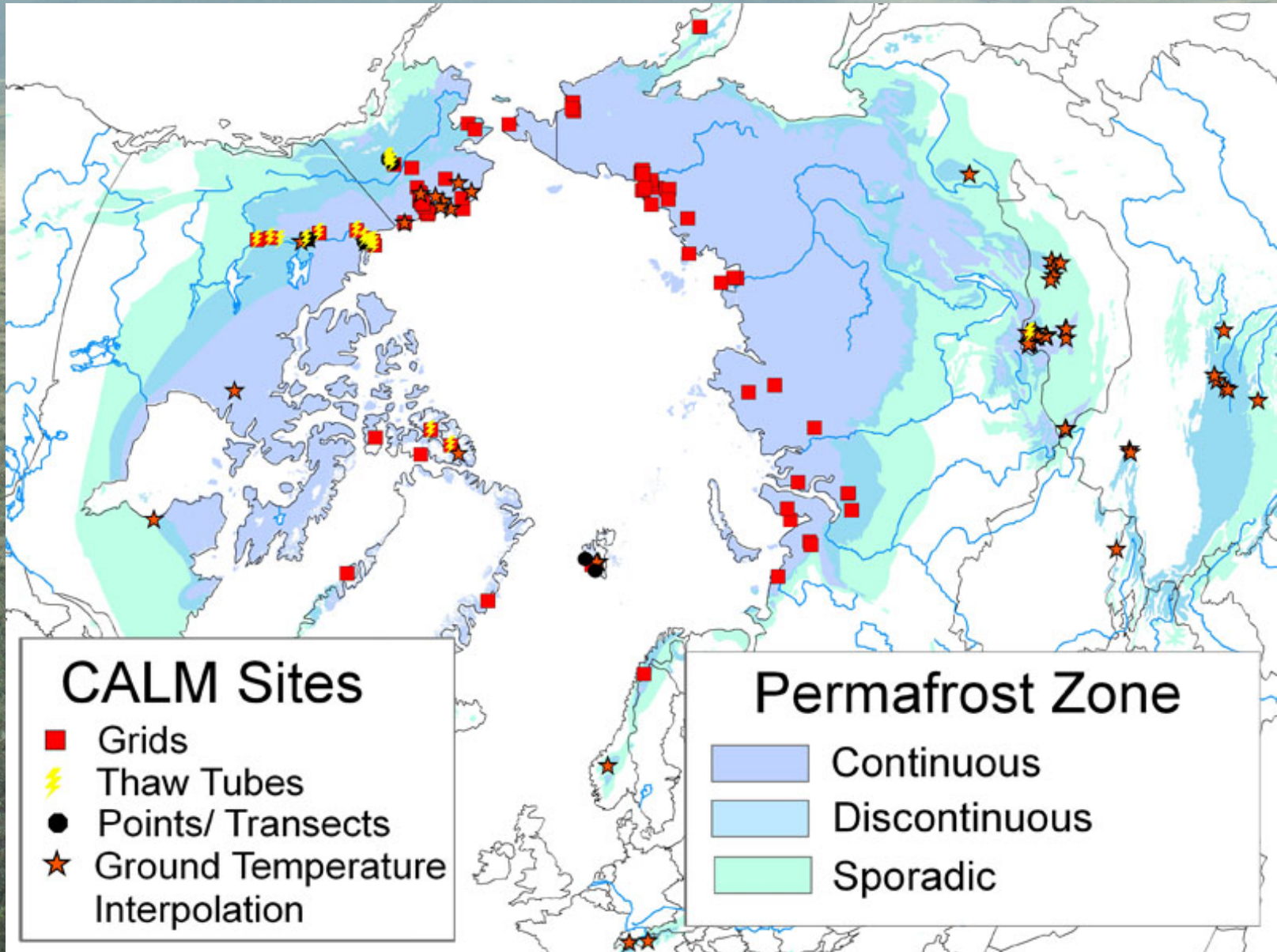
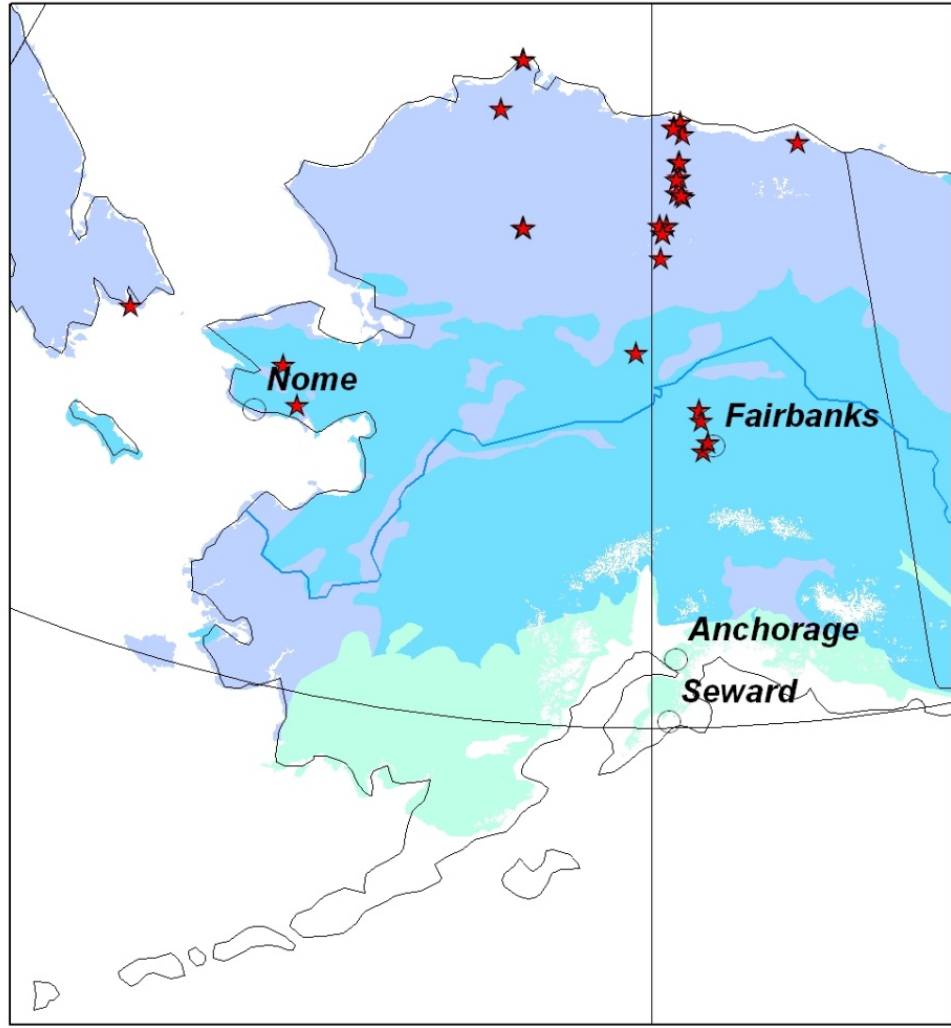
A wide-angle photograph of a vast, open, grassy landscape under a blue sky. Two reindeer are visible in the middle ground, walking across the field. The terrain is flat and covered in low-lying vegetation. In the distance, there are some small, light-colored patches that could be snow or ice. The overall scene is a typical Alaskan tundra or subarctic landscape.

**Long-Term Active Layer and Ground Surface
Temperature Trends: Results of Observations at
Alaskan CALM Sites**

Nikolai Shiklomanov, University of Delaware

CIRCUMPOLAR ACTIVE-LAYER MONITORING (CALM) NETWORK





CALM Observations

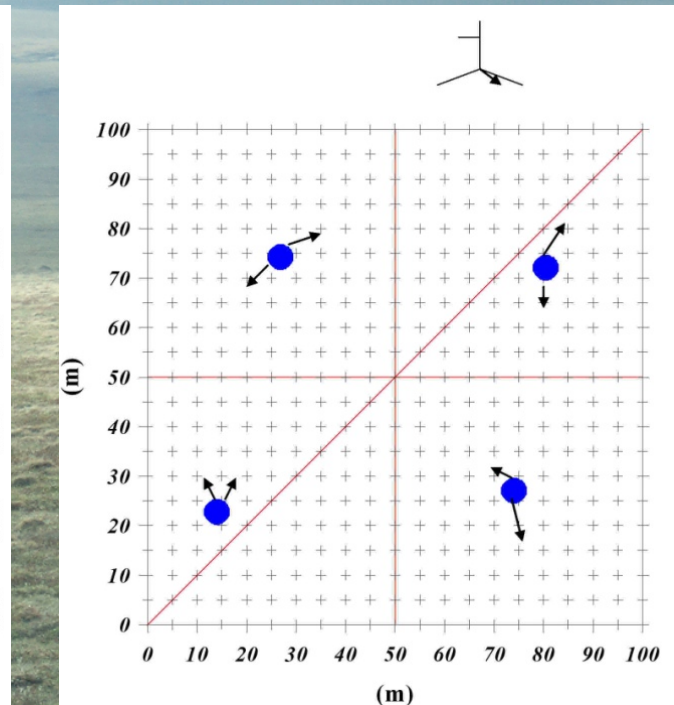
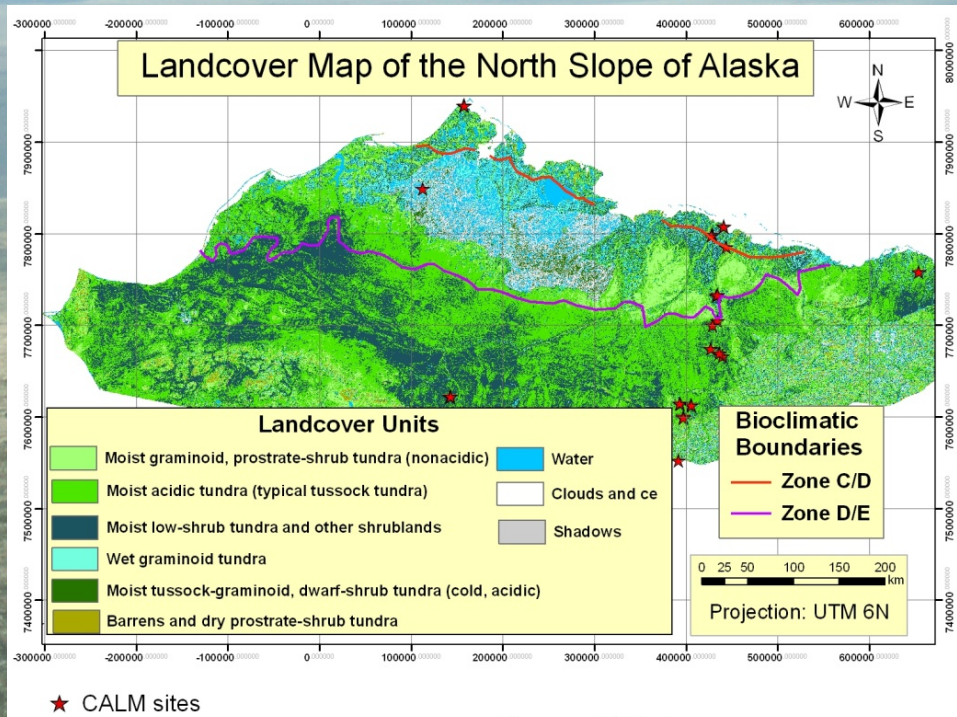
Ground Surface Temperature

Thaw depth

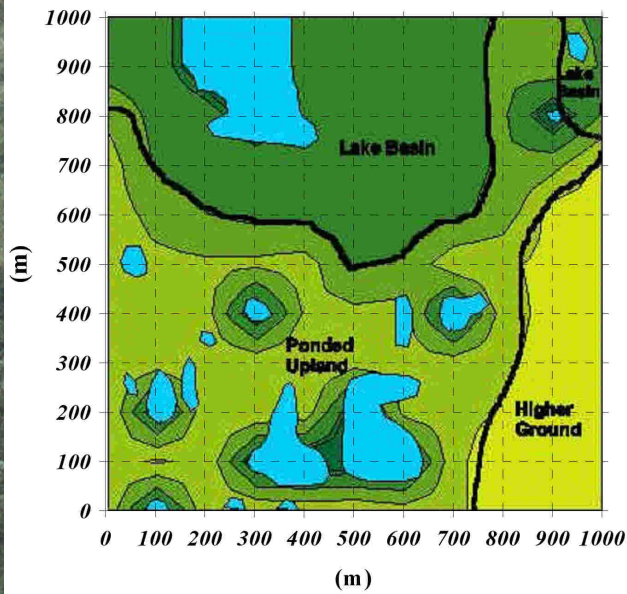
Frost Heave / Thaw Subsidence



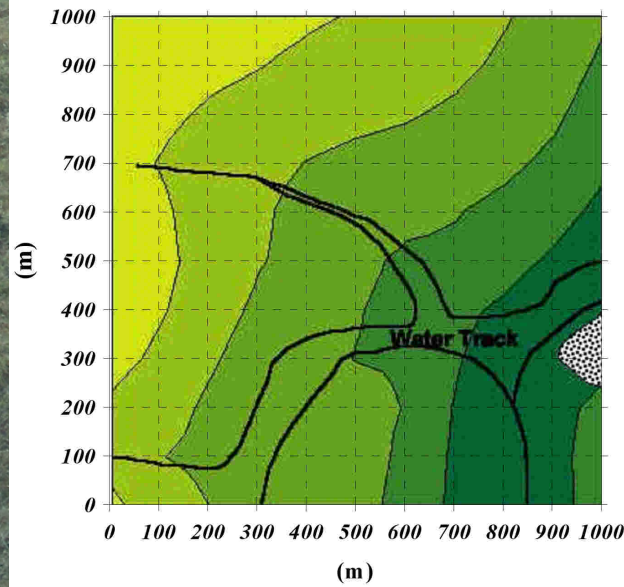
CALM Sampling Strategy



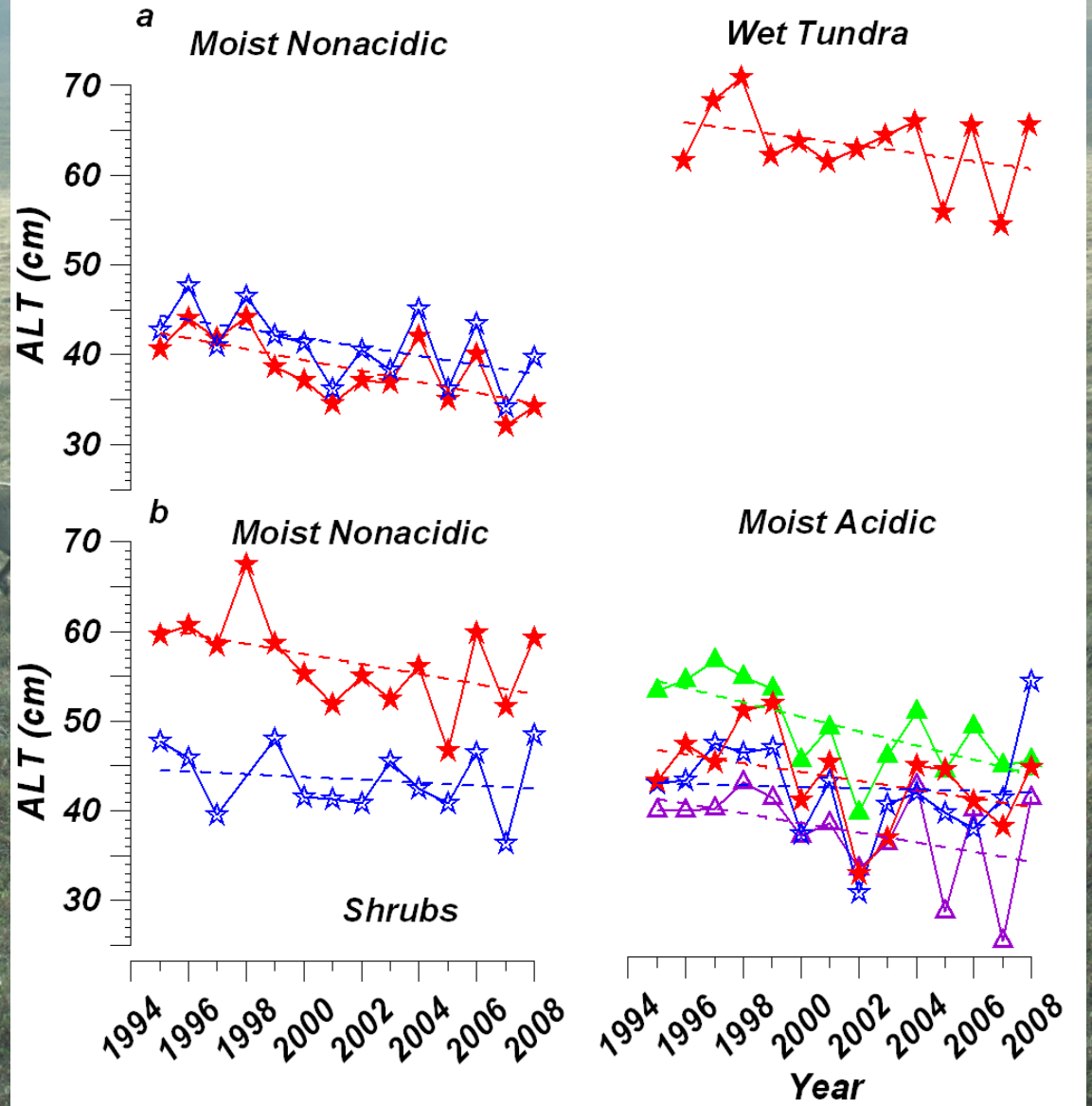
Coastal Plain



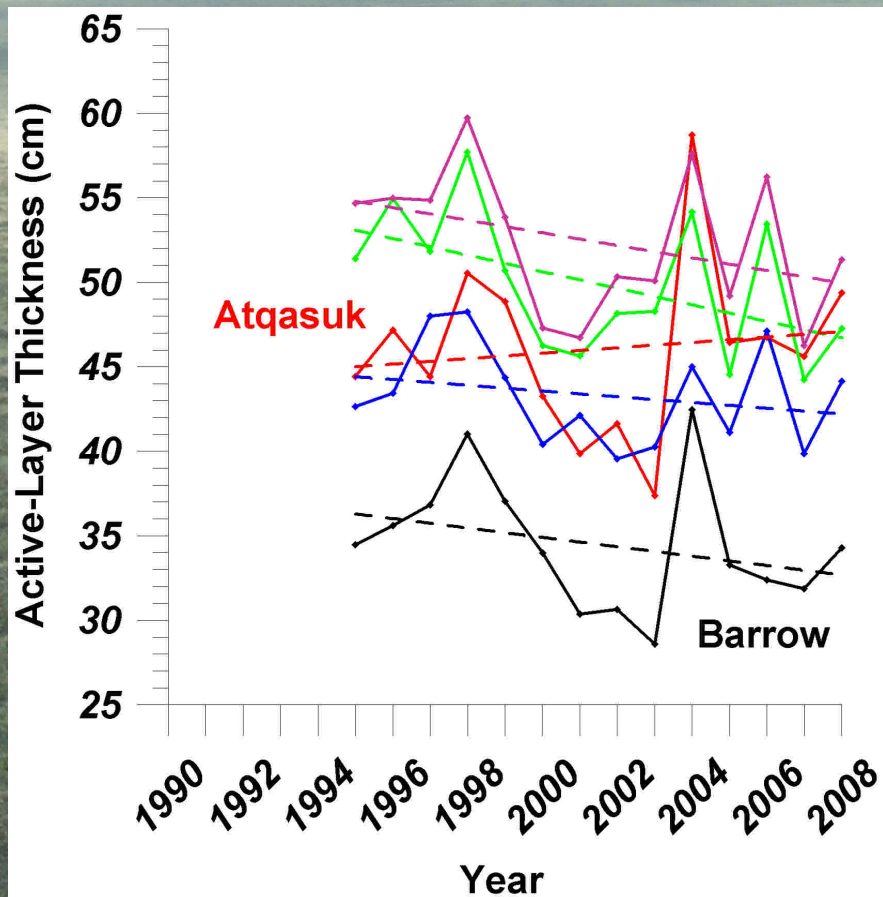
Foothills



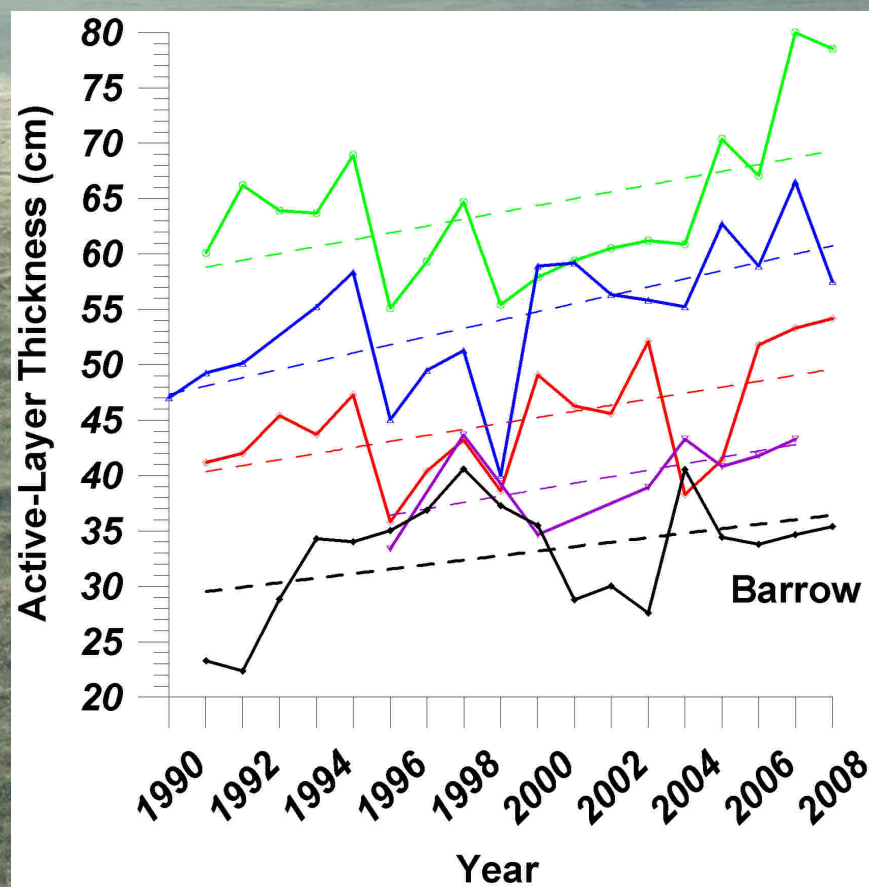
Active Layer Trends for Characteristic North Slope Landscapes



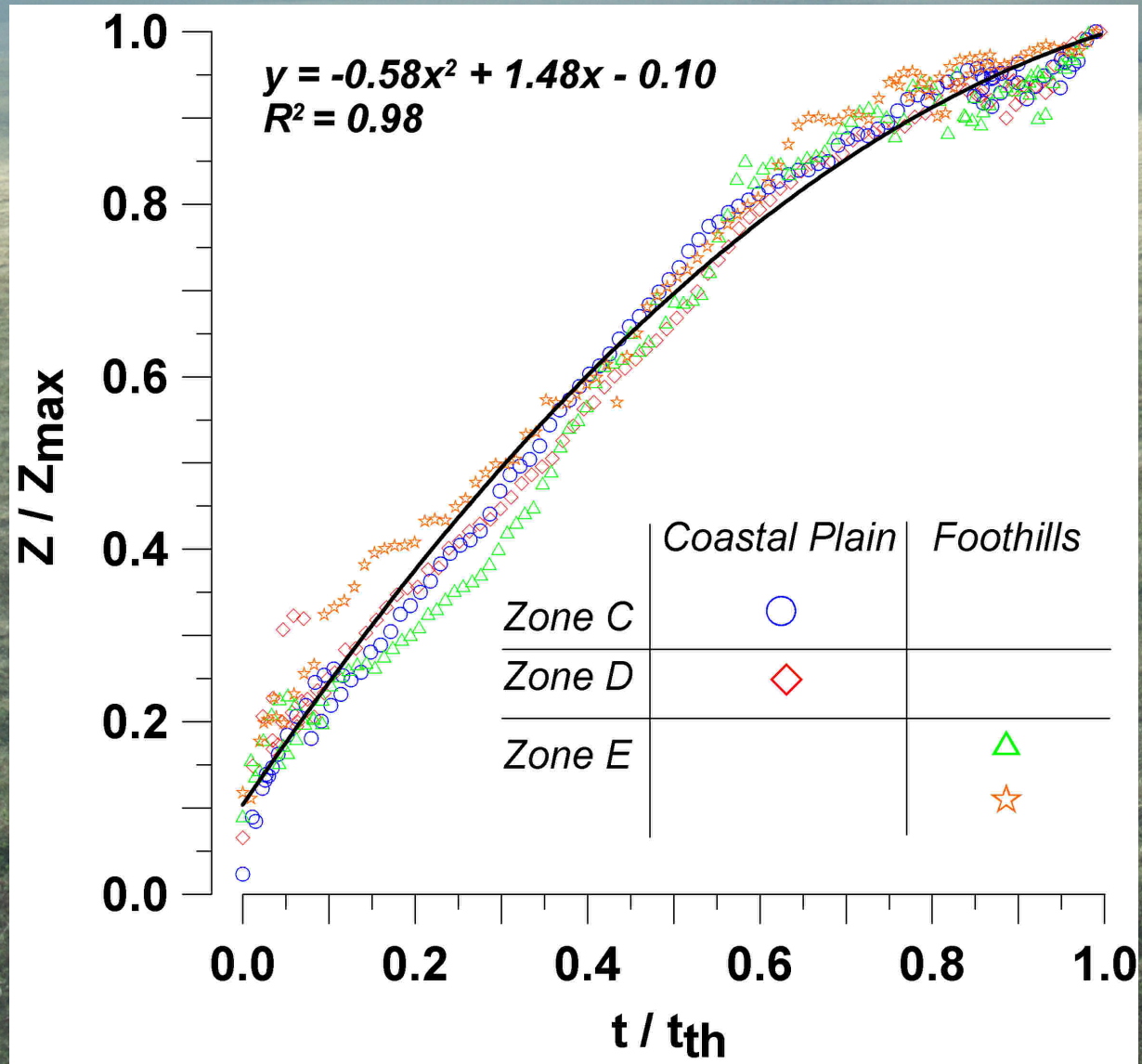
North Slope



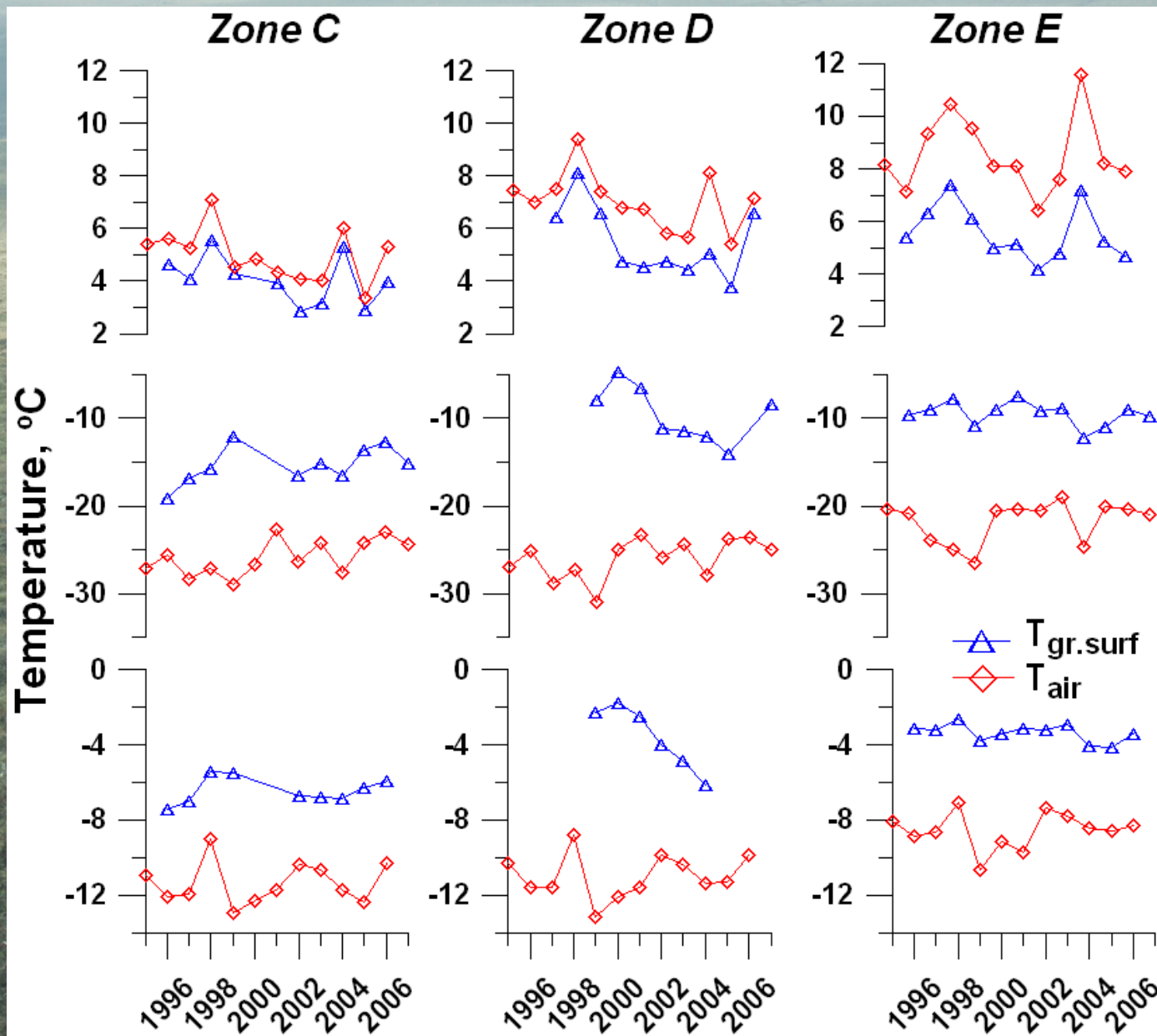
Interior



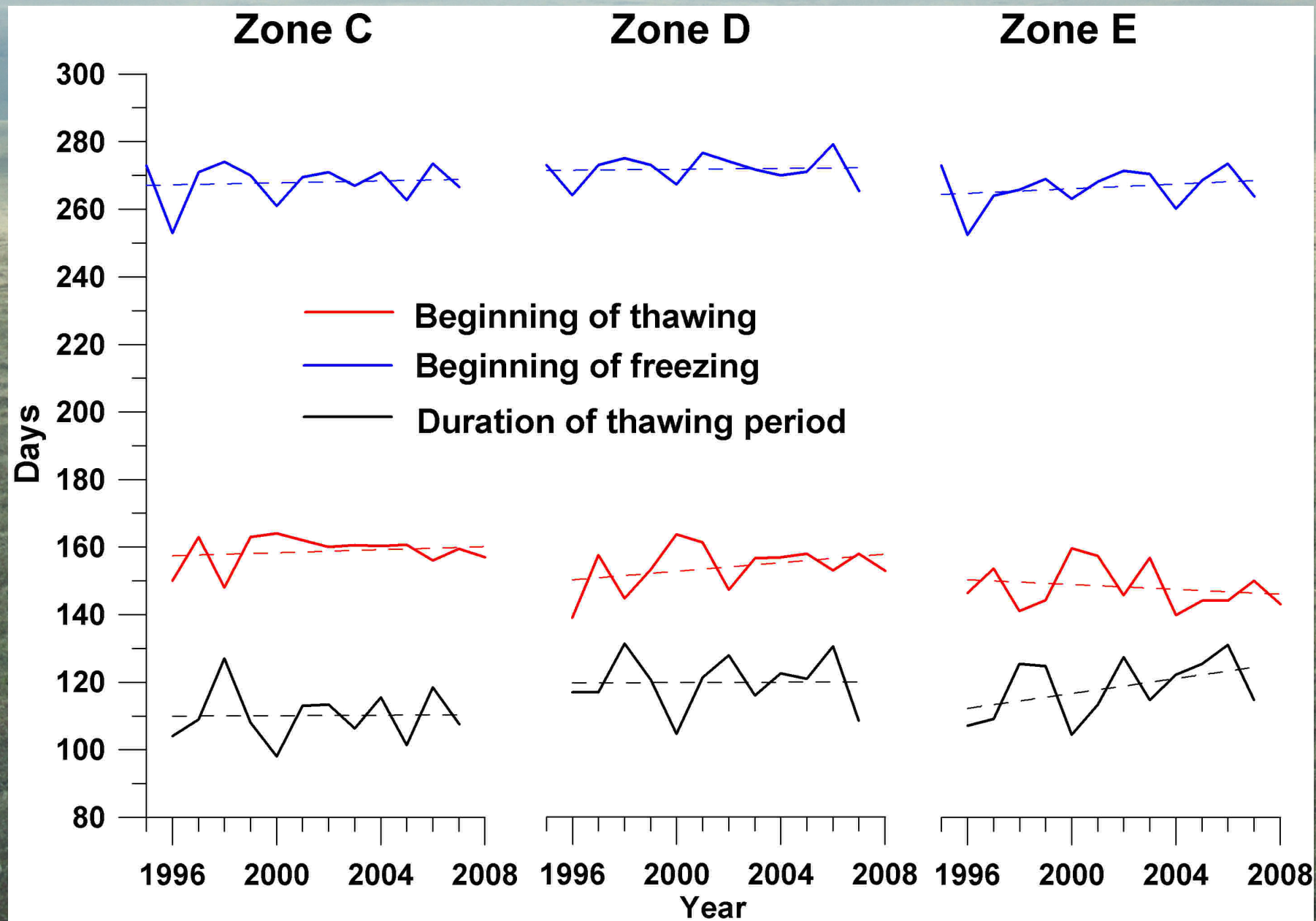
Seasonal Progression of Thaw Depth



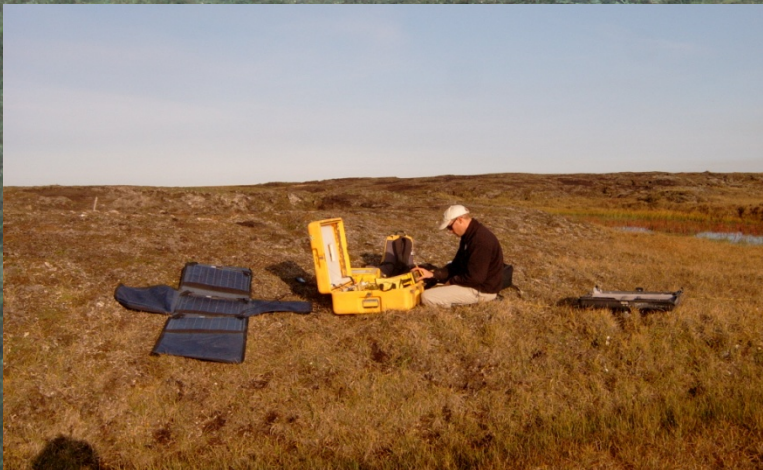
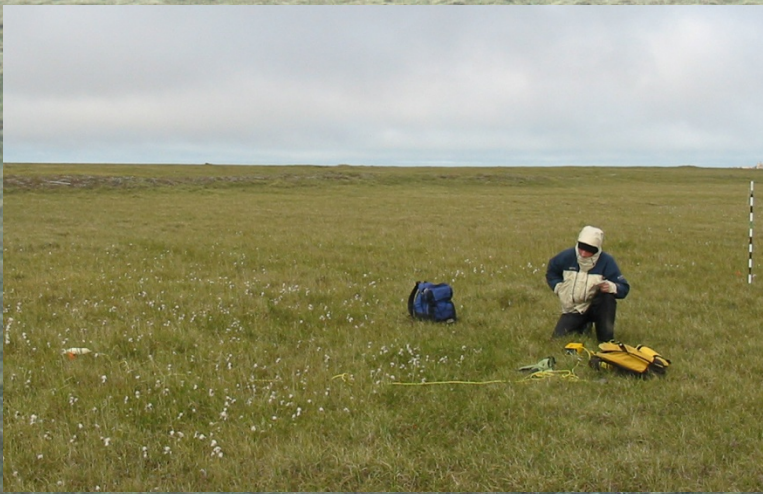
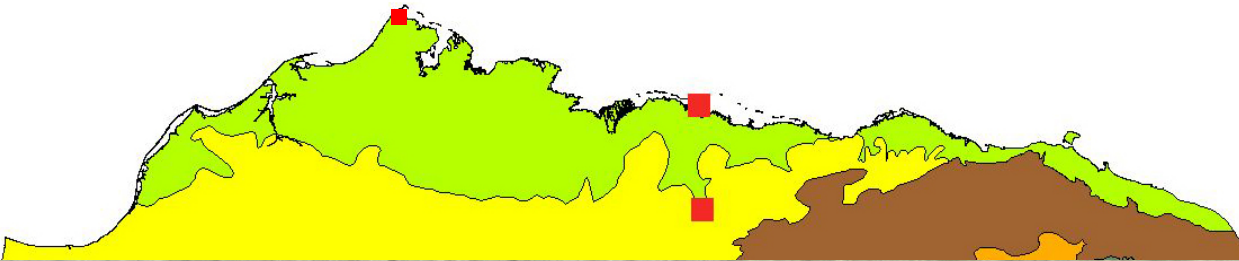
Trends of Air and Ground Temperatures within Bioclimatic Zones



The Length of Thawing Period at the Ground Surface within Bioclimatic Zones



Detection of Frost Heave and Thaw Settlement within Representative Landscapes.



Use of high-precision *Differential Global Positioning System (DGPS)* technology.

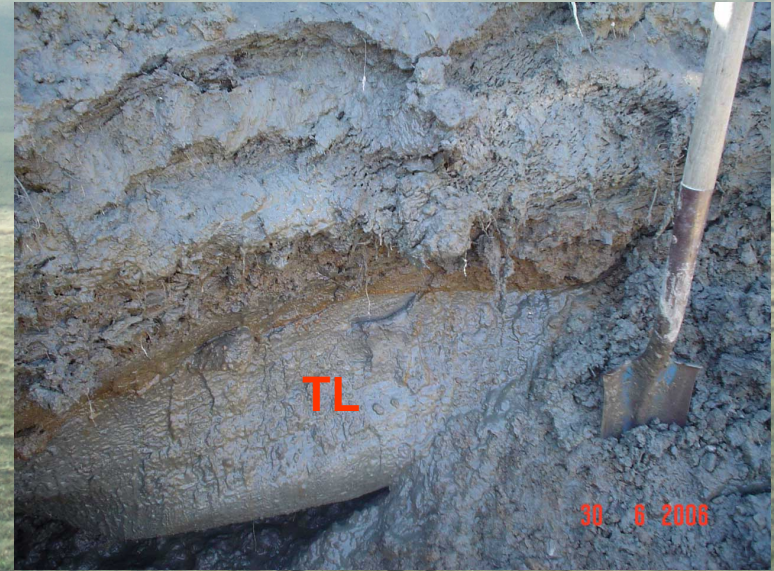
Three primary locations representative of main physiographic provinces.

Spatially-oriented observations at various characteristic landscapes.

36 observational points in each landscape unit.

Observations were initiated in 2001 and were conducted twice a year (June and August).

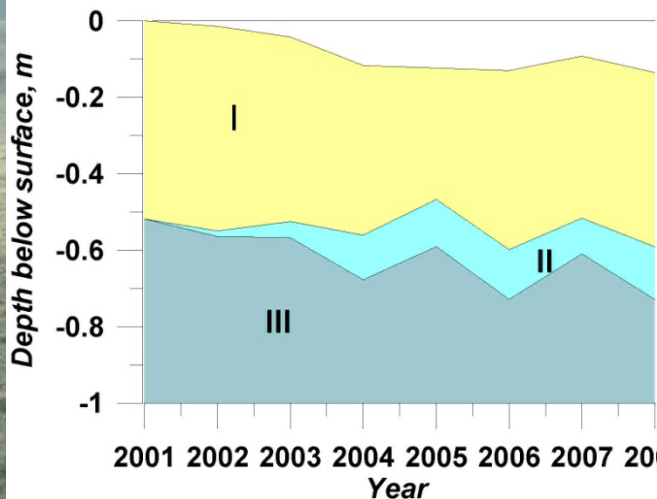
TRANSITION LAYER (TL)



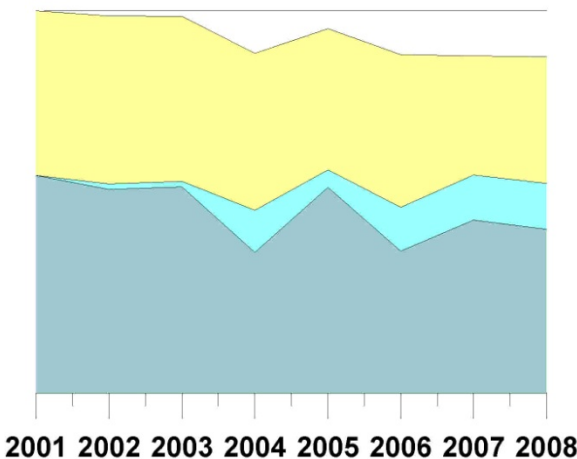
Transition Layer – boundary layer (0.1–2.0 m) between the active layer and permanently frozen part of permafrost.

Thaw Settlement within Representative Landscapes.

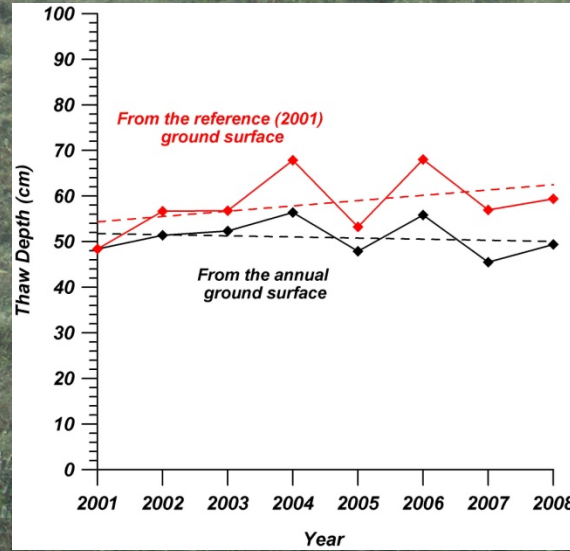
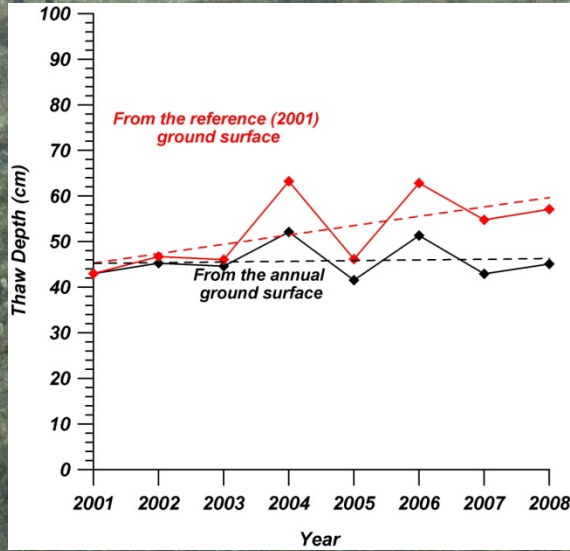
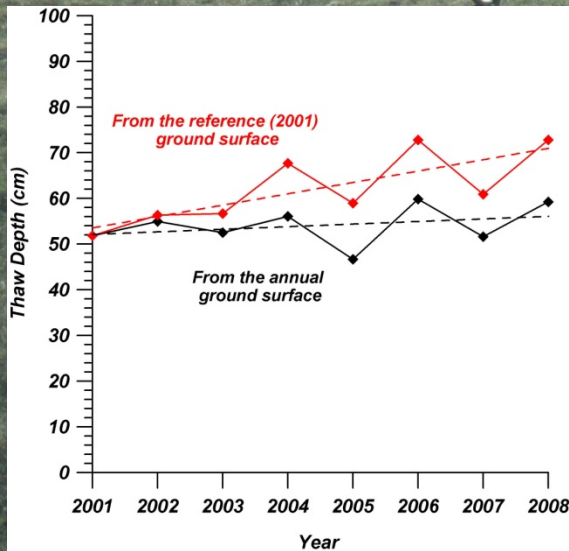
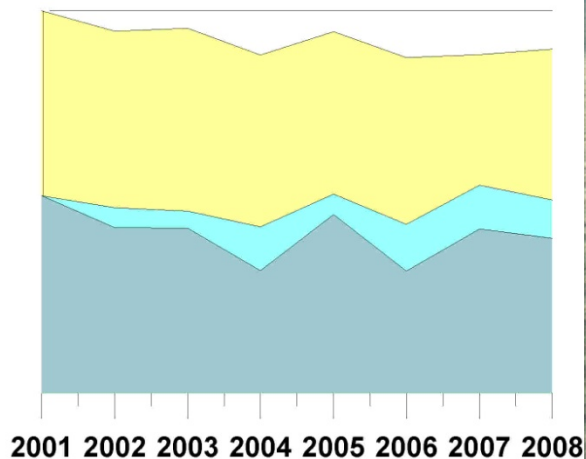
Foothills



Coastal Plain Upland

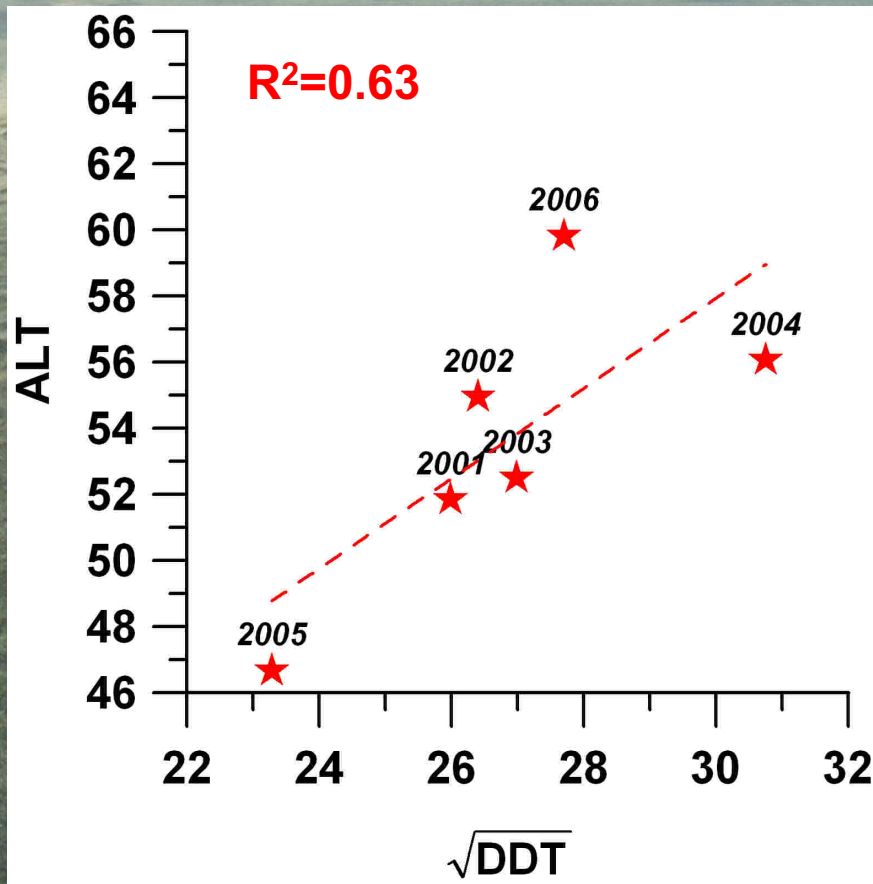


Coastal Plain Drained Lake Basin



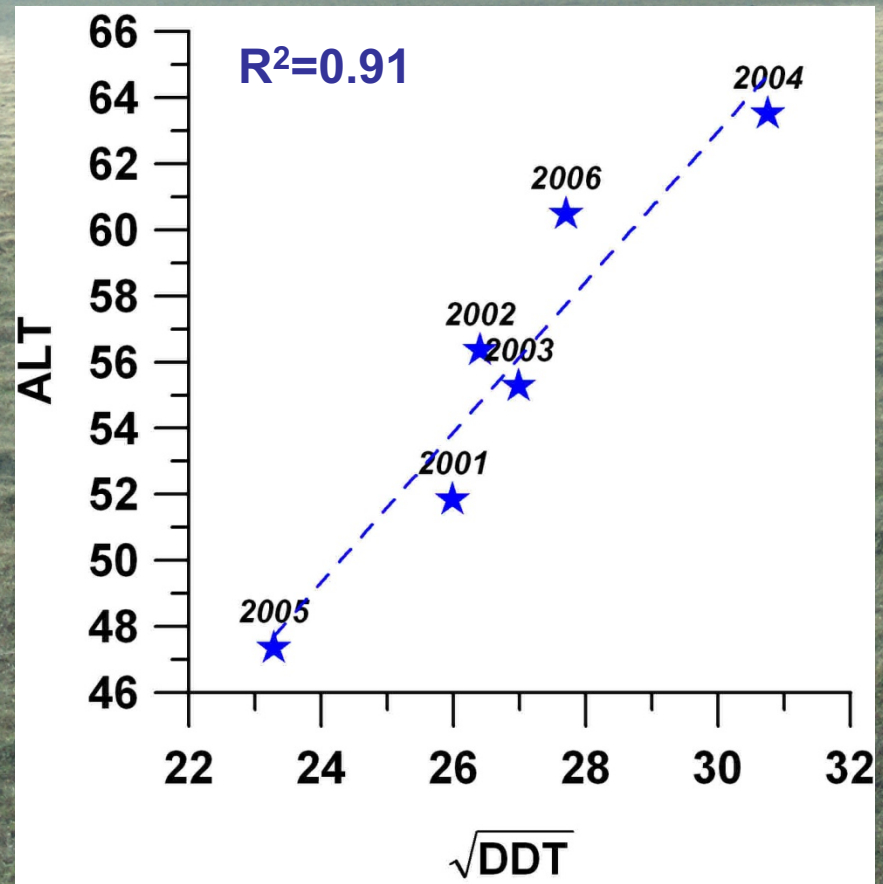
ALT vs \sqrt{DDT}

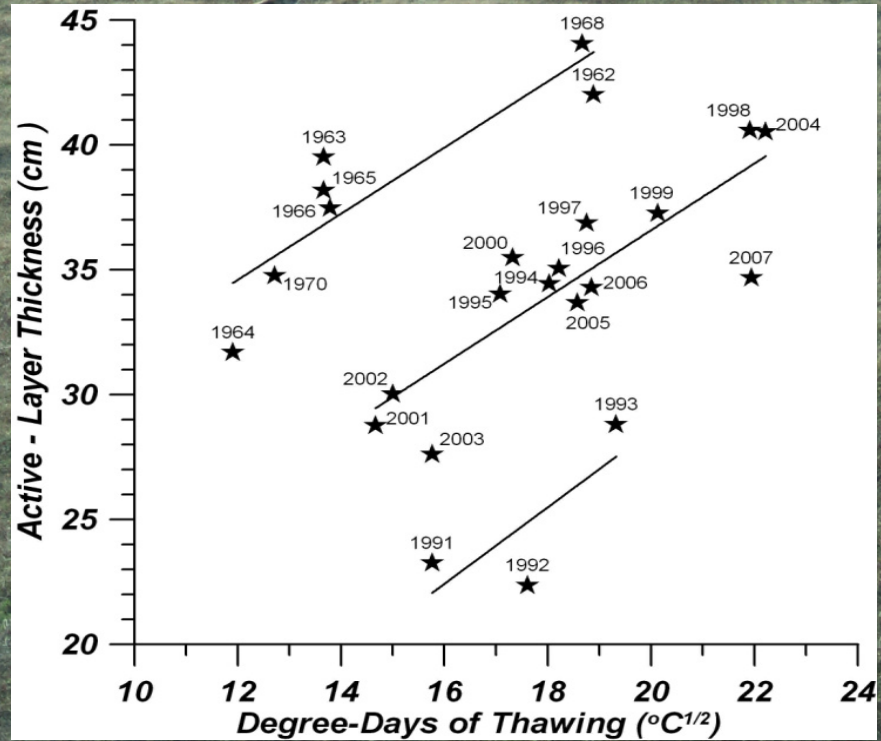
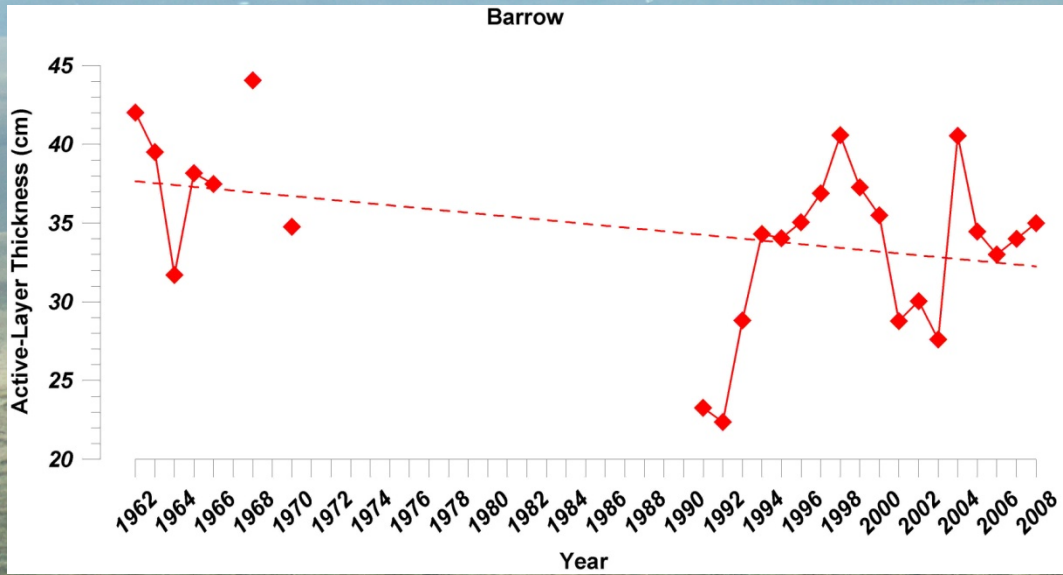
(ALT is as measured by metal probe)



ALT vs \sqrt{DDT}

(ALT is corrected for ground subsidence)





Thank you

