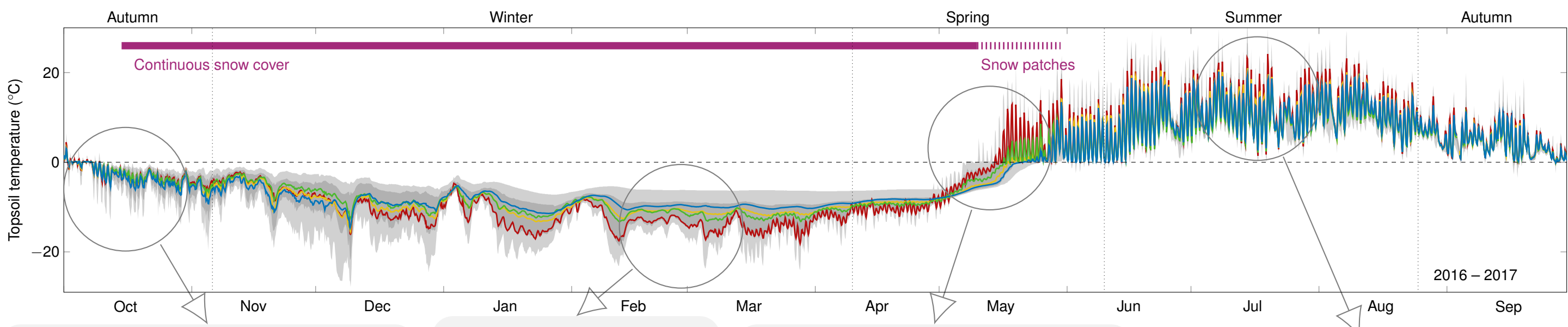


# Tundra vegetation affects thaw depth response to soil temperature

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**Autumn**

- Topsoil temperature independent of vegetation
- Variation controlled by air temperature and snow

**Winter**

- Warm soil below tall vegetation

**Spring**

- All temperatures equal in the last April days
- Low vegetation with little snow warms up first

**Summer**

- Temperatures similar below all vegetation types
- Thawing degree days, on average per type, almost identical except for lichen tundra

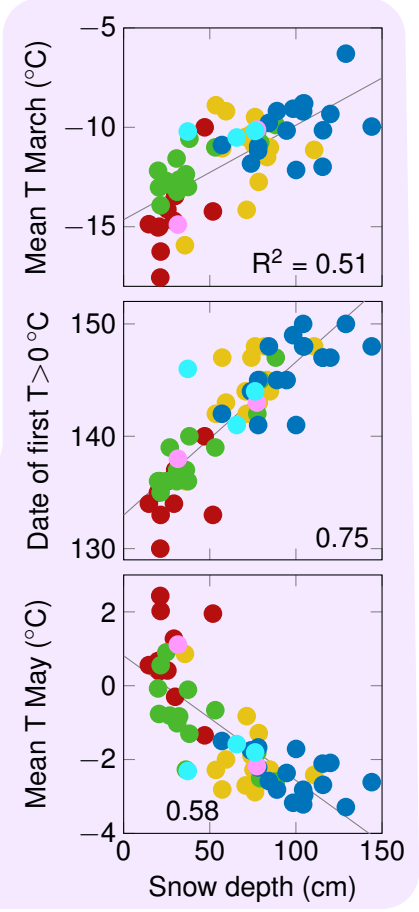
**Implications**

- The use of **vegetation as a proxy** is limited to the snow season
- **Soil properties** and **moisture** play an important part
- **Complex interactions** conceal causal relationships while intuitive effects are not always relevant



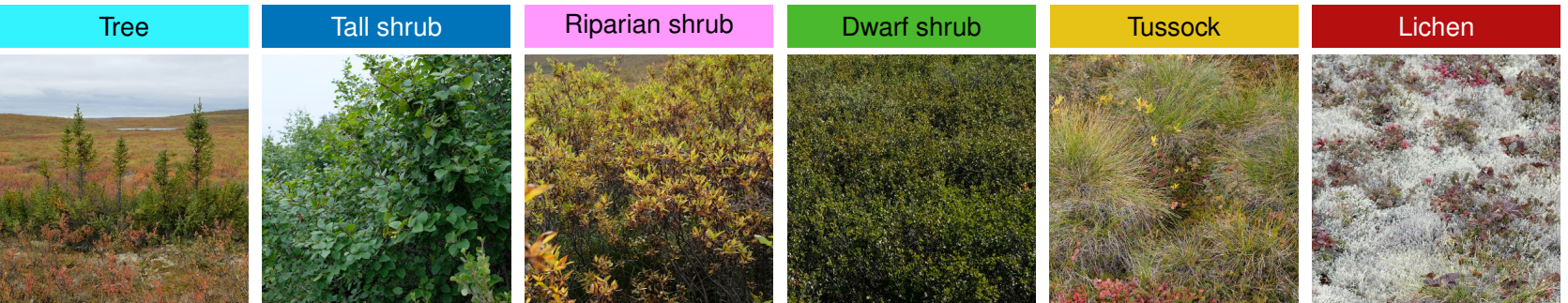
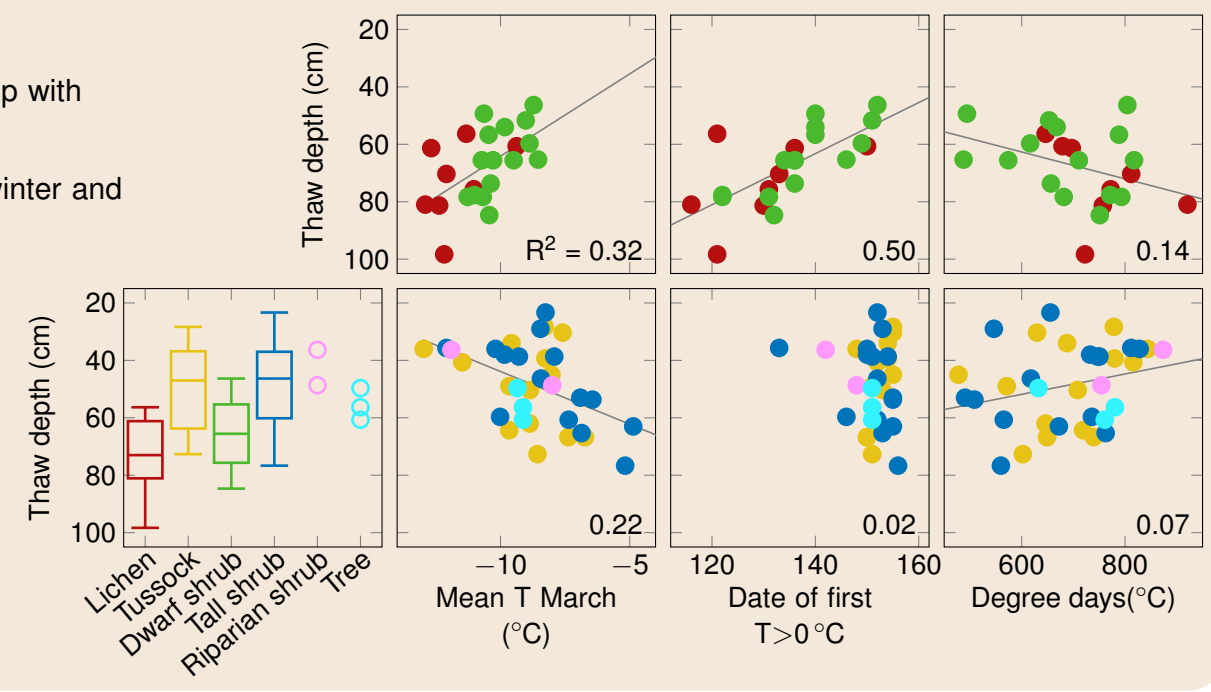
**Snow**

- Accumulates at tall vegetation
- Keeps soil warm in winter and cool in spring
- Snowmelt timing highly variable



**Thaw depth**

- Non-significant relationship with summer temperature
- Strong relationship with winter and spring temperature
- Deep below lichen and dwarf shrub tundra
- Deeper at locations with cold winters
- More shallow below tussocks and tall shrubs
- Deeper at locations with warm winters



**Research focus**

As the Arctic is warming rapidly, vegetation changes. My research focus is the **feedback of vegetation changes on climate and permafrost**. In this study, we measured topsoil temperature (1–3 cm) at 68 locations below 6 vegetation types at Trail Valley Creek, NWT (Canada, 68.742°N, 133.499°W) and analysed the interaction between topsoil temperature variation in the different seasons, snow, and thaw depth.