# Top down thaw- slow and steady

Arctic Ocean Coast near Utqiagvik (formerly Barrow), Alaska



# "Ecosystem protection" against thaw forcings



Farmer's Loop site near Fairbanks, Alaska

# Top down thaw- slow and steady

Changing redox conditions (seasonally):

- Microbial sourcing?
- Biogeochemical processes?
- Rapid changes in soil conditions?
- Wetting/drying fronts?

Imnavait Creek, AK



Barker et al. Chemical Geology 2014

Mineral soils

Active layer:

seasonal redox processes

<u>Transition zone</u>

Permafrost

#### Fox, AK



# Thermokarst- rapid landscape change

Potentially rapid (days/week/months/years) hydrogeologic changes:

- Microbial sourcing?
- Biogeochemical processes?
- Rapid changes in soil conditions?
- Wetting/drying fronts
- Exposed soils/horizontal movement/ ponded water





Inherent issues with heterogeneity and accessing representative samples The CRREL Permafrost Tunnel near Fairbanks, Alaska as a sampling/field site. 300m +





