

# Snow & Weather Gradients Across Alaska's North Slope

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**The Question:** Precipitation instruments at OLI to be moved after 2021, but to where?



**The Choices:** Either to SAIL in Colorado or to extend NSA footprint inland.



**The Science:** Pressing need to capture the sharp weather & precipitation gradients that exist across the North Slope of Alaska.

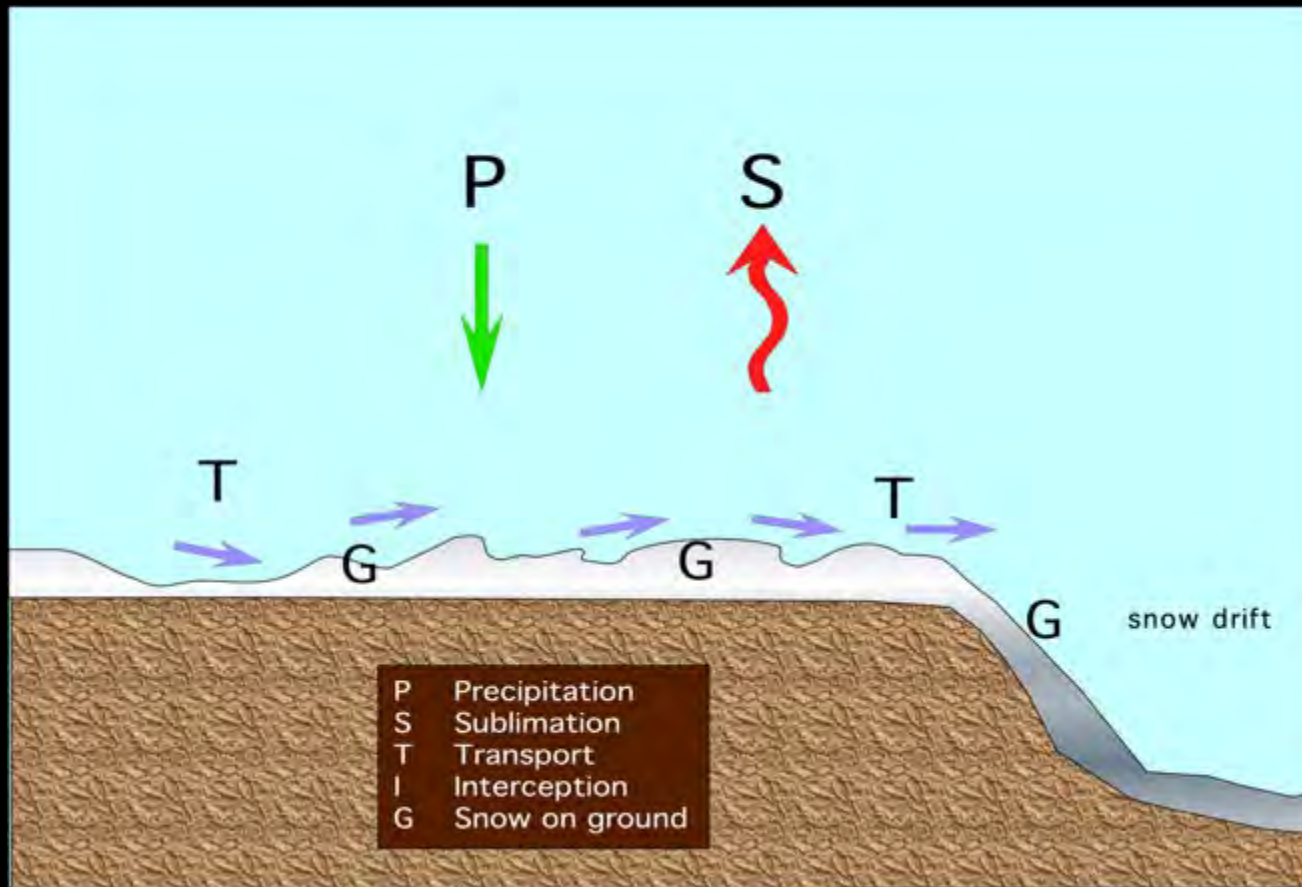


**Who are we?** Snow and snow precipitation experts from the University of Alaska now mentors for NSA and OLI precipitation instruments and conducting SALVO albedo experiment.



## Why Snow?

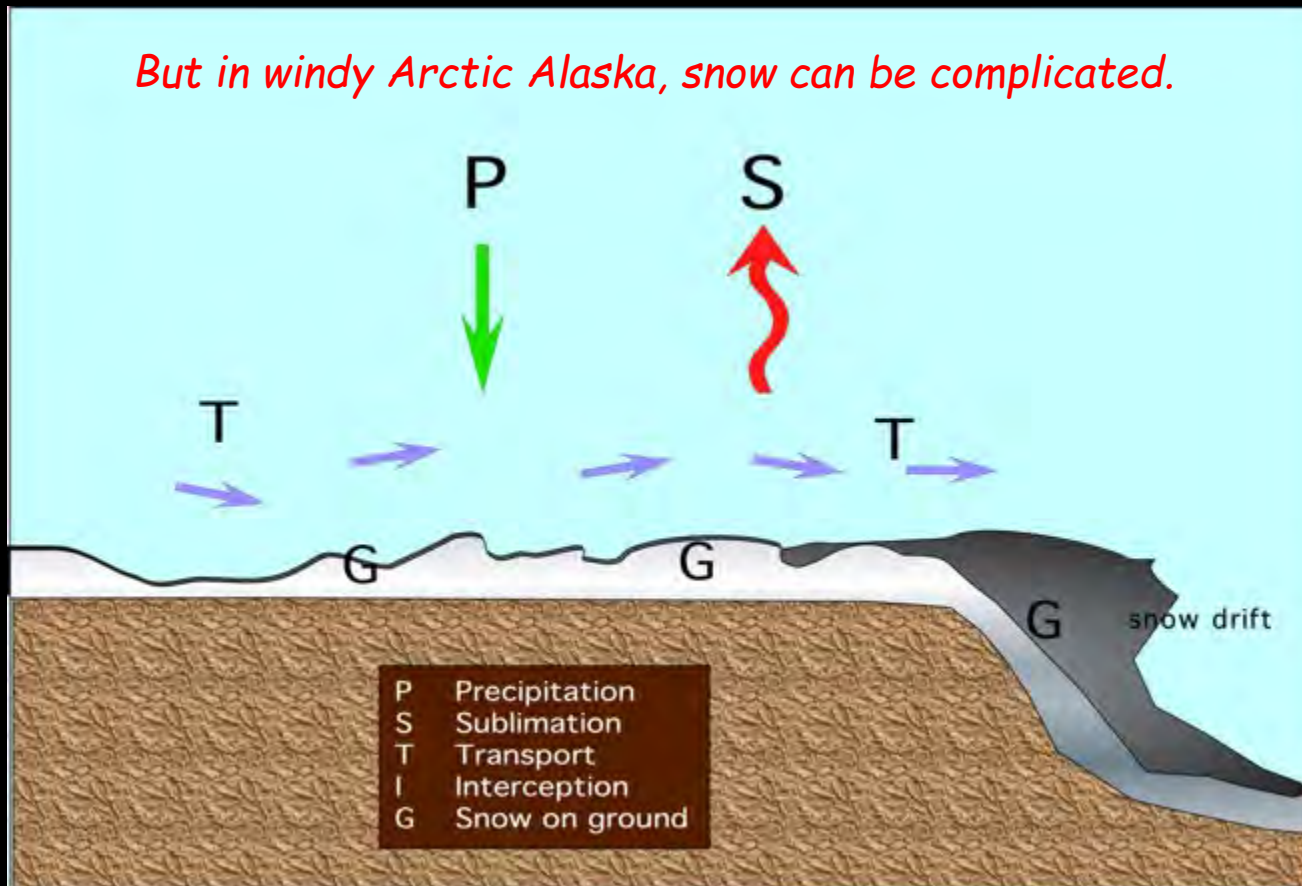
- Snow covers AK tundra 9 months of the year
- Snow 1<sup>st</sup> order control on state of permafrost
- Snow reflects up to 90% of visible radiation
- Snow 1<sup>st</sup> order control on sea ice freezing
- Snow a cumulative record of winter weather events



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*But in windy Arctic Alaska, snow can be complicated.*

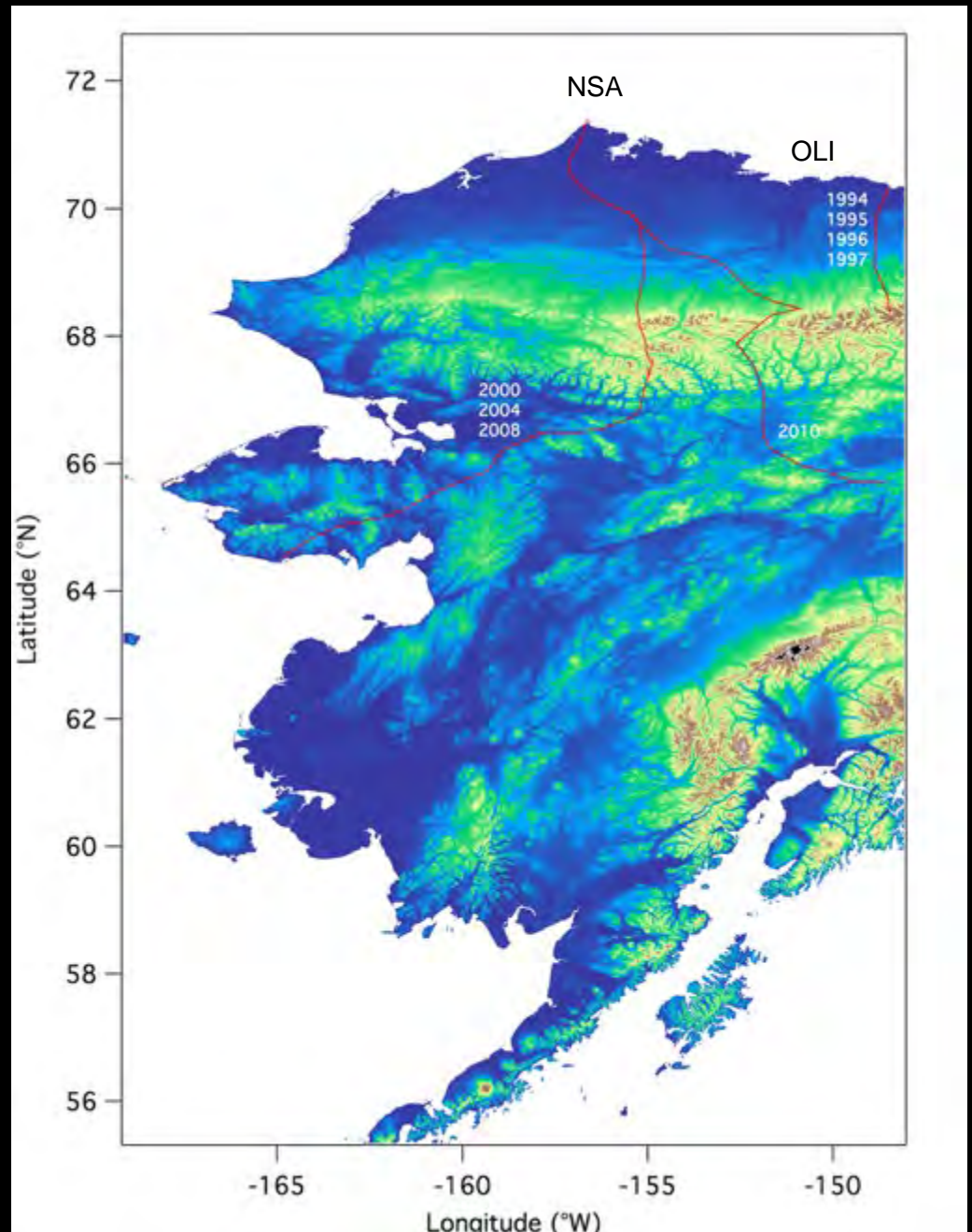




# A Regional Perspective

*Long Oversnow Traverses*

1994  
1995  
1996  
1997  
2000  
2004  
2008  
2010  
2014







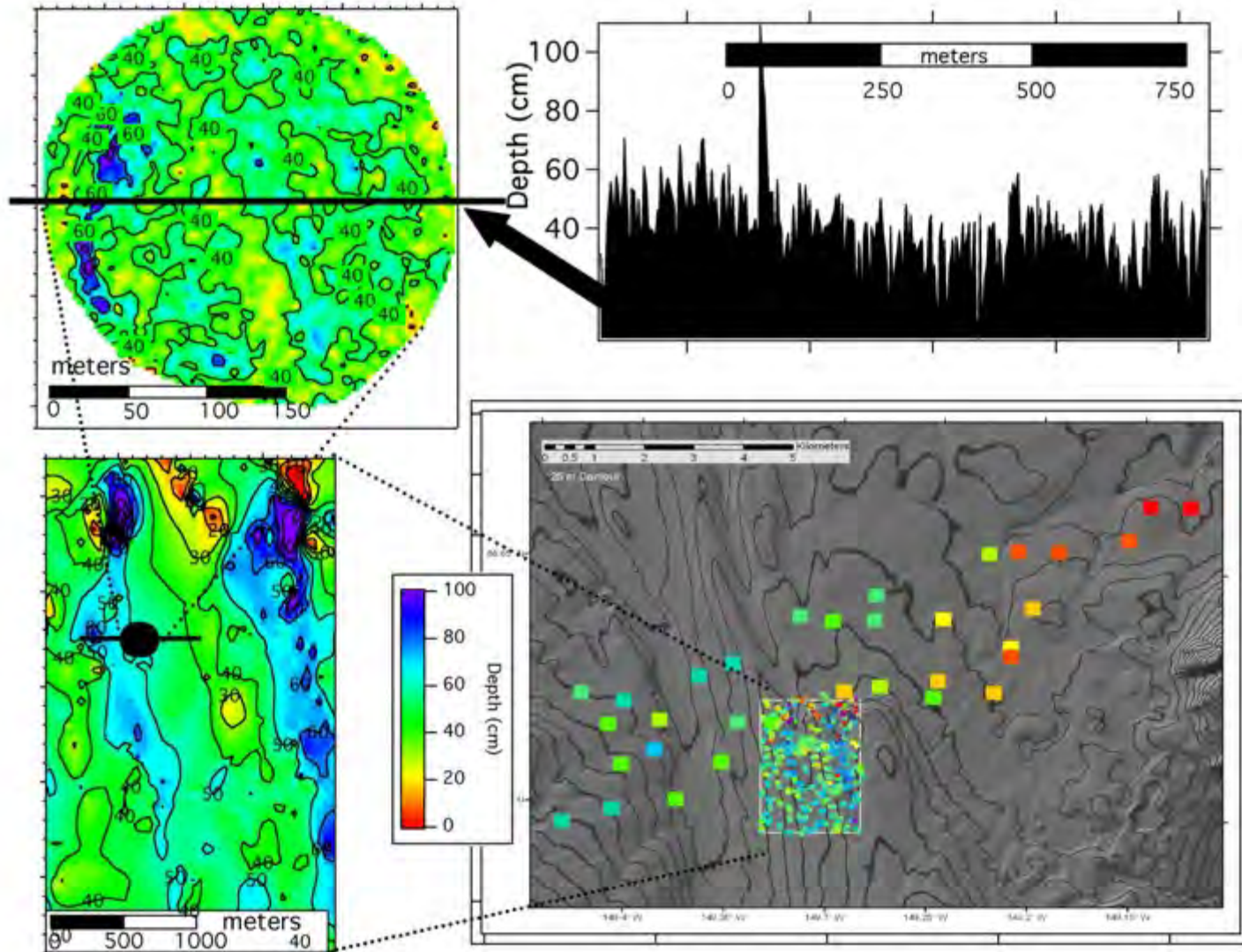


# Measuring snow depth, density, stratigraphy and distribution repeatedly . . . .





While struggling against local snow heterogeneity . . . .

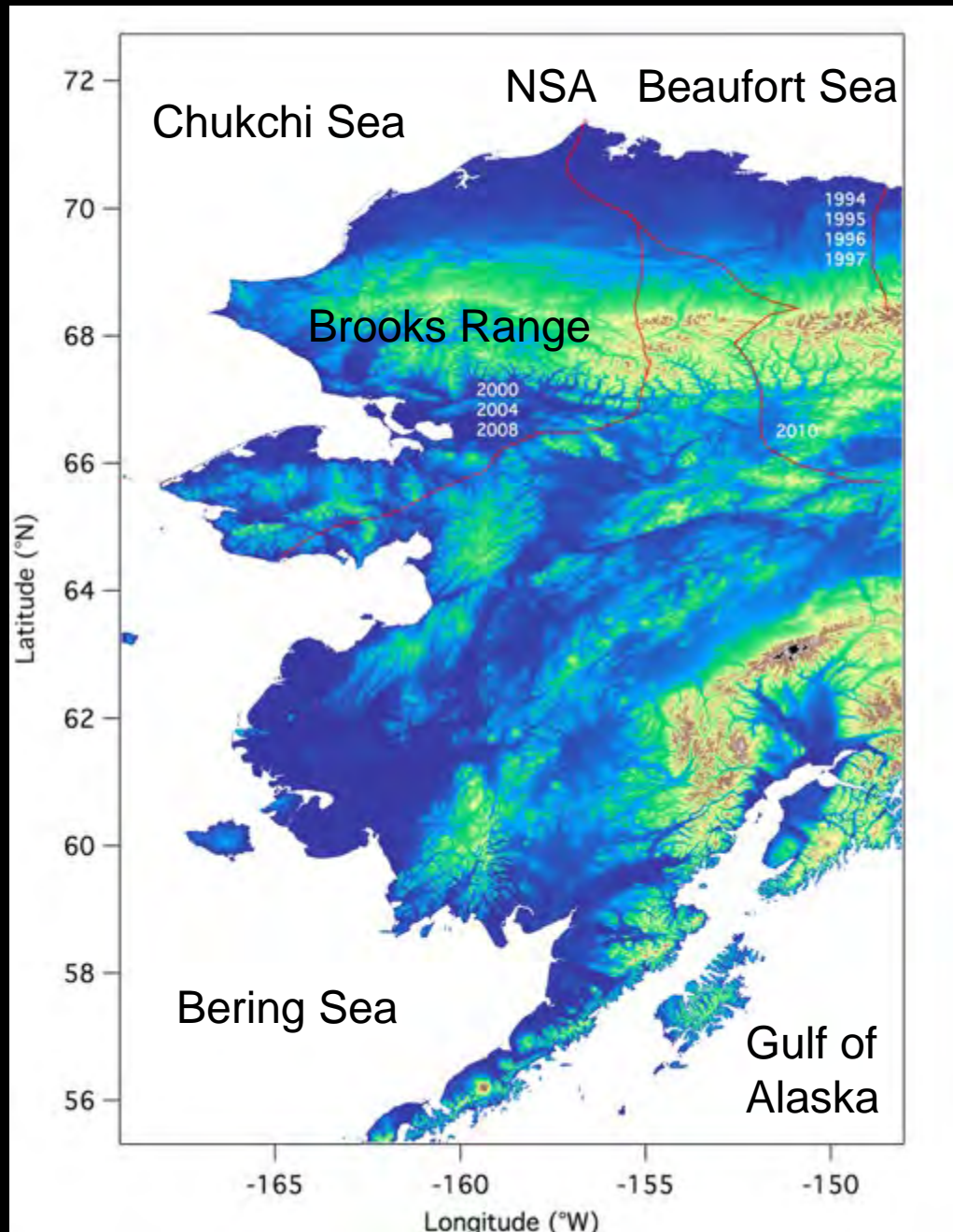


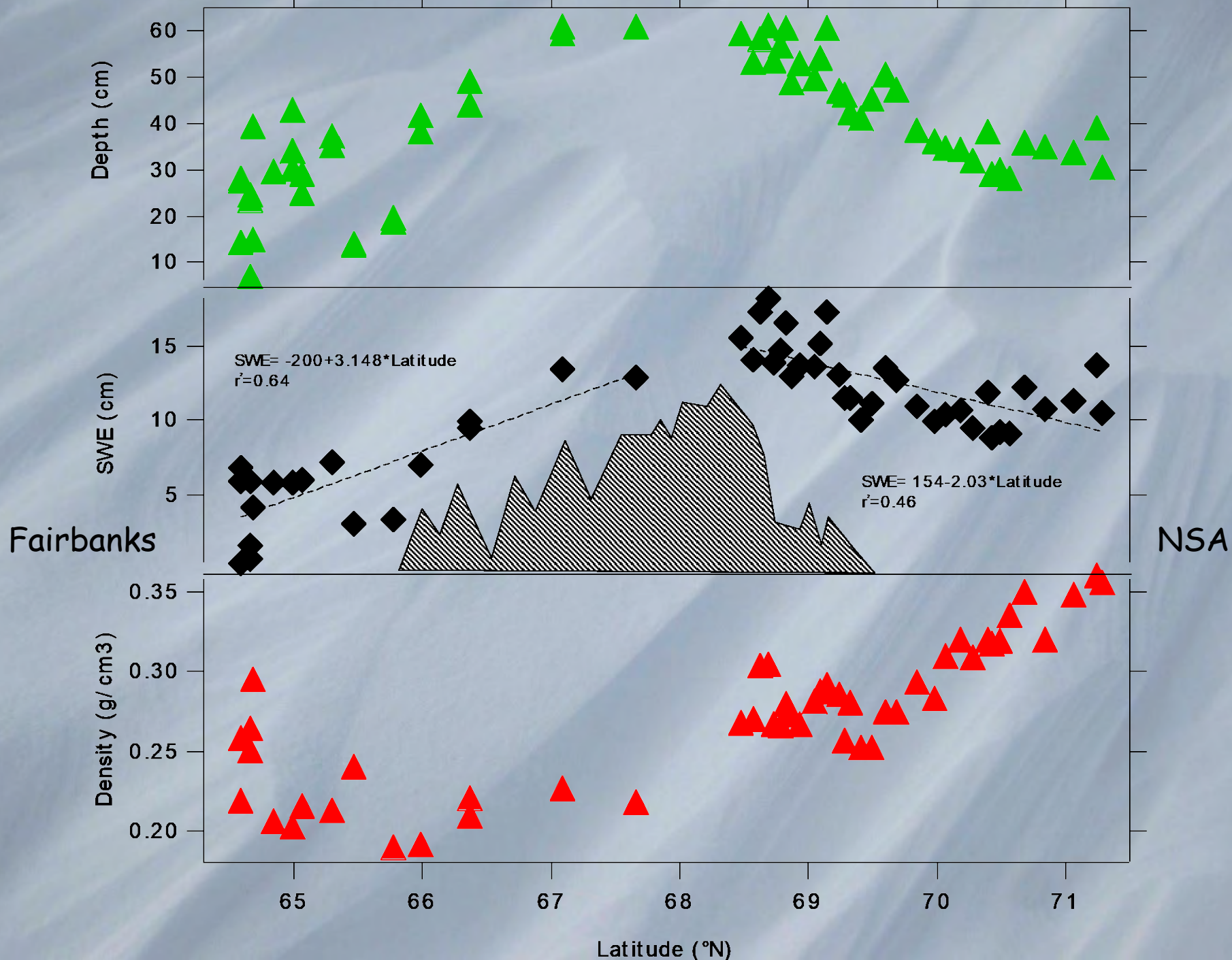
Snow gradients reflect gradients in other weather as well:

- Temperature
- Cloudiness
- Sunshine
- Wind
- Fog
- Stratus

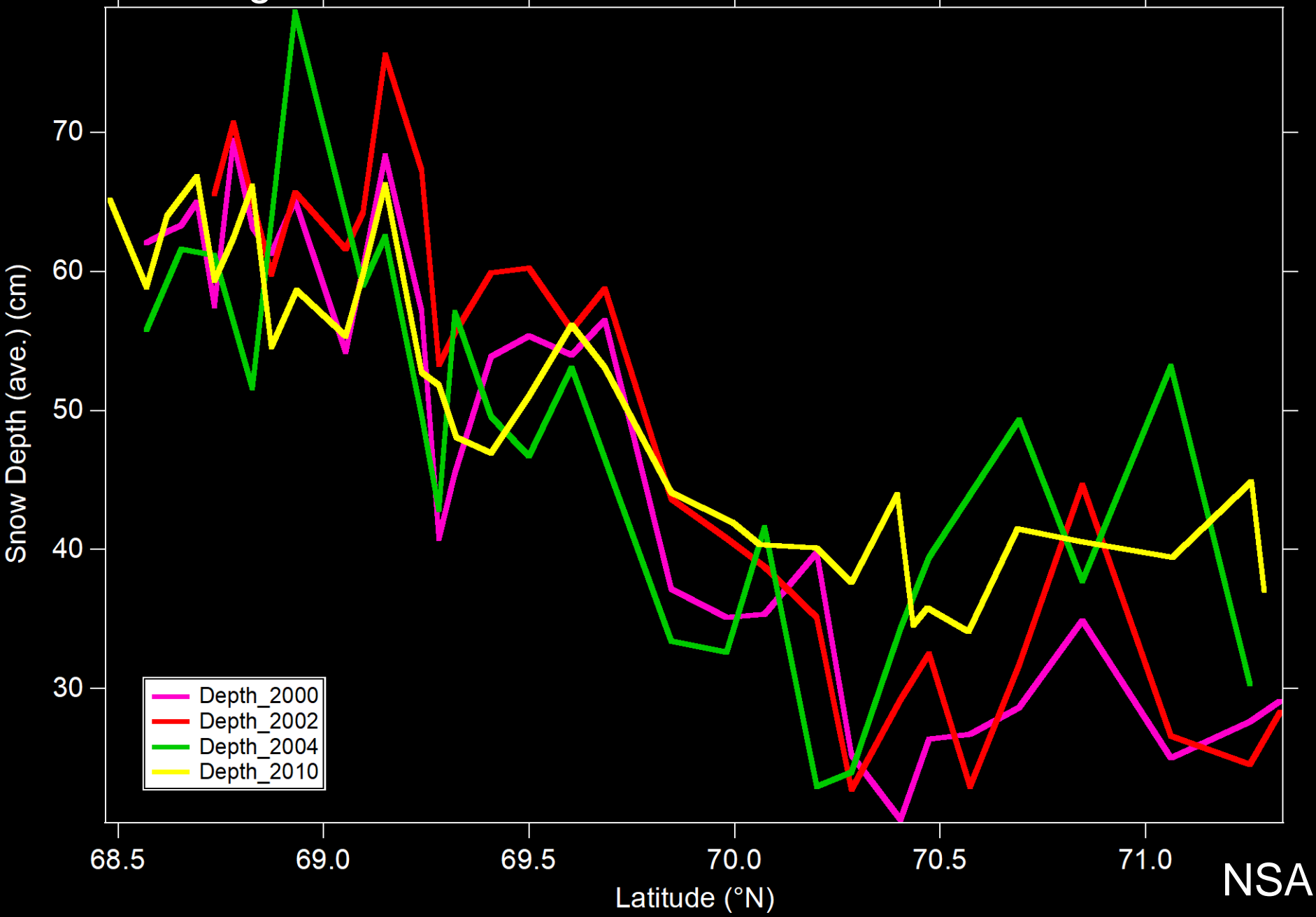
Gradients Driven by Oceans, Mountains, & Sea Ice







# Brooks Range



NSA



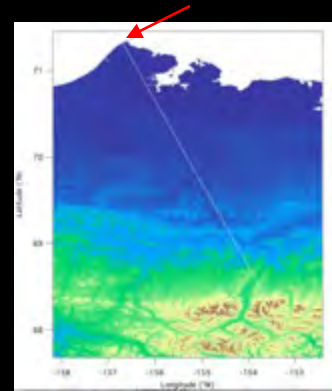
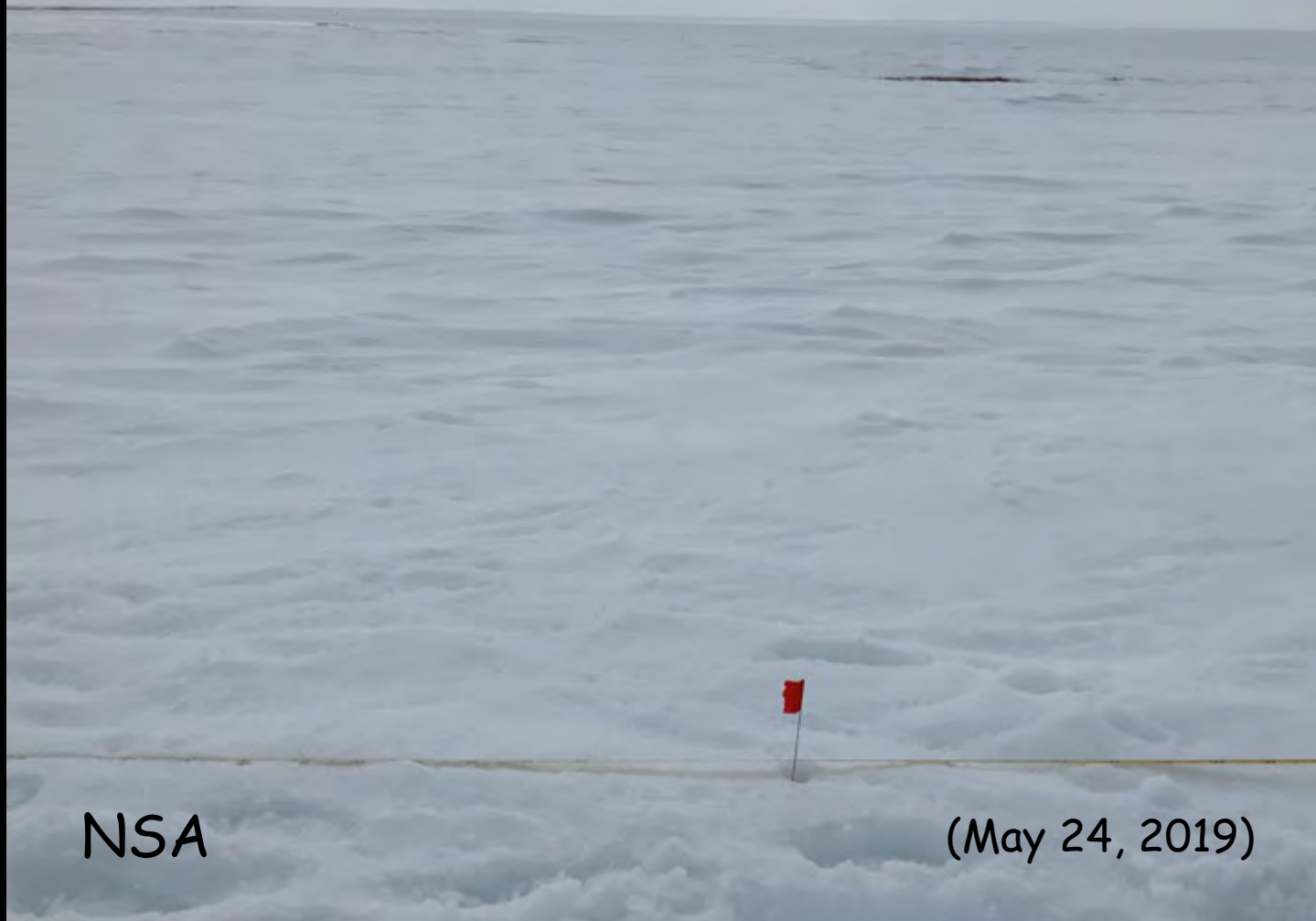
# Drilling down to NSA



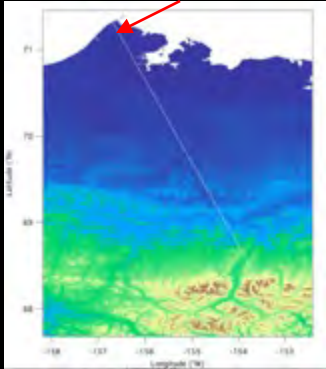
# NSA-Looking North



# NSA-Traveling South

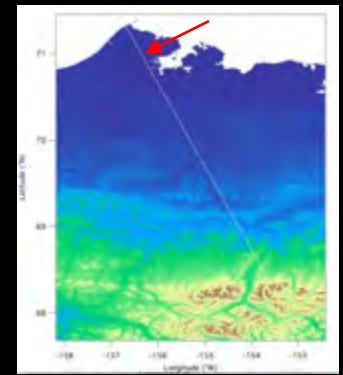




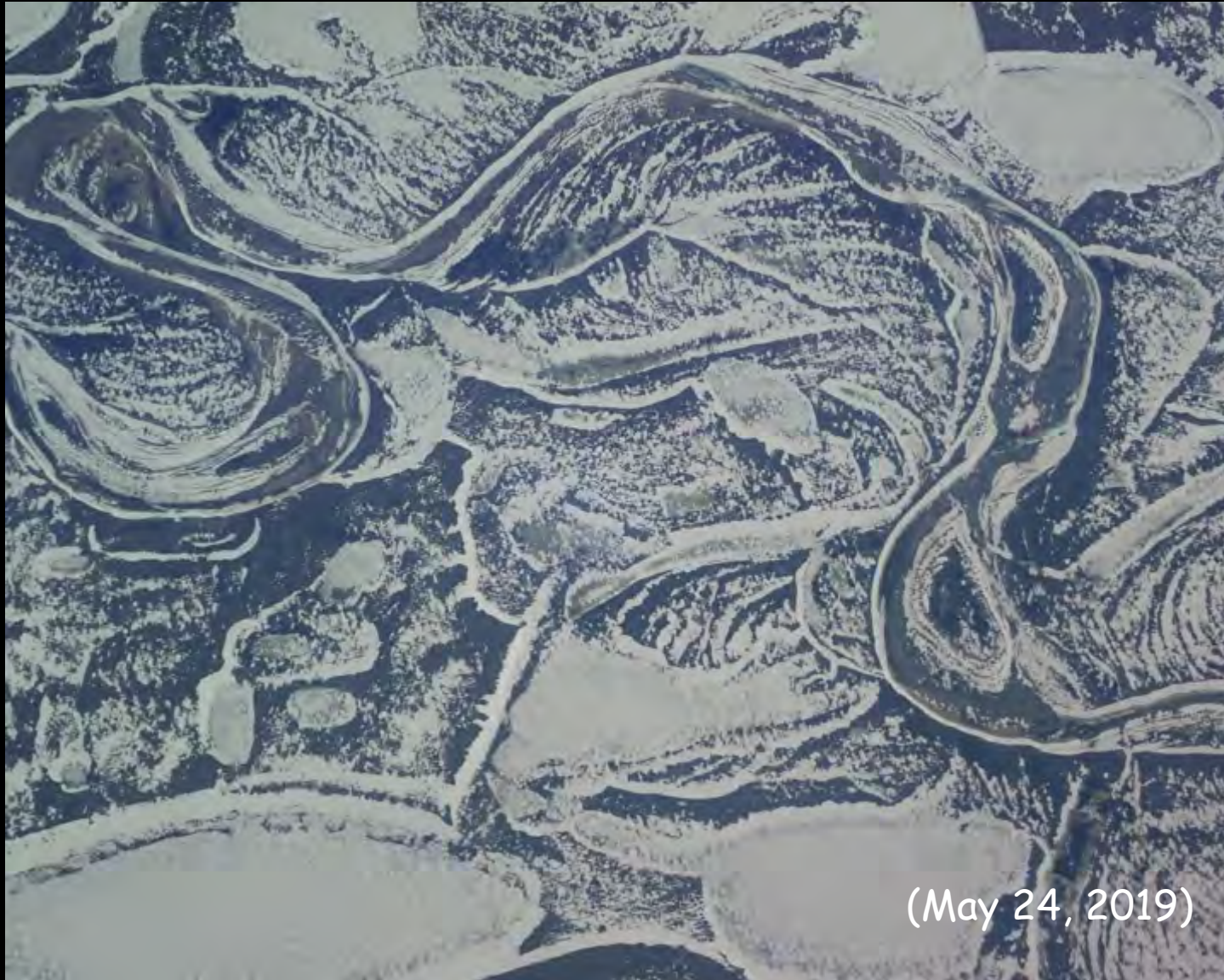


BEO

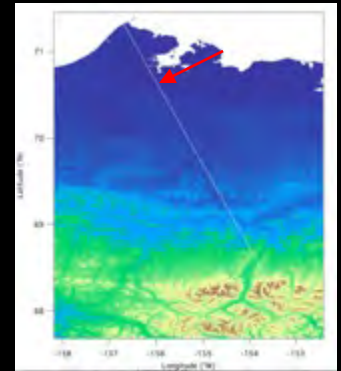
(May 24, 2019)







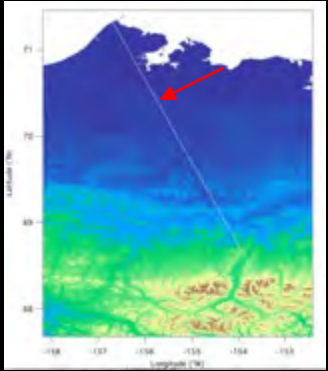
(May 24, 2019)



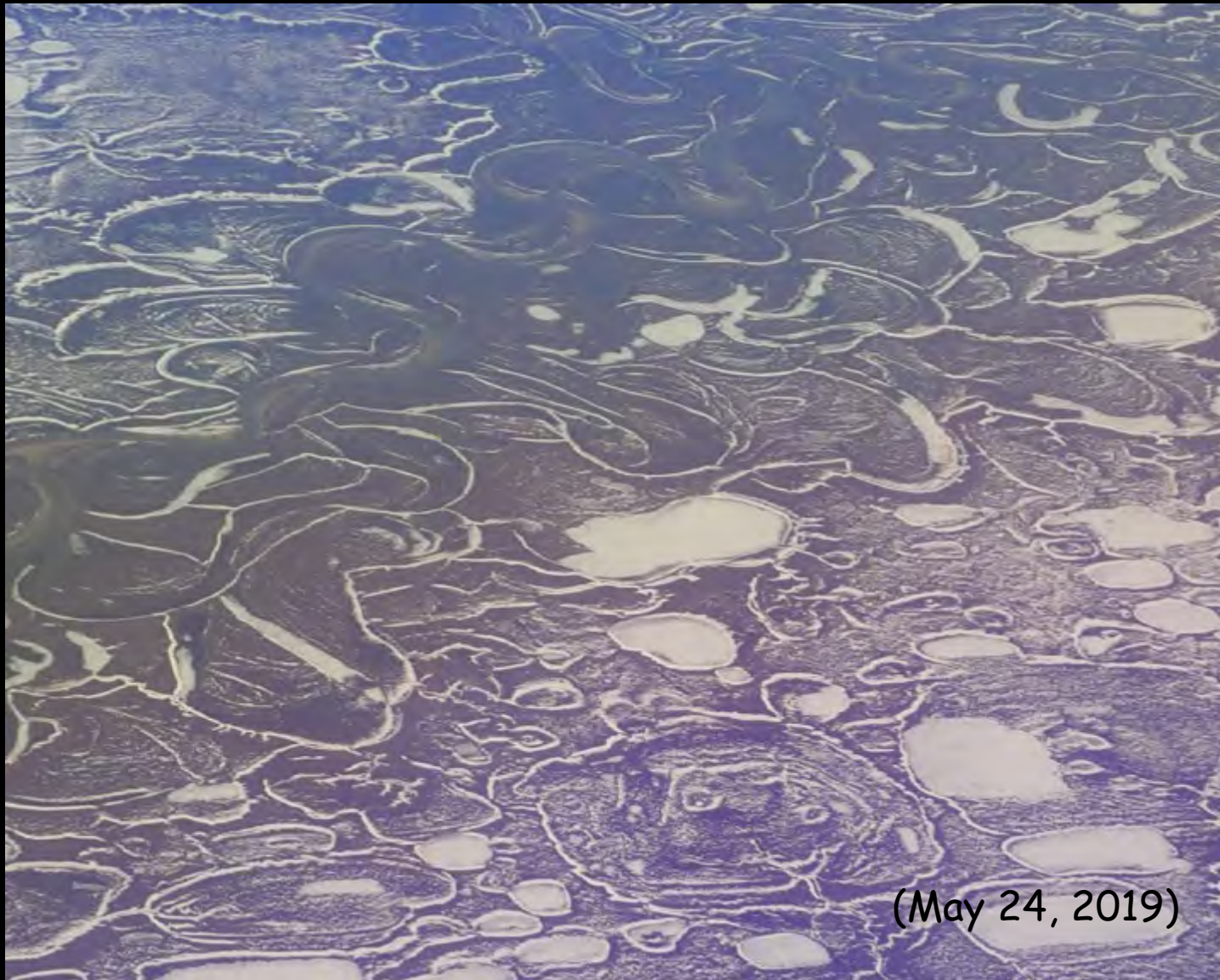




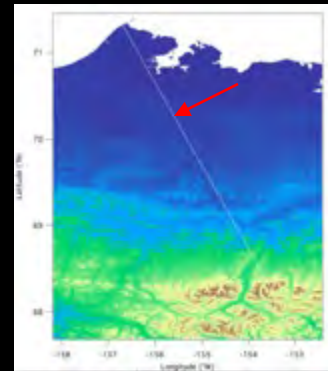
(May 24, 2019)





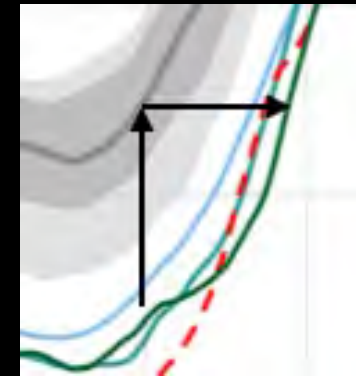
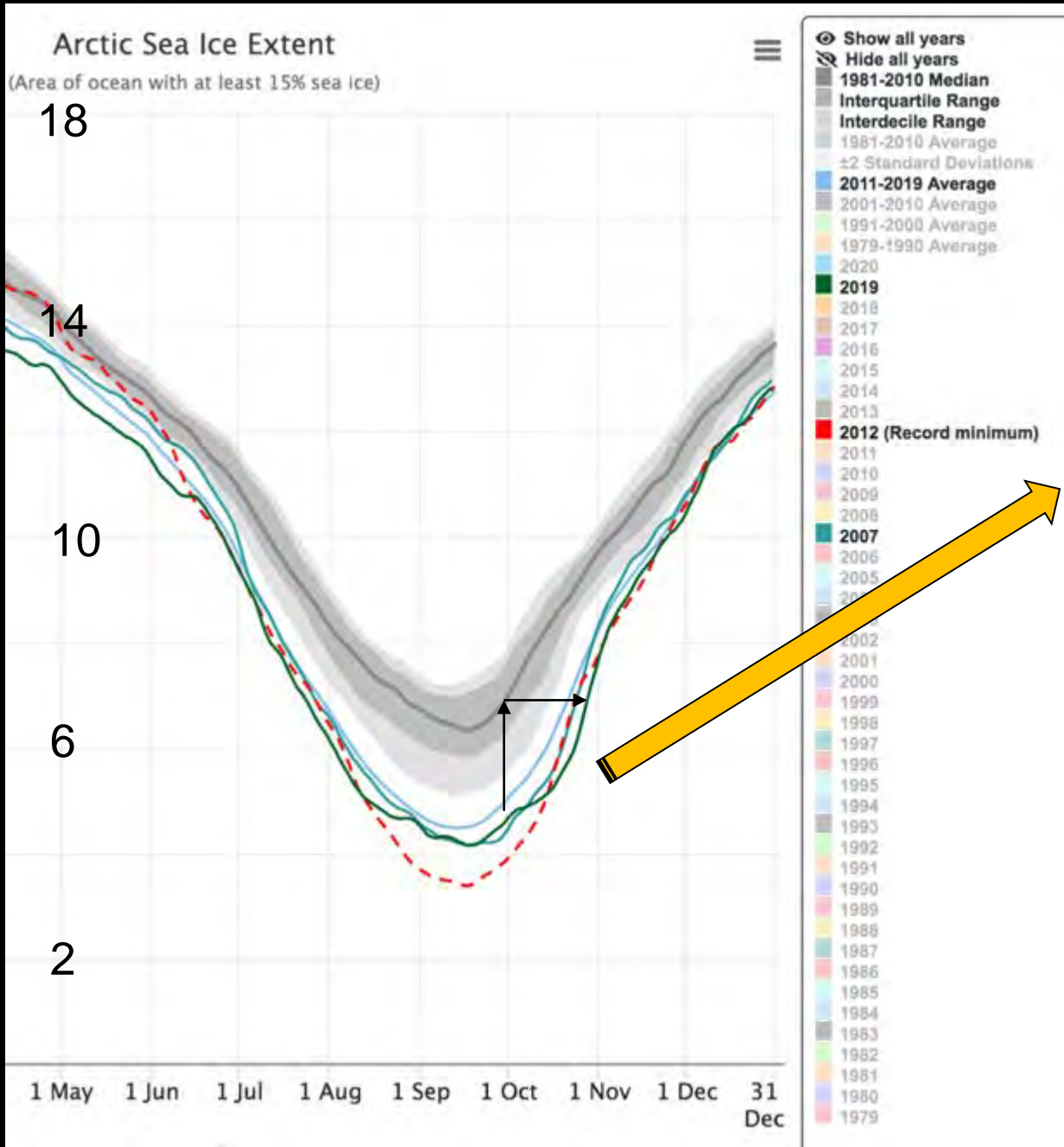


(May 24, 2019)



Scientifically, what is at stake?

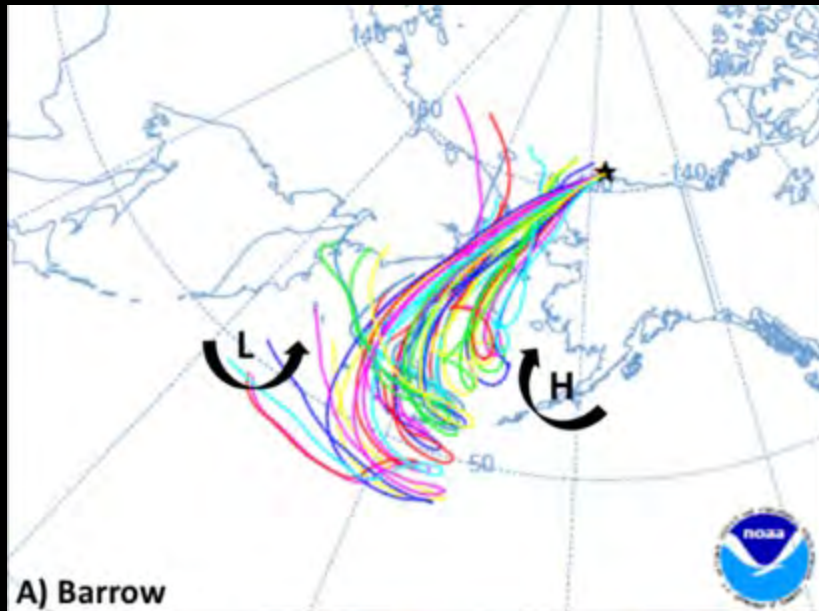
Extent (Millions of sq. kilometers)



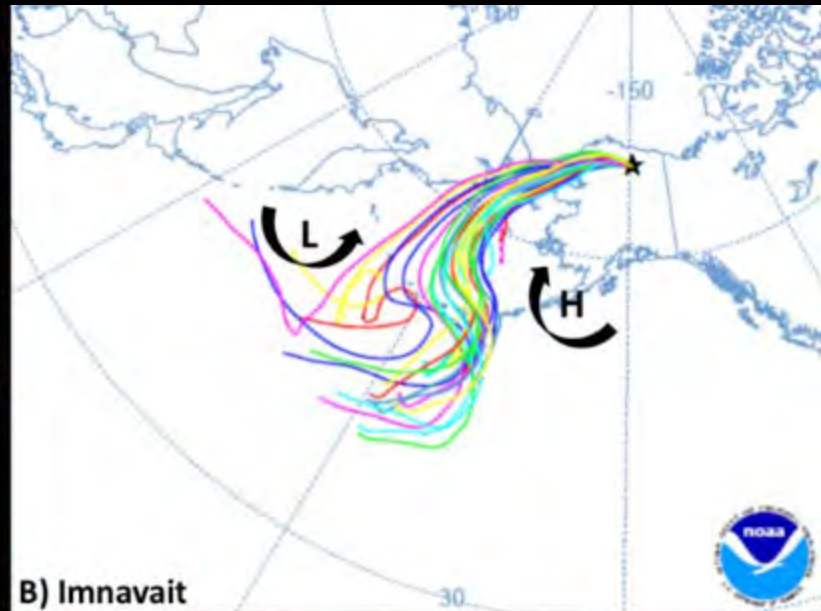
One month change

Data from NSIDC

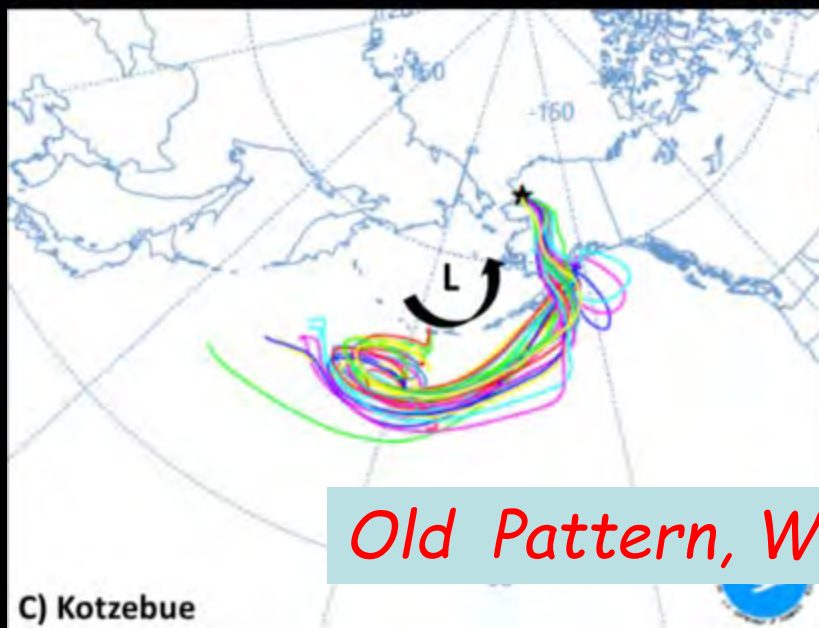




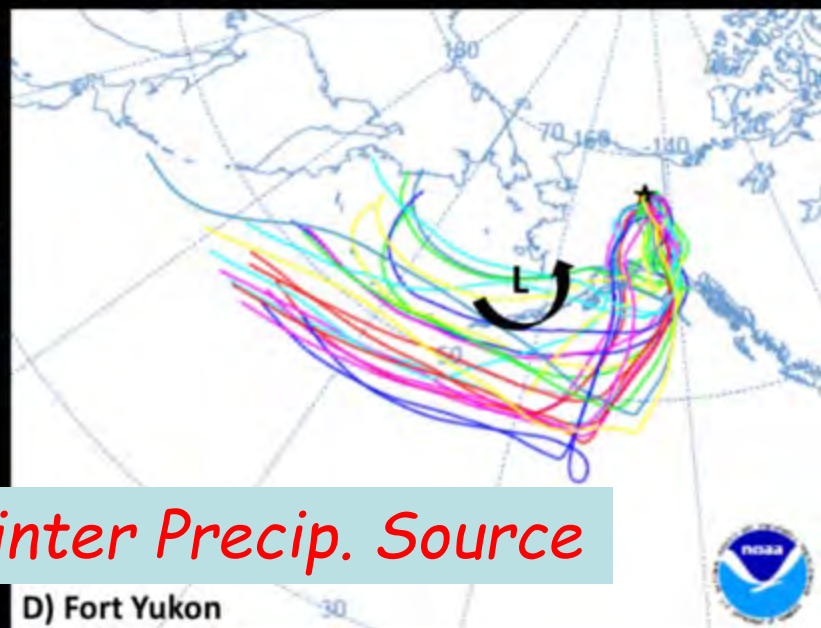
A) Barrow



B) Imnavait

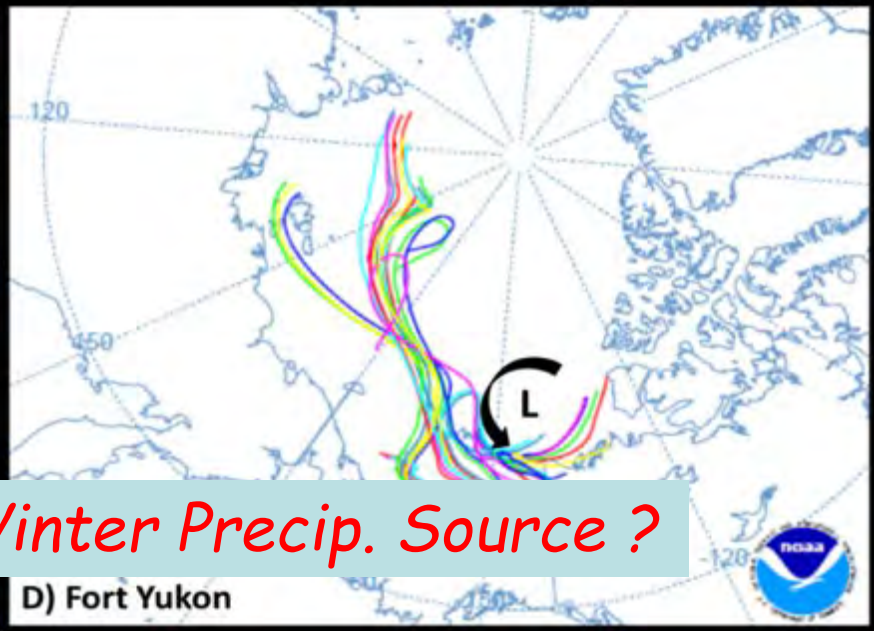
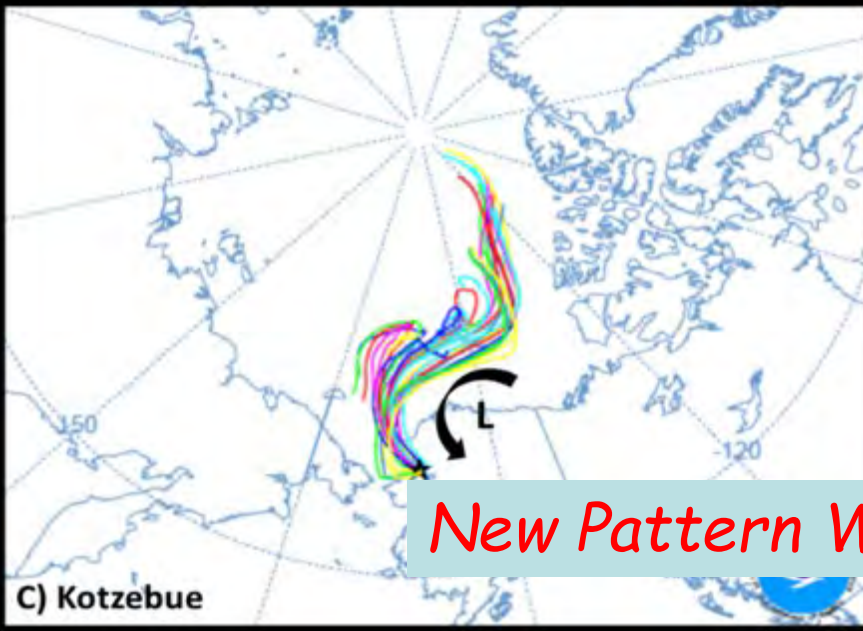
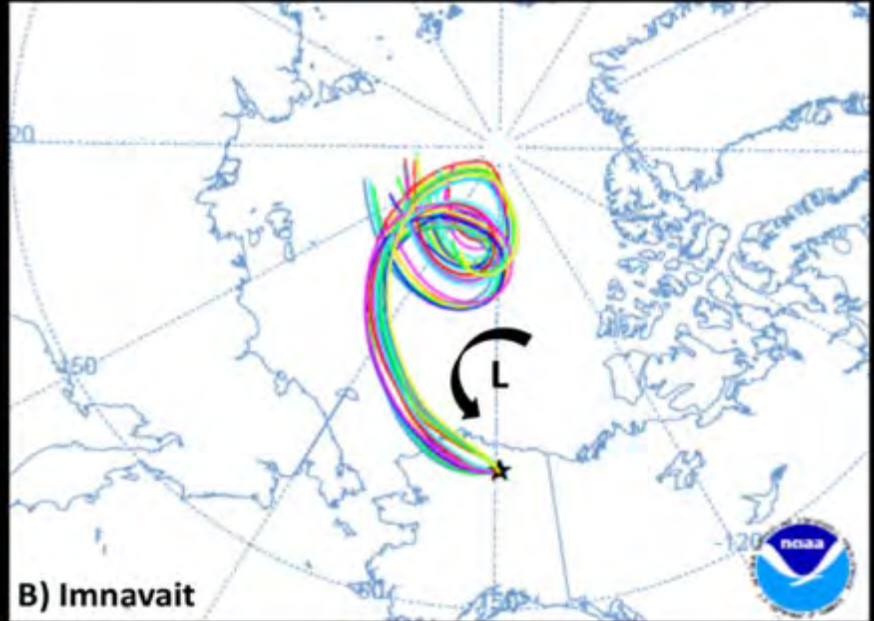
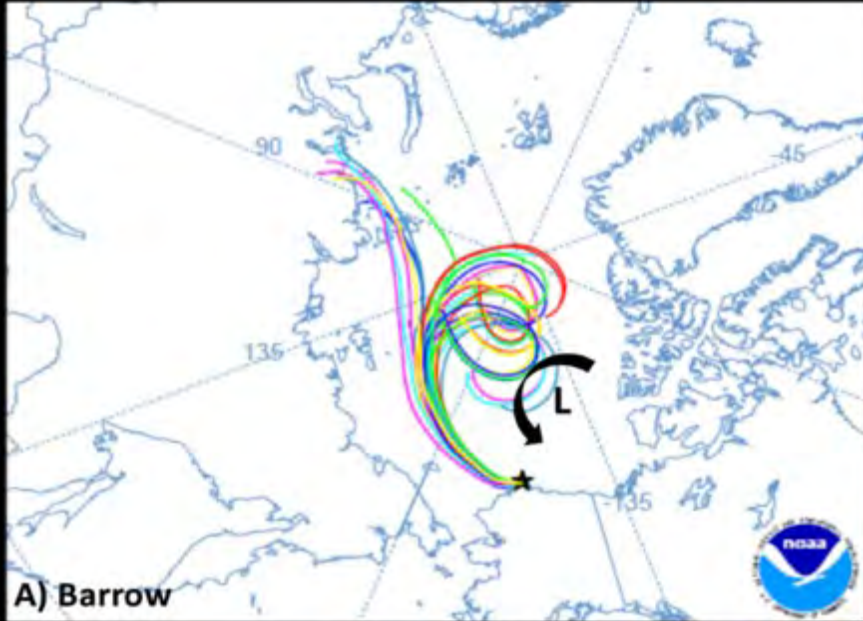


C) Kotzebue



D) Fort Yukon

*Old Pattern, Winter Precip. Source*



*New Pattern Winter Precip. Source ?*



# A Start on Capturing Gradients



**ASR Project: The Seasonal Evolution of Land and Sea Surface Albedo during Snowmelt Along the Alaskan Arctic Coast (SALVO)**

