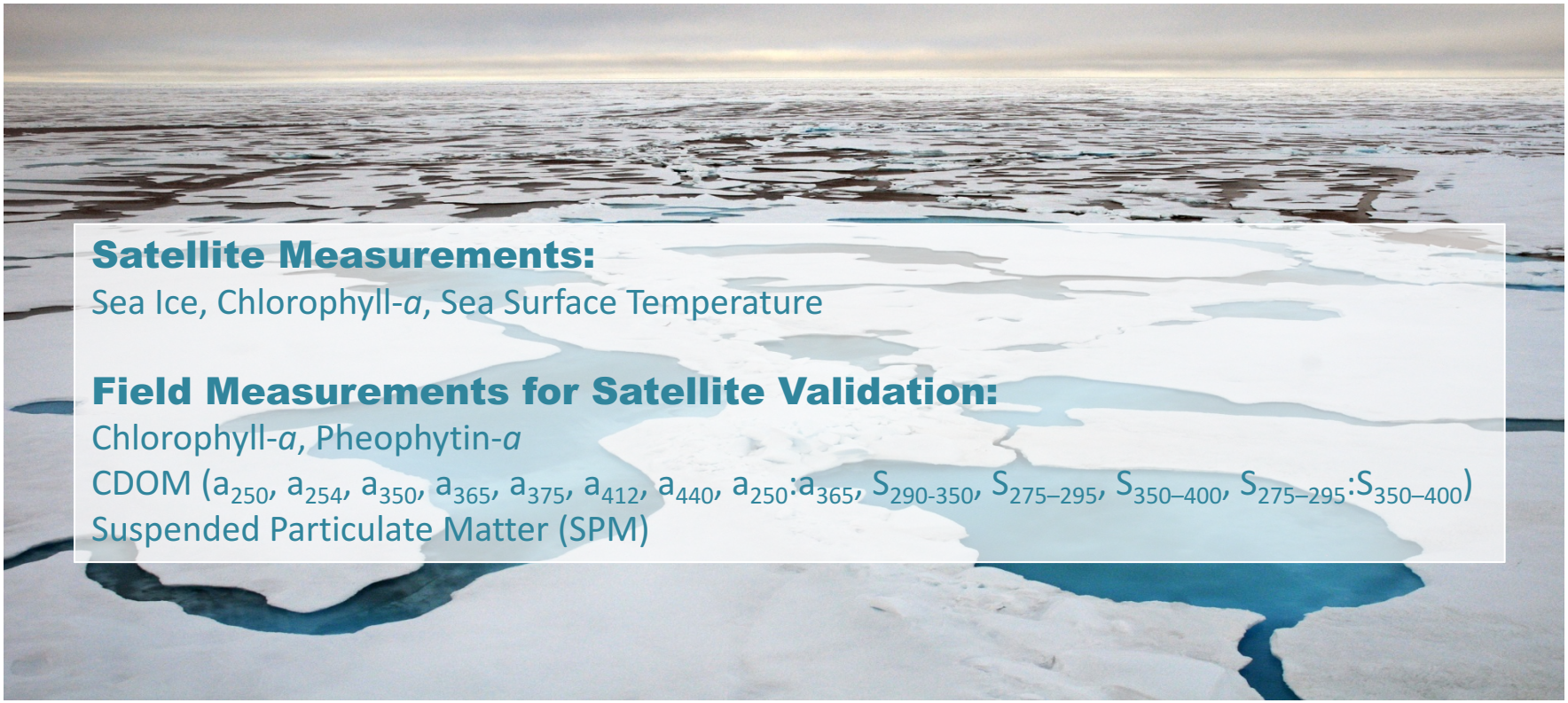
Biogeochemical and Satellite Measurements across the DBO:

CCGS *Sir Wilfred Laurier*: July 2013, 2014, 2015



Satellite Measurements:

Sea Ice, Chlorophyll-*a*, Sea Surface Temperature

Field Measurements for Satellite Validation:

Chlorophyll-*a*, Pheophytin-*a*

CDOM (a_{250}, a_{254}, a_{350}, a_{365}, a_{375}, a_{412}, a_{440}, a_{250}:a_{365}, $S_{290-350}$, $S_{275–295}$, $S_{350–400}$, $S_{275–295}$:$S_{350–400}$)

Suspended Particulate Matter (SPM)

PIs:

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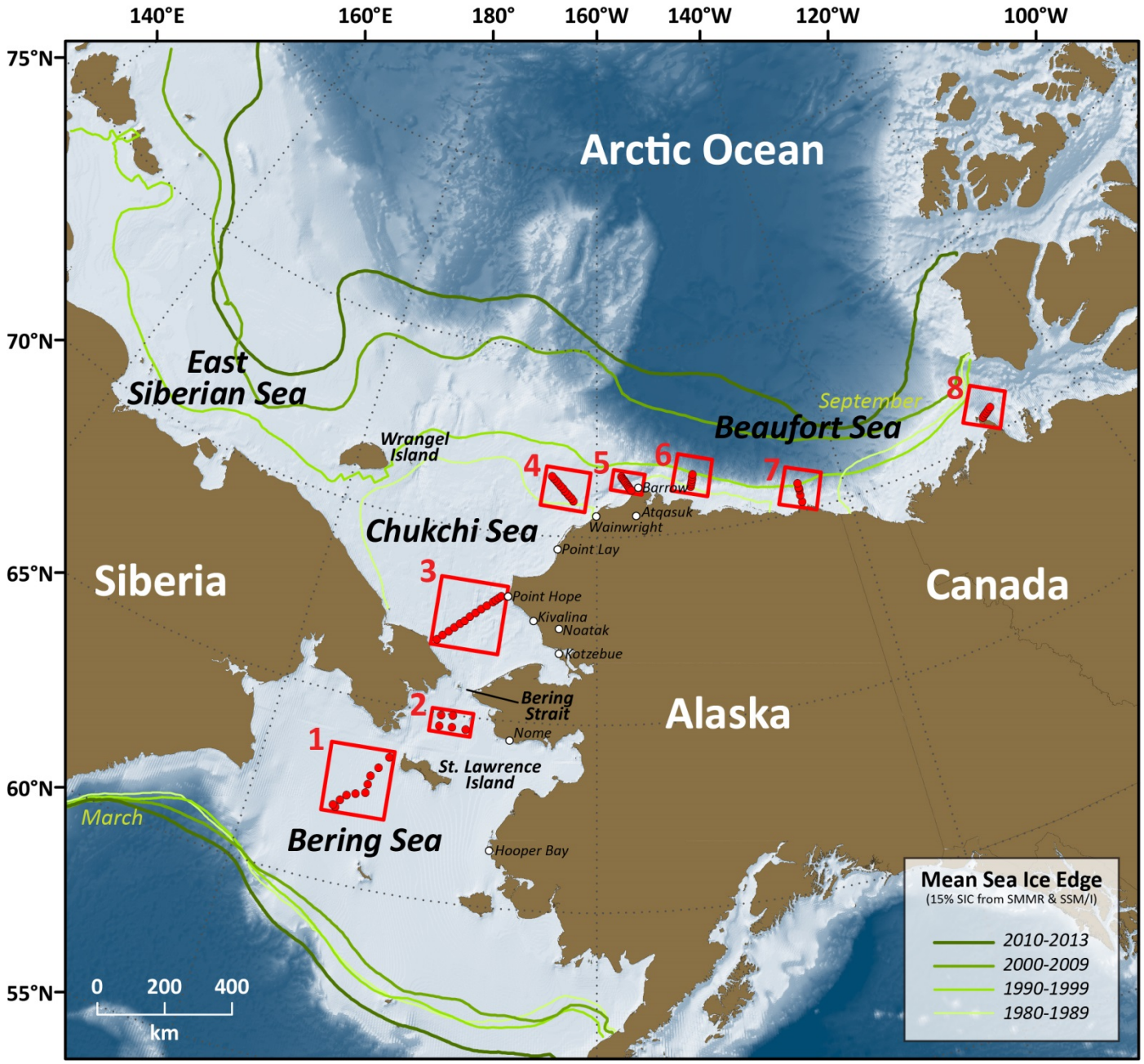
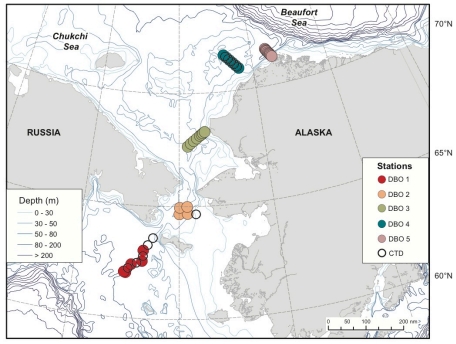
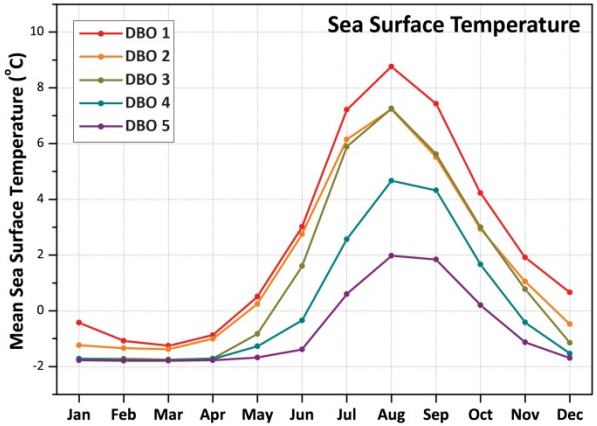
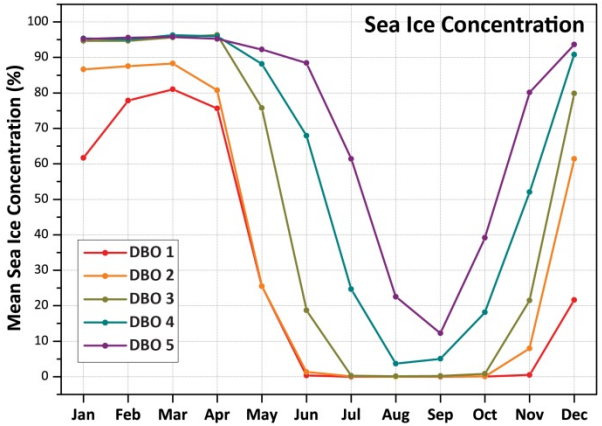

140°E
160°E
180°
160°W
140°W
120°W
100°W
75°N
70°N
65°N
60°N
55°N
Arctic Ocean
East Siberian Sea
Wrangel Island
Chukchi Sea
Beaufort Sea
September
Siberia
Canada
Alaska
Bering Strait
St. Lawrence Island
Bering Sea
March
Barrow
Atqasuk
Wainwright
Point Lay
Point Hope
Kivalina
Noatak
Kotzebue
Nome
Hooper Bay
1
2
3
4
5
6
7
8
0
200
400
km
Mean Sea Ice Edge
(15% SIC from SMMR & SSM/I)
2010-2013
2000-2009
1990-1999
1980-1989

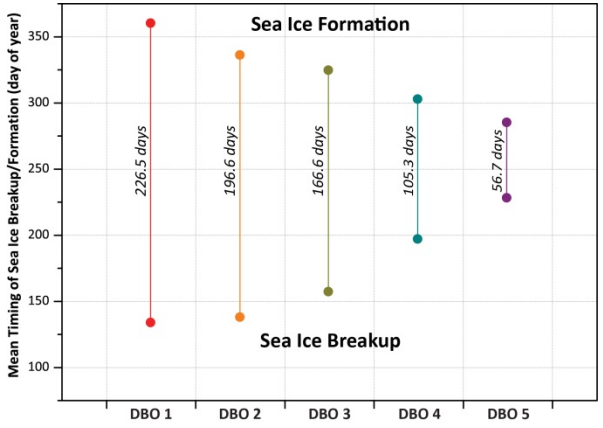
Monthly Mean DBO Climatologies (DBO 1–5, 6–8 to be added)

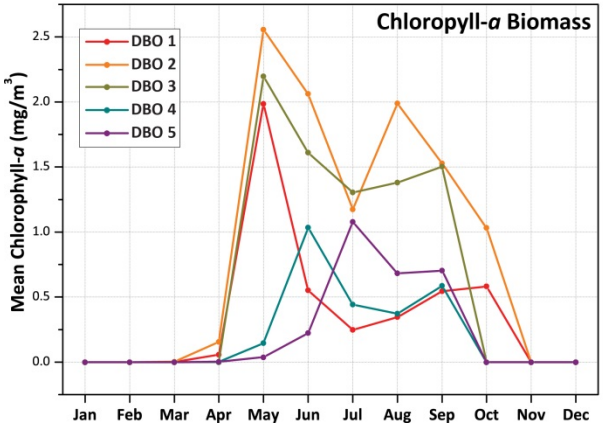
- *Sea Surface Temperature*
- *Sea Ice Concentration*
- *Timing of Sea Ice Breakup/Formation*
- *Chlorophyll-a*
- *Surface Nitrate (World Ocean Atlas)*
- *Solar Insolation (NASA)*

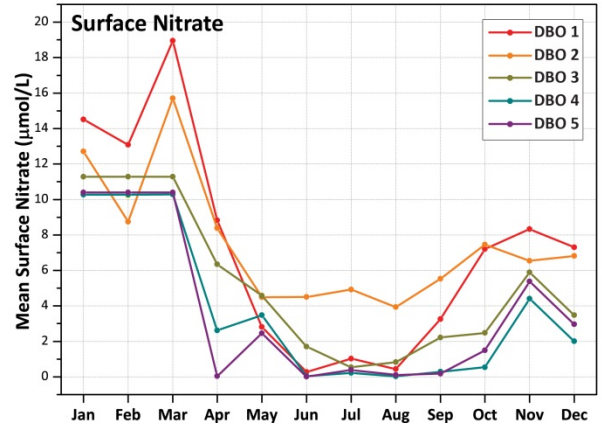


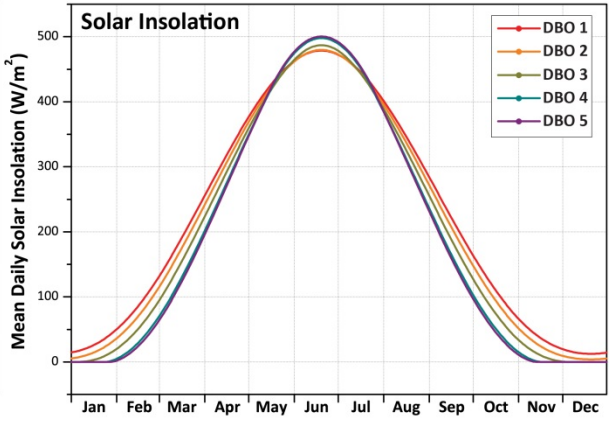








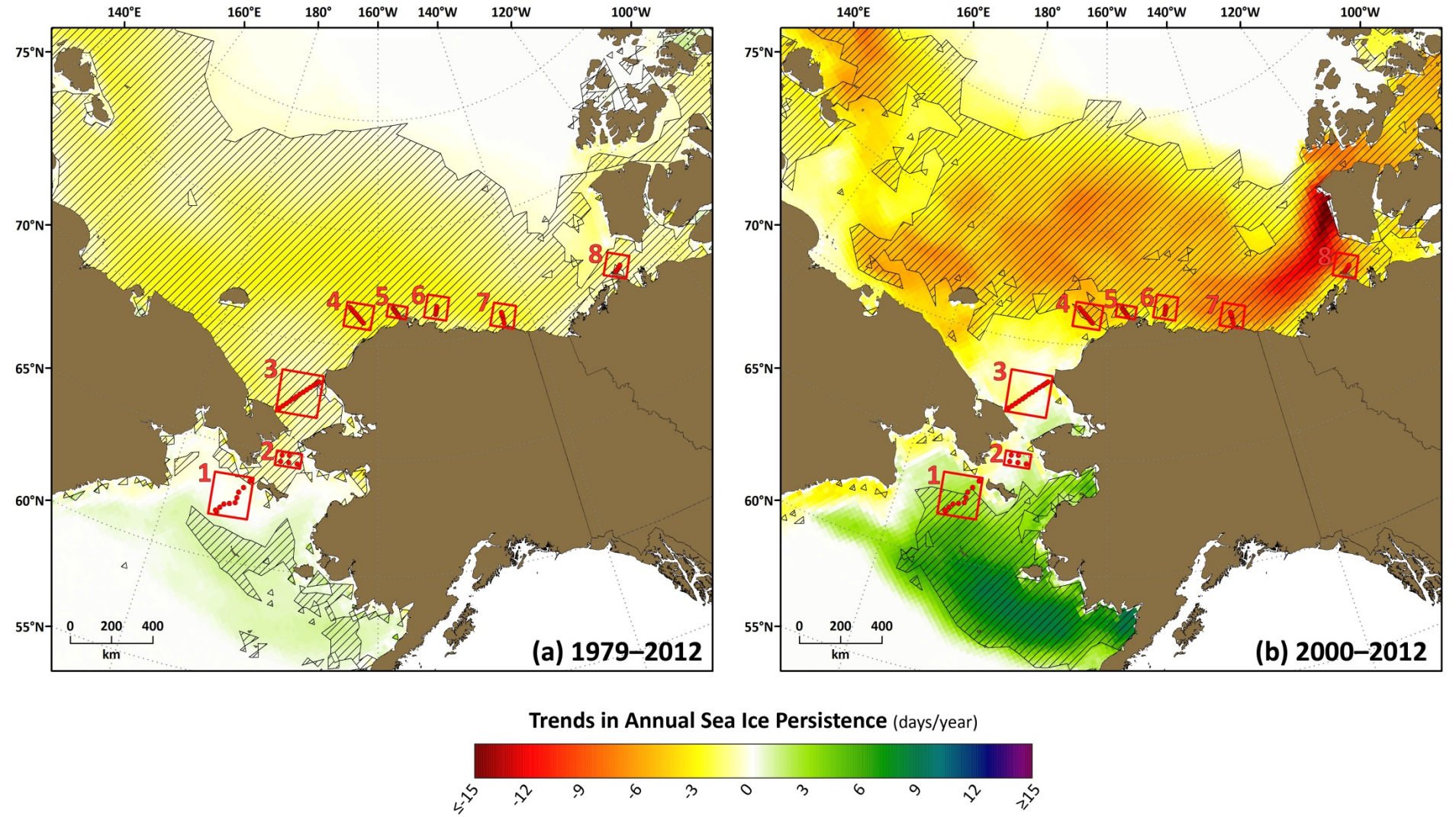




Trends in Annual Sea Ice Persistence (DBO 1–8)

Hatching indicates statistically significant trends (Mann-Kendall p<0.1)

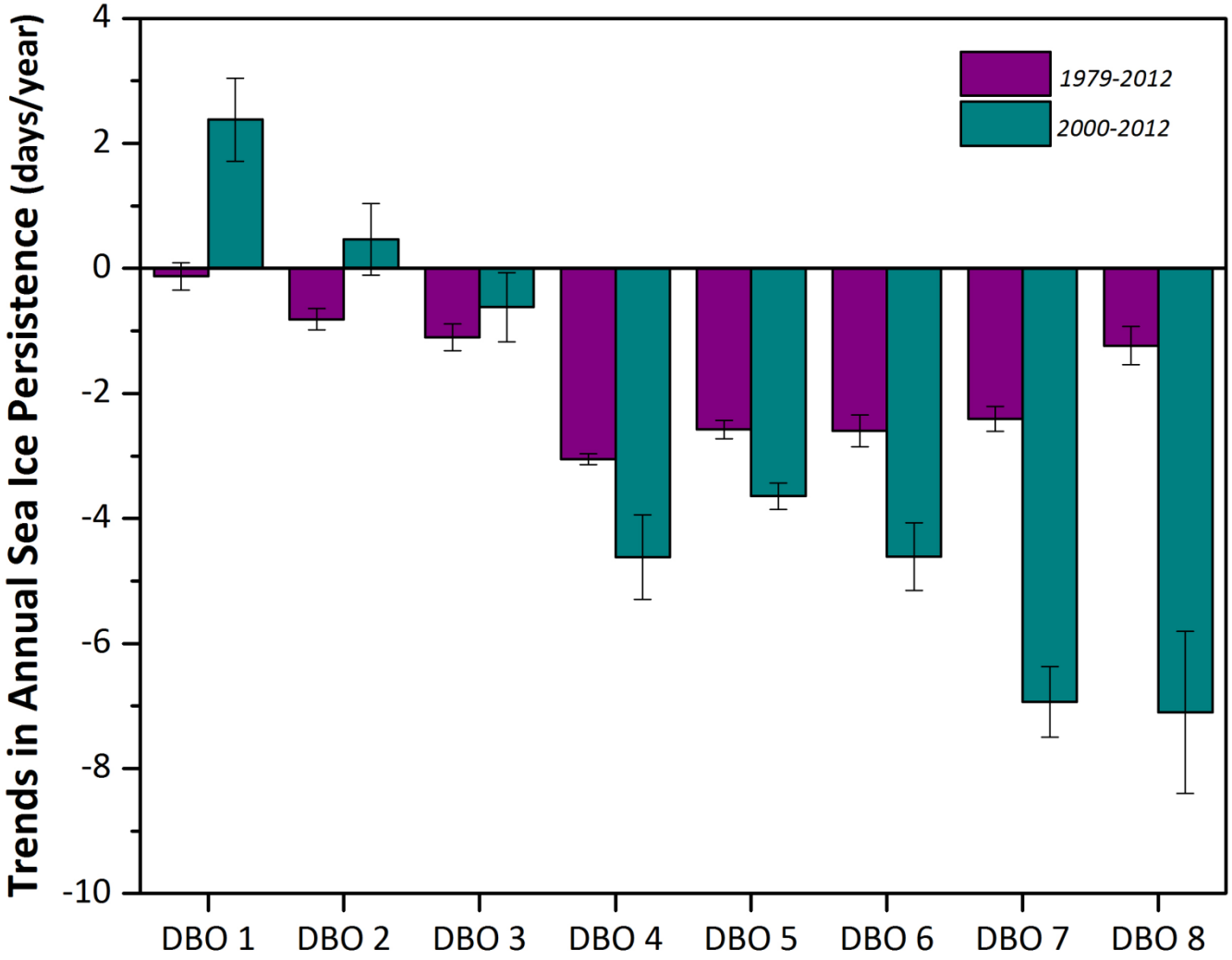
Trends in annual sea ice persistence have accelerated since 2000



Trends in Annual Sea Ice Persistence (DBO 1–8)

Trends in annual sea ice persistence have accelerated since 2000

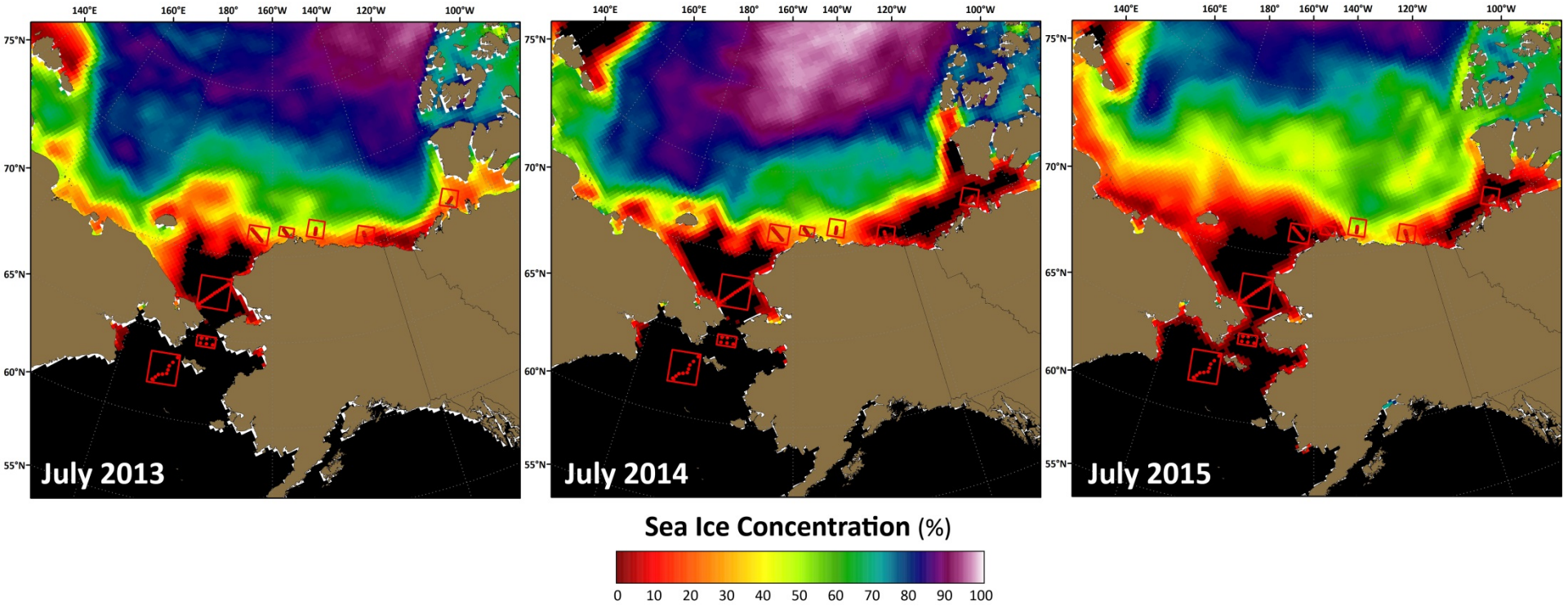
Recent gains in annual sea ice persistence in the south (DBO 1–2) transition to losses in the north (DBO 3–8)



Monthly Mean Sea Ice Concentration (SSM/I)

2013, 2014, 2015 (corresponding to the NSF/AON Laurier cruises)

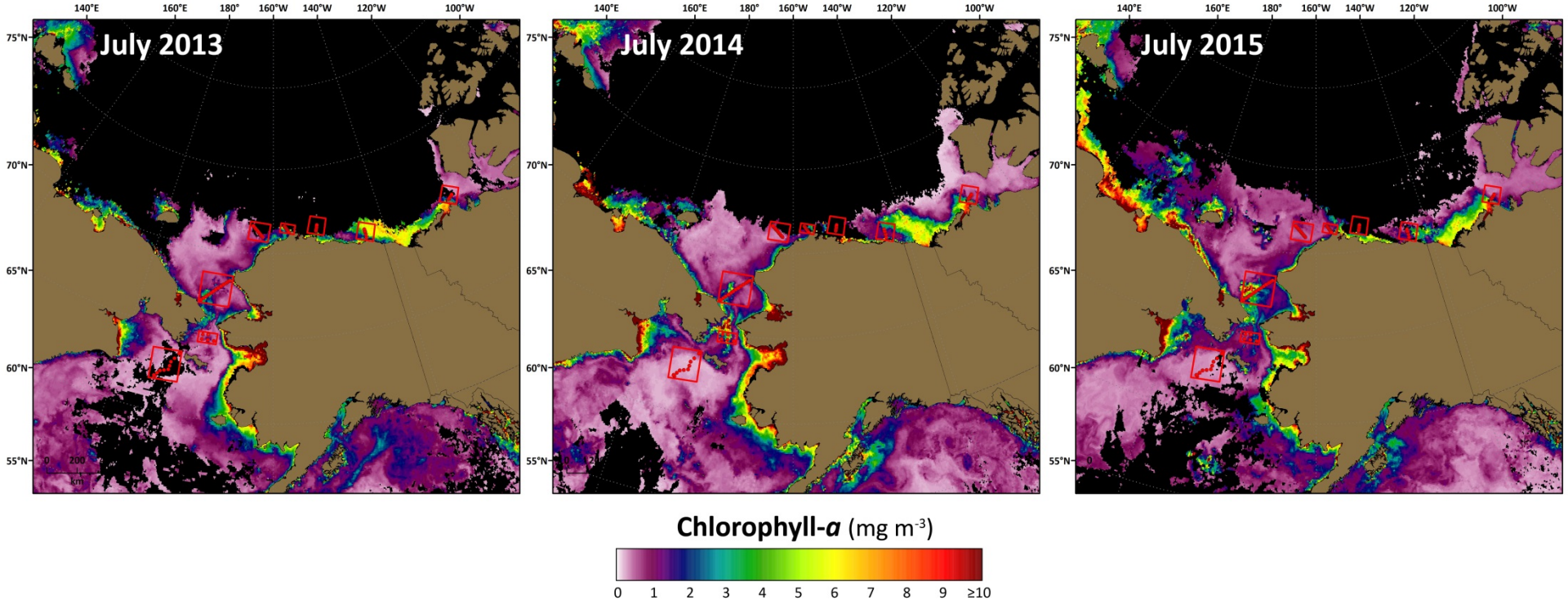
Significantly less ice in 2015 compared to 2013 and 2014

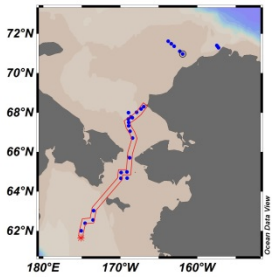


Monthly Mean Chlorophyll-*a* Concentration (MODIS-Aqua)

2013, 2014, 2015 (corresponding to the NSF/AON Laurier cruises)

More extensive blooms in the northern Chukchi Sea in 2015 (sea ice broke up earlier)





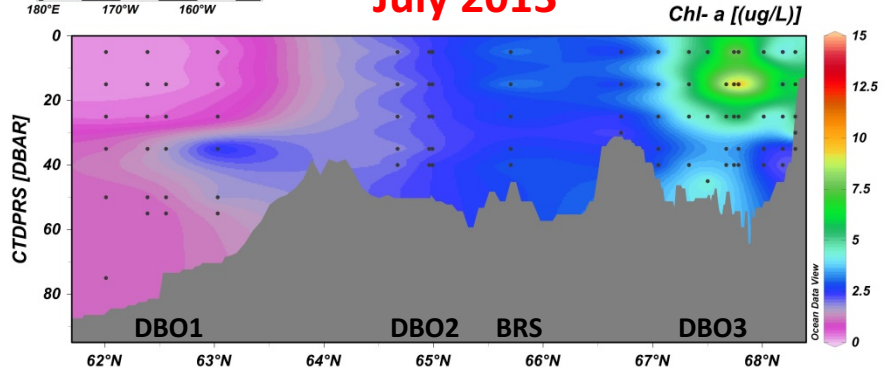
Field Observations for Satellite Validation: DBO1, DBO2, BRS, DBO3

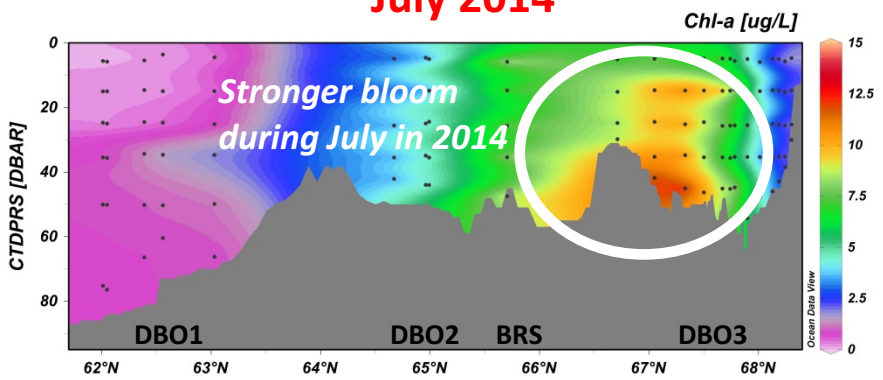
Chlorophyll-a, Pheophytin, Suspended Particulate Matter (SPM)

July 2013

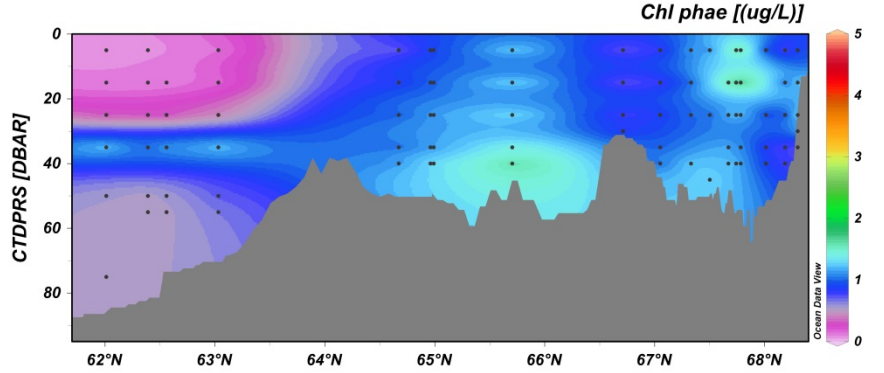
July 2014

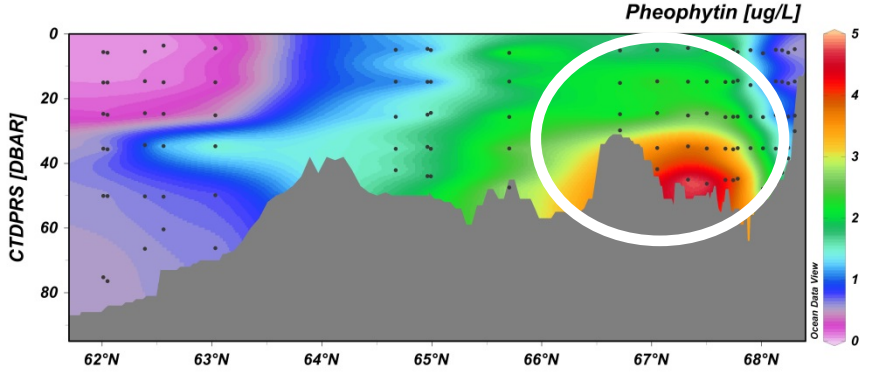
Chlorophyll-*a*



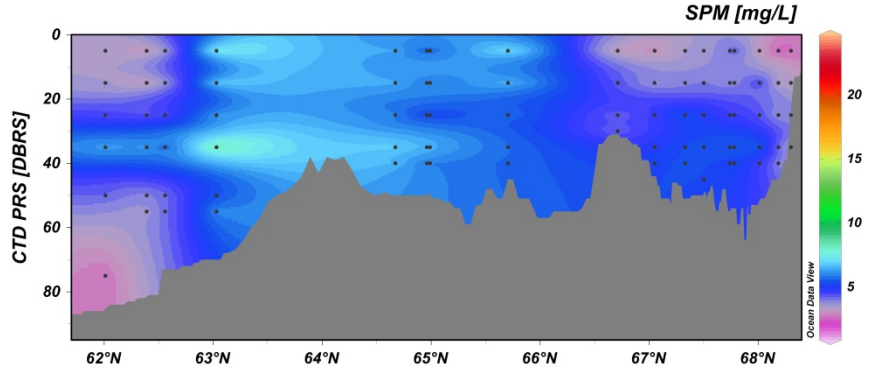


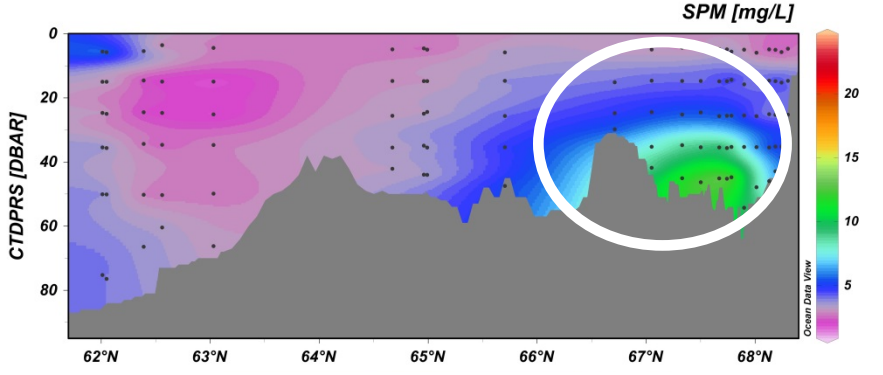
Pheophytin

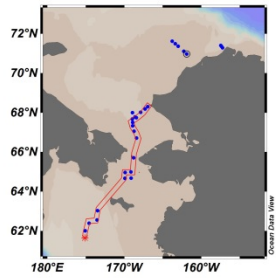




Suspended Particulate Matter (SPM)







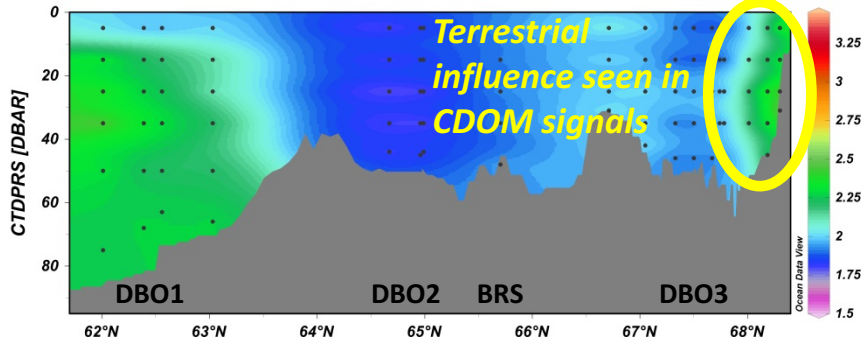
Field Observations for Satellite Validation: DBO1, DBO2, BRS, DBO3

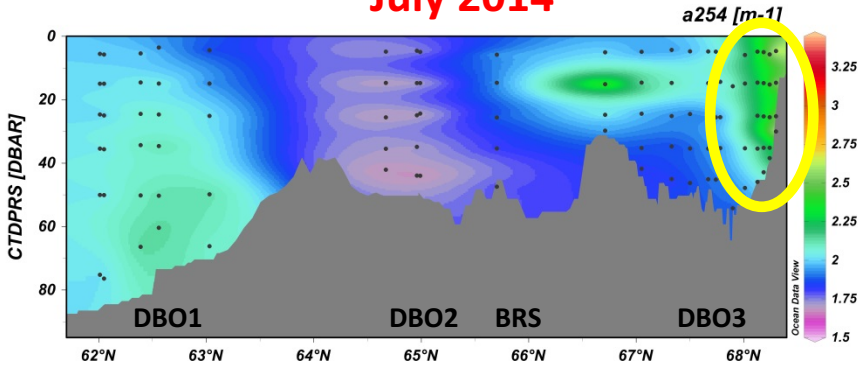
CDOM Parameters: a_{254}, a_{440}, $S_{275\text{-}295}$

July 2013

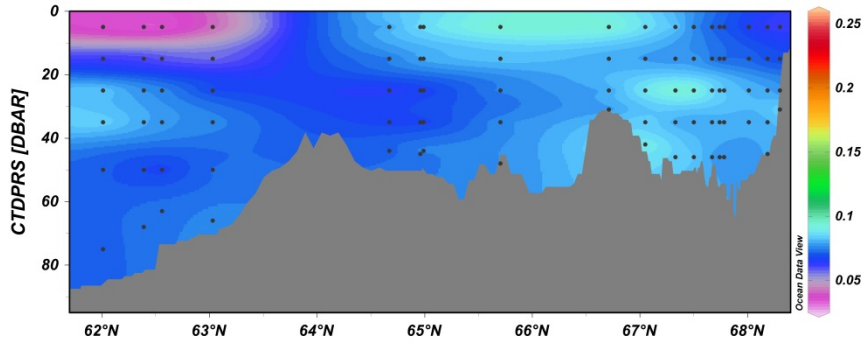
July 2014

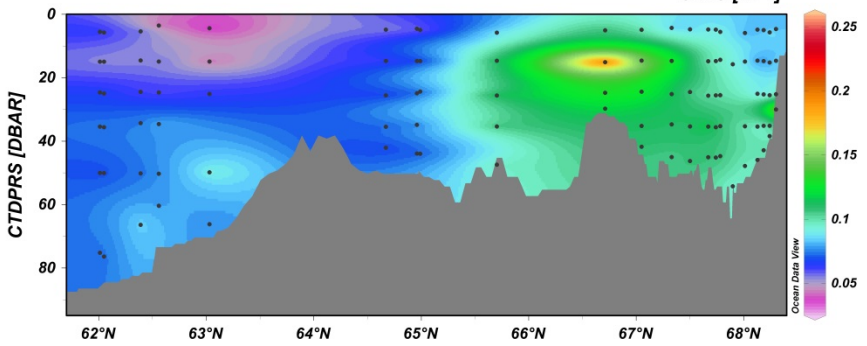
CDOM Absorbance: a_{254}



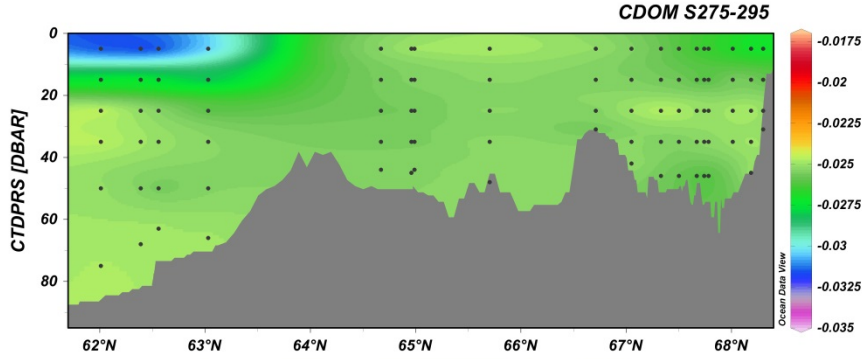


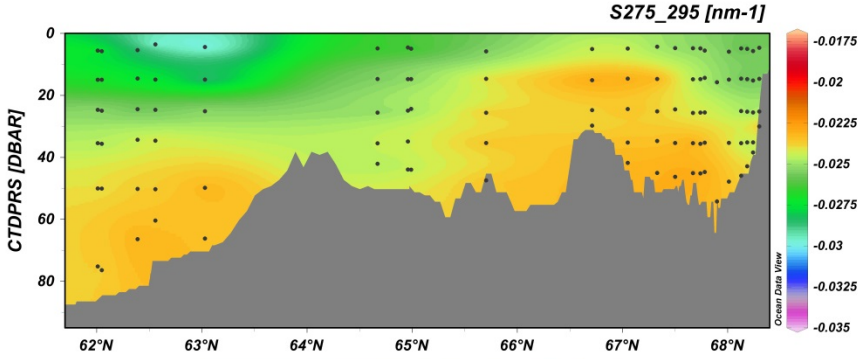
CDOM Absorbance: a_{440}



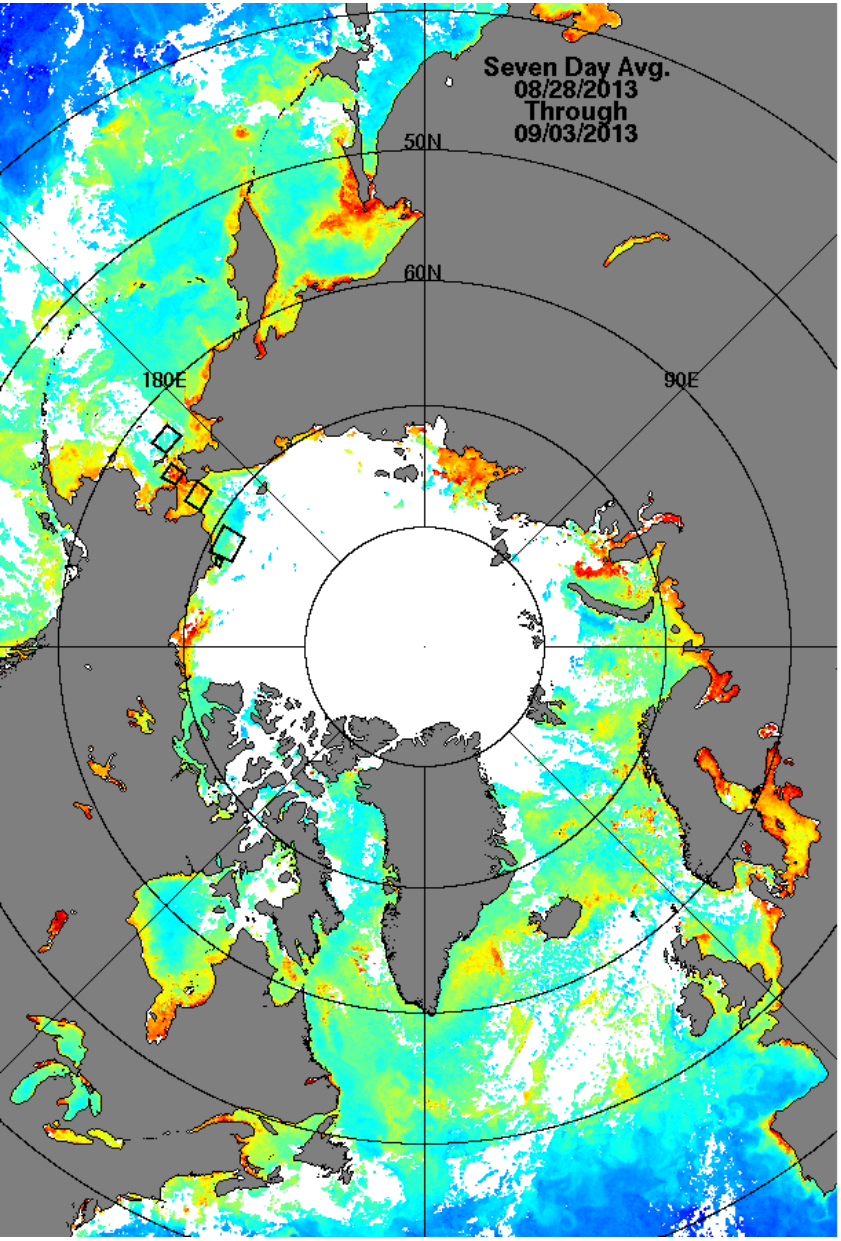


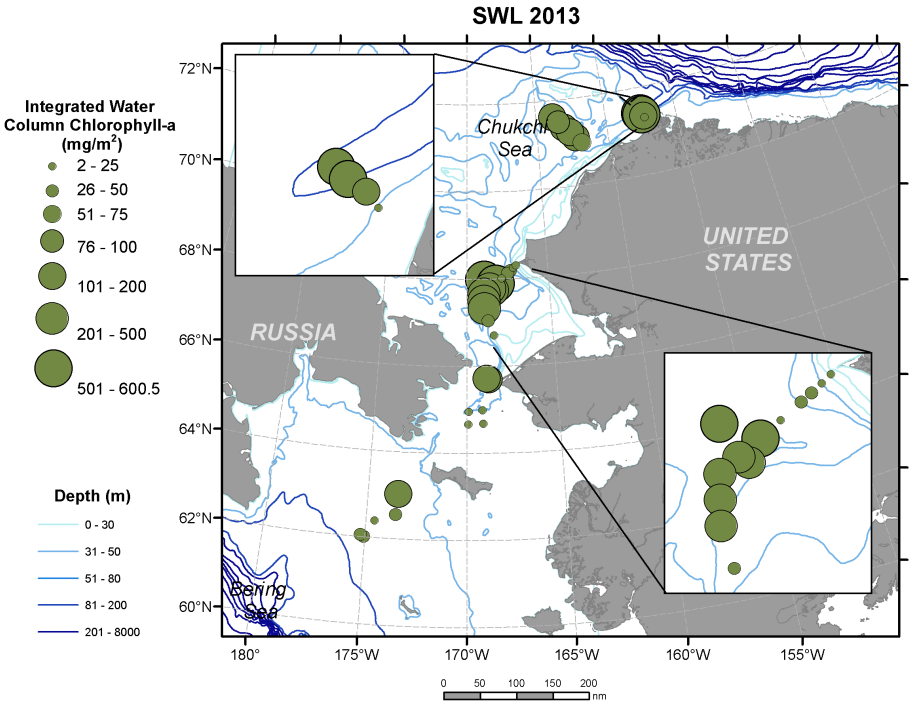
CDOM Spectral Slope $S_{275\text{-}295}$





NASA DBO-surface chlorophyll and field collected intregated values





- Highest chl a via satellites and field data in Bering Strait and offshore SE Chukchi Sea DBO3 SE Chukchi Sea hotspot

http://neptune.gsfc.nasa.gov/csb/index.php?section=270 **(courtesy Joey Comiso)**

Joey Comiso: DBO NASA Products

http://neptune.gsfc.nasa.gov/csb/index.php?section=270

(link to internet site and go through the webpage)