

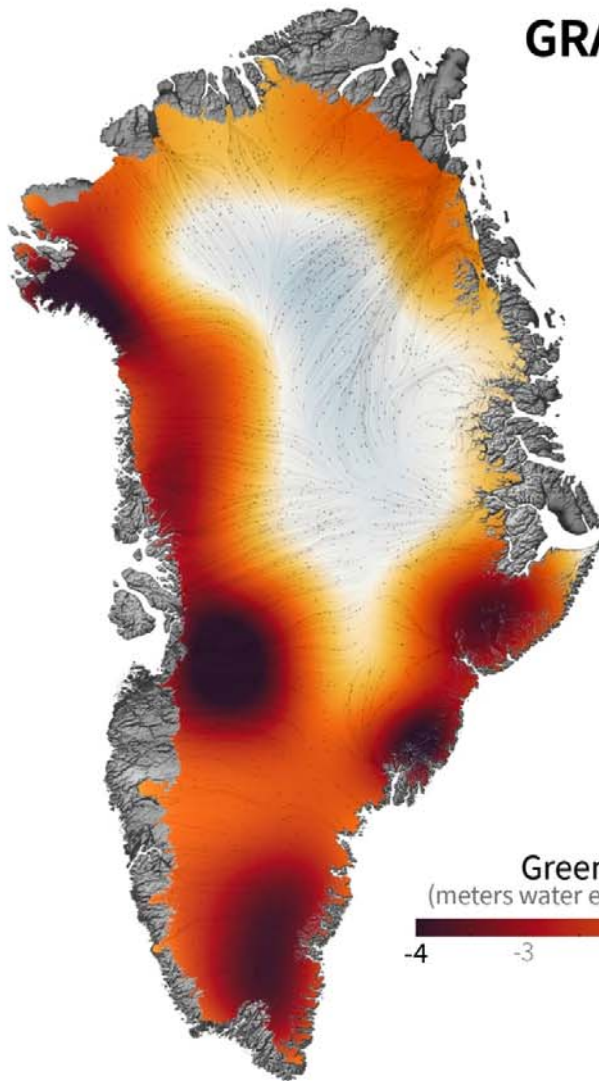
JPL



Josh Willis  
[joshua.k.willis@jpl.nasa.gov](mailto:joshua.k.willis@jpl.nasa.gov)  
Jet Propulsion Laboratory

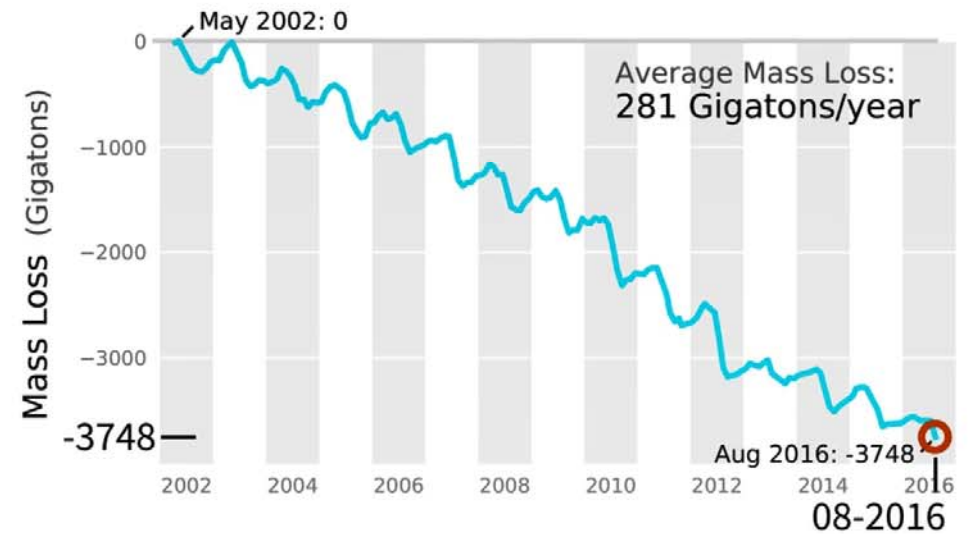


## GRACE Observations of Greenland Ice Mass Changes



**Greenland Ice Loss**  
(meters water equivalent relative to 2002)

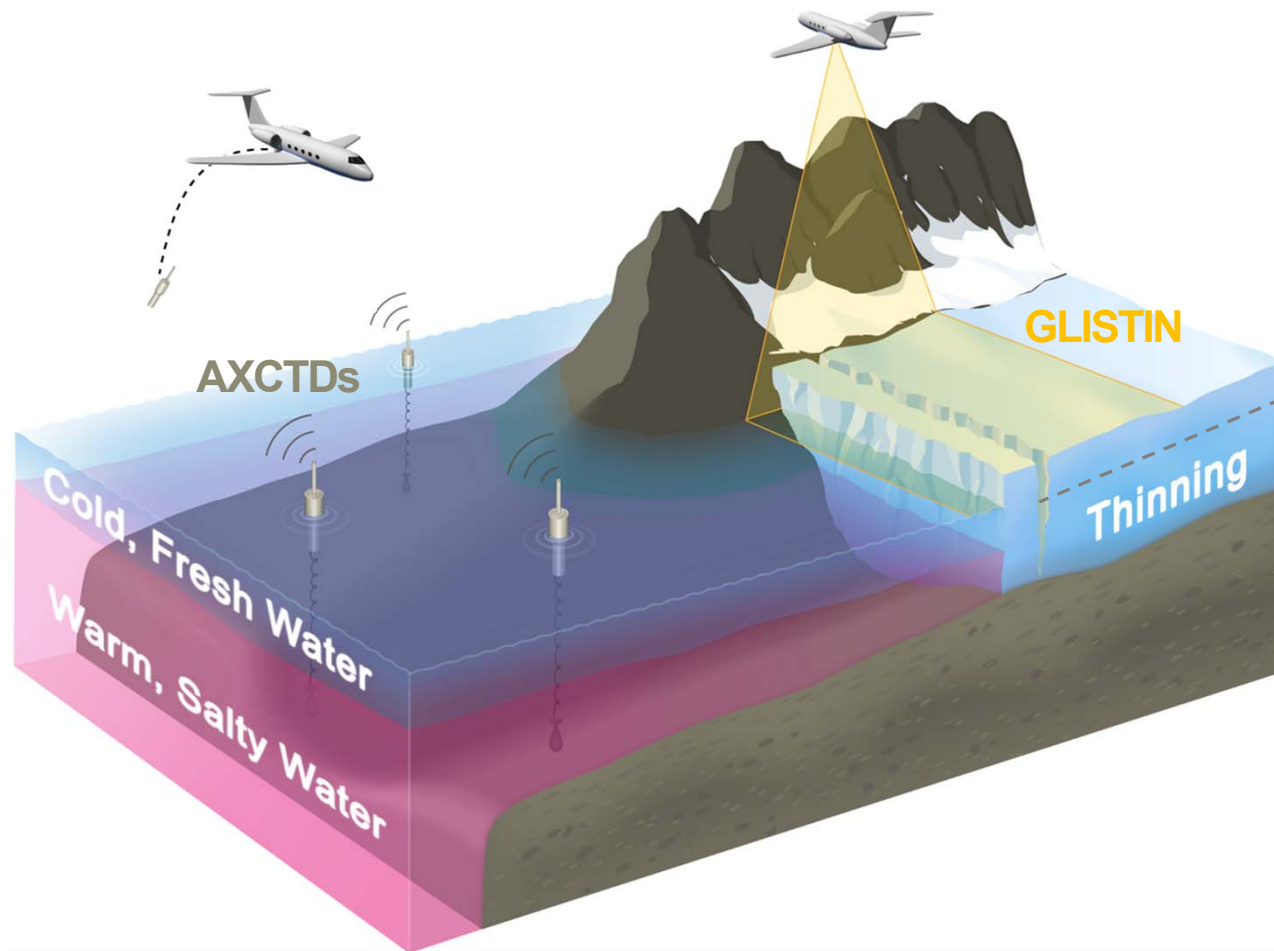
-4 -3 -2 -1 0 0.5





# OMG's Yearly Surveys

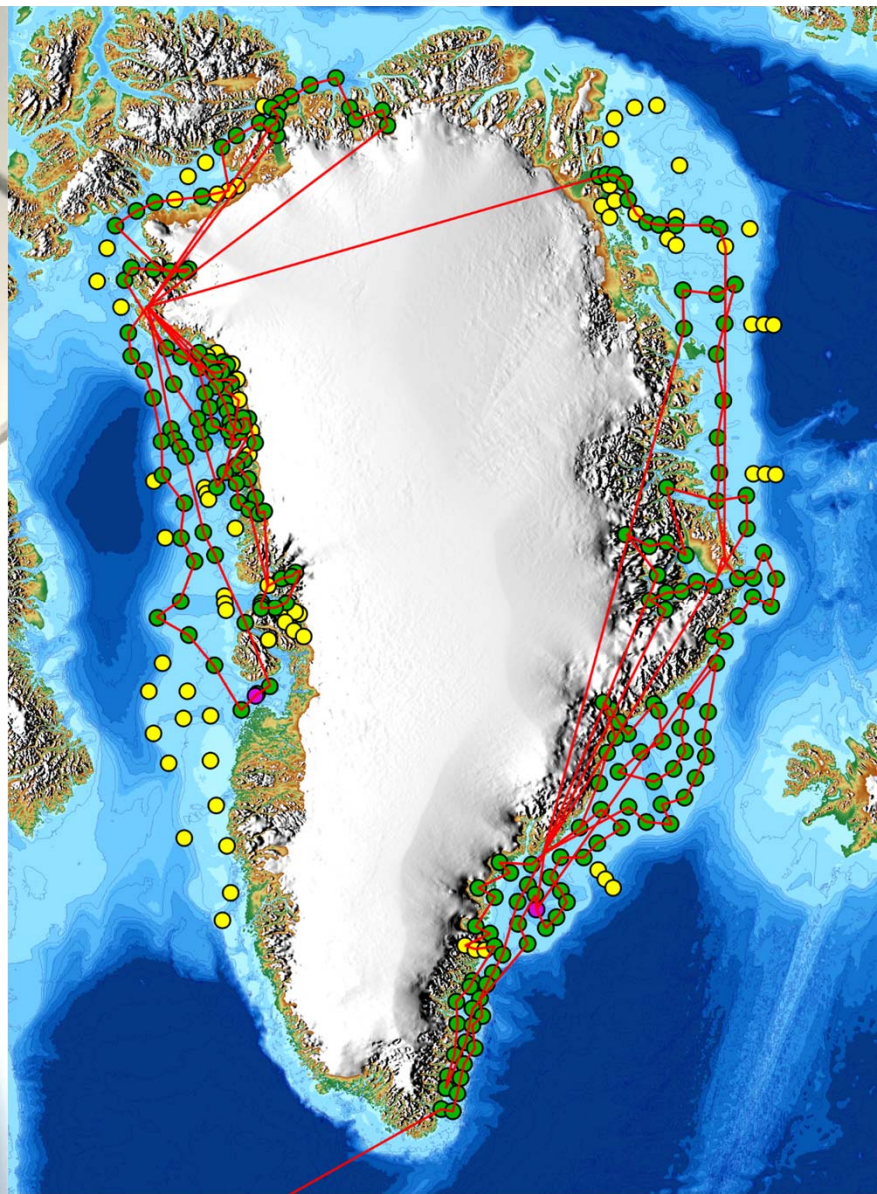
AXCTD survey is unique – no other observing system measures Temp & Salinity on shelf



Ice elevation in 2020 and 2021 will be observed by IceSat-II

2019 OMG survey will be used for comparison between GLISTIN-A and IceSat-II





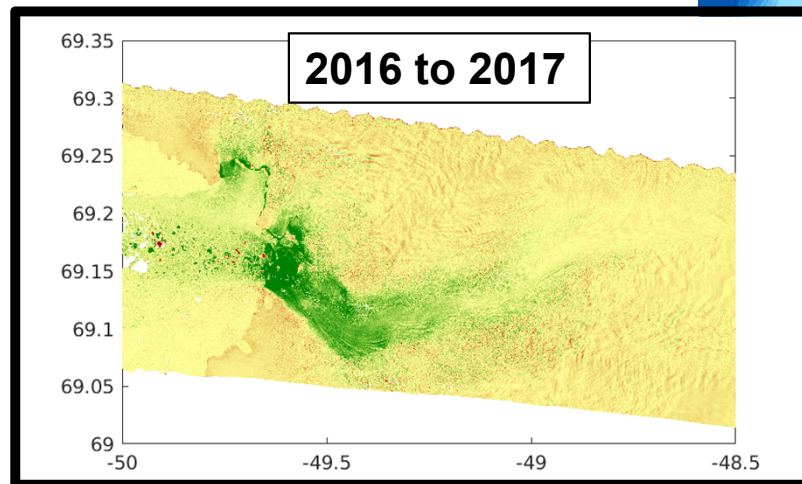




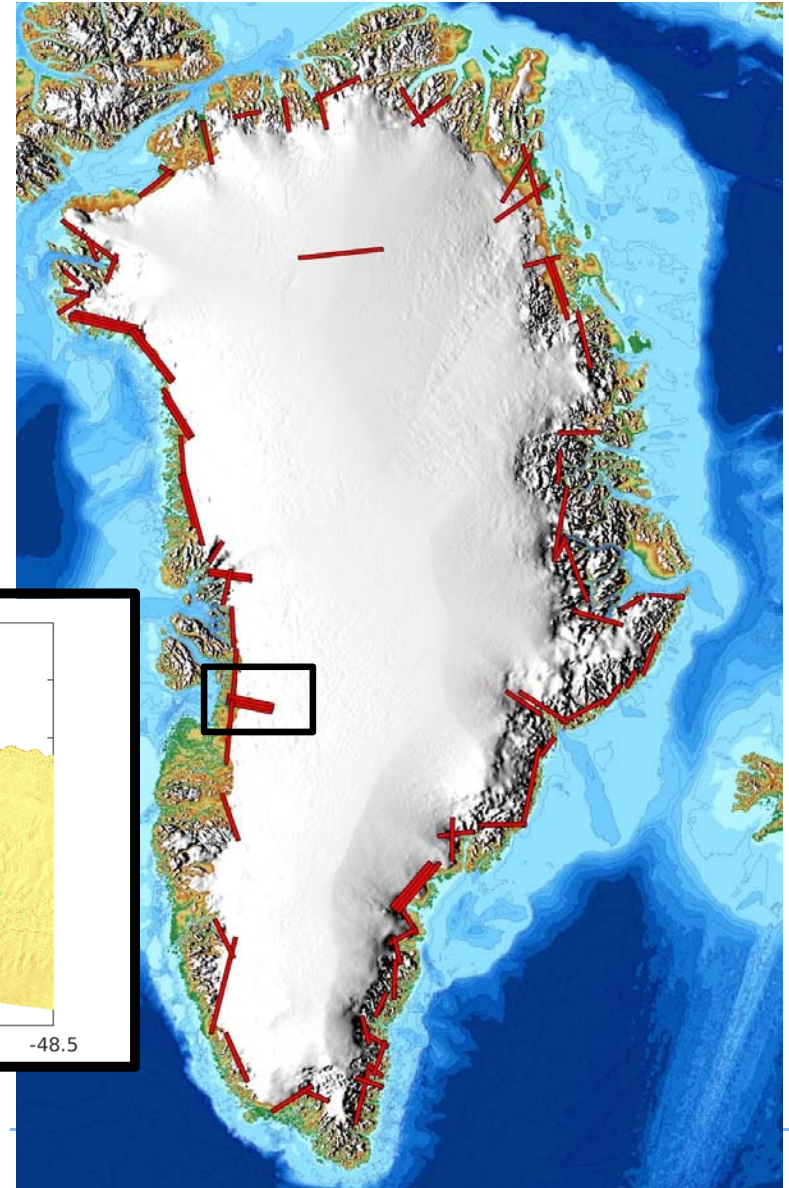
# GLISTIN Surveys

The GLISTIN Surveys were completed in 2019. No 2020 or 2021 surveys were carried out since ICESat-2's successful campaign began in late 2018

GLISTIN Data from all 4 years is now available on PODAAC in a new easy to use gridded format



*GLISTIN Data showing Jakobshavn thinning in the first two years of OMG (From Khazendar et al., 2019)*

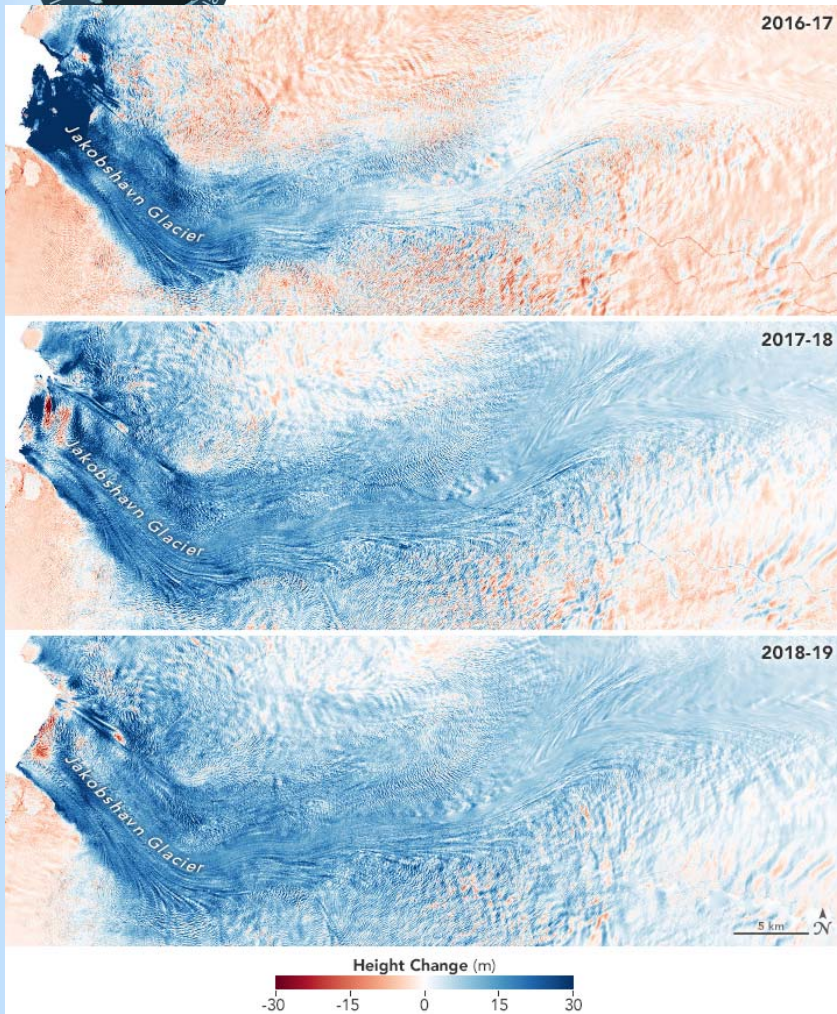




## OMG News – Jakobshavn Growing



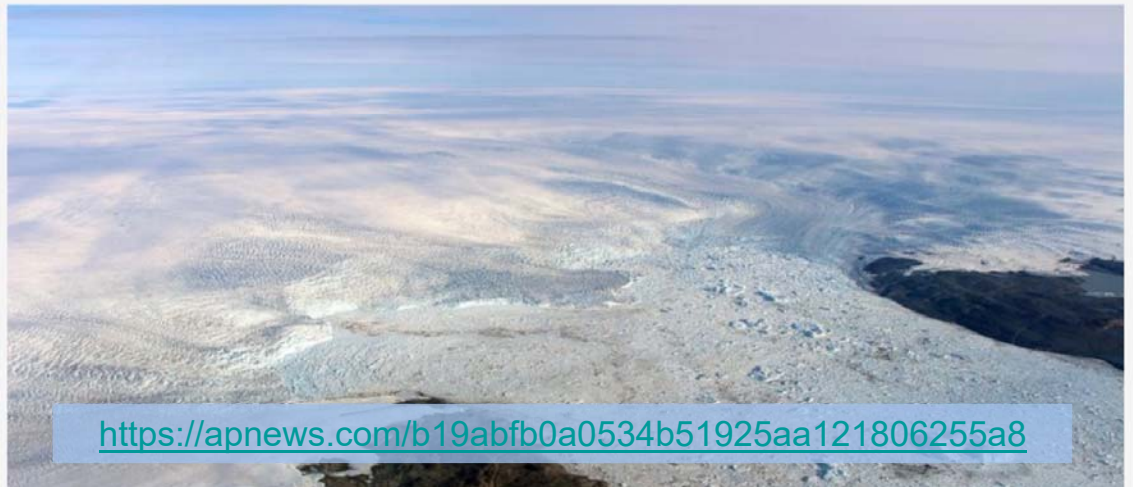
OMG showed this short term growth of Greenland's largest glacier was due to a cyclic change in ocean temperature



AP

### Big U-turn: Key melting Greenland glacier is growing again

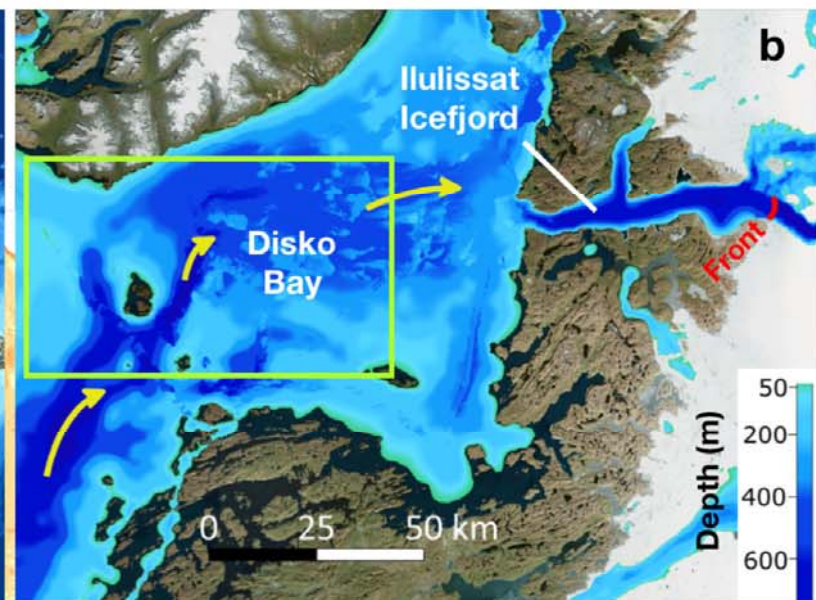
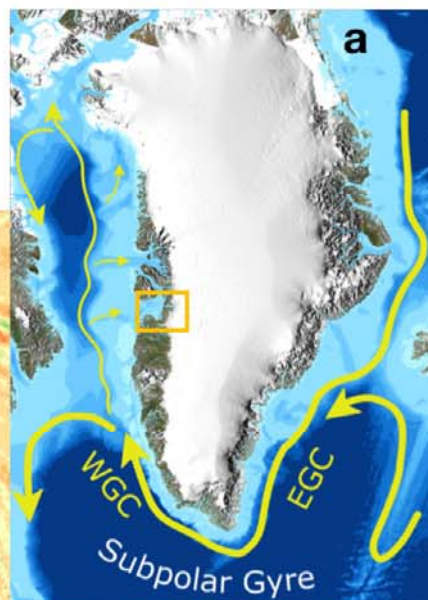
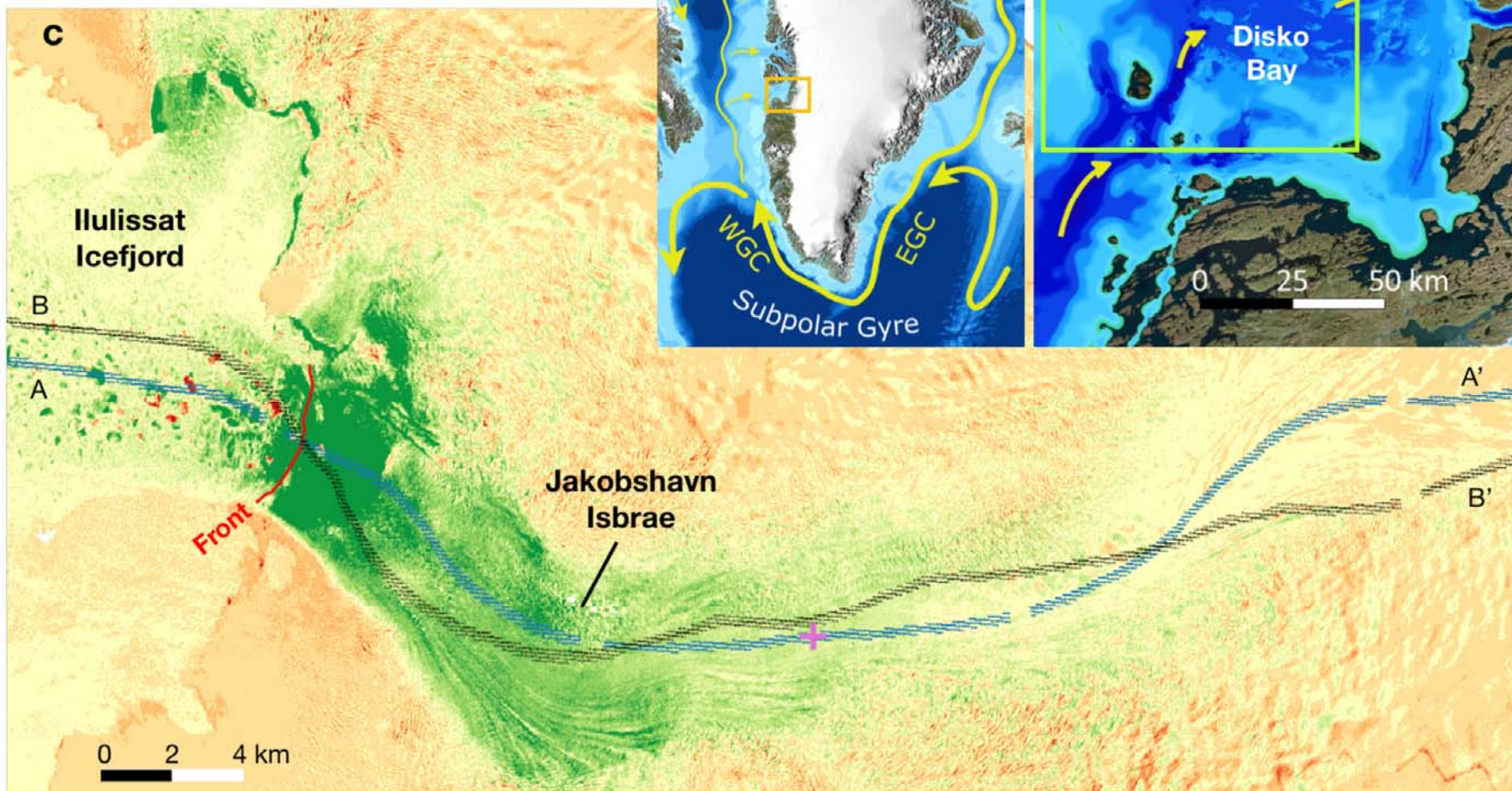
BY SETH BORENSTEIN March 25, 2019



<https://apnews.com/b19abfb0a0534b51925aa121806255a8>



Surface elevation change (m)



2017 front



2011 ATM path



2017 ATM path



Speed  
measurements  
location

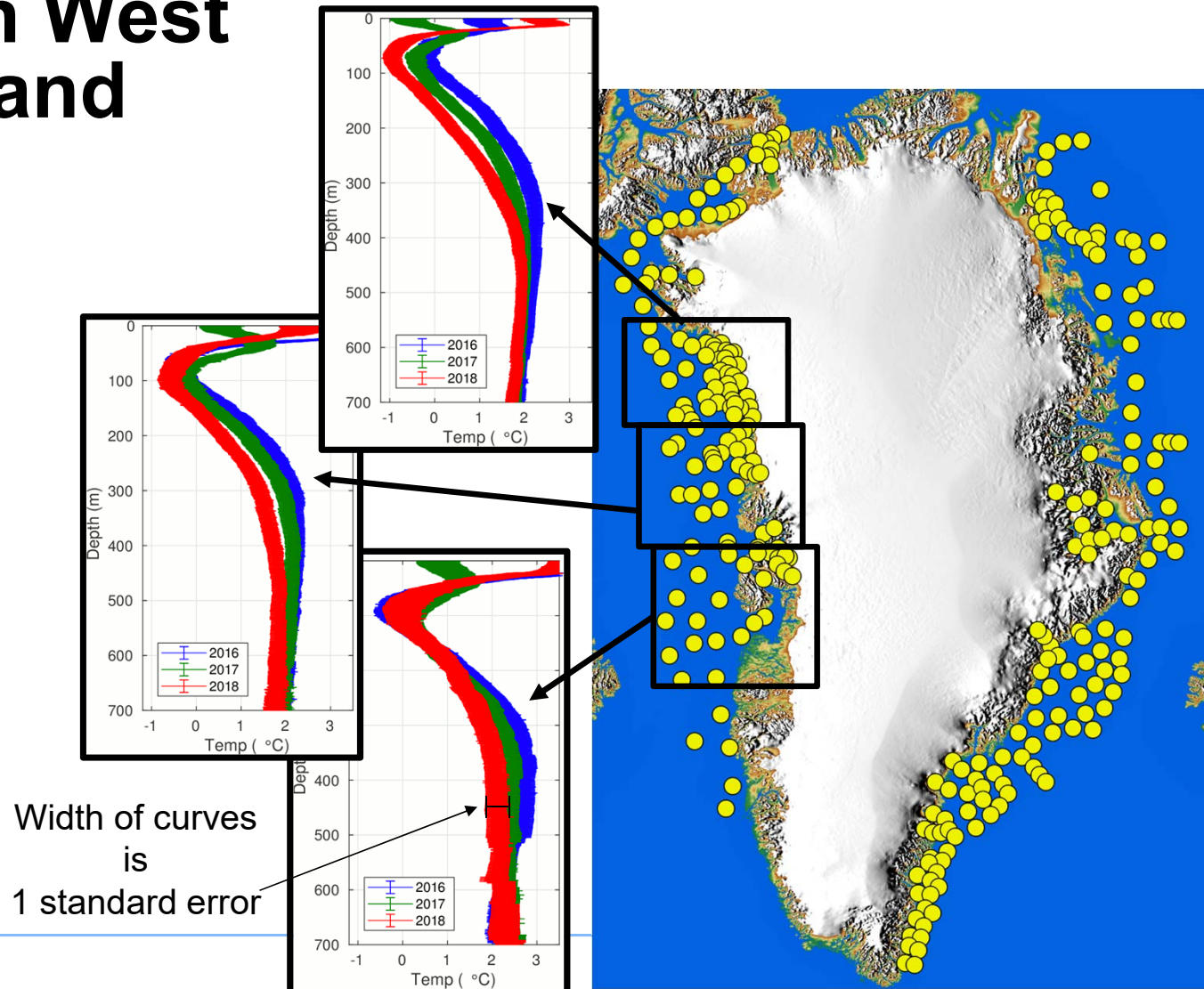






# Cooling in West Greenland

Cooling of  $1^{\circ}\text{C}$  has spread north, along the entire west coast of Greenland, due to a shift of the NAO, which has been in a warm phase for nearly 20 years.







<https://www.cbsnews.com/video/nasa-program-omg-working-to-find-how-fast-greenland-is-melting/>

**CBS  
This  
Morning**



**NBC's  
Today  
Show**



<https://www.today.com/video/climate-in-crisis-al-roker-studies-greenland-s-melting-glaciers-69039685943>



**TROUBLE AT THE TOP OF THE WORLD**  
AL GOES TO GREENLAND FOR FIRSTHAND LOOK AT CLIMATE CRISIS

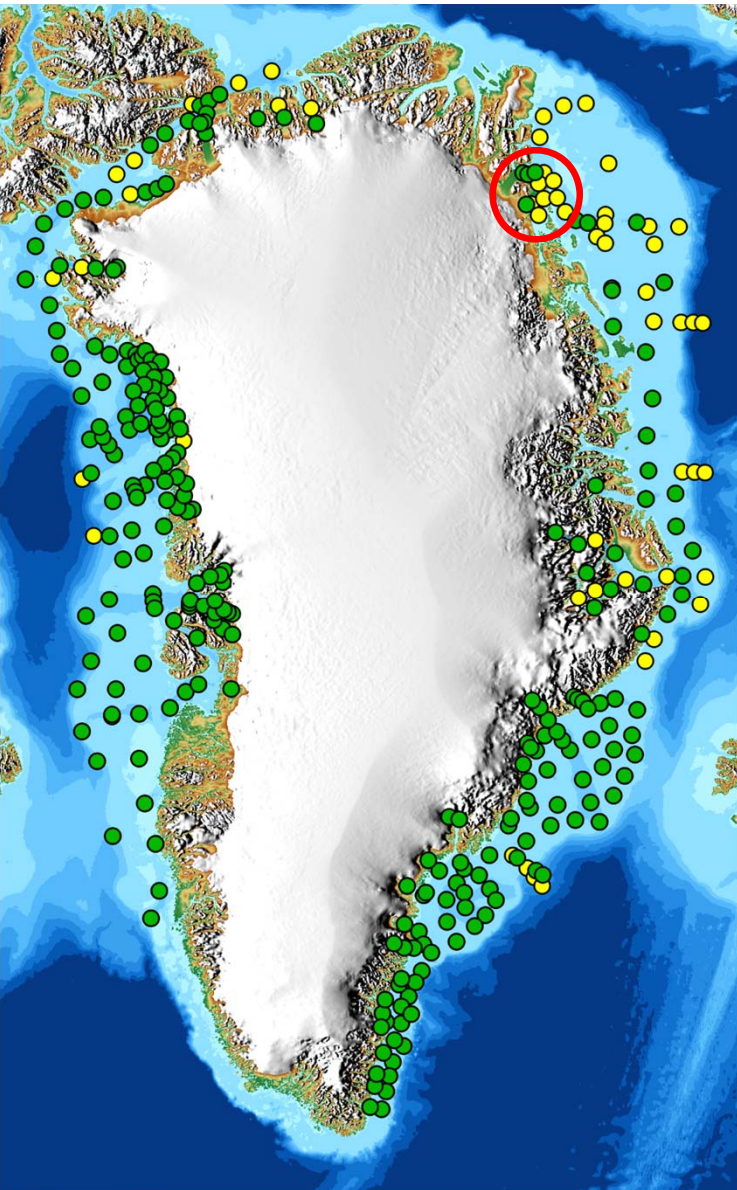
## OMG Media flights - August 2019



OMG flew 8 media outlets in 6 days during in August 2019

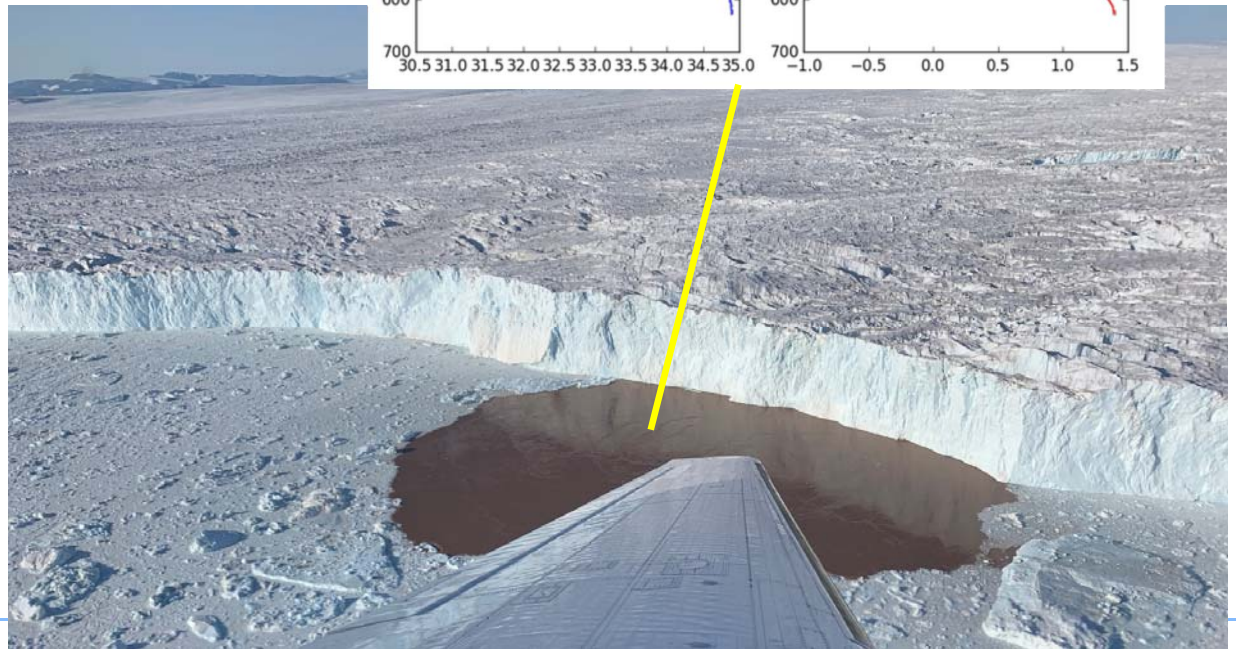
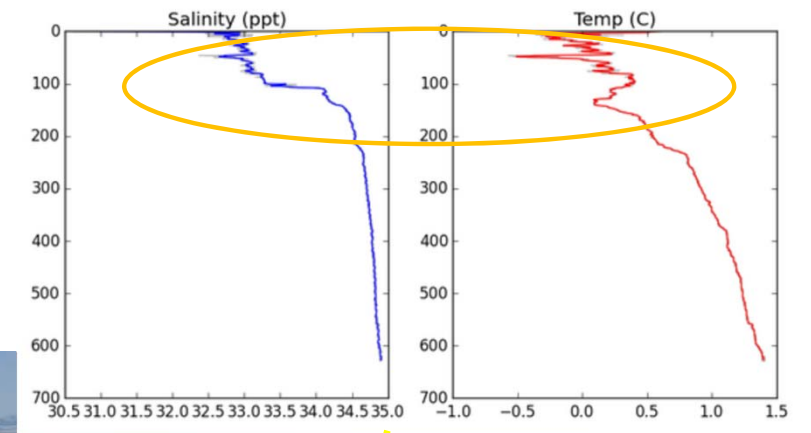
### Outlets included:

NBC Today Show  
CBS News  
CNN  
Weather Channel  
AP  
AFP  
ITN  
National Geographic



## Zacharie

## Plume Profile

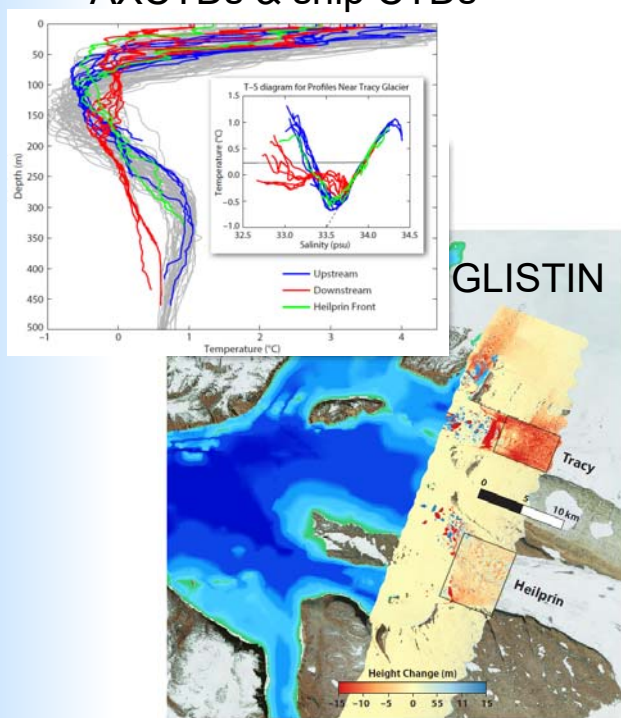






# OMG's Excellent Record for Science

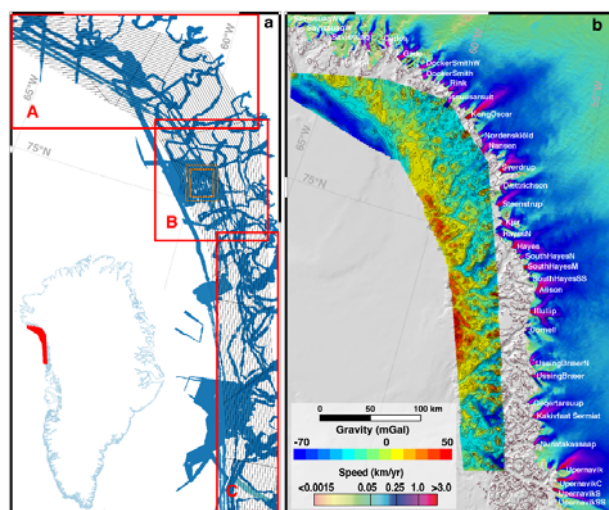
AXCTDs & ship CTDs



Willis et al., *Oceanography*, 2018

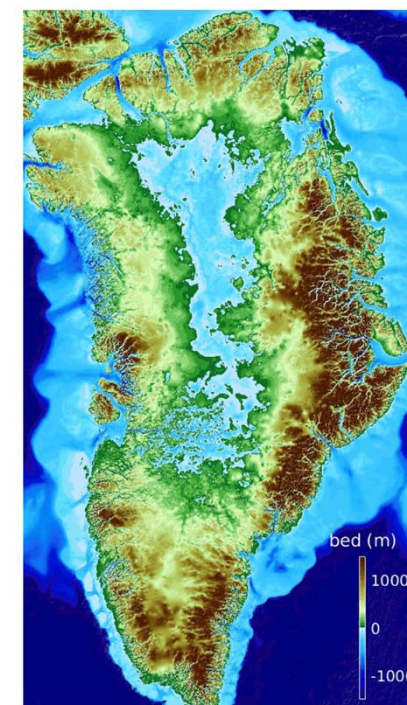
45 peer-reviewed pubs using data from every survey

Airborne Gravity



An et al., *Remote Sensing*, 2019

Ship based bathymetry



Morlighem et al., *Geophys. Res. Lett.*, 2017