The Atlantic water boundary current from repeat DBO6 occupations

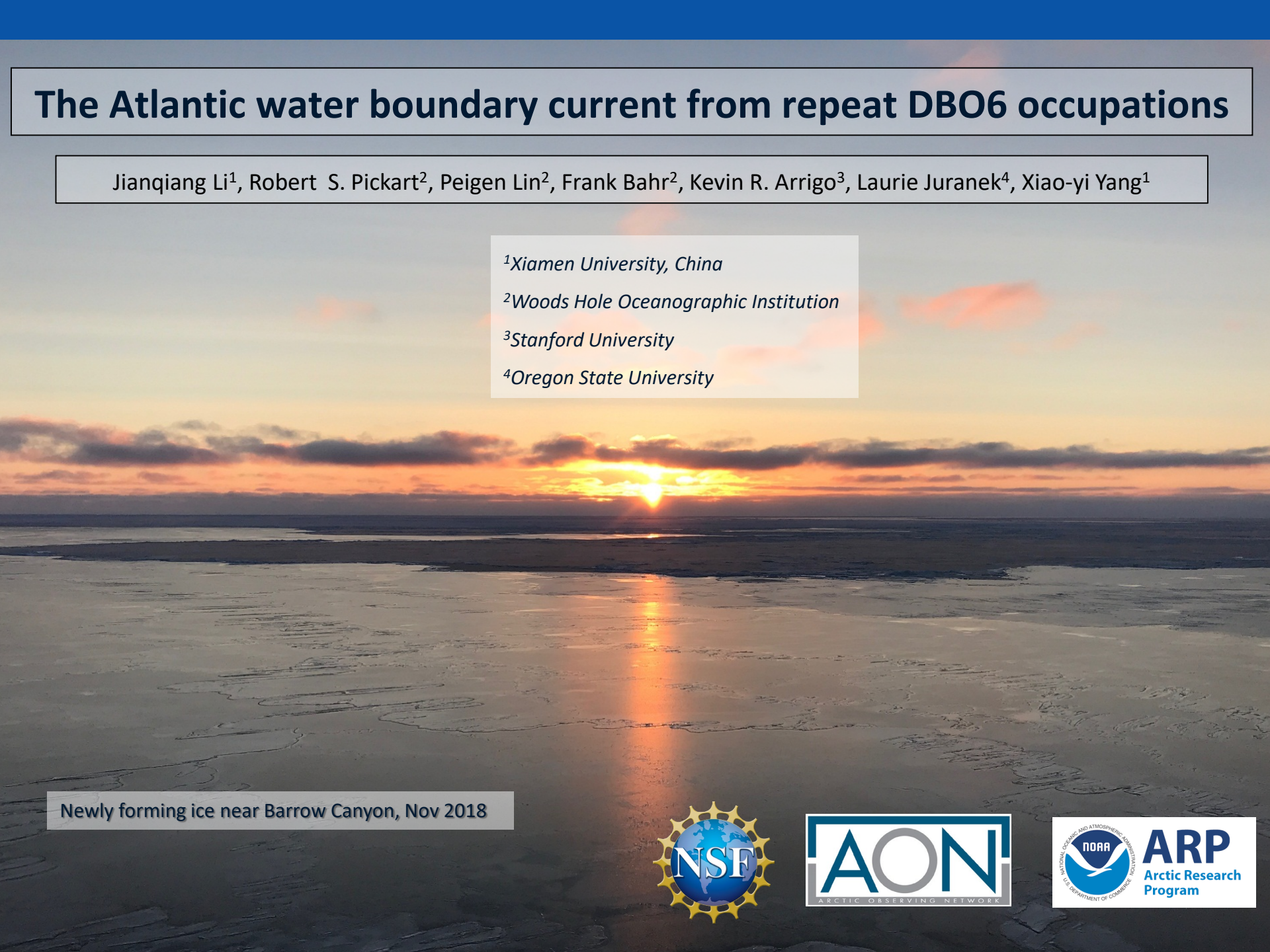
Jianqiang Li[1], Robert S. Pickart[2], Peigen Lin[2], Frank Bahr[2], Kevin R. Arrigo[3], Laurie Juranek[4], Xiao-yi Yang[1]

[1]*Xiamen University, China*

[2]*Woods Hole Oceanographic Institution*

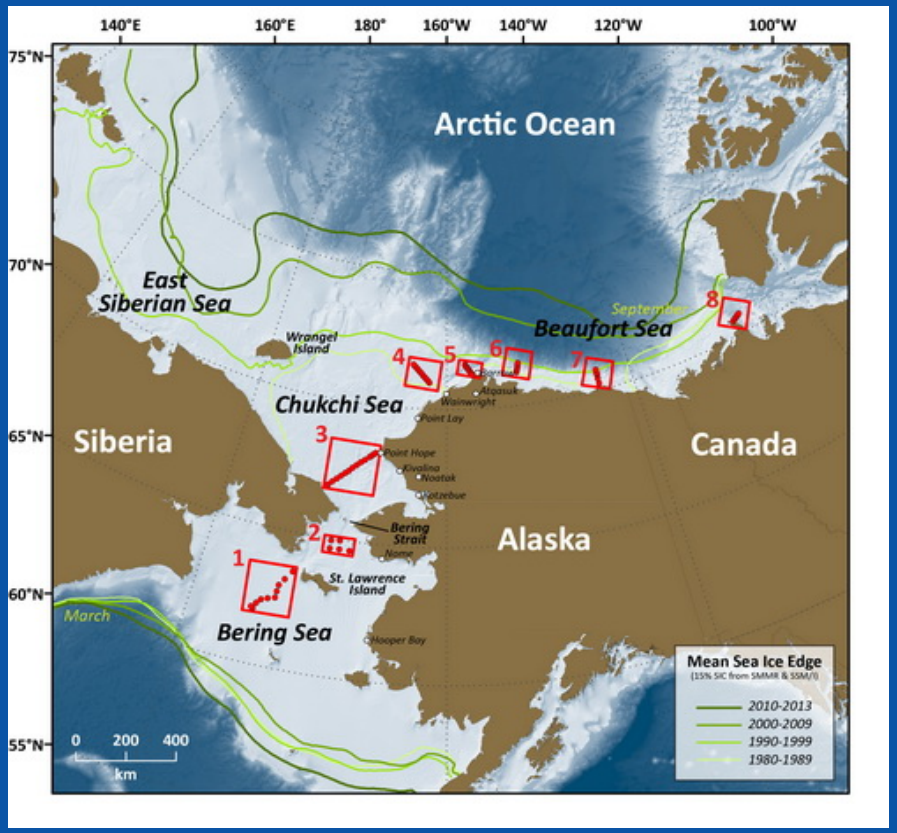
[3]*Stanford University*

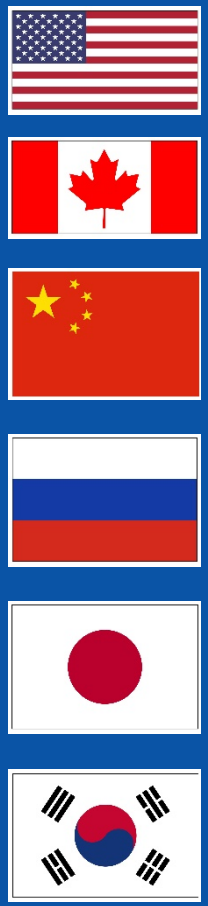
[4]*Oregon State University*



Newly forming ice near Barrow Canyon, Nov 2018

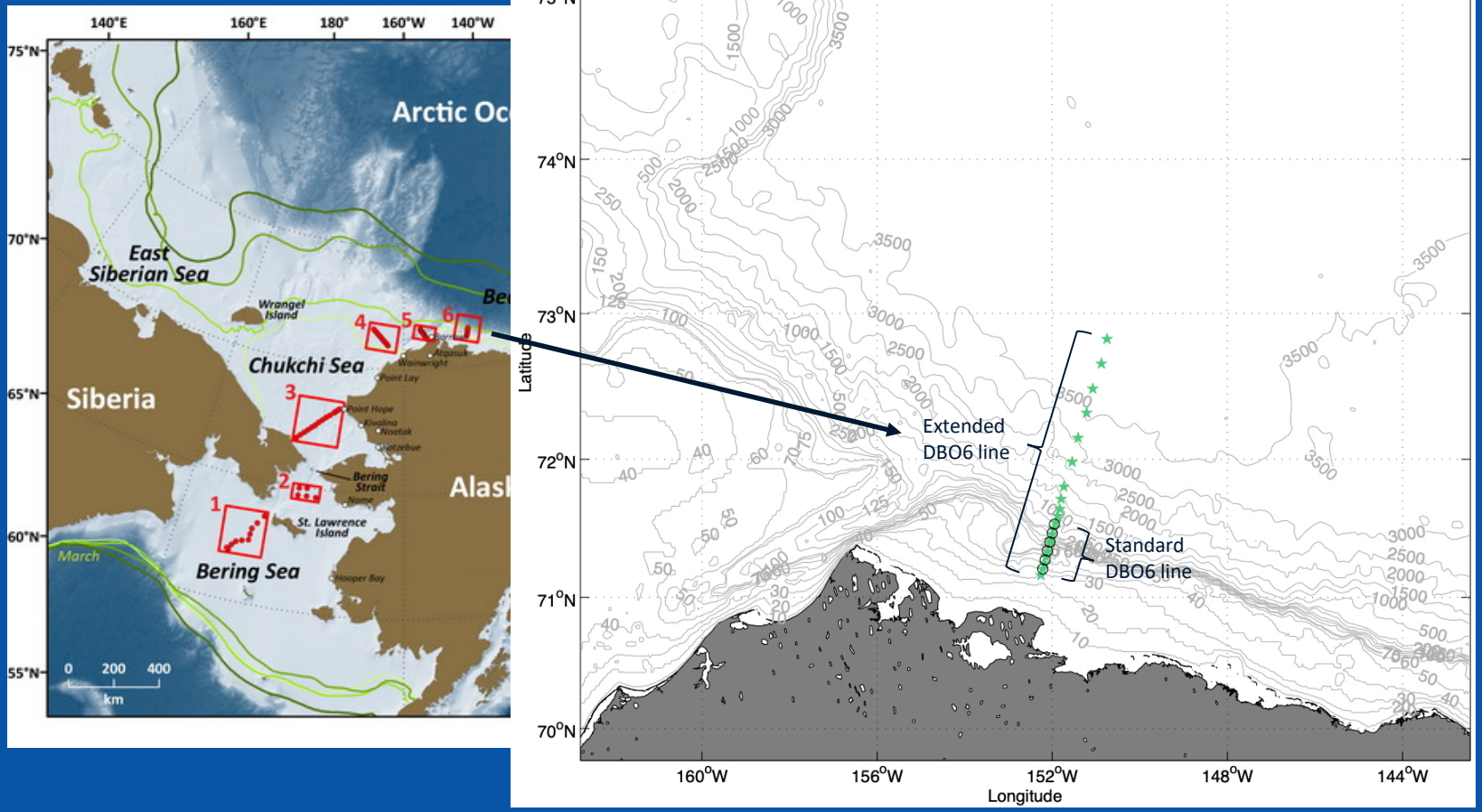
The Distributed Biological Observatory (DBO)





Pacific Arctic Group

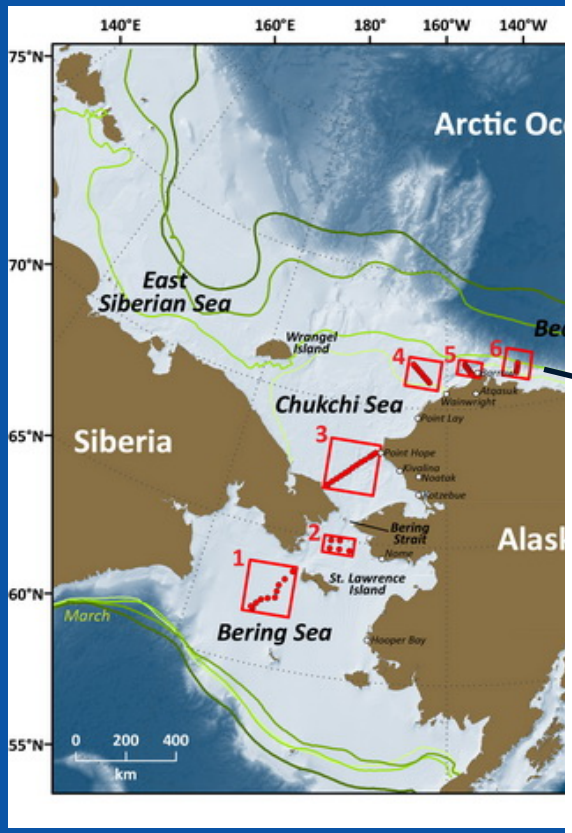
The Distributed Biological Observatory (DBO)

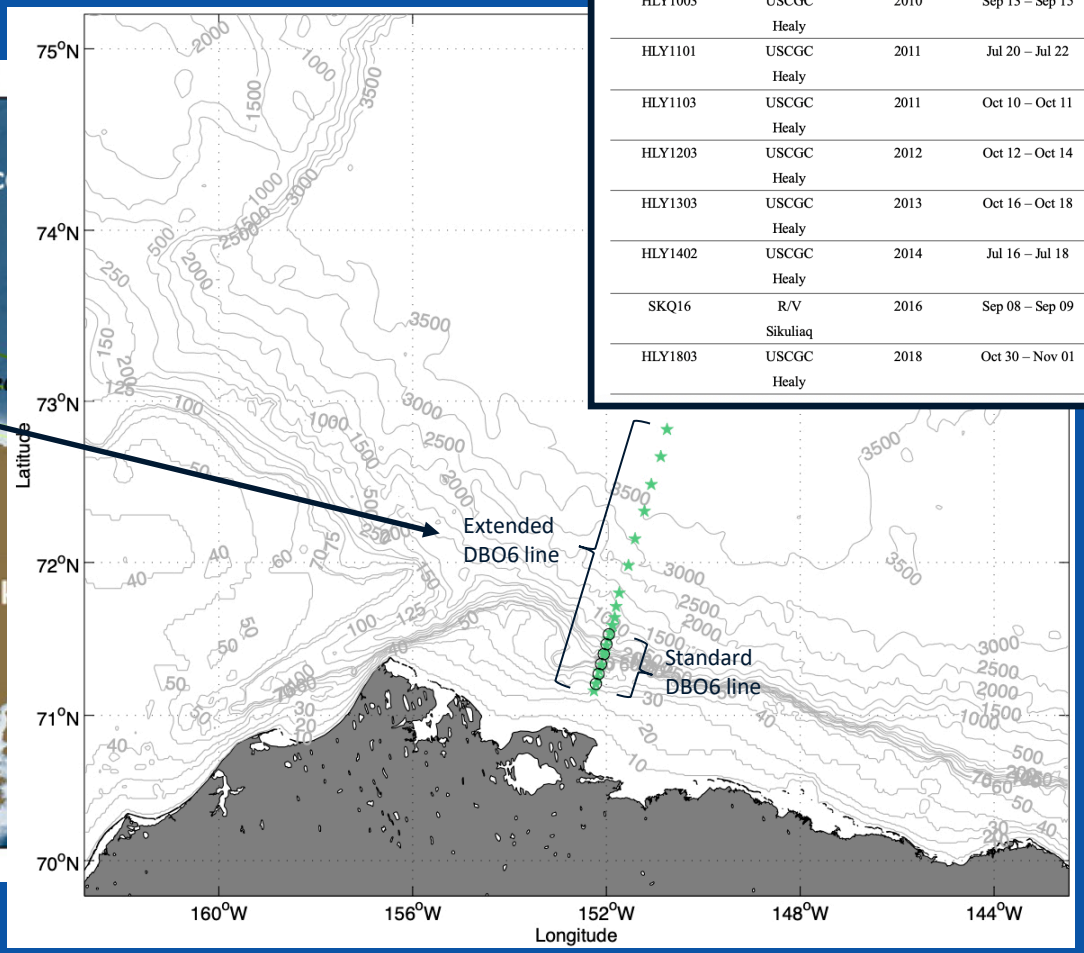


9 occupations of the extended DBO6 line 2003-2019

The Distributed Biological Observatory

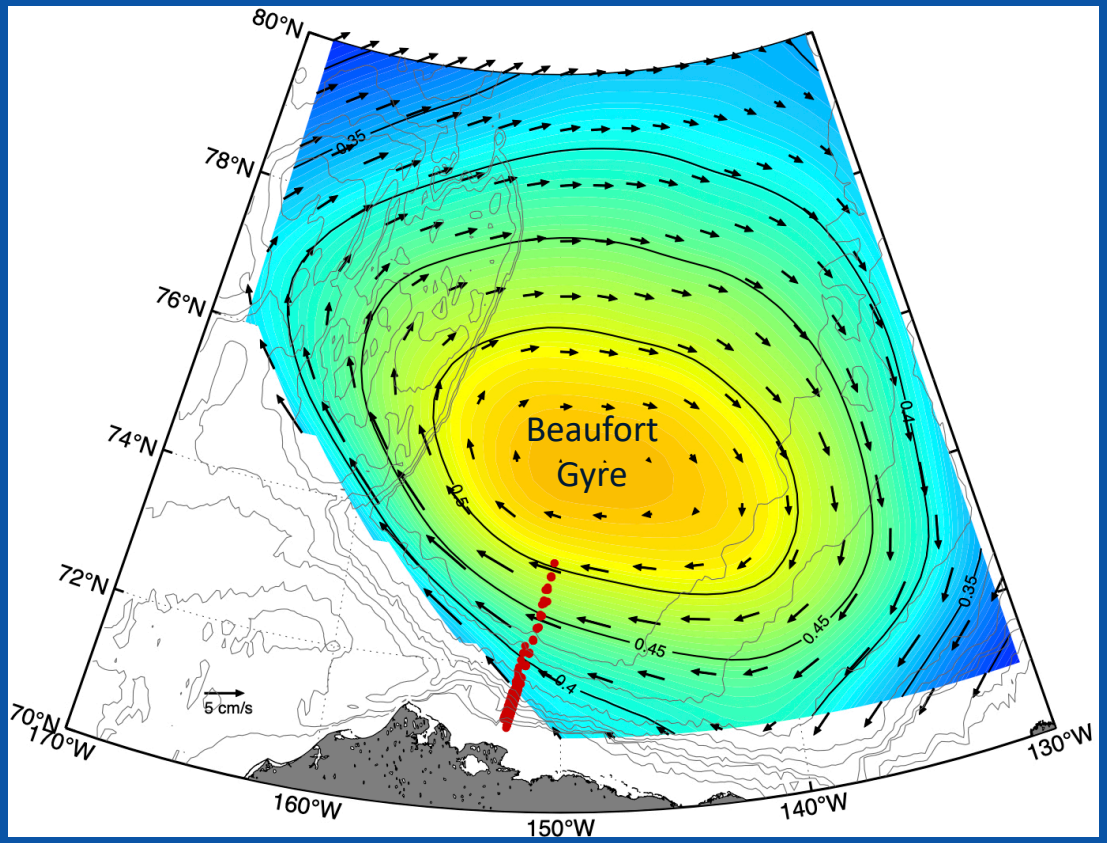
Cruise	Ship	Year	Dates
NBP03	R/V N.B. Palmer	2003	Aug 12 – Aug 14
HLY1003	USCGC Healy	2010	Sep 13 – Sep 15
HLY1101	USCGC Healy	2011	Jul 20 – Jul 22
HLY1103	USCGC Healy	2011	Oct 10 – Oct 11
HLY1203	USCGC Healy	2012	Oct 12 – Oct 14
HLY1303	USCGC Healy	2013	Oct 16 – Oct 18
HLY1402	USCGC Healy	2014	Jul 16 – Jul 18
SKQ16	R/V Sikuliaq	2016	Sep 08 – Sep 09
HLY1803	USCGC Healy	2018	Oct 30 – Nov 01



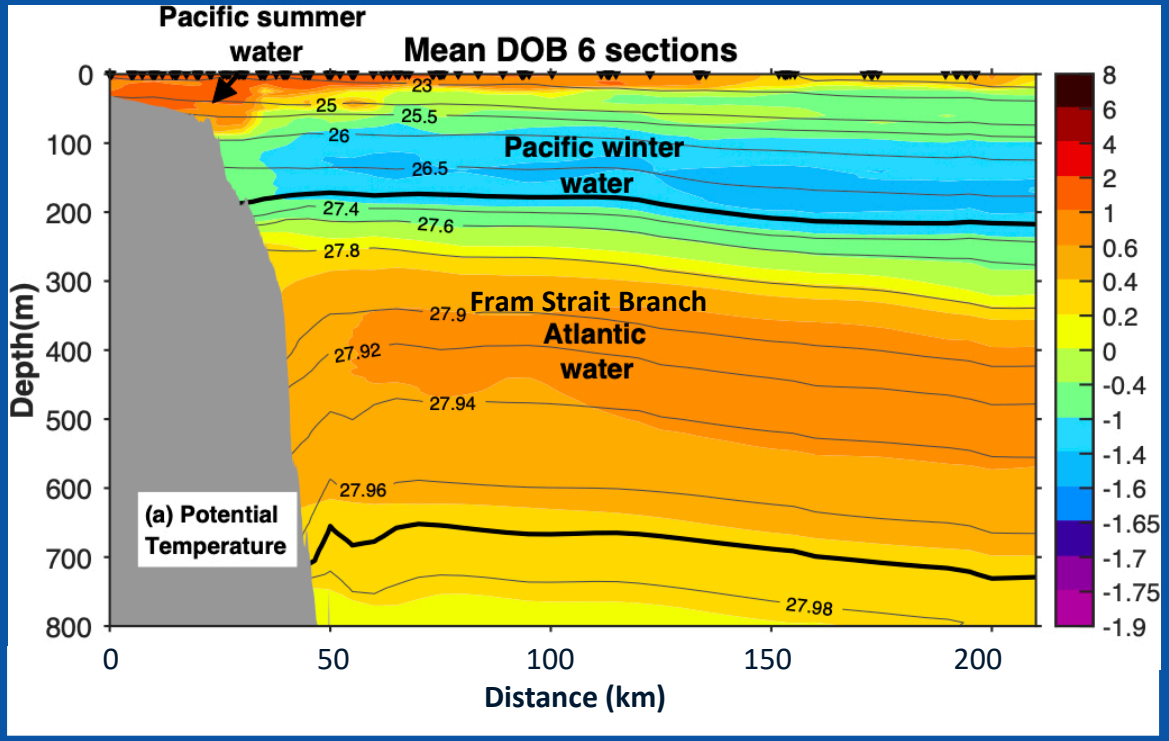


Extended DBO6 line

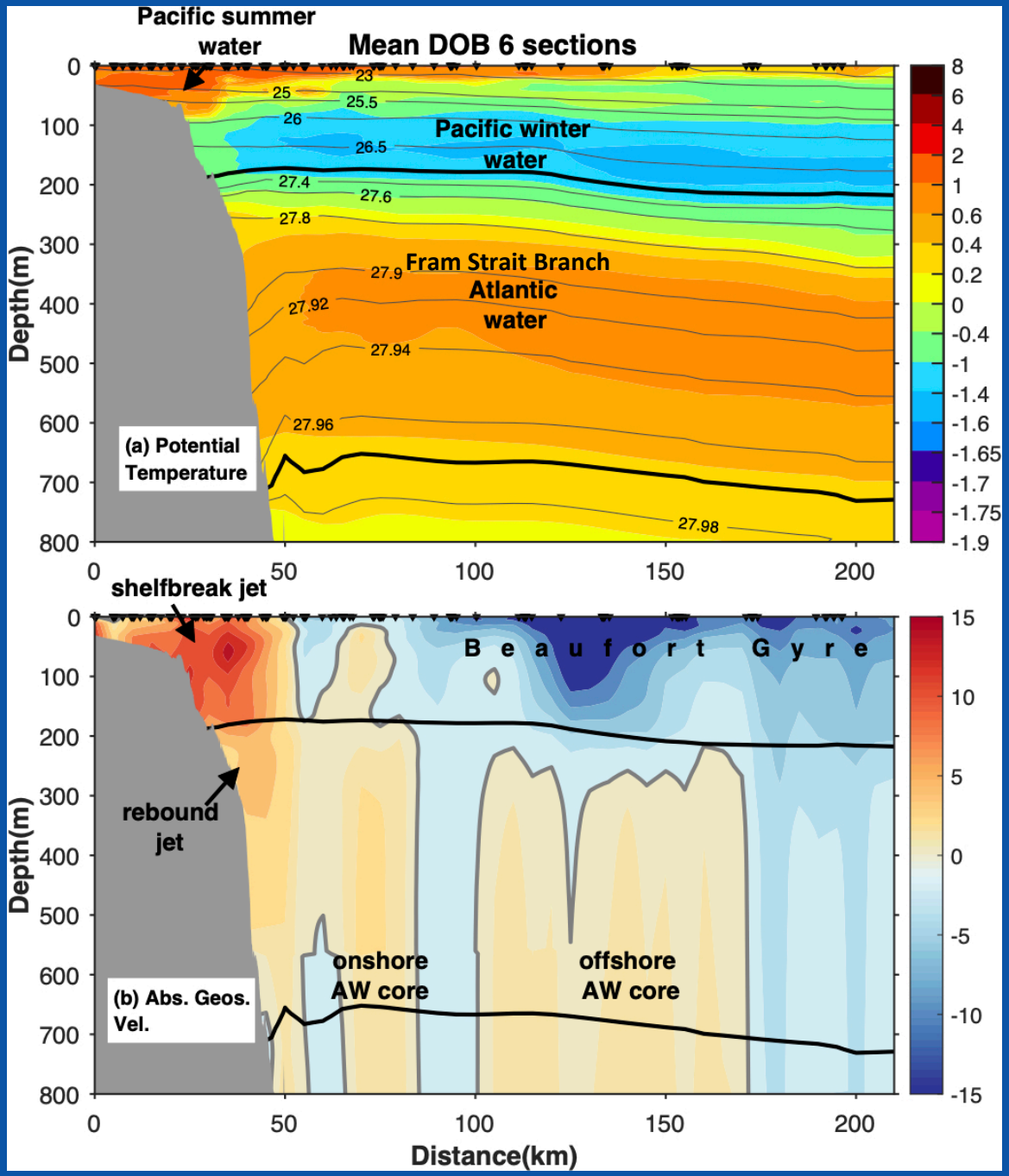
Mean absolute dynamic topography and surface flow vectors (2003-14)



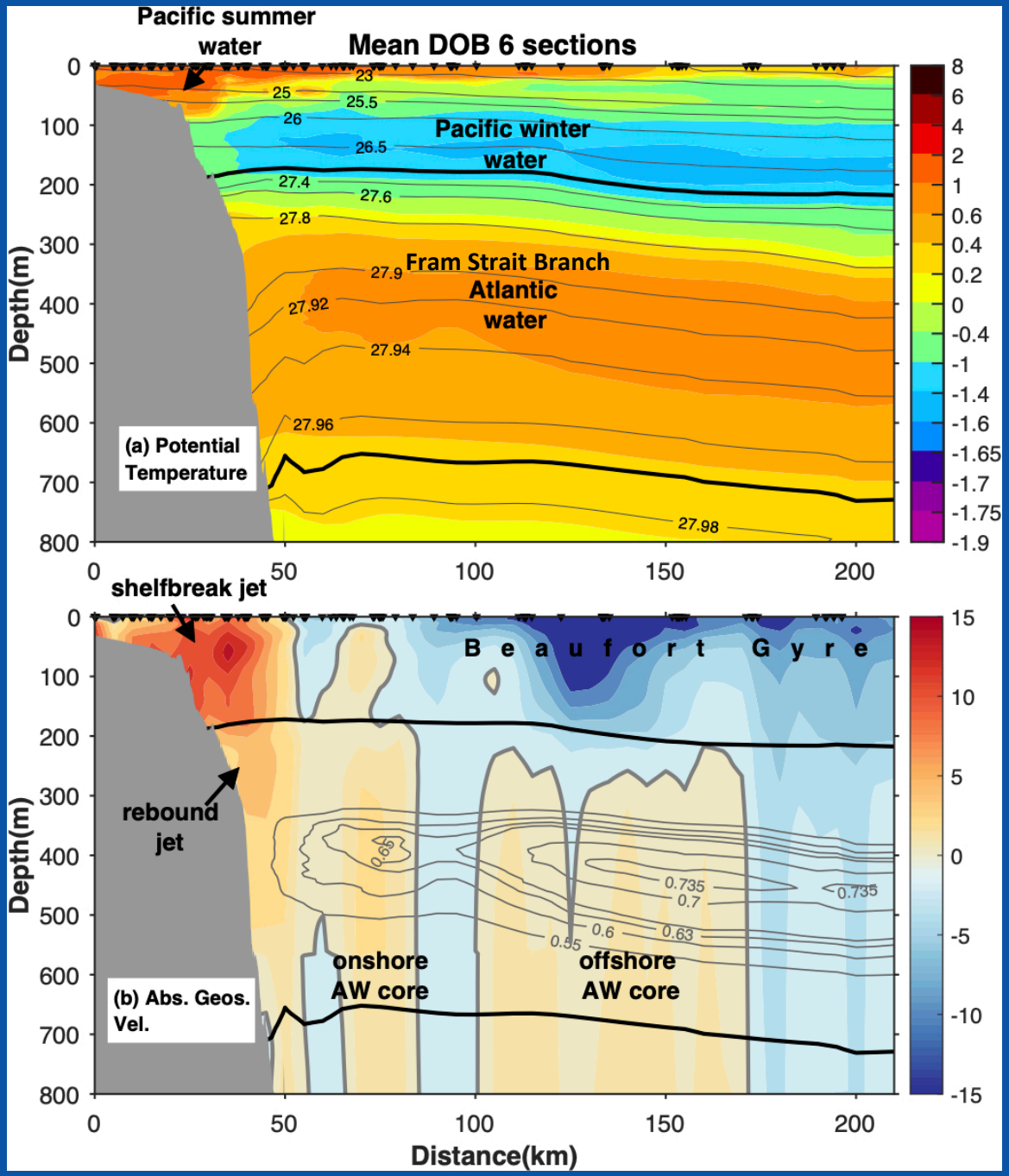
Extended DBO6 line



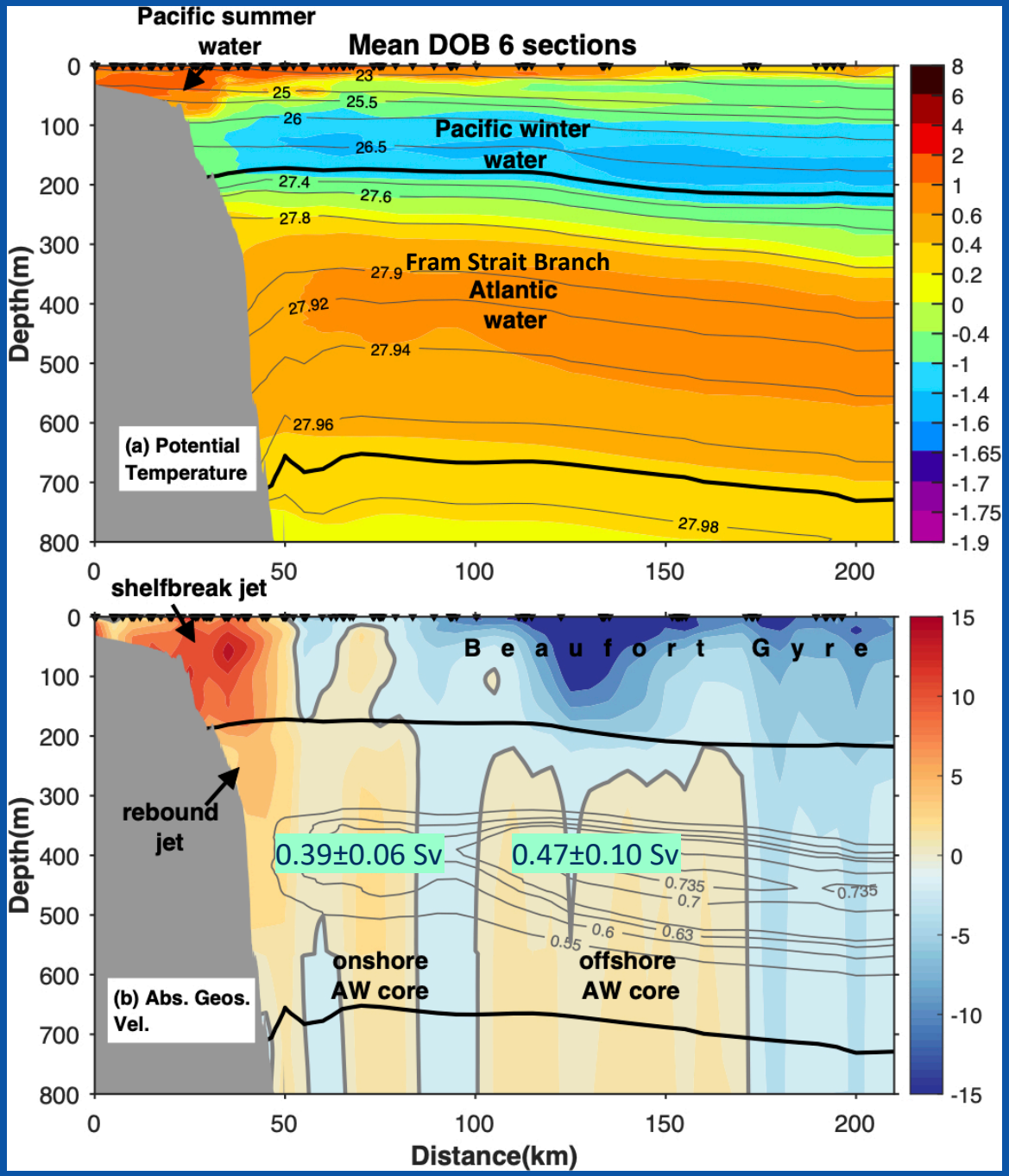
Extended DBO6 line



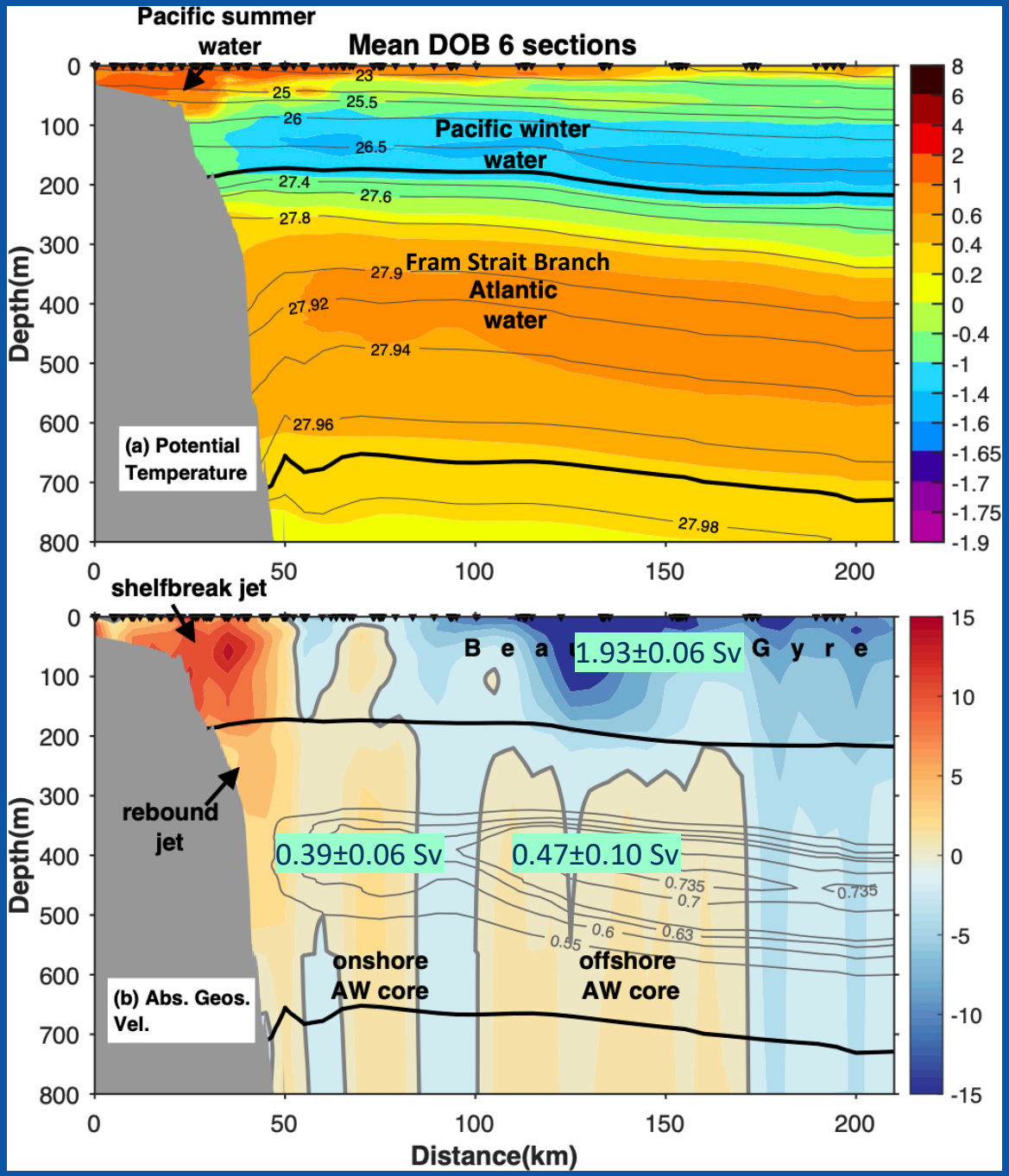
Extended DBO6 line



Extended DBO6 line

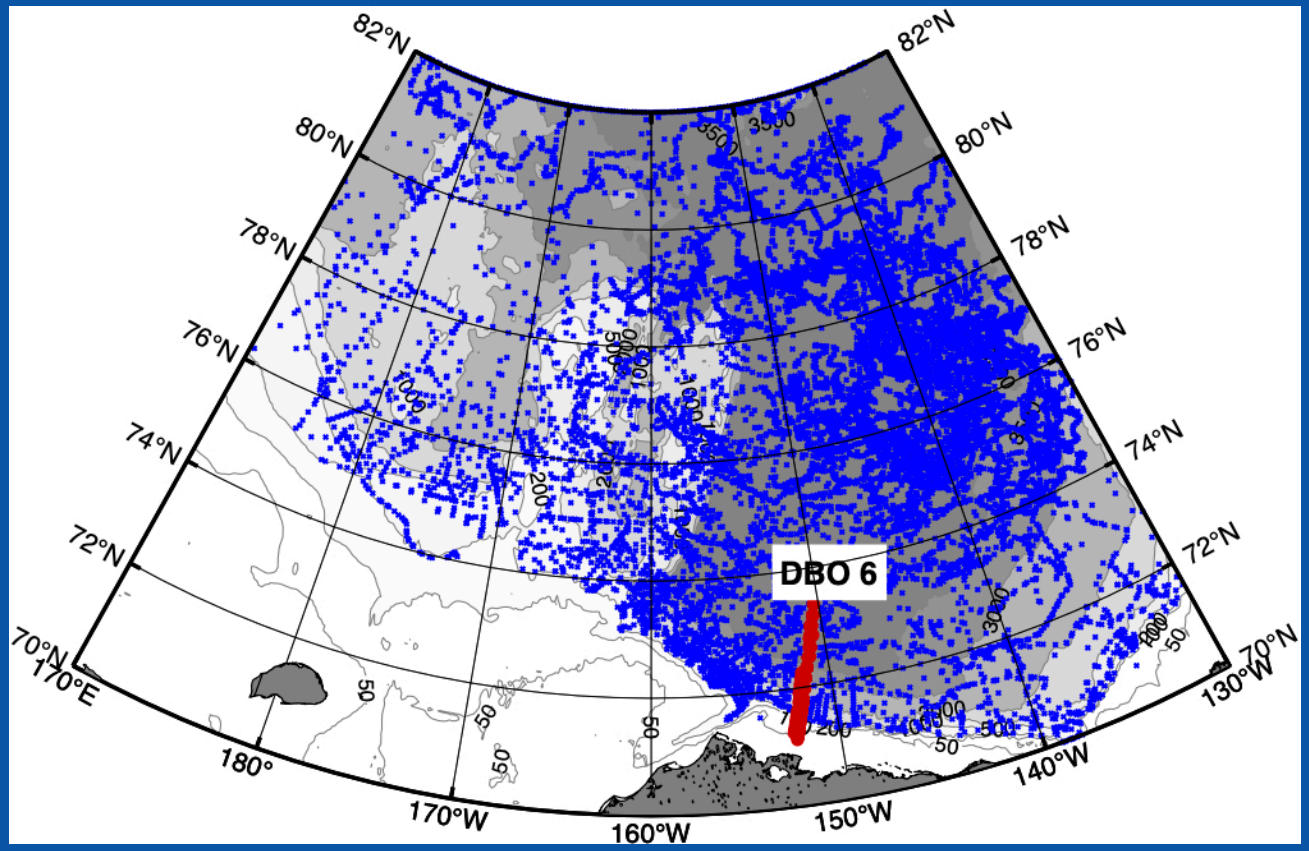


Extended DBO6 line



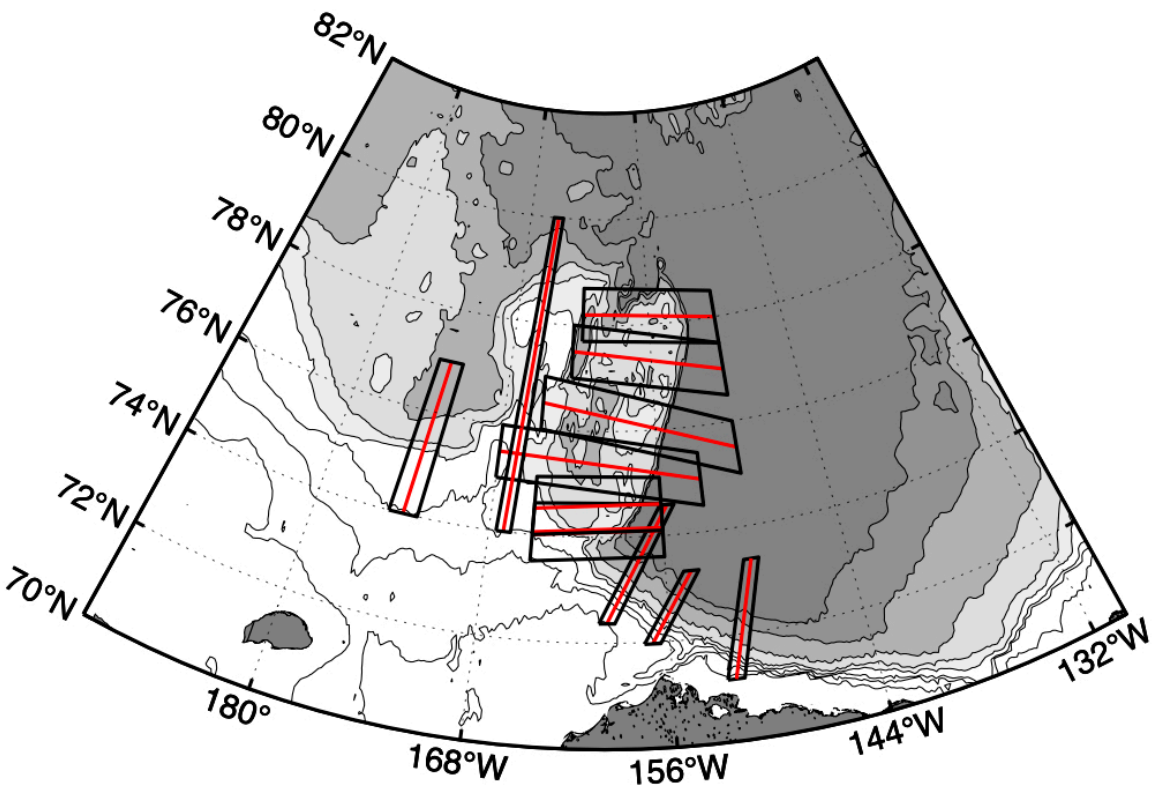
Tracking the current upstream

Unified Database of the Arctic and Subarctic Hydrography (UDASH) see Behrendt et al. (2018)

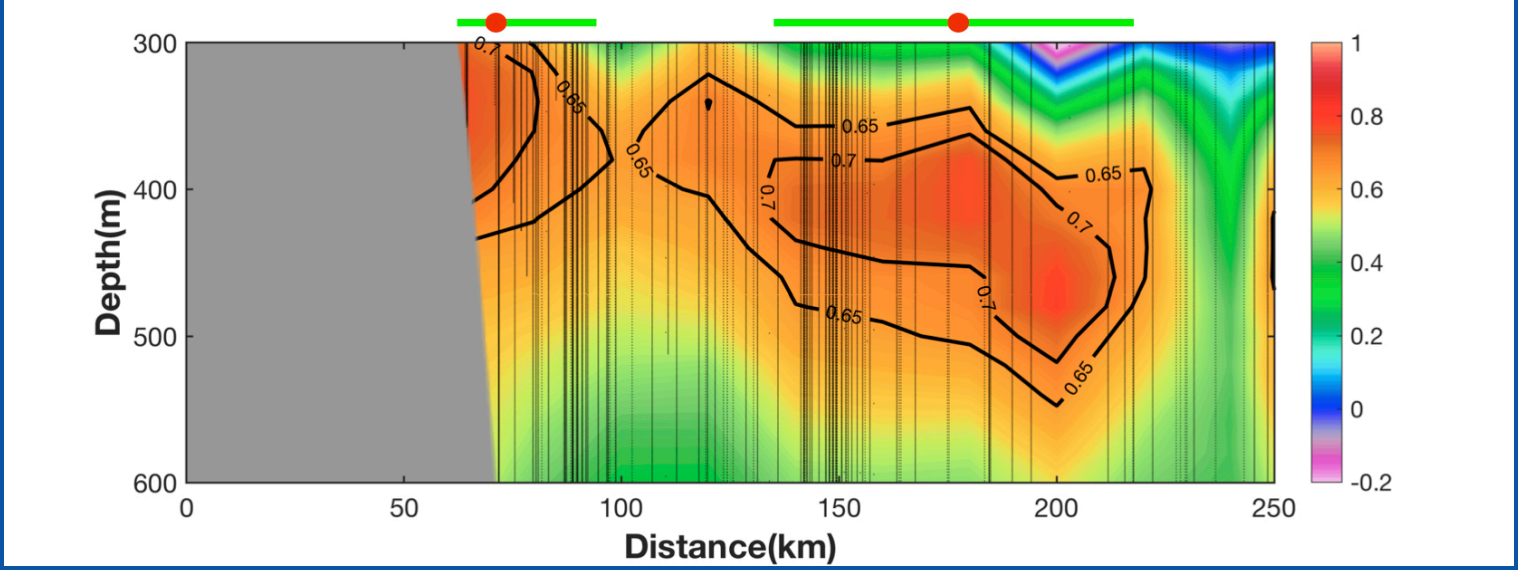


Coverage from 1980-2015

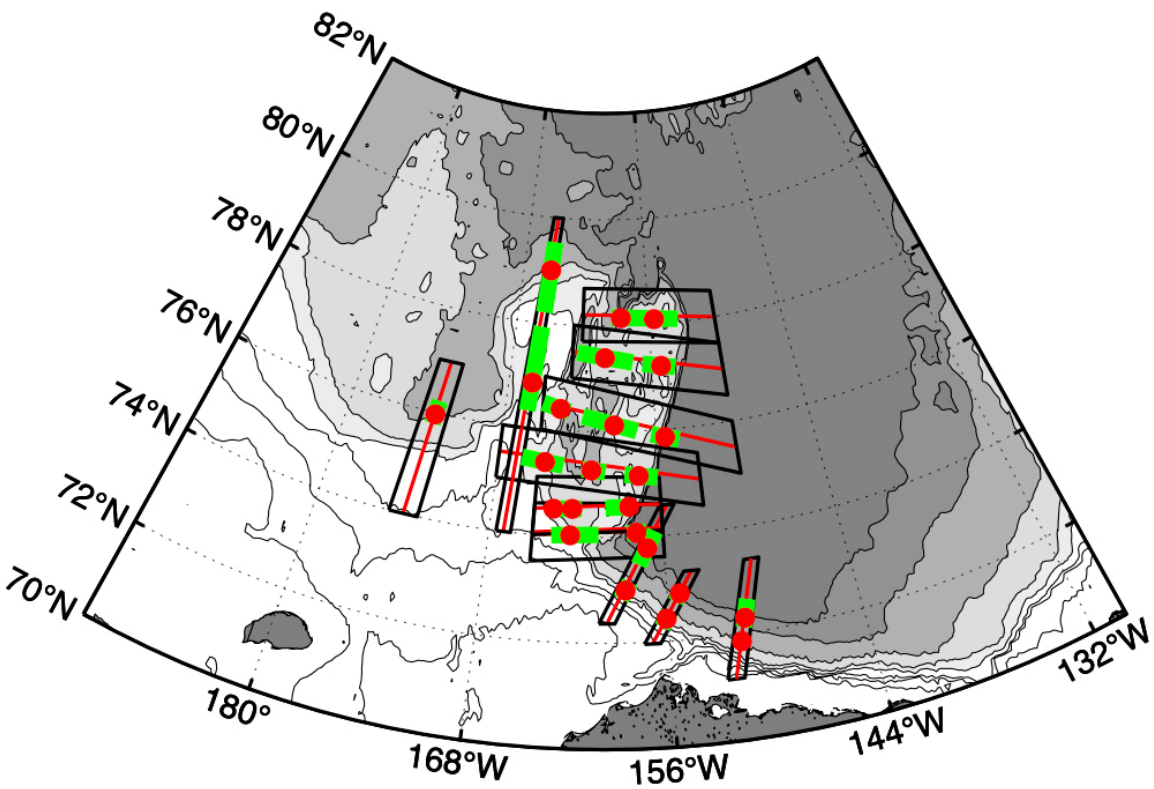
Tracking the current upstream



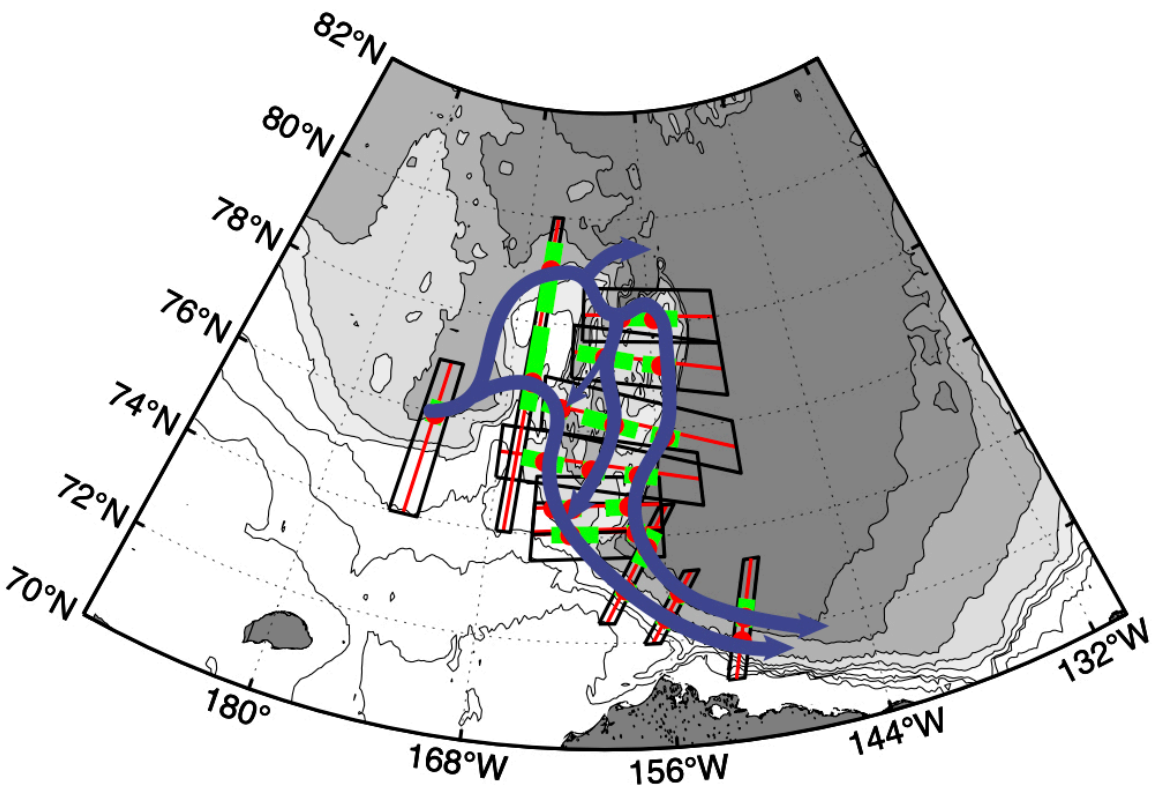
Tracking the current upstream



Tracking the current upstream

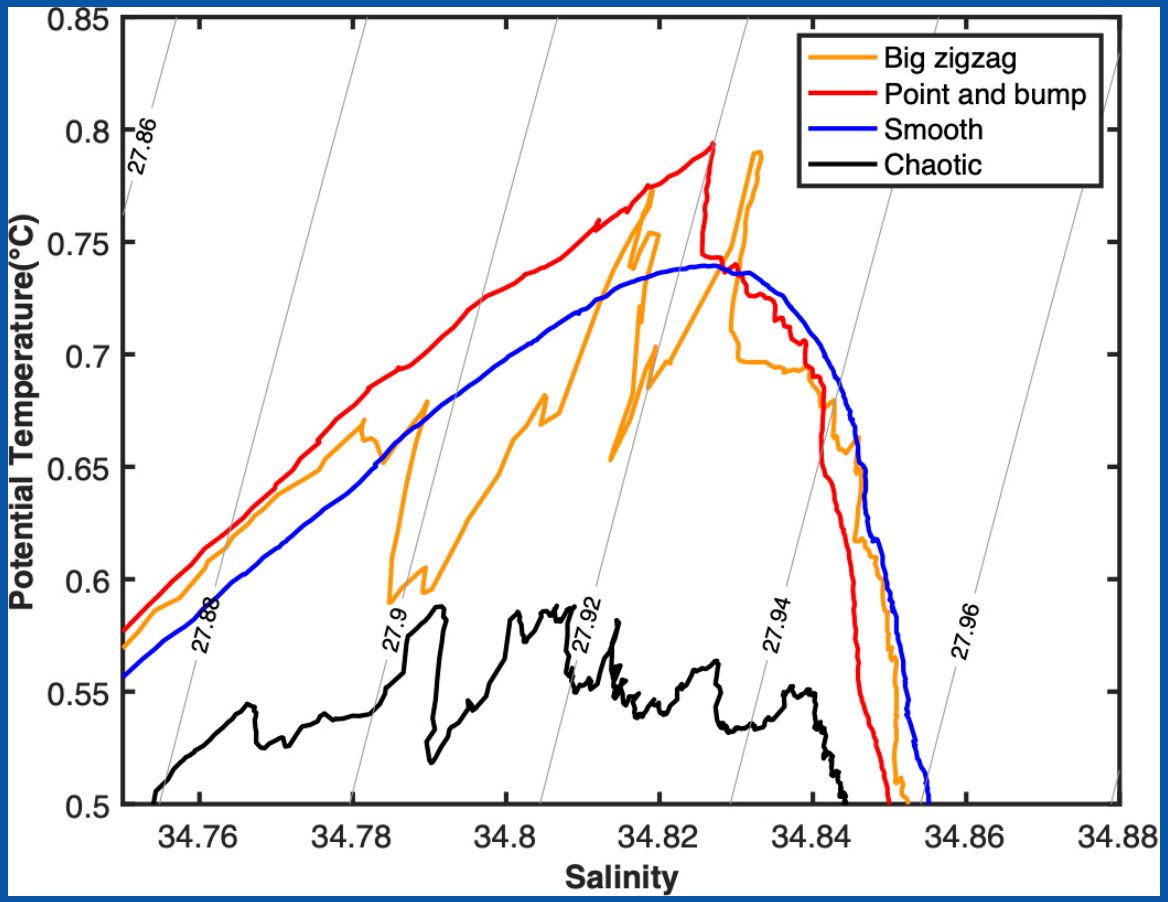


Tracking the current upstream



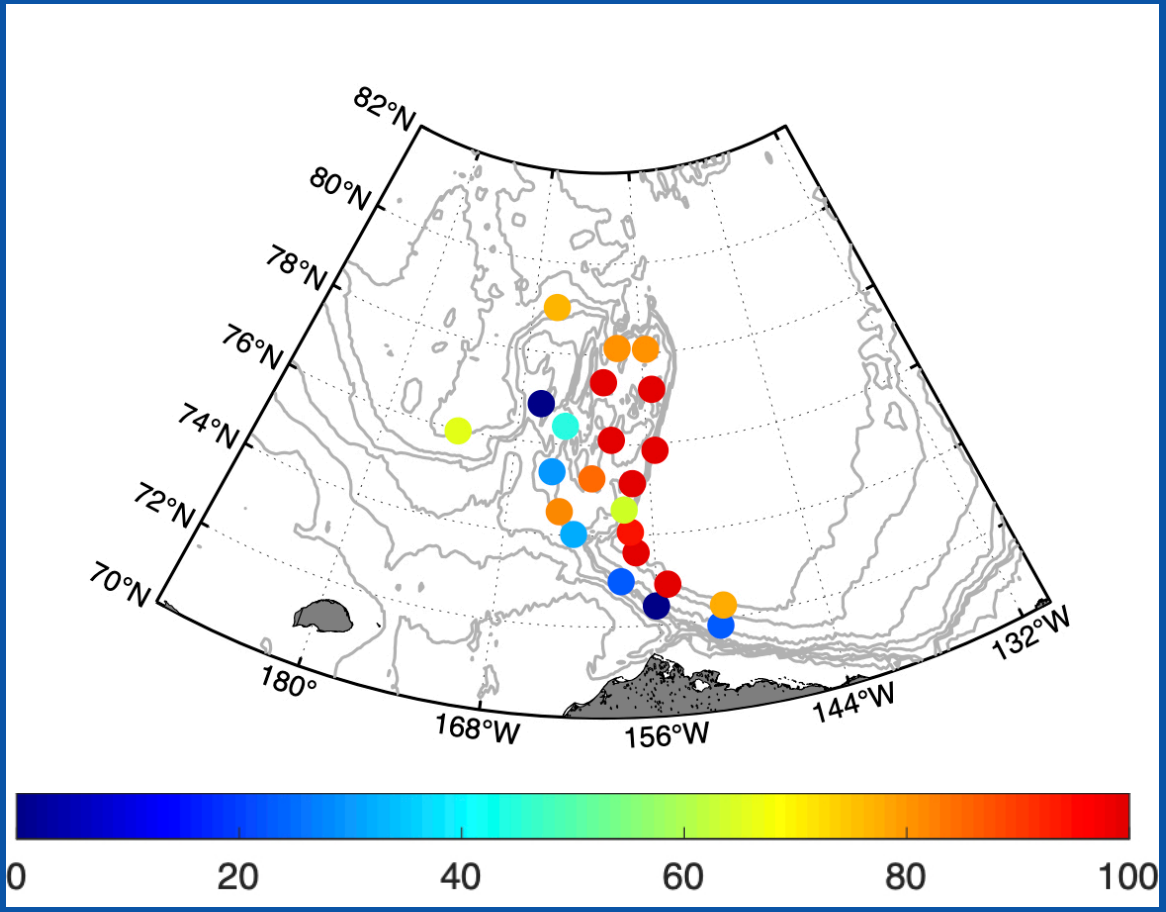
Tracking the current upstream

Four classes of T/S structures



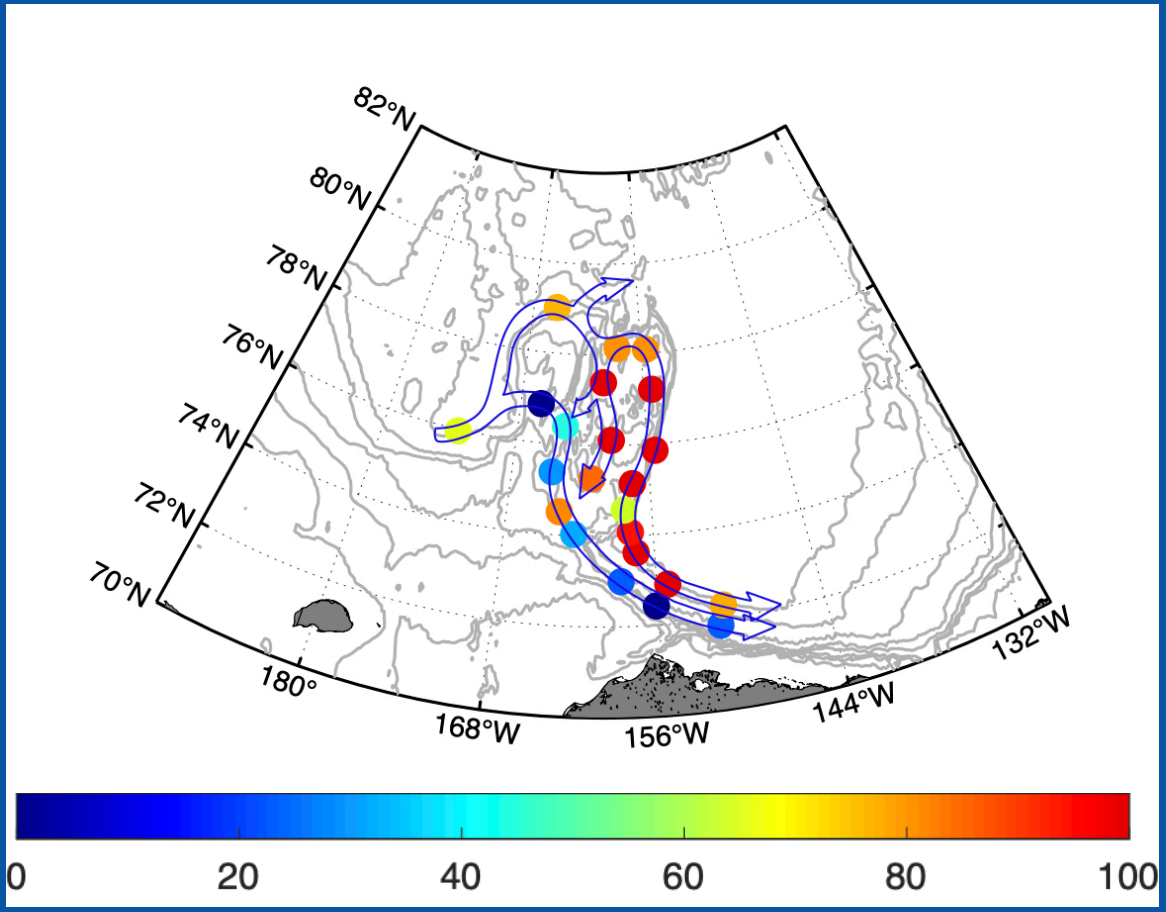
Tracking the current upstream

Percentage of point and bump profiles



Tracking the current upstream

Percentage of point and bump profiles



Conclusions so far

There are two branches of the Atlantic Water boundary current in the southern Canada Basin, flowing beneath/counter to the Beaufort gyre.

They transport comparable amounts of Fram Strait Branch Water (order 0.4 Sv).

The branches emerge from the Chukchi Borderland, due to a topography-driven bifurcation.

The continental slope branch experiences more mixing which results in a distinct T/S structure.

Next steps: (1) Investigate the propagation of warm anomalies. (2) Use mooring data to flesh out the relationship between the Atlantic water boundary current and the Beaufort gyre.