

# Permafrost



Always frozen



E Schuur, Siberia

Ground ice



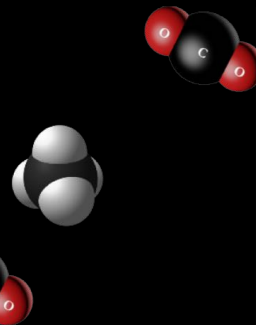
J Moore, Alaska

Roads, buildings, etc



P Khury, HBL

Peat



Greenhouse gases



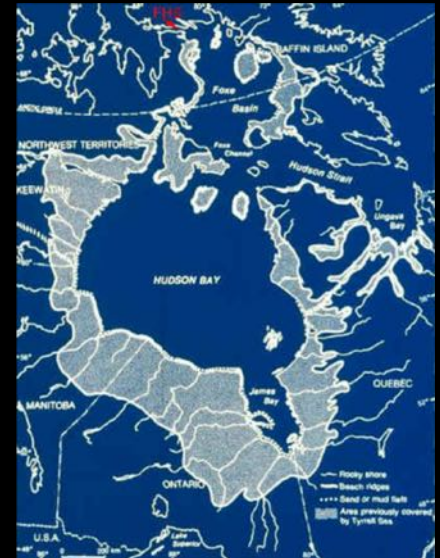
Climate warming

# How does permafrost form?

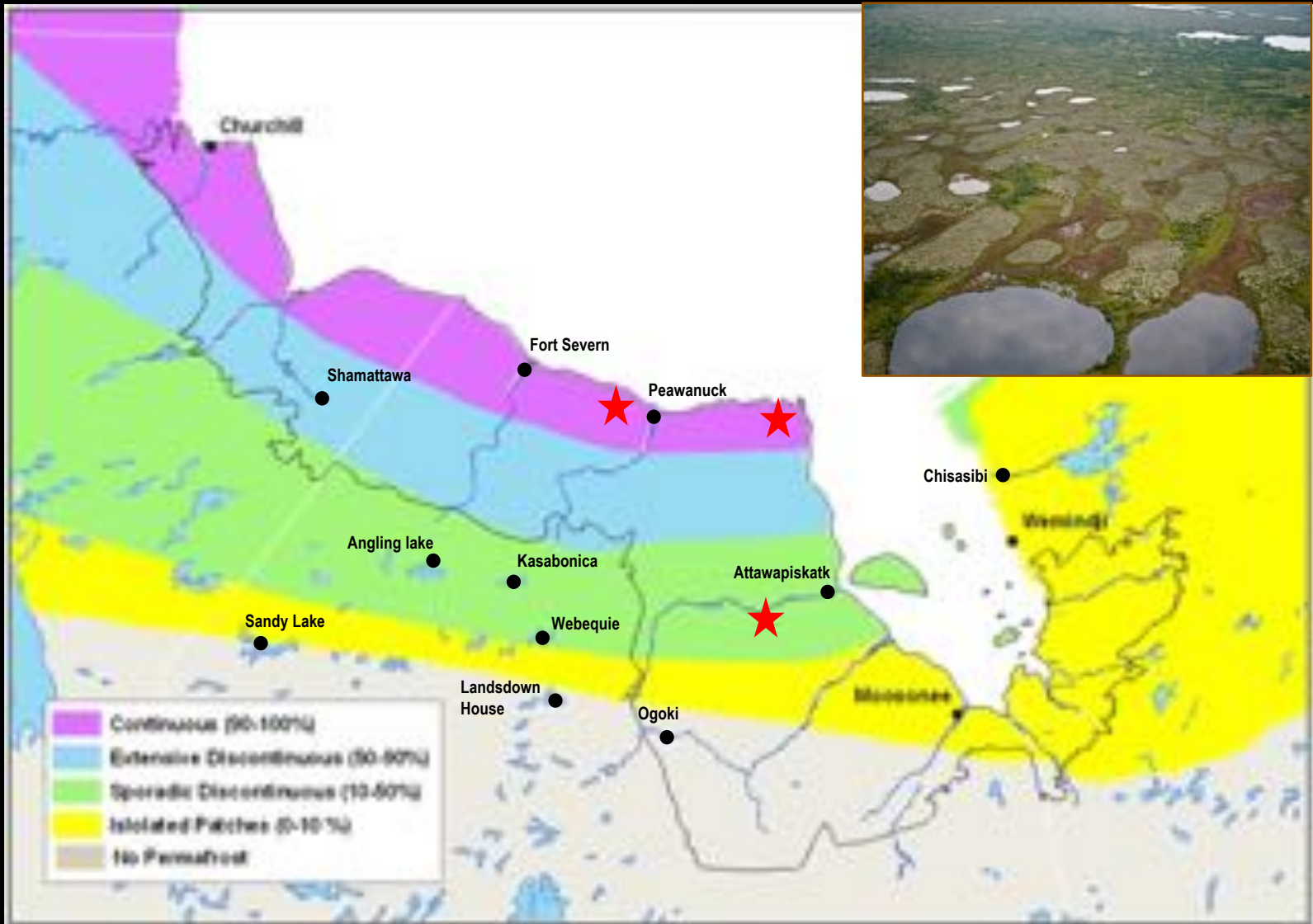
- Ground gets very cold during many winters
  - Not under water
  - Not under glaciers



- Ontario
  - Under glaciers until  $\approx 7\,700$  yrs ago
  - After glaciers, large lakes and Tyrrell sea

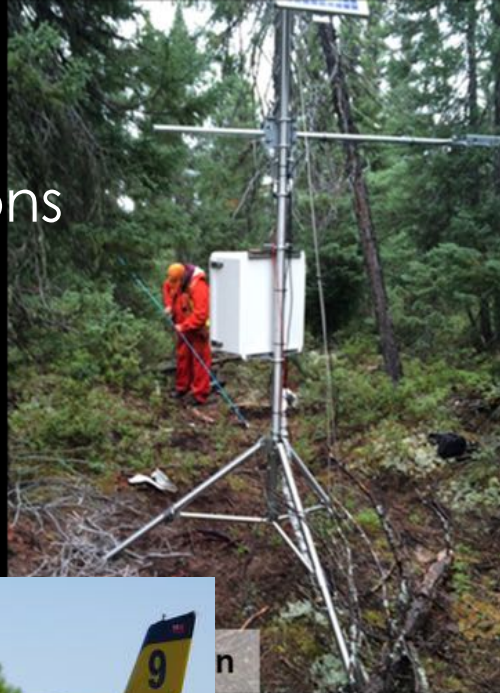


# Permafrost in Ontario

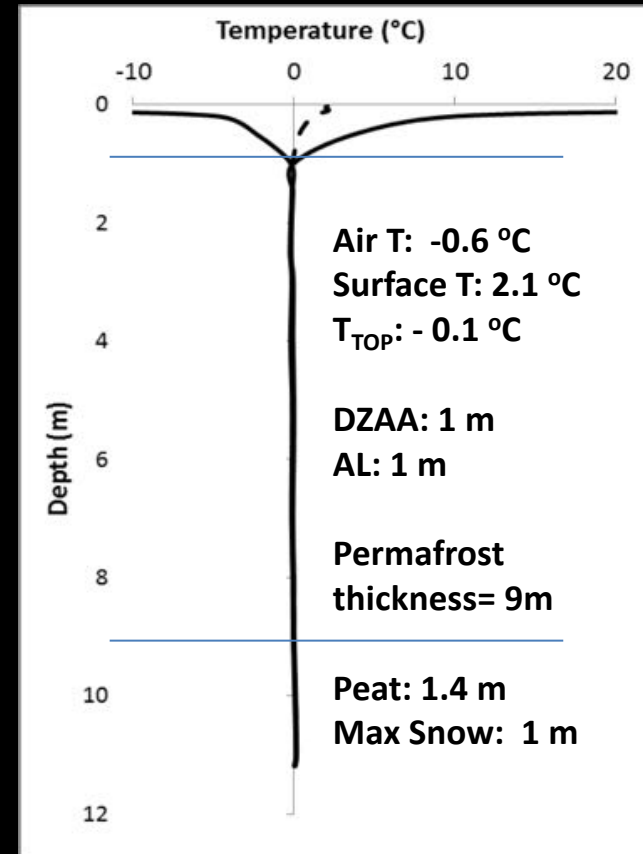


# Thermal conditions in HBL

- 5 stations
- + 4 up-coming stations
- 4 - 11 m deep



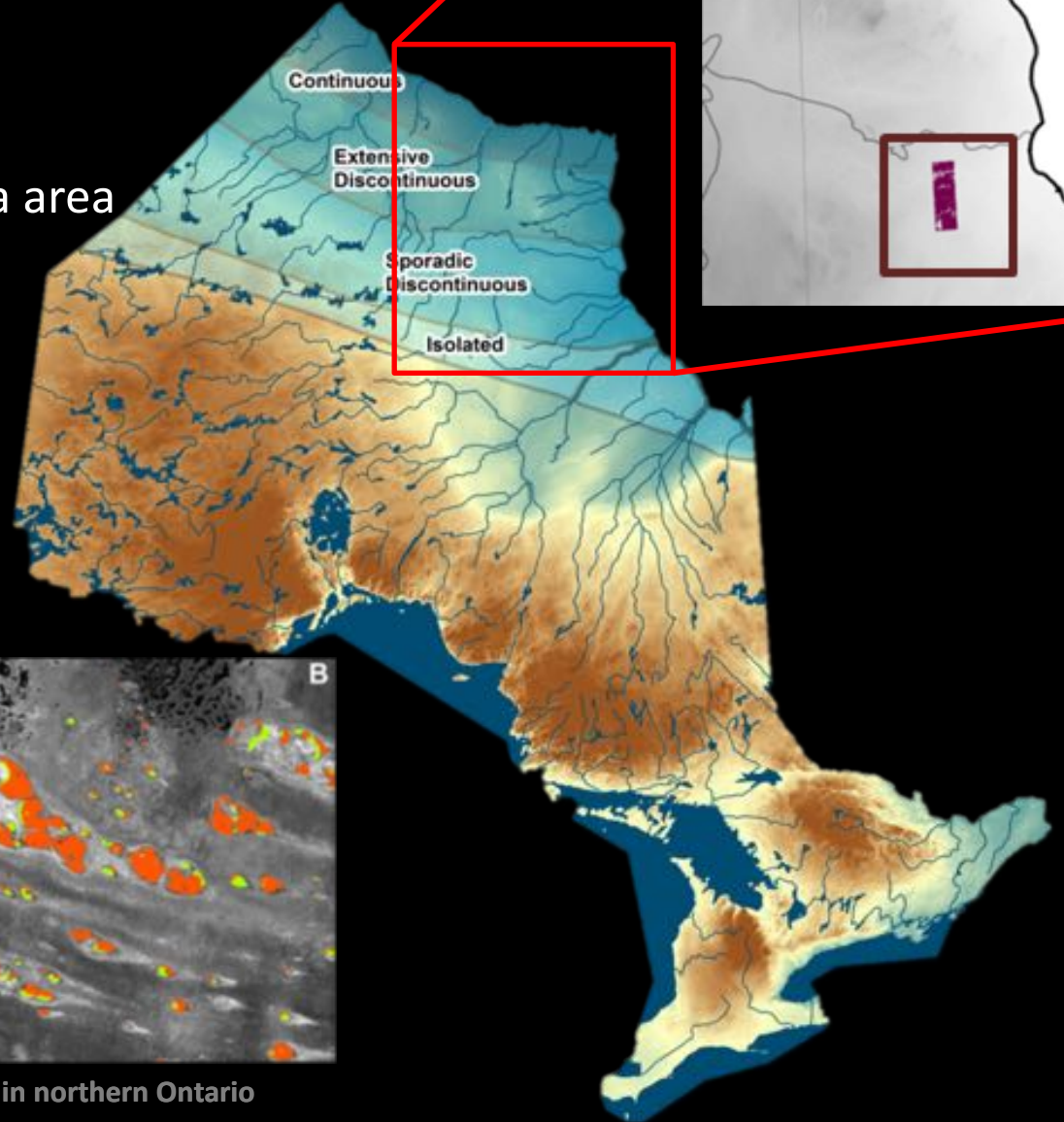
## SW of Attawapiskat



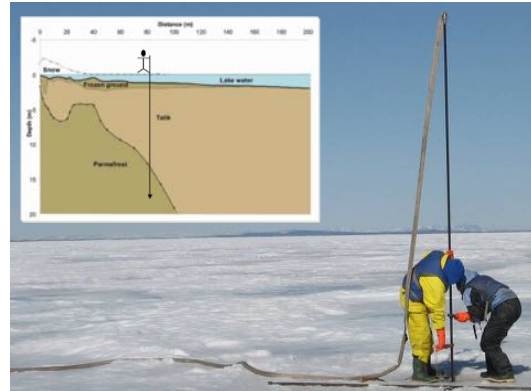
# Palsa change

## Phase 1:

- 435 km<sup>2</sup> area
- 1954 VS 2011:
  - 26.3% decrease in palsa area



# My previous work on permafrost and peatlands

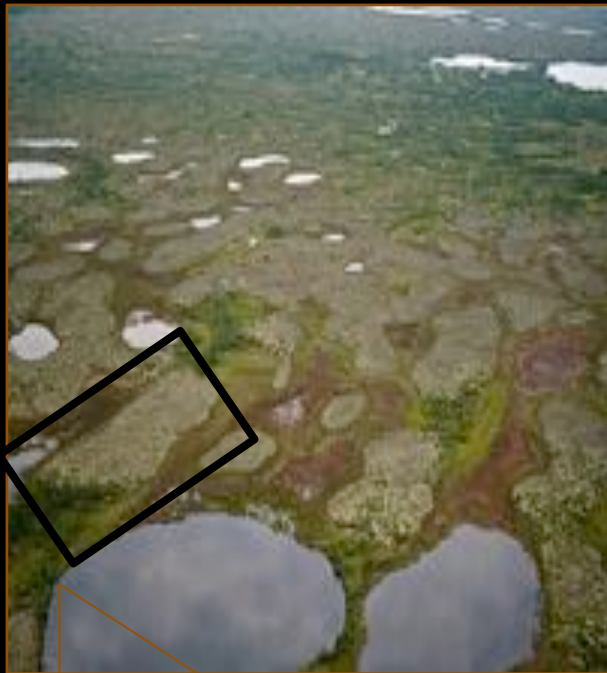


Permafrost and bank erosion

Permafrost under water

Permafrost recovery

# Degrading permafrost in the Hudson Bay Lowlands: Greenhouse Gas and Mercury



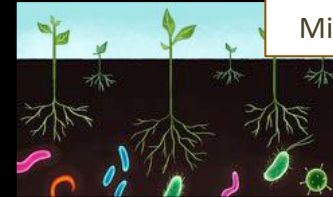
PALSAS



CORE EXTRACTION



1)



Microbes?

2)



Greenhouse Gases?

3)



Mercury?

Adam Kirkwood  
Laurentian University  
Up North on Climate  
Conference





# Roads, buildings, etc



Tiksi, Siberia (H Lantuit)



Kangerlussuaq, Greenland  
(F Ancker-Agergaard)



Yakutsk, Siberia (N Weiss)