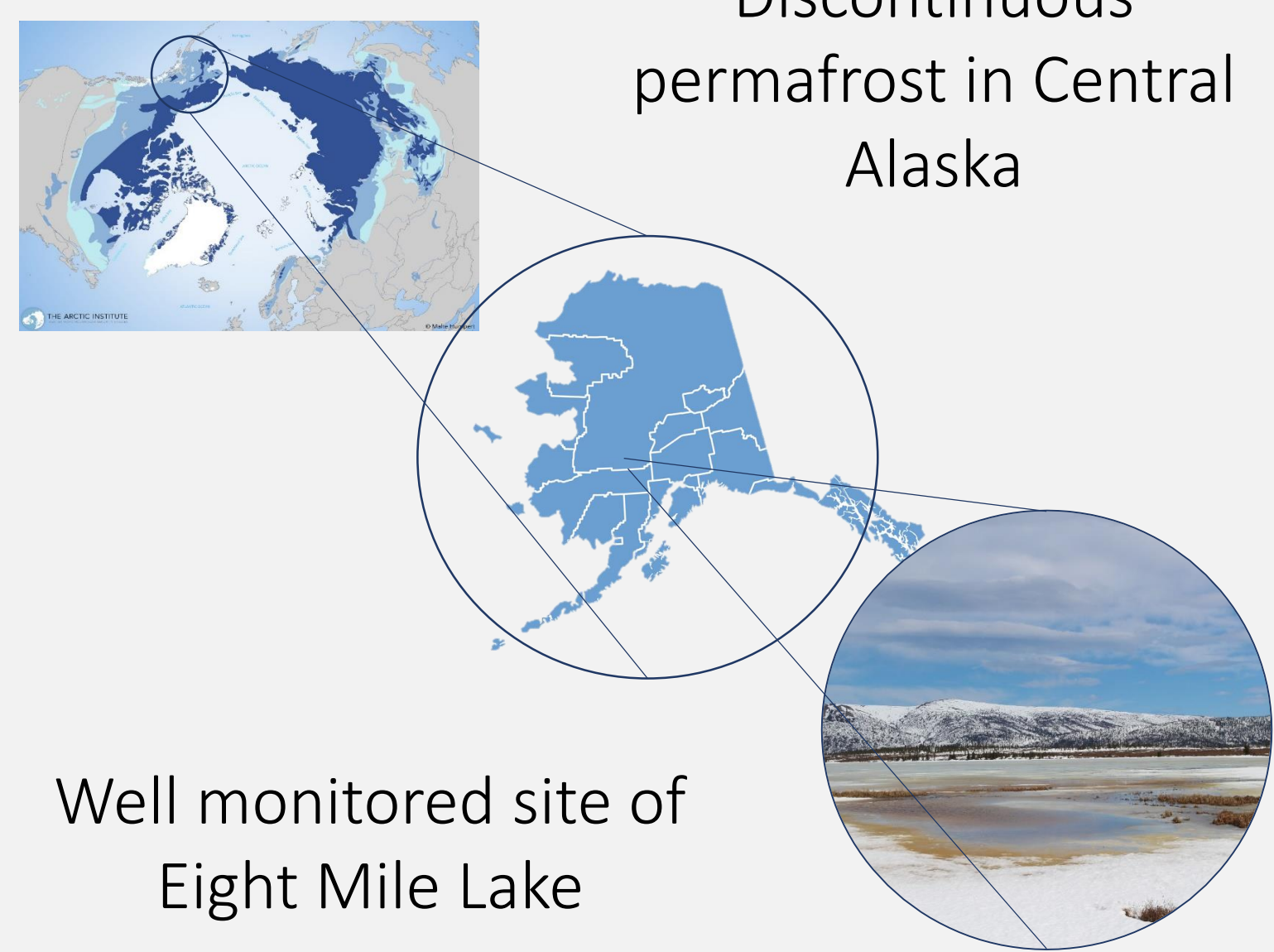
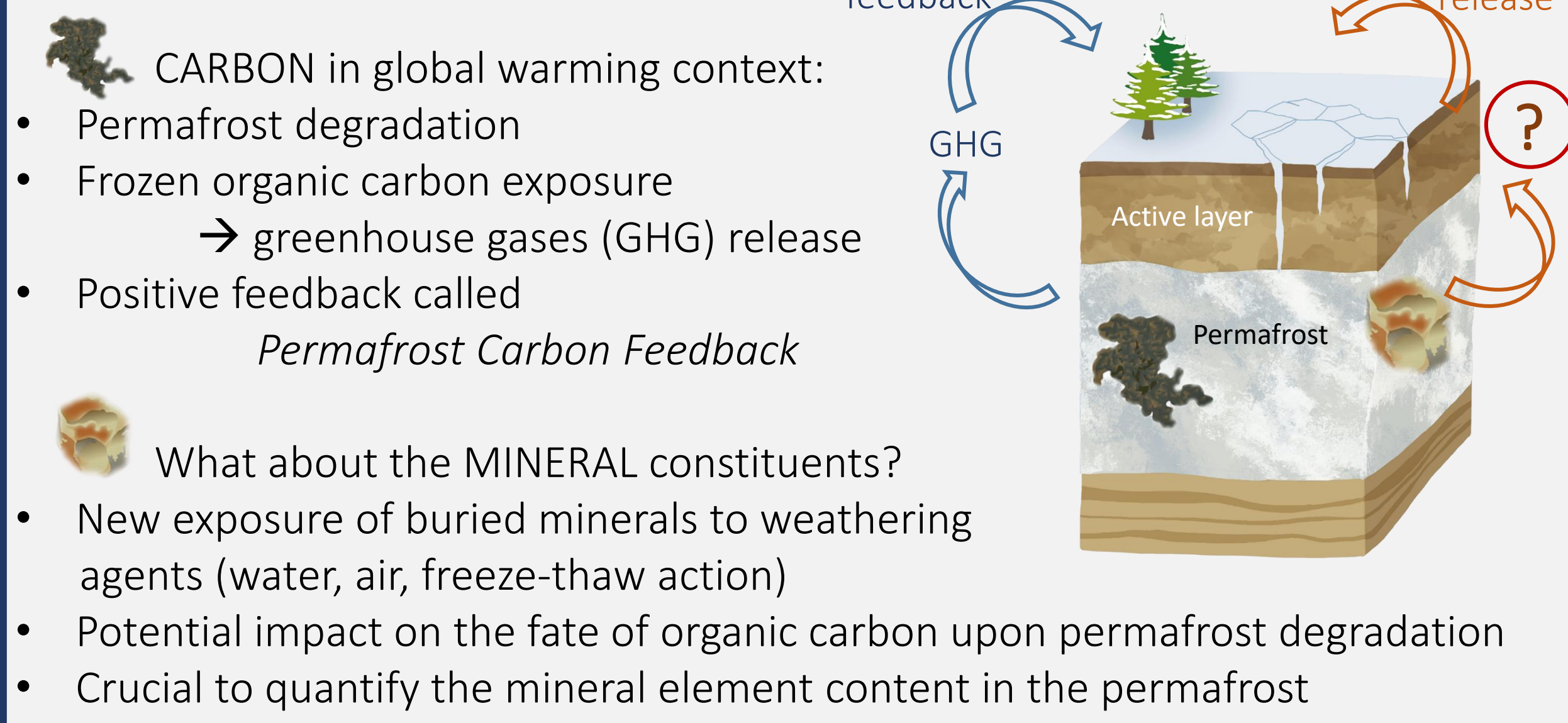


Key words: global warming, permafrost, Arctic soils, mineral weathering, element cycling, vegetation, Mg isotopes

Where are we?

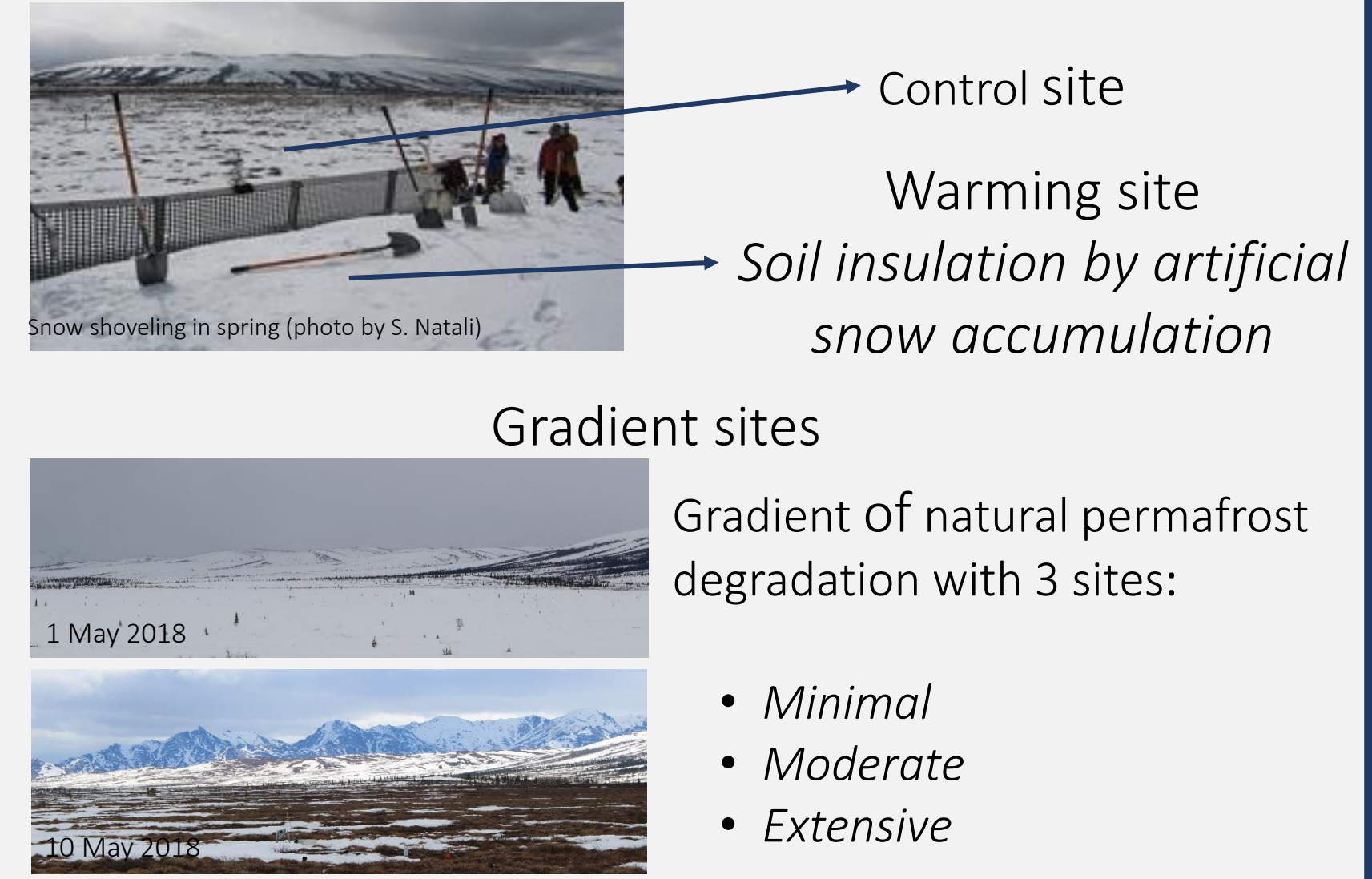


Why do we care?



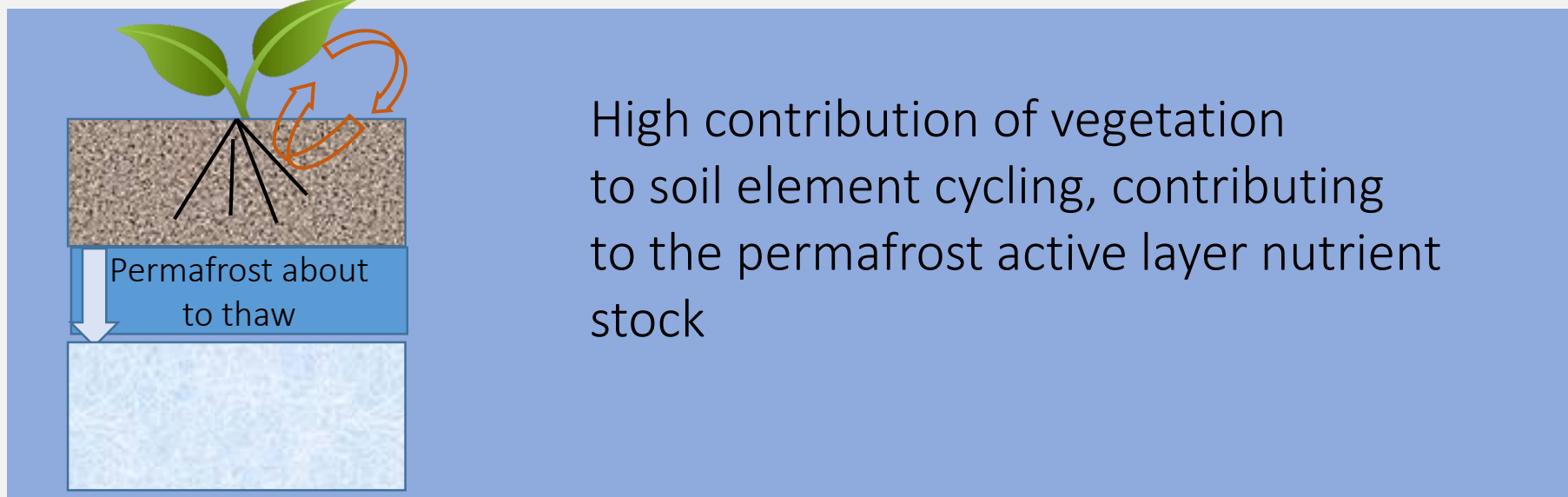
May 2018 – First expedition at Eight Mile Lake

CIPEHR sites (Experimental heating project & control)

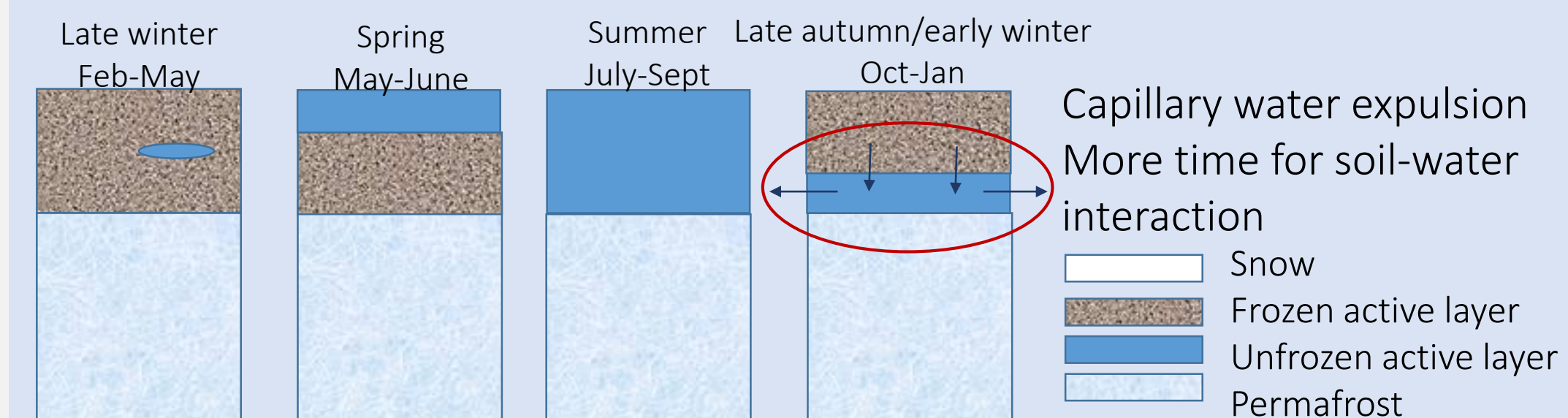


Conceptual understanding of Arctic ecosystem interactions

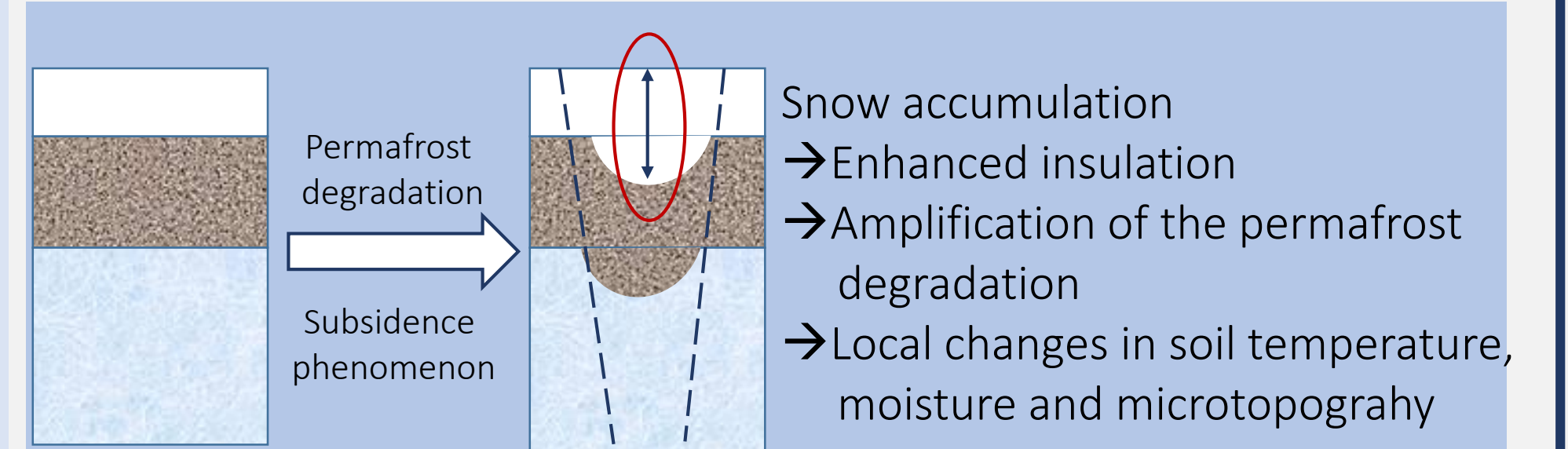
(1) Organic soils



(2) Freeze-thaw cycle



(3) Microtopography



Research questions

Research question of the project WeThaw : What is the impact of permafrost thaw on mineral element release in soils?

PhD thesis focus on soil and soil-plant interactions

- What is the soil element distribution in the surface (0-20 cm) about to thaw in the Spring?
- What is the contribution from vegetation to element cycling in soils and to surface elements available for export at thaw?

Samples collection

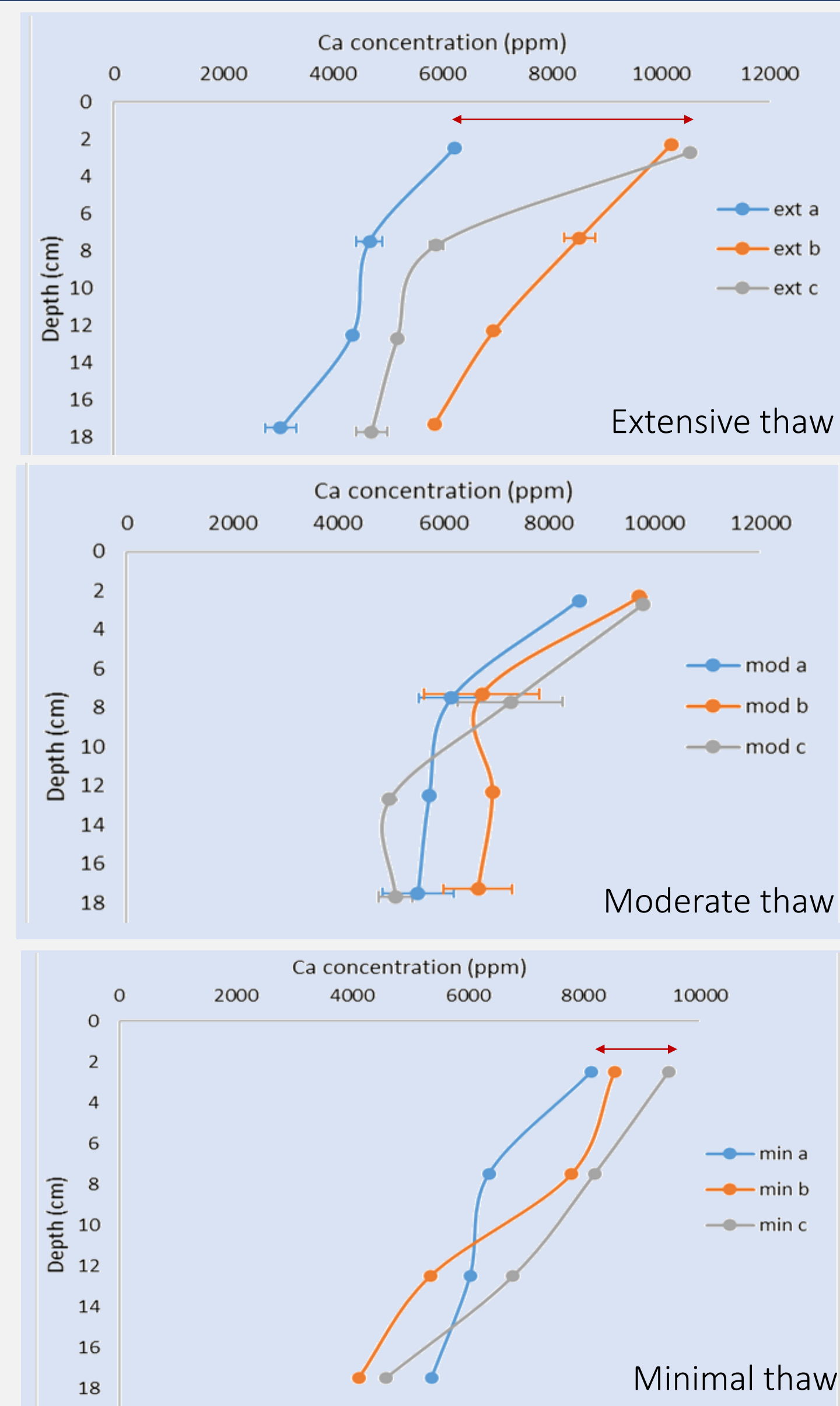
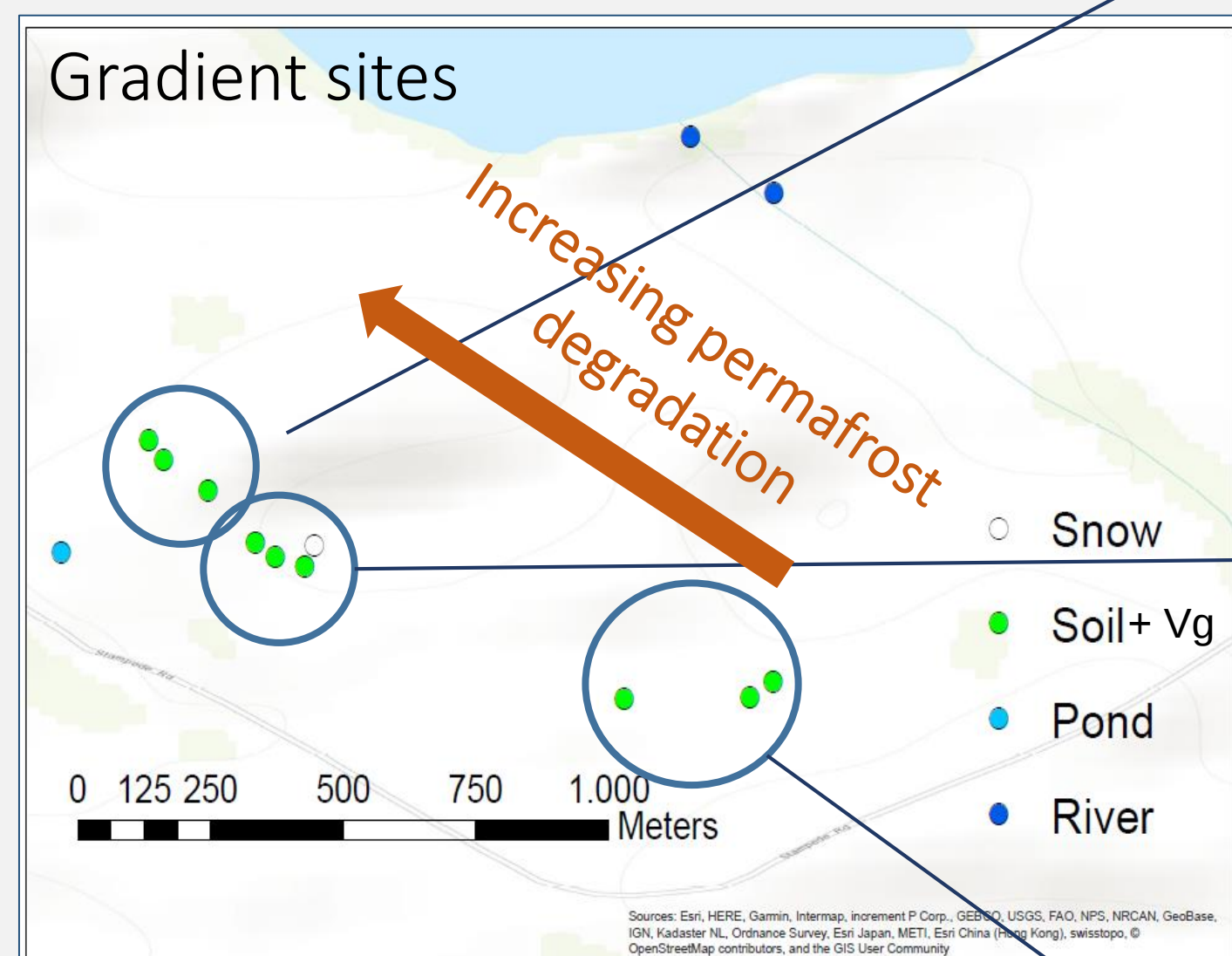
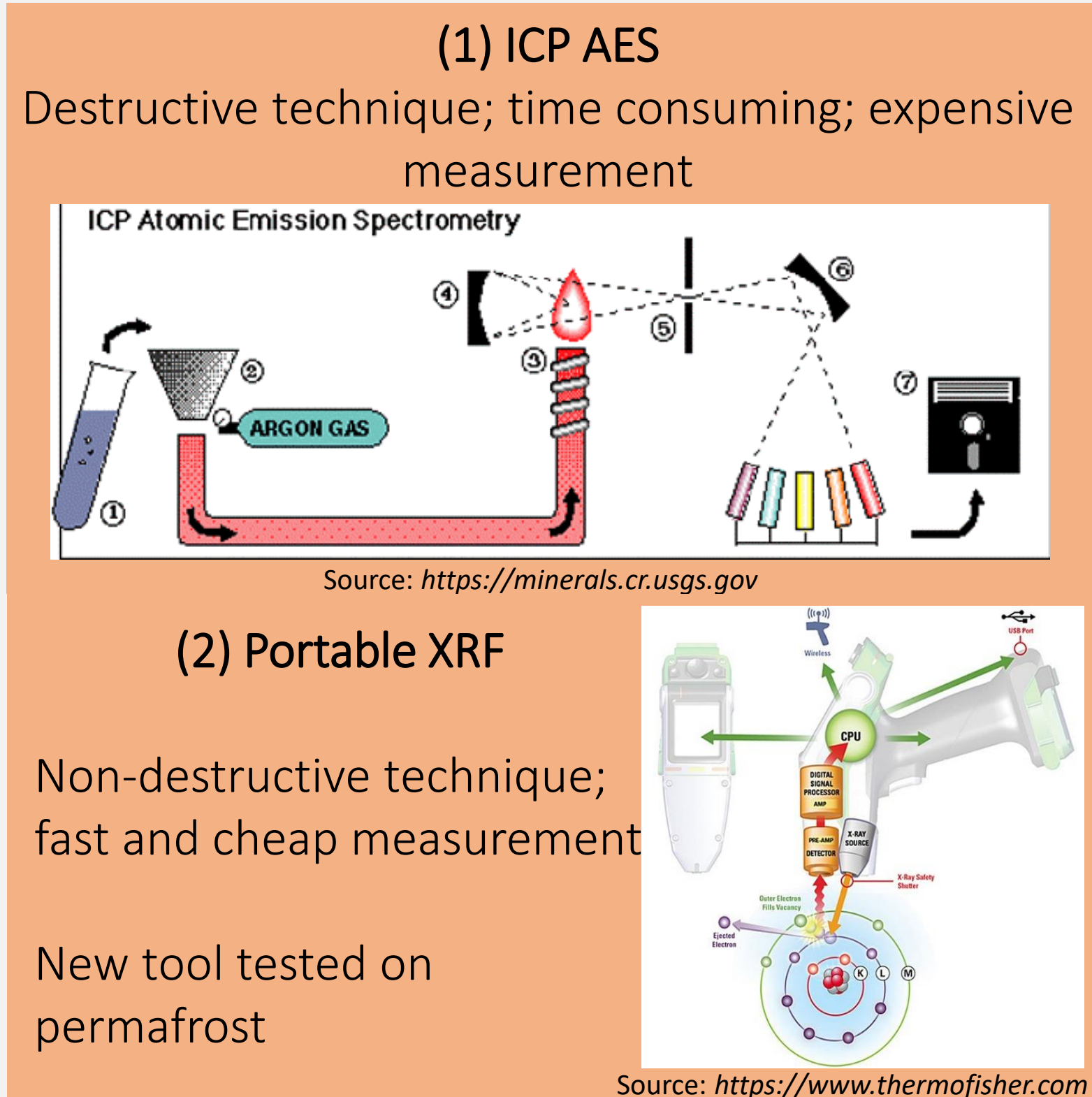
- Soils (frozen and unfrozen) : 4 sites
- Vegetation: *Betula nana* (deciduous), *Vaccinium vitis-idaea* (evergreen), *Eriophorum vaginatum* (graminoid)
- Soil pore water

Methods and ongoing measurements

What is the soil element distribution in the surface (0-20 cm) about to thaw?

Vegetation
0-5 cm
5-10 cm
10-15 cm
15-20 cm

Comparison of two analytical techniques to measure element concentrations

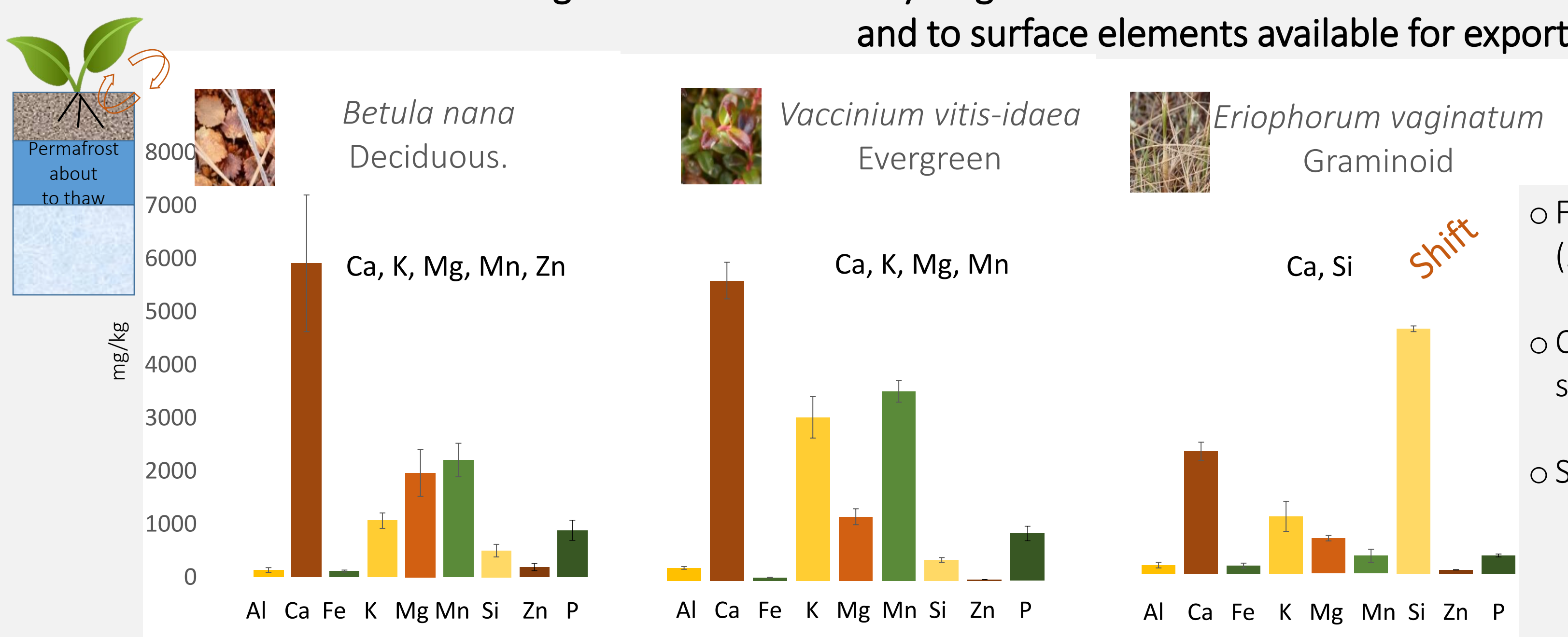


Larger variability in soil element distribution with increasing permafrost degradation

Increase Ca concentration in surface soils: is it from vegetation?

What is the contribution from vegetation to element cycling in soils

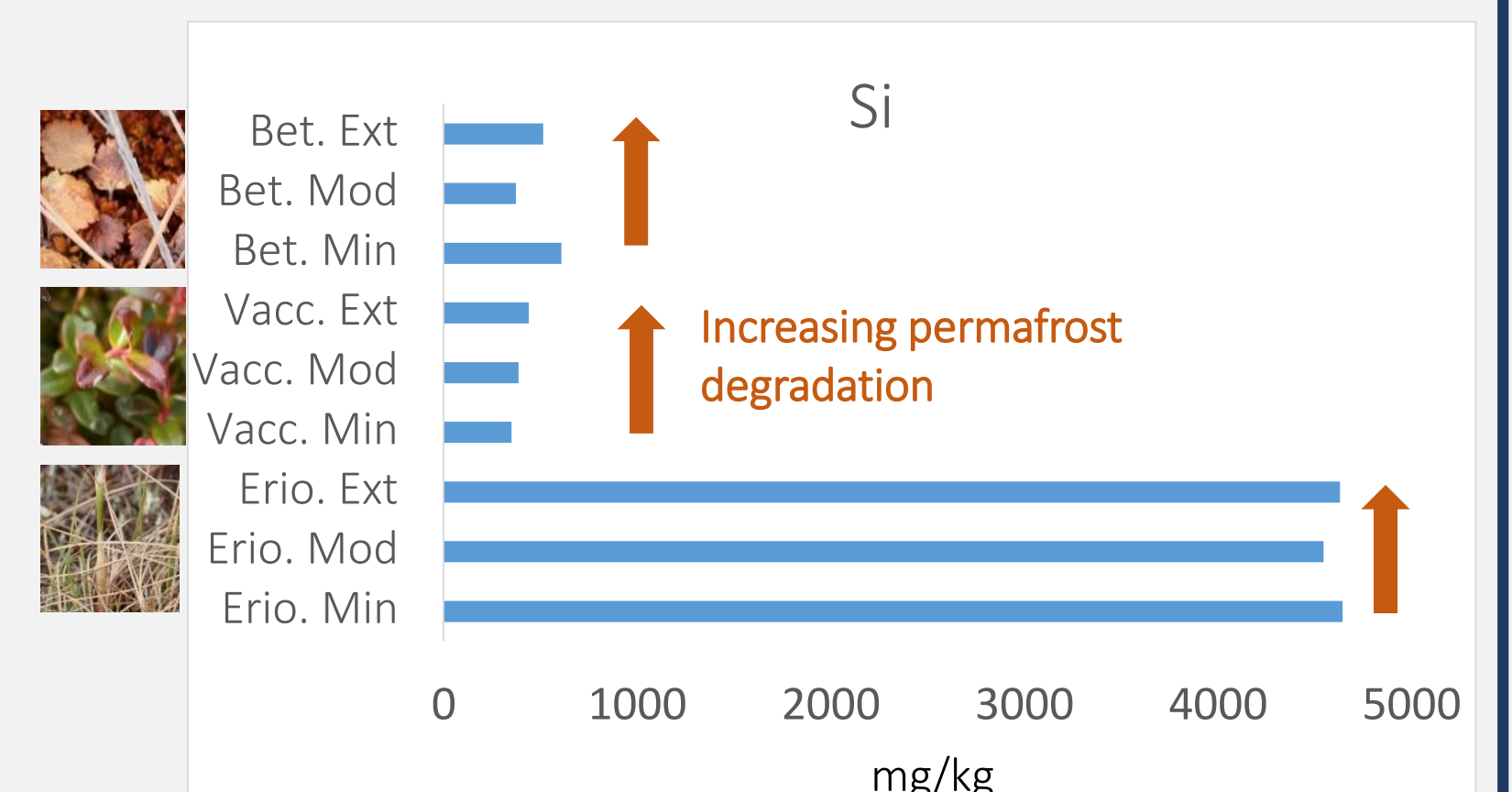
and to surface elements available for export at thaw?



Field: shift in vegetation to graminoid (*Eriophorum v.*) upon thawing

Ca concentration is high in all plant species: impact on soil litter?

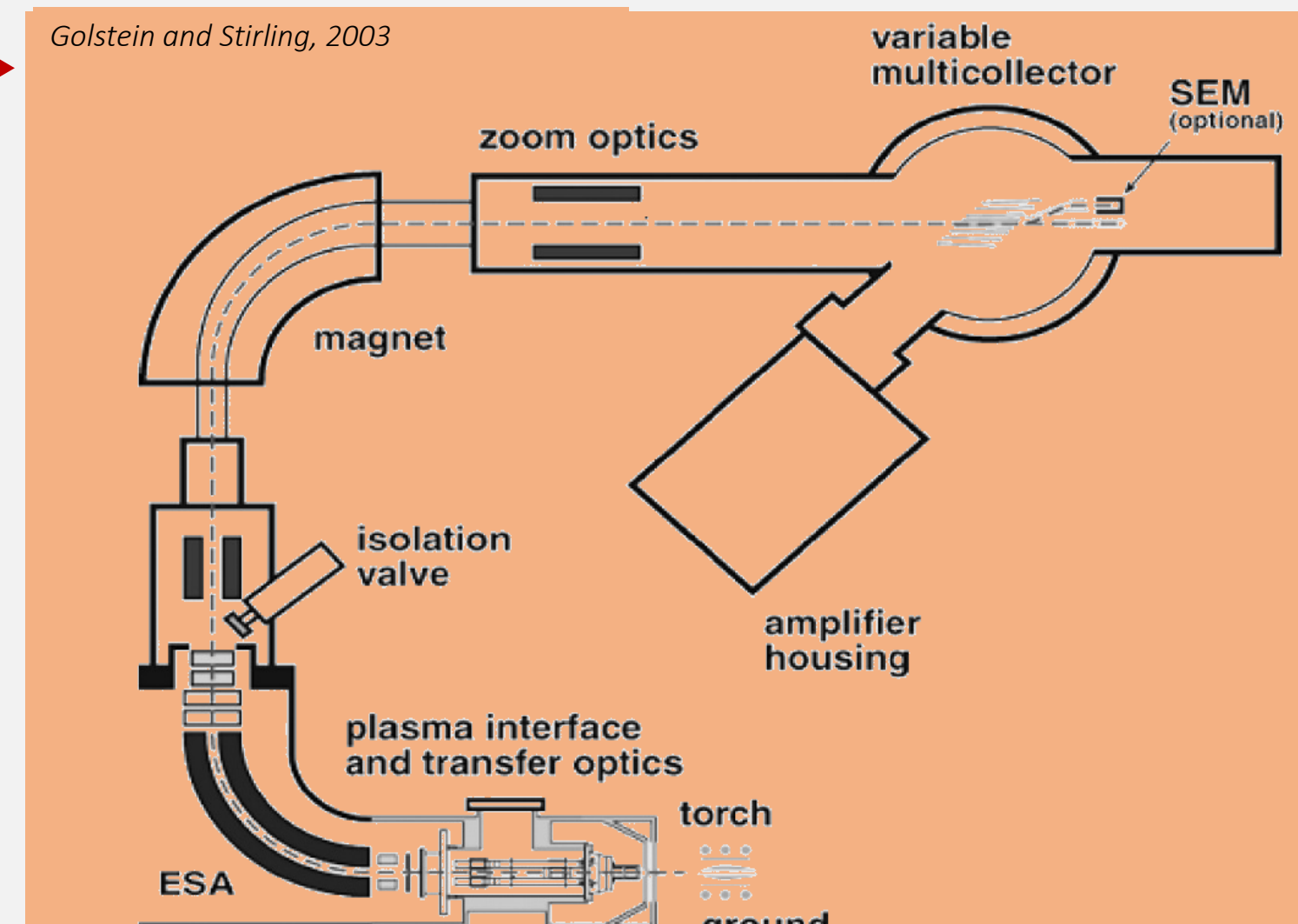
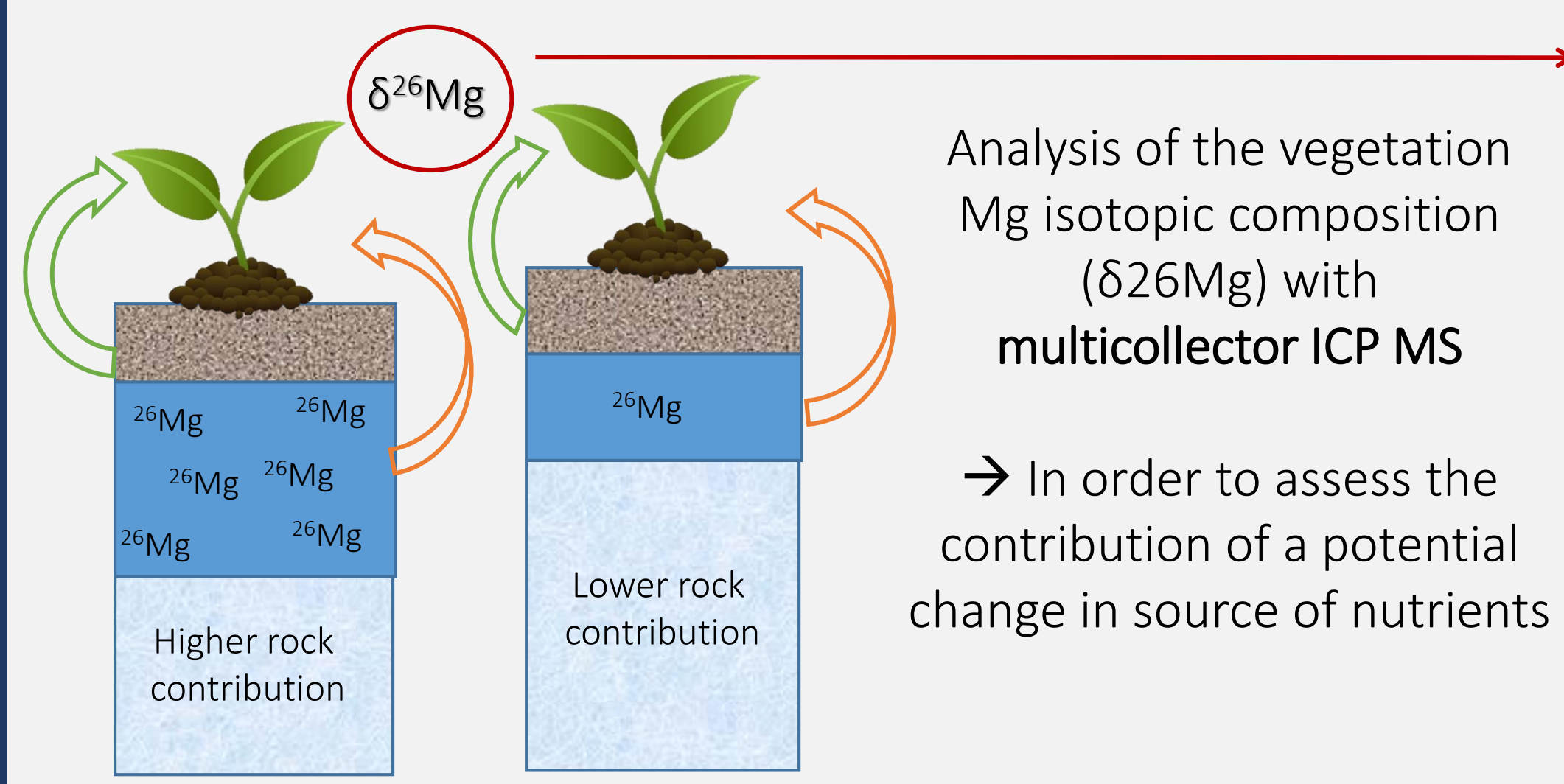
- Si-accumulation in *Eriophorum v.*:
- Species effect dominates over the gradient of permafrost degradation
- Shift in vegetation → shift in element cycling



Future work

Will permafrost degradation impact the sources of soil nutrients for plants?

Mg isotopes = stable isotopes (^{24}Mg , ^{25}Mg , ^{26}Mg) used as proxy for sources of nutrients (rock or litter derived)



Work on different timescales

