

# Qaanaaq: An Ice and Sediment Record of Interglacial Warmth and Ice Sheet Response

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# Driving Research Objectives

- *Climate forcing* and *ice sheet response* during two key warm periods:
  - The Holocene Thermal Maximum = Transient Response
  - The Eemian = Equilibrium Response

Intermediate Drill

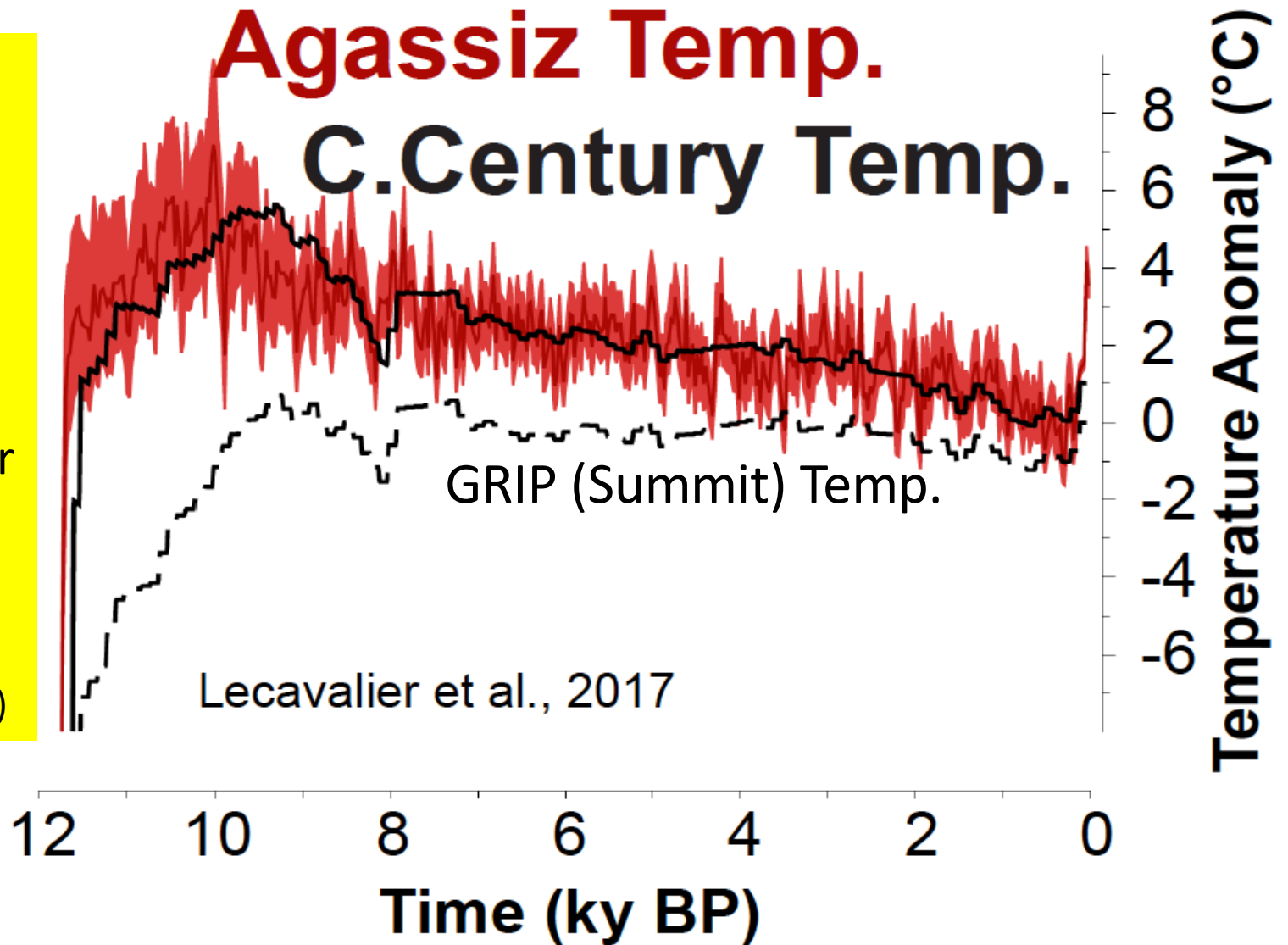
South Pole Drilling Camp



# NW Greenland Has Strong Climate Forcing: Climate Signal Strongest Near the Coast

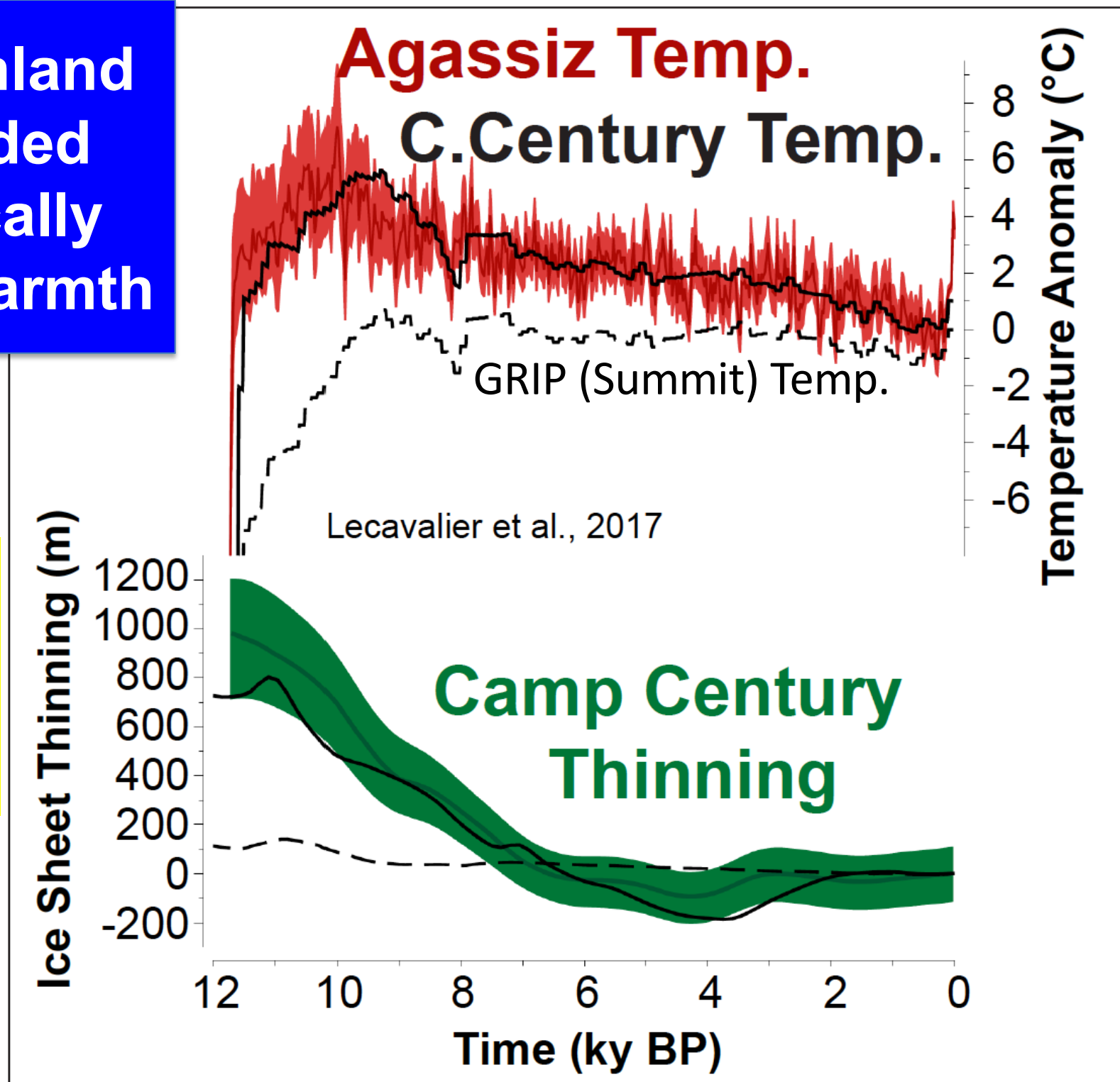
HTM summer  
temps 4-7°C  
warmer than  
modern (1952-  
2014)

Eemian summer  
temps 5.5-8°C  
warmer than  
modern  
(McFarlin et al., 2018)



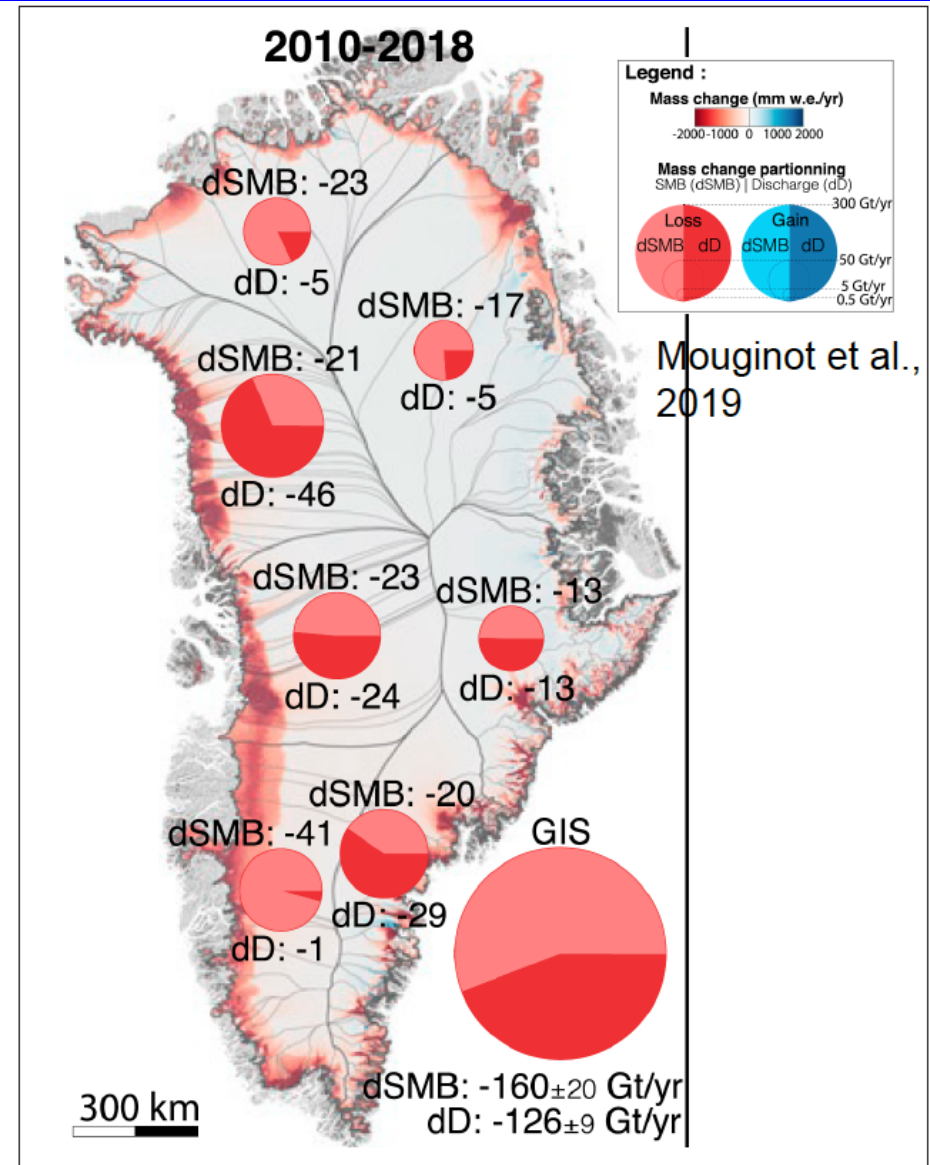
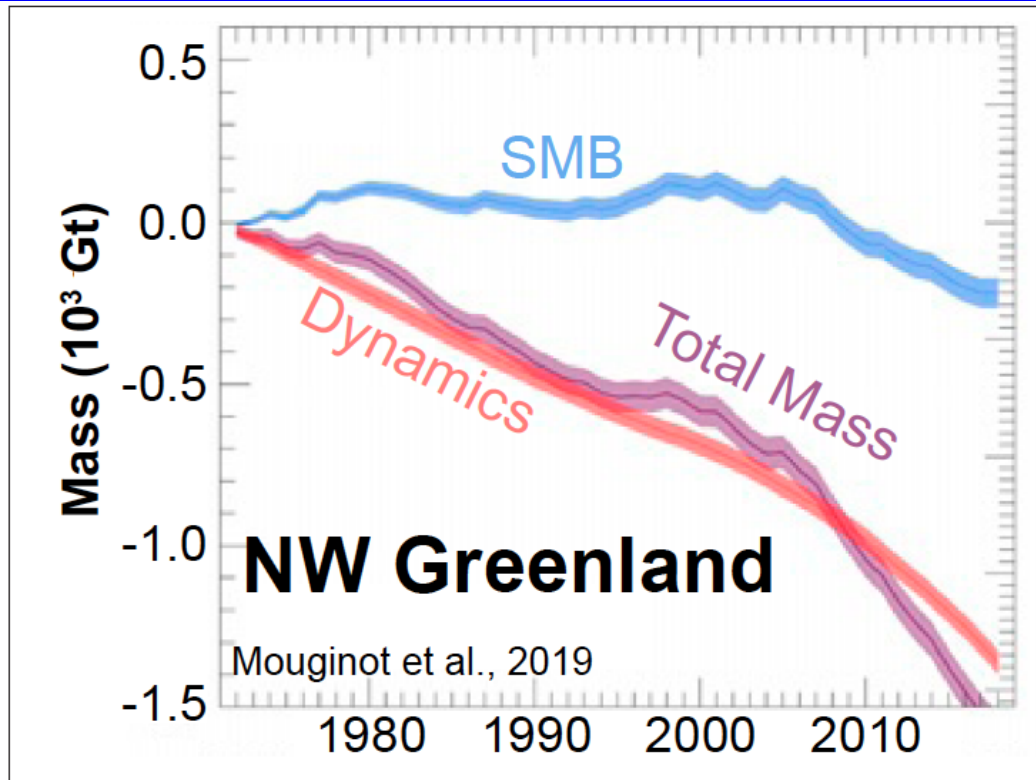
**NW Greenland  
Responded  
Dynamically  
to Prior Warmth**

**~1000 m of  
Holocene  
thinning at  
C. Century!**



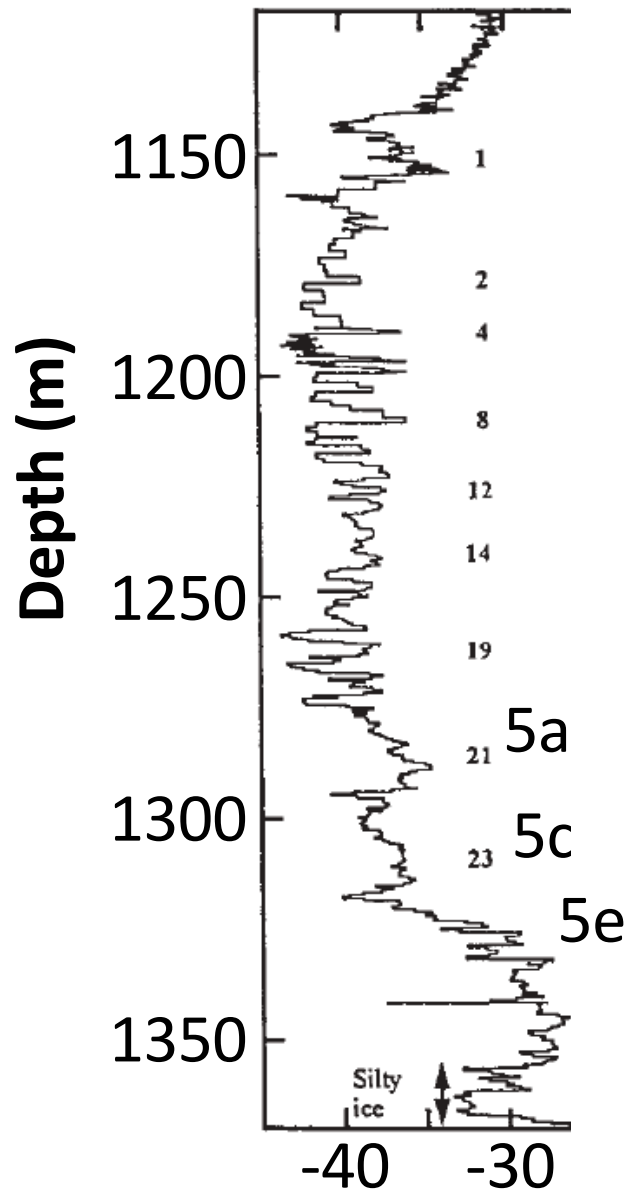


# NW Greenland Is Melting Quickly



# NW Greenland Has Shallow Eemian Ice

## Camp Century Isotopes



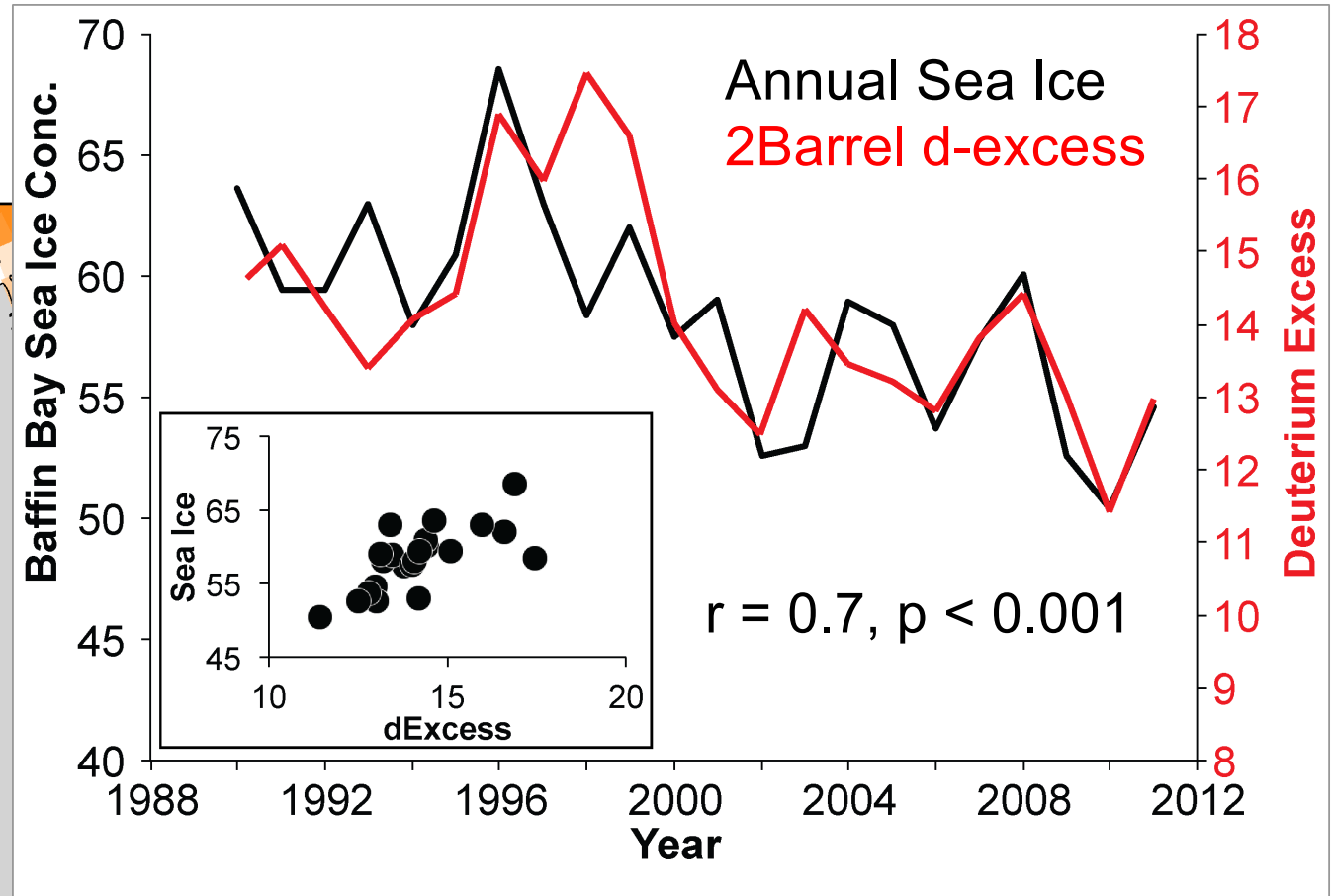
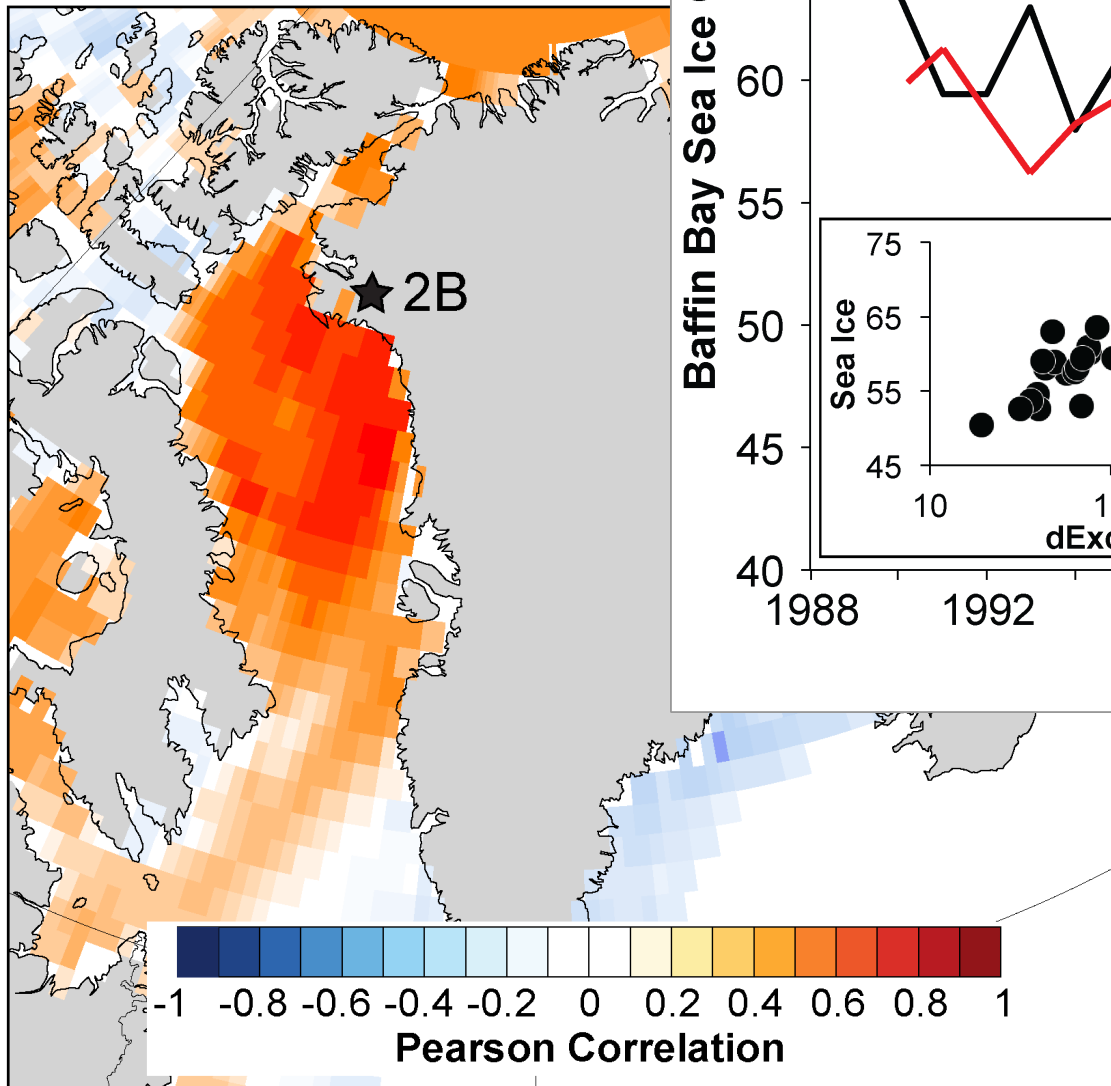
Johnsen et al., 2001

## Camp Century Drilling: 1963-1966



# NW Greenland Has Sensitive Ice Core Proxies of Baffin Sector

2Barrel d-excess vs.  
Annual Sea Ice



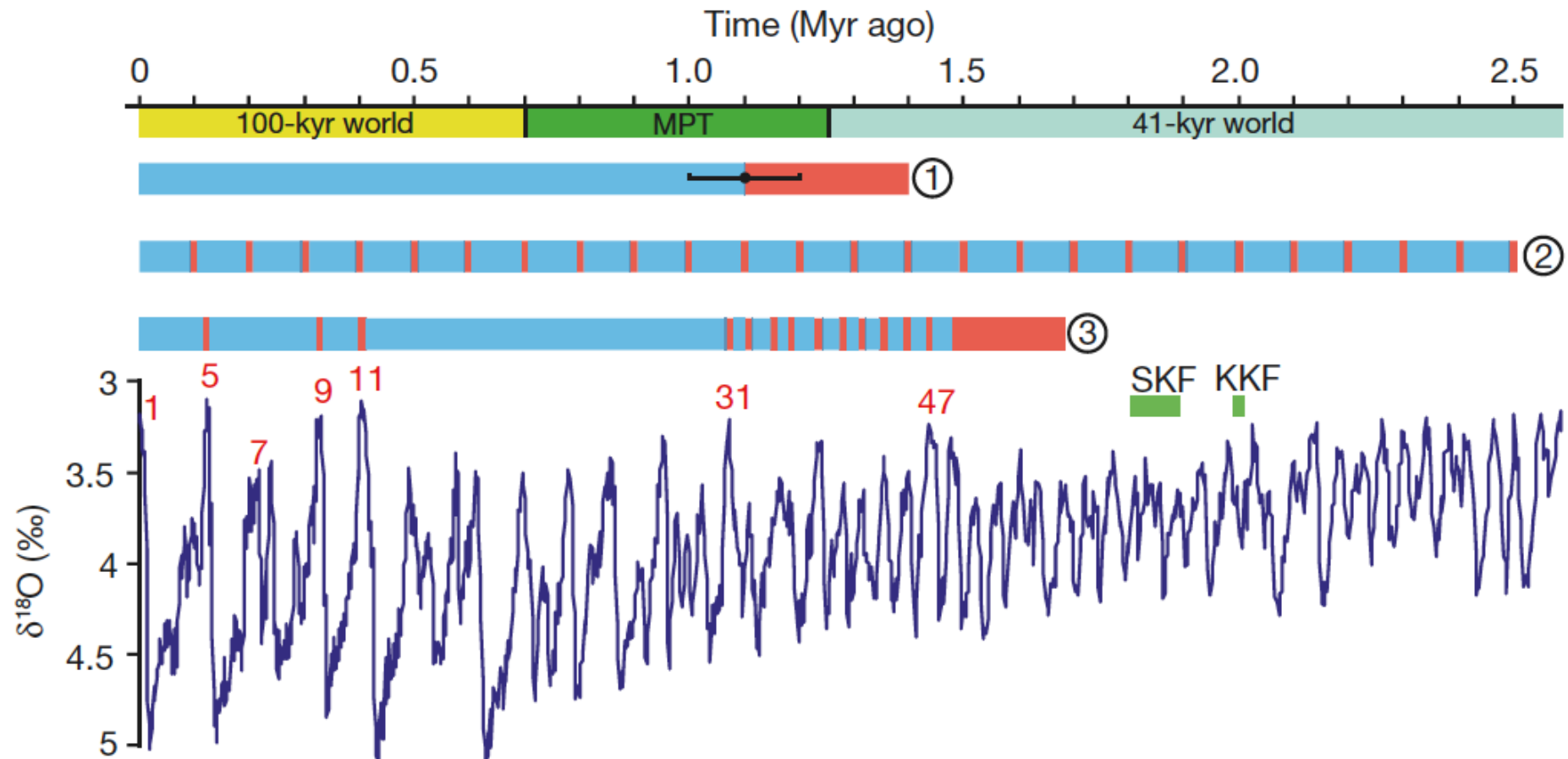
**Lower** d-excess in years  
with **Less** Sea Ice

Osterberg et al., 2015



# Greenland was nearly ice-free for extended periods during the Pleistocene

Joerg M. Schaefer<sup>1,2</sup>, Robert C. Finkel<sup>1,3</sup>, Greg Balco<sup>4</sup>, Richard B. Alley<sup>5</sup>, Marc W. Caffee<sup>6</sup>, Jason P. Briner<sup>7</sup>, Nicolas E. Young<sup>1</sup>, Anthony J. Gow<sup>8</sup> & Roseanne Schwartz<sup>1</sup>





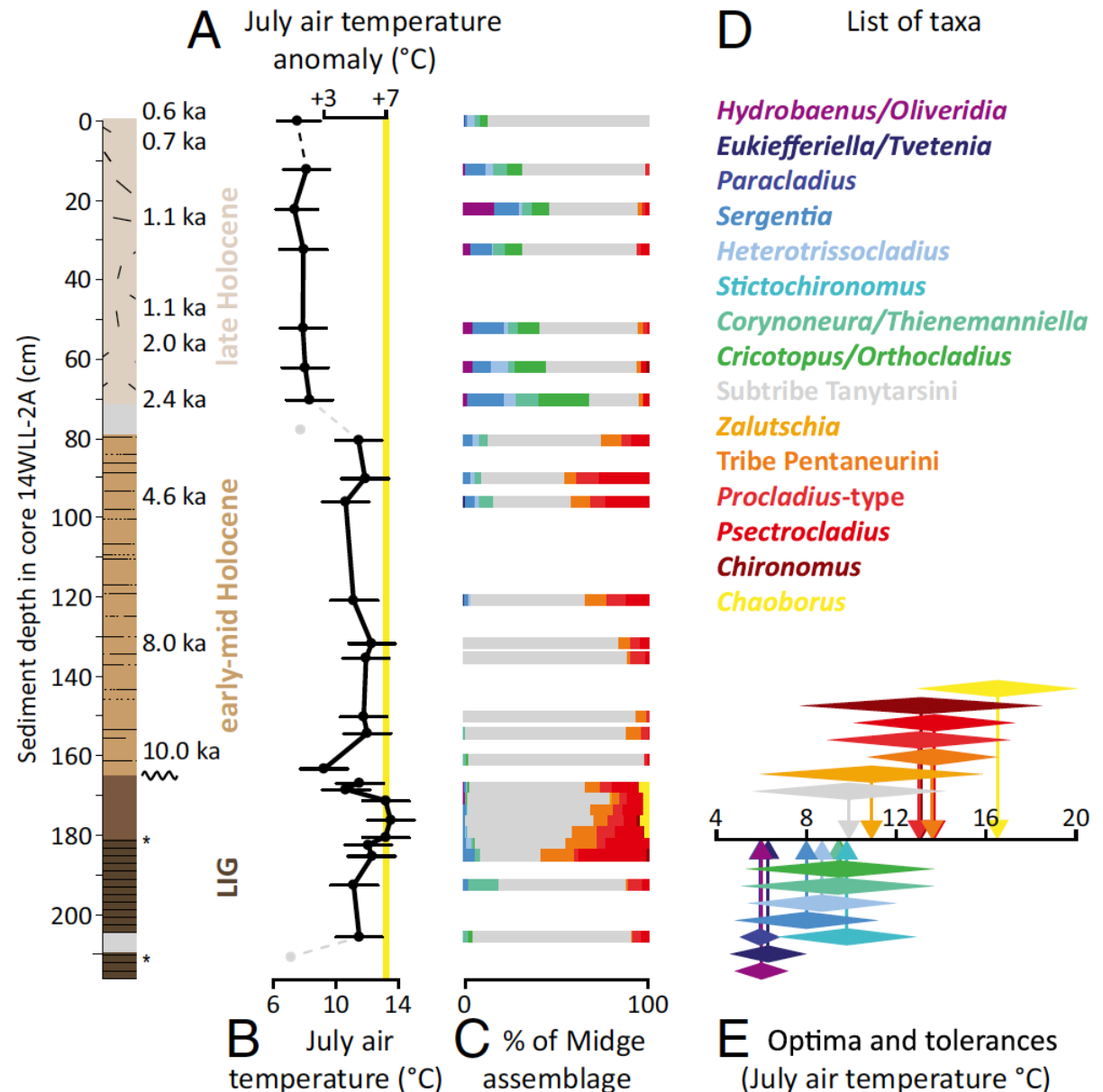
# Pronounced summer warming in northwest Greenland during the Holocene and Last Interglacial



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## Lake Sediment Record of Holocene and Eemian

- HTM summer temps 4-7°C warmer than modern (1952-2014)
- Eemian summer temps 5.5-8°C warmer than modern



# Potential Site Selection of Both Qaanaaq and South Dome with GreenTrACS2

