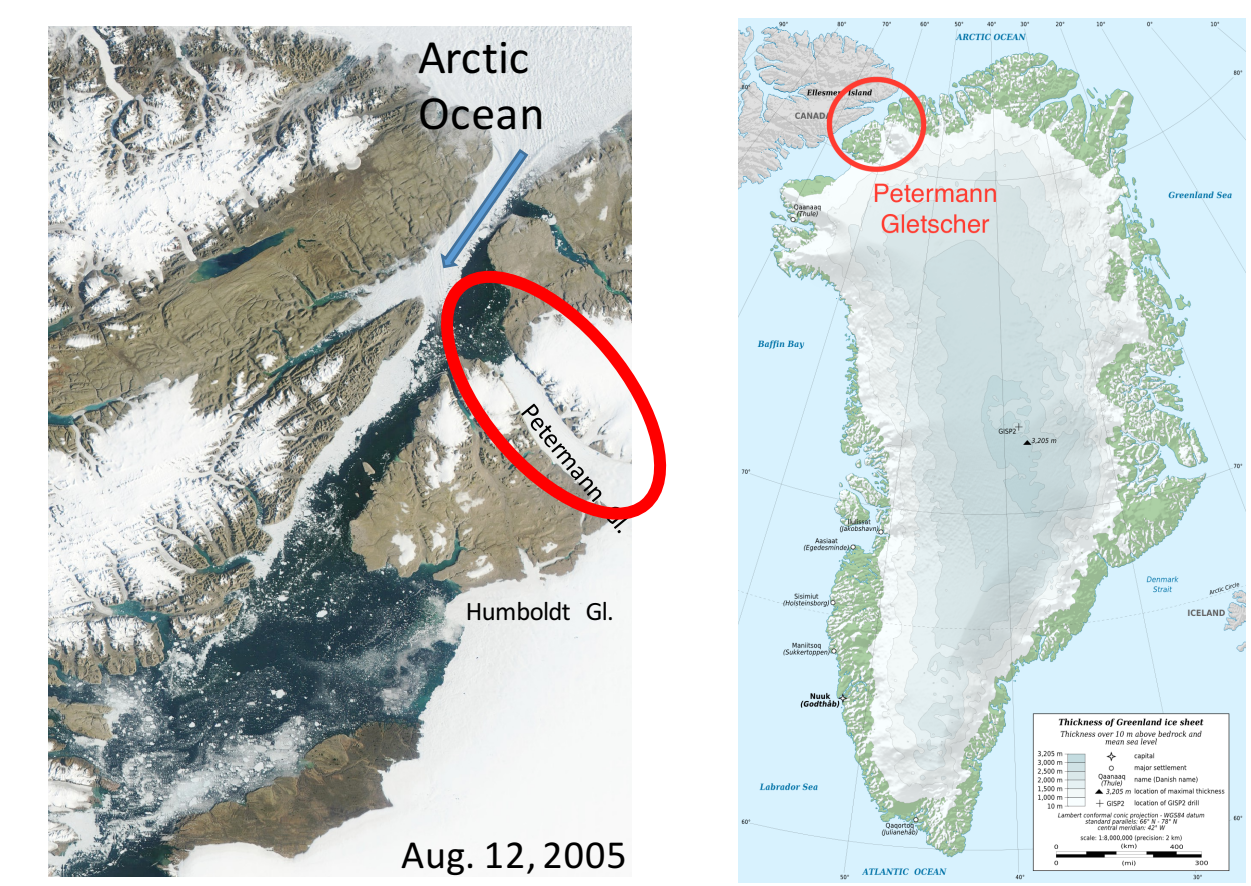


# Ocean Warming in Petermann Fjord North Greenland

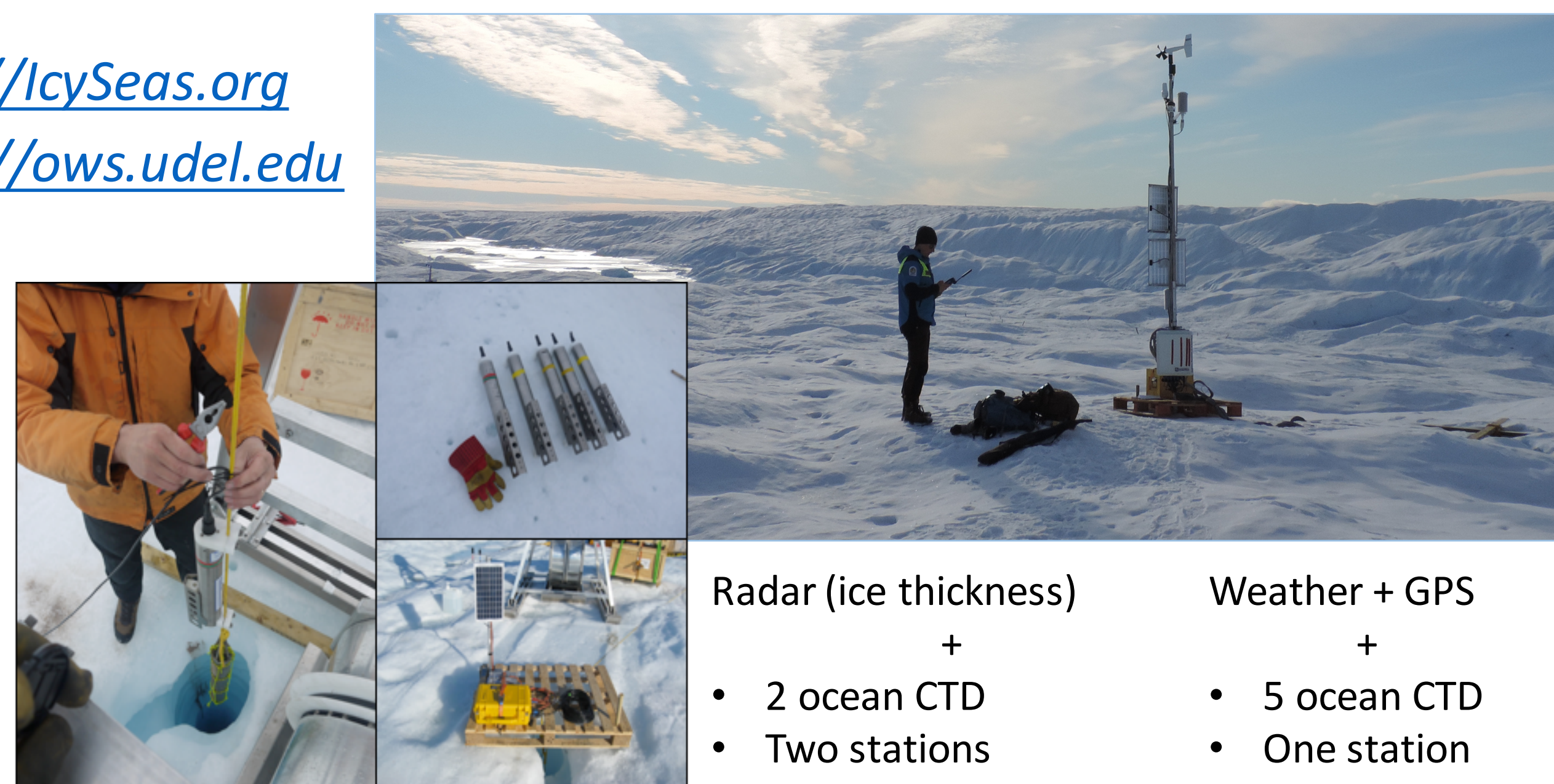


Andreas Münchow\* University of Delaware, USA  
 Peter Washam University of Delaware, USA  
 Laurie Padman Earth & Space Research, USA  
 Keith Nicholls British Antarctic Service, UK

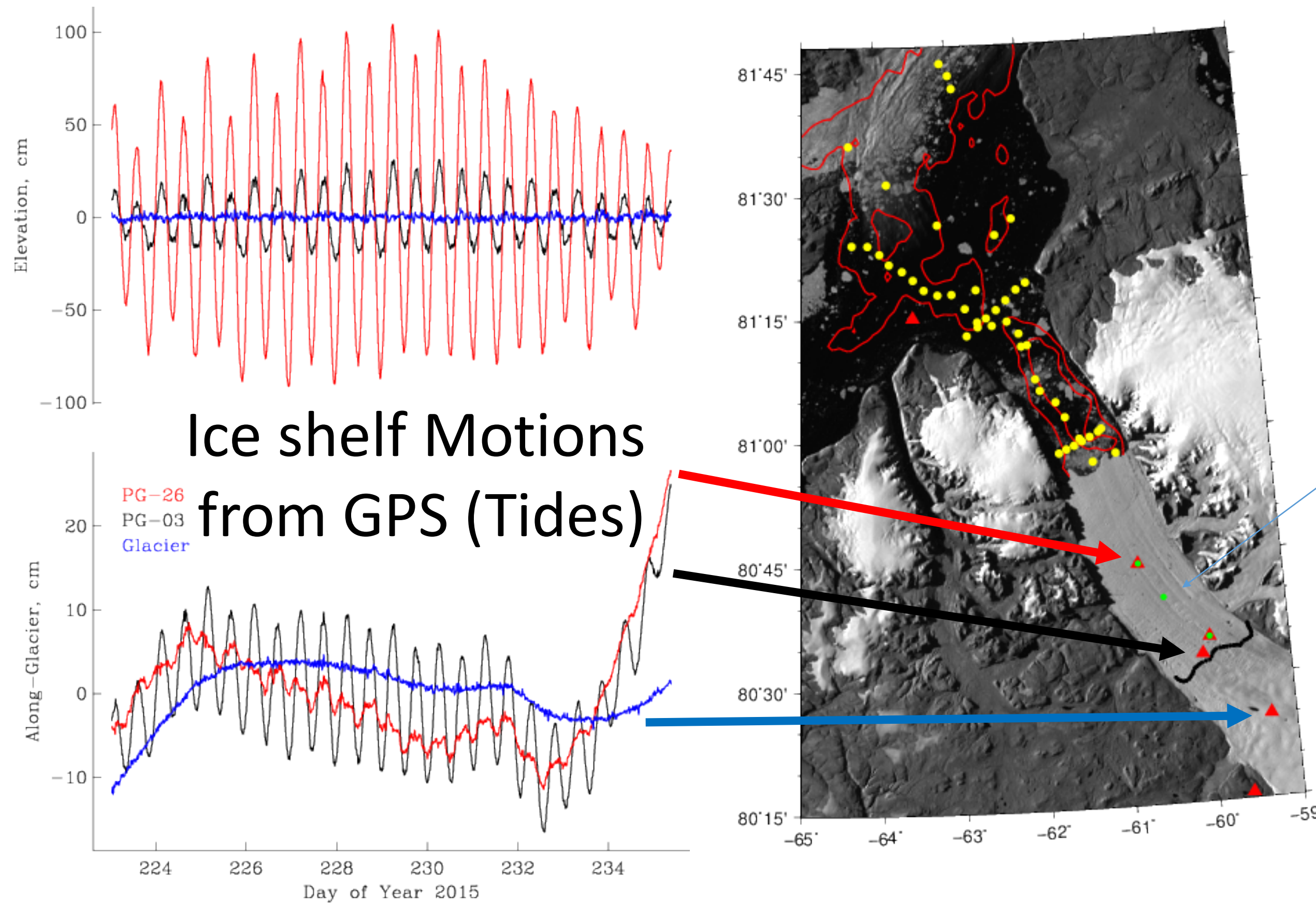
(\*) muenchow@udel.edu

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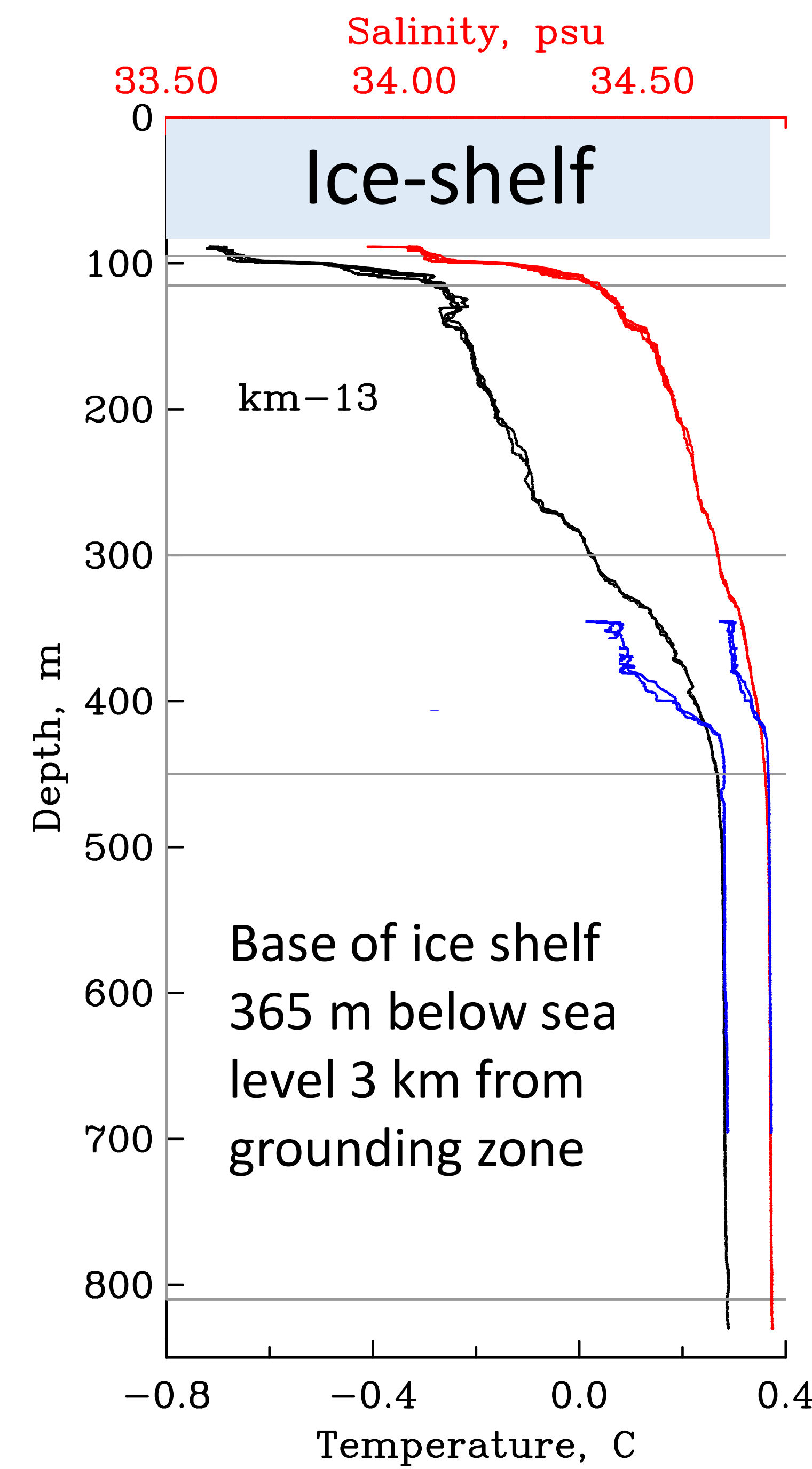
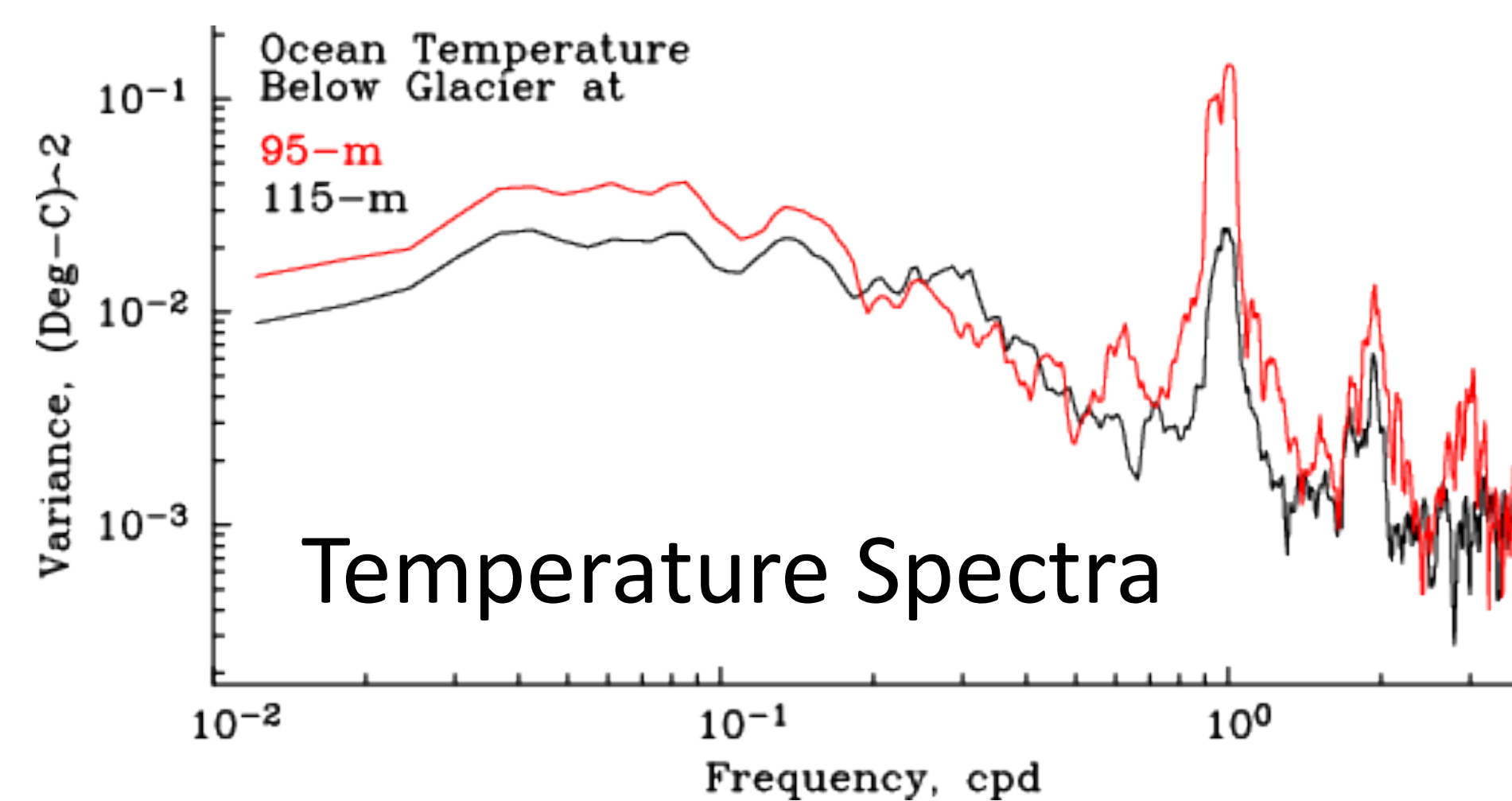
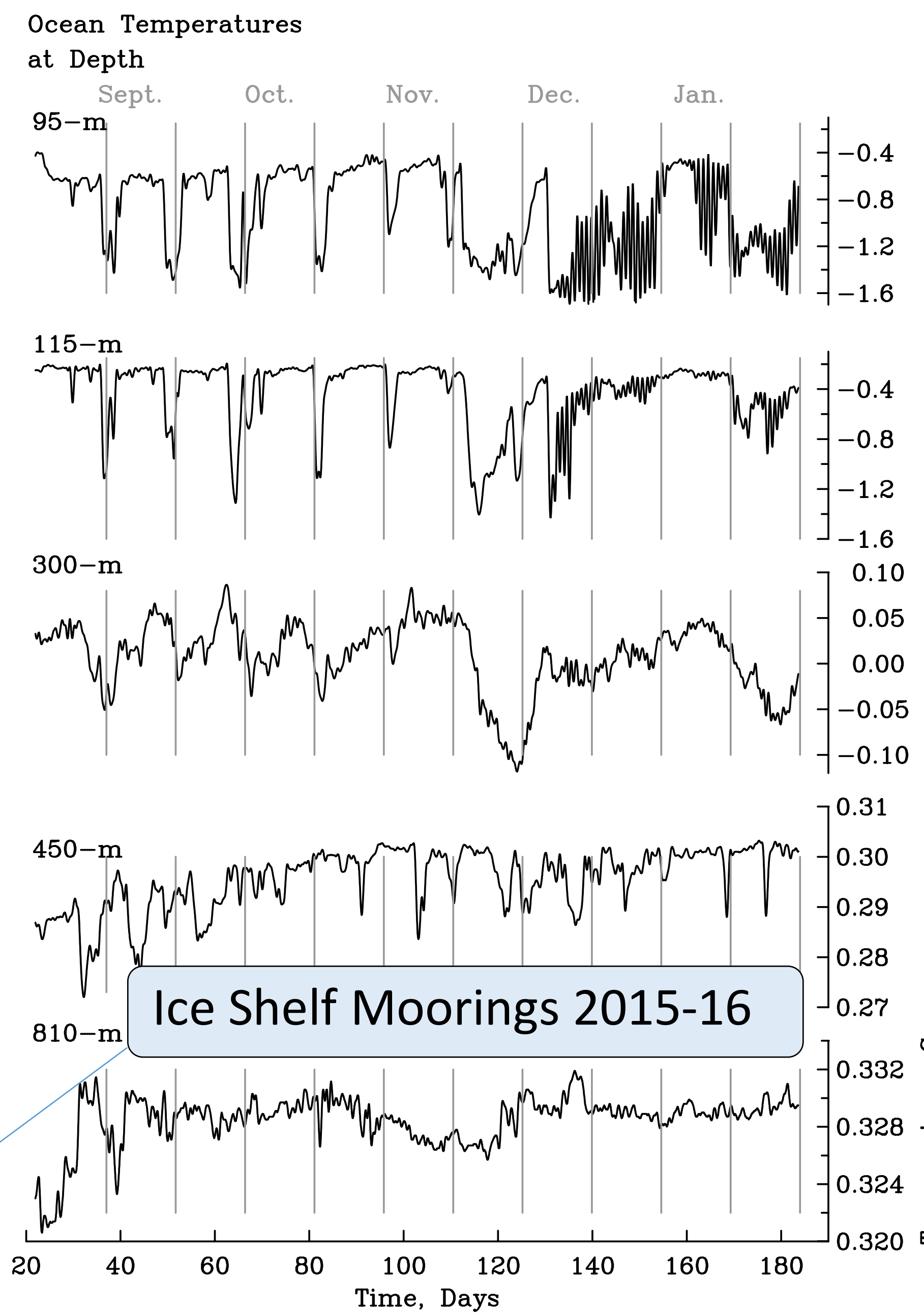
<http://IcySeas.org>  
<http://ows.udel.edu>



Radar (ice thickness) + Weather + GPS  
 • 2 ocean CTD • 5 ocean CTD  
 • Two stations • One station  
 • Iridium short-burst data • Iridium dial-up



Dual-frequency GPS were deployed on the glacier for 13 days in August of 2015. Data are referenced to bedrock GPS. Accuracies are better than 0.01 m for horizontal and 0.05 m for vertical position for each 30 second sample.



## New Observations:

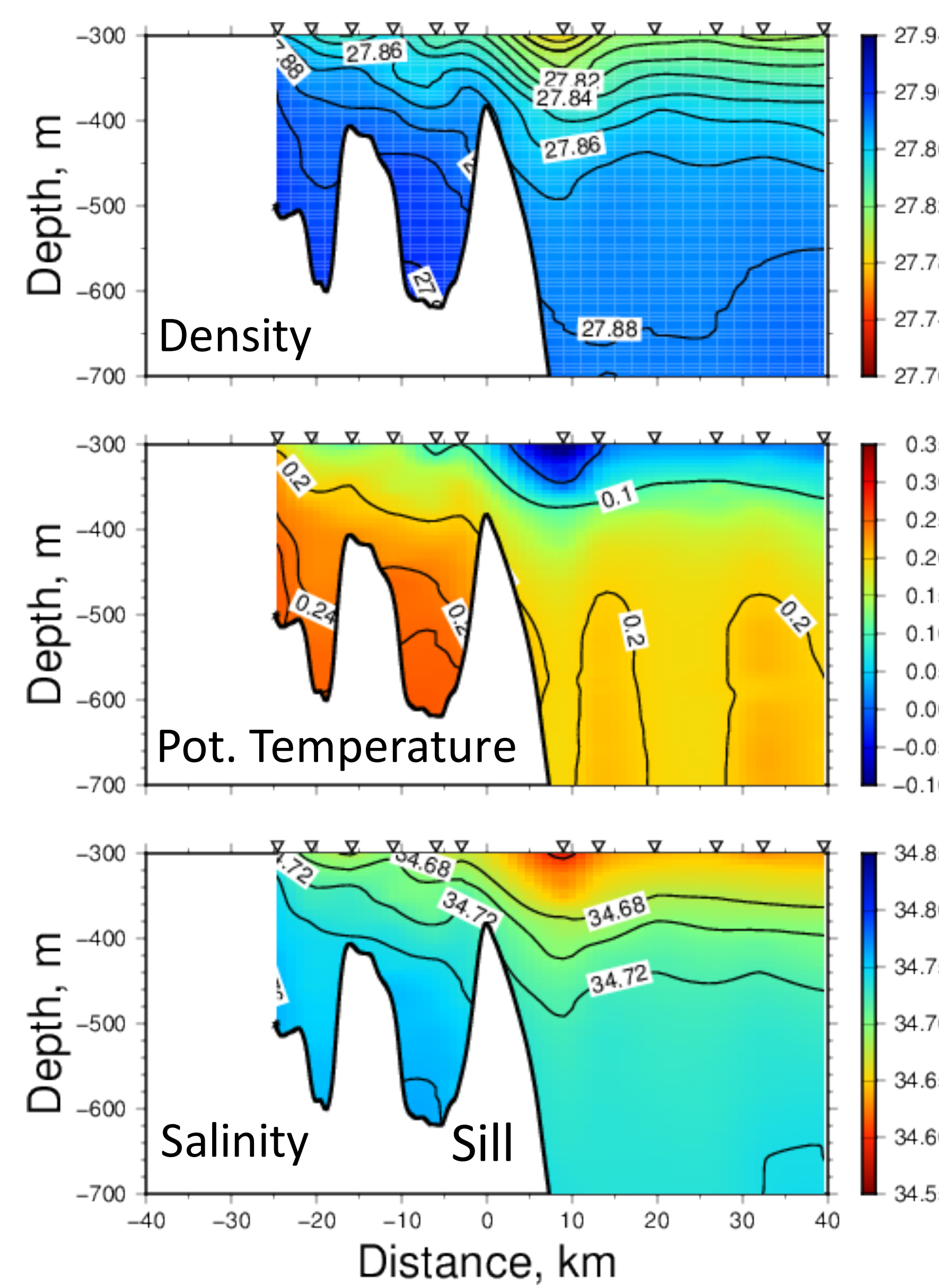
- Strong ocean/glacier temperature vs. salinity correlation;
- Bi-monthly meltwater pulses  $\sim 1.2^\circ\text{C}$
- Diurnal mixed layer oscillations;
- Atlantic Waters warmer and saltier.

## Hypotheses:

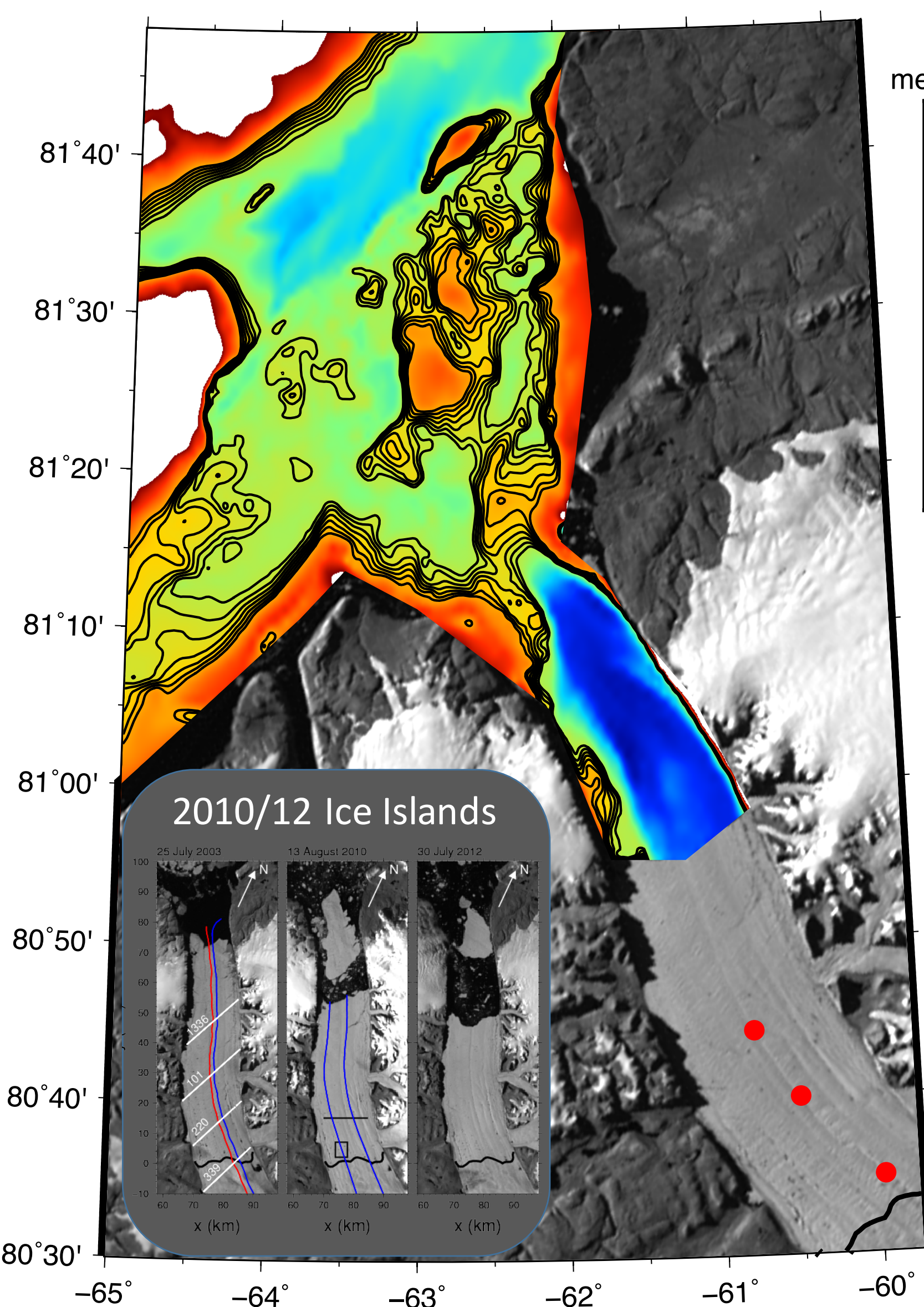
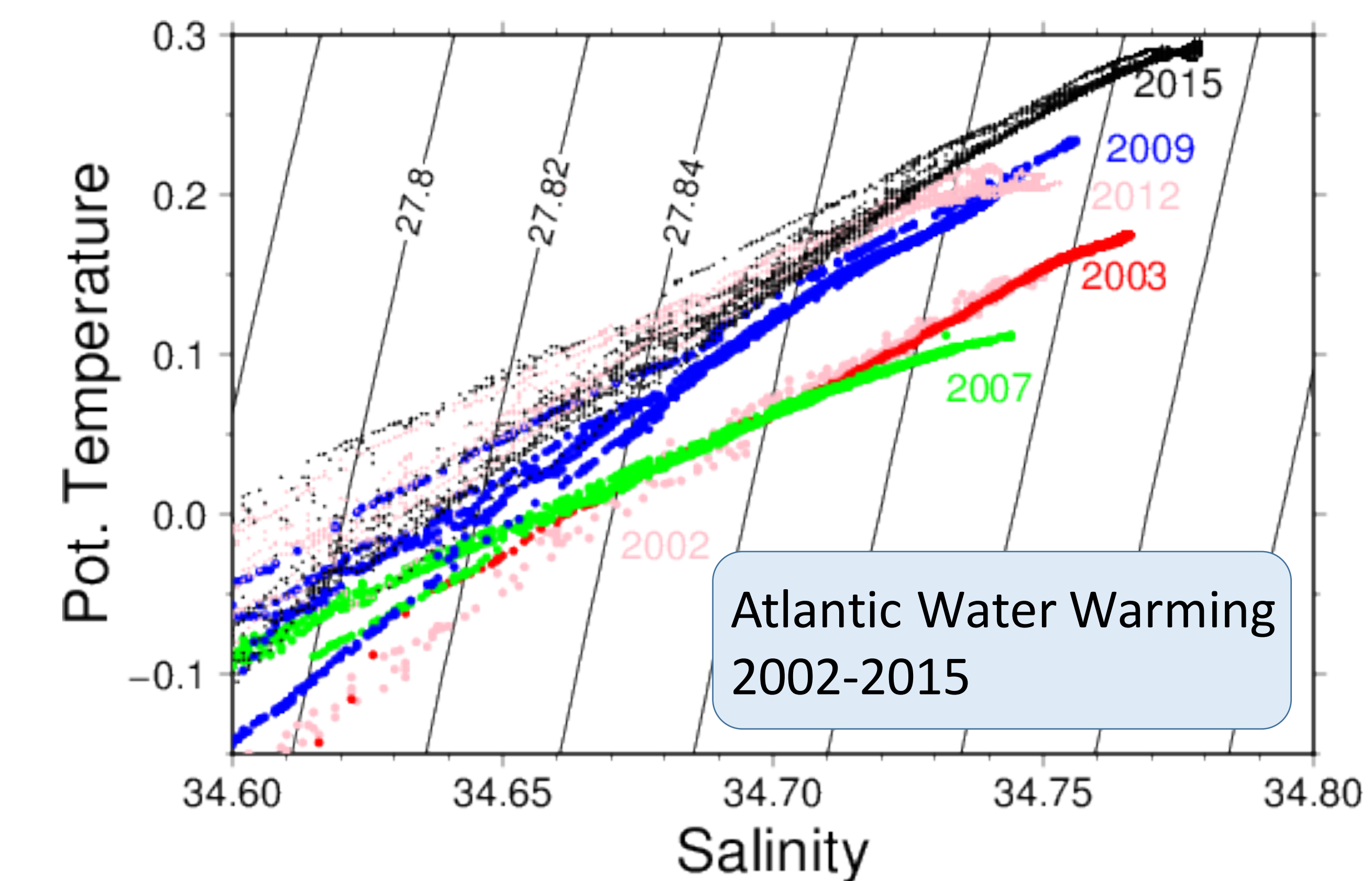
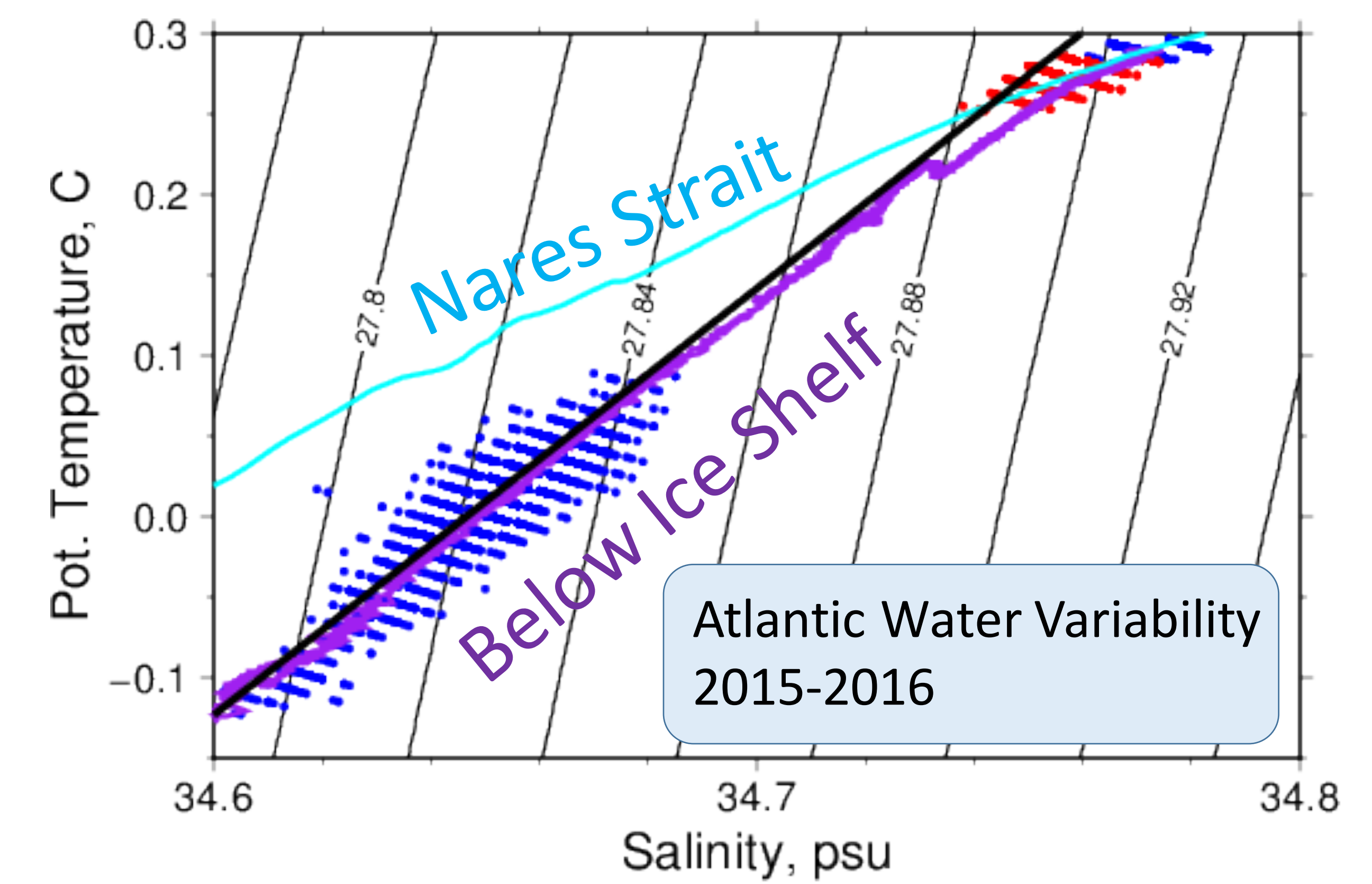
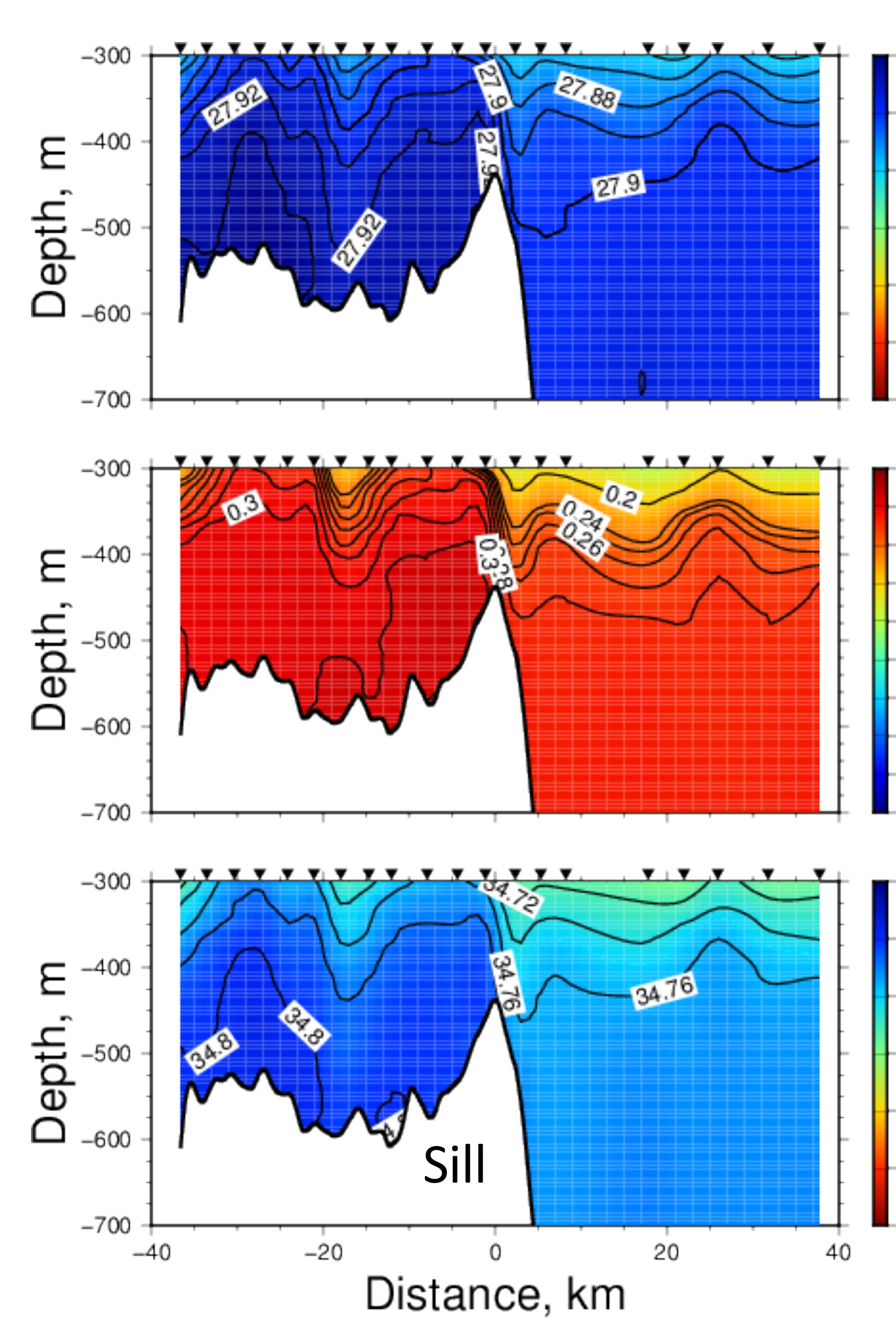
Warming Atlantic water in Nares Strait increase the heat flux into Petermann Fjord and under Petermann Gletscher Ice Shelf, leading to higher basal melt rates and thinning of the ice shelf.

High-frequency ocean variability (tides and weather-band oscillations) in the fjord as well as seabed and ice-draft topography all impact 1. water-mass exchange across the sill, 2. exchange of heat between ocean and glacier, and 3. glacier mass balance.

## Across-Sill 2012



## Across-Sill 2015



Nares Strait Petermann Fj.