Optical, Biogeochemical, and Satellite Remote Sensing Observations across the DBO

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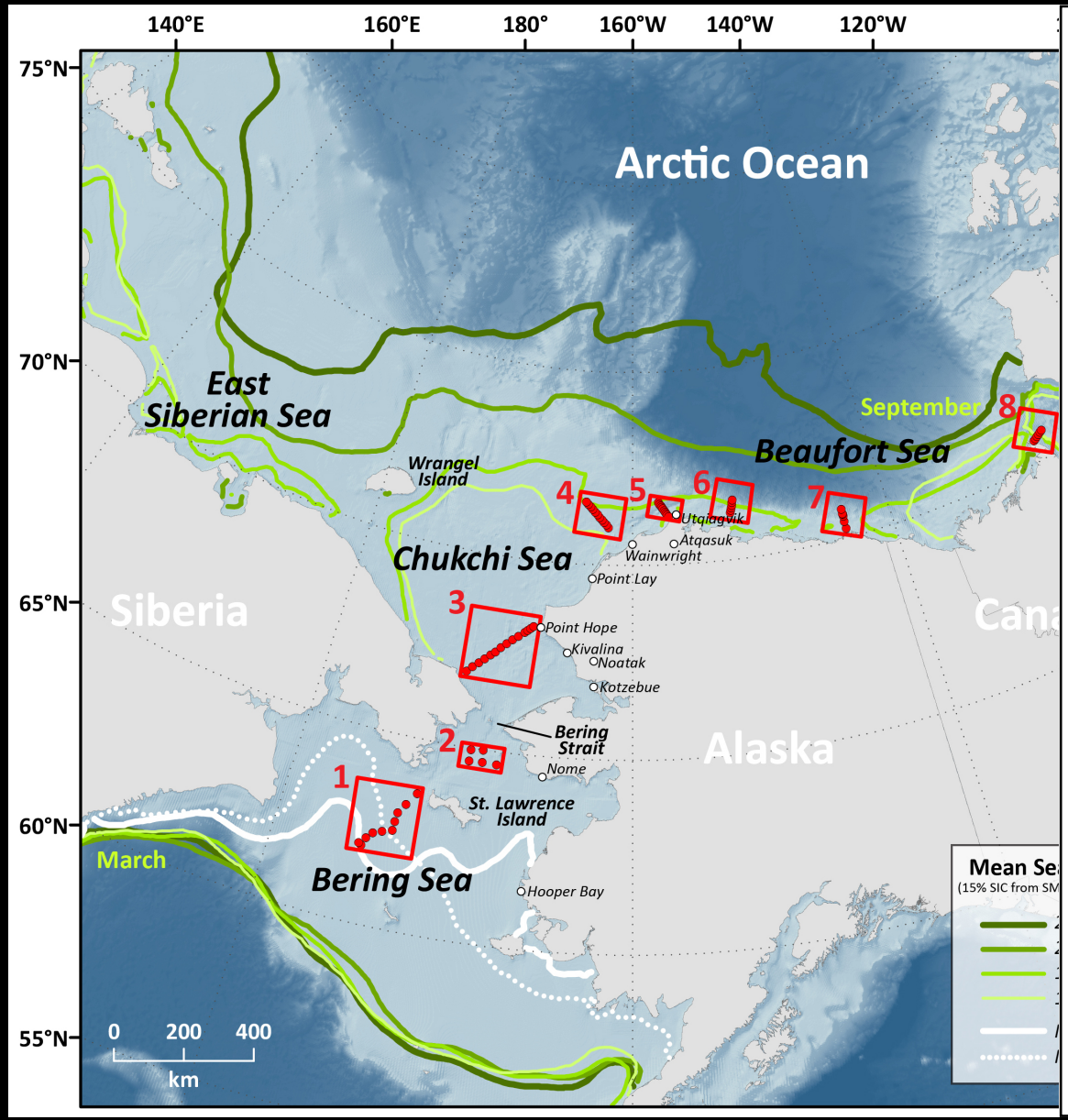
DBO Workshop
NOAA/PMEL, Seattle WA
22 January 2020

DBO Sites and SWL19 Cruise Track



Data Collections

Satellite Time Series:

(1) Sea Ice Cover
- *Concentration*
- *Annual Persistence*
- *Timing of Breakup*
- *Timing of Freeze-up*

(2) Chlorophyll-*a* Concentration

(3) Primary Productivity

(4) Sea Surface Temperature

Ship-Based Collections/Measurements:

(1) Chlorophyll-*a* Concentration
- *Pheophytin-a Concentration*

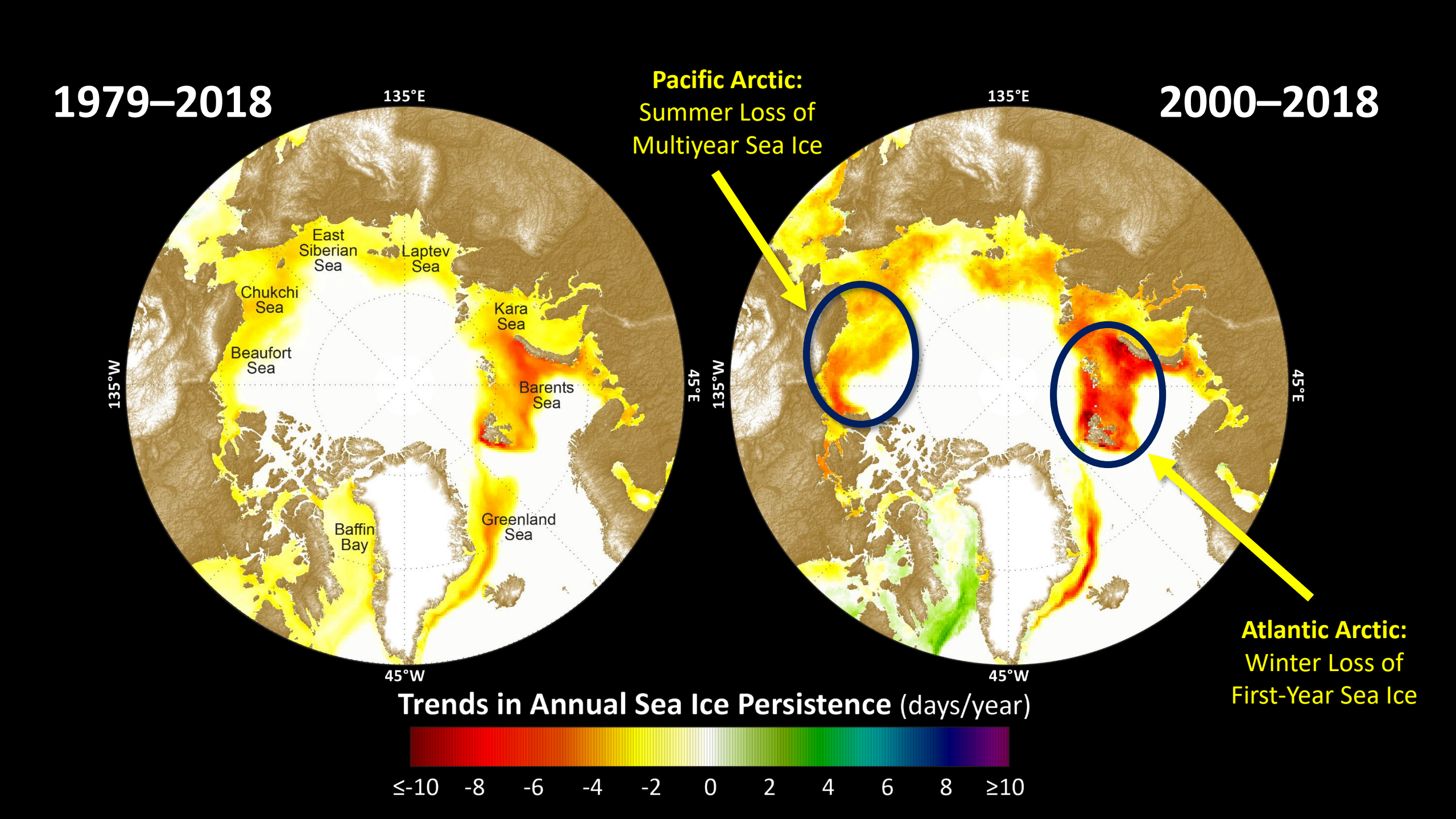
(2) Suspended Particulate Matter (SPM)
- *Inorganic and Organic*

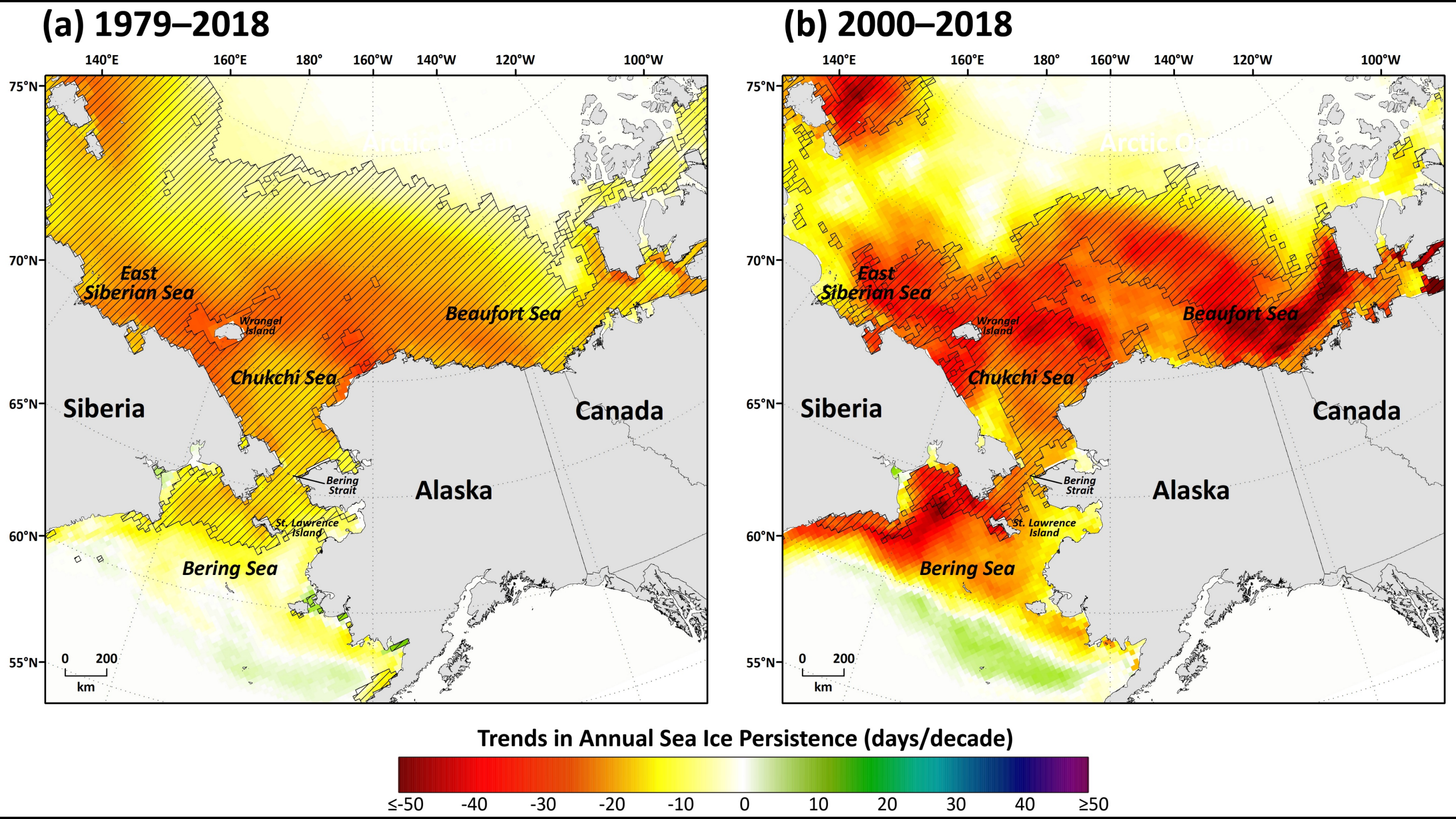
(3) Chromophoric Dissolved Organic Matter (CDOM)
- *Absorption and Spectral Slope Parameters*

(4) Dissolved Organic Carbon (DOC)

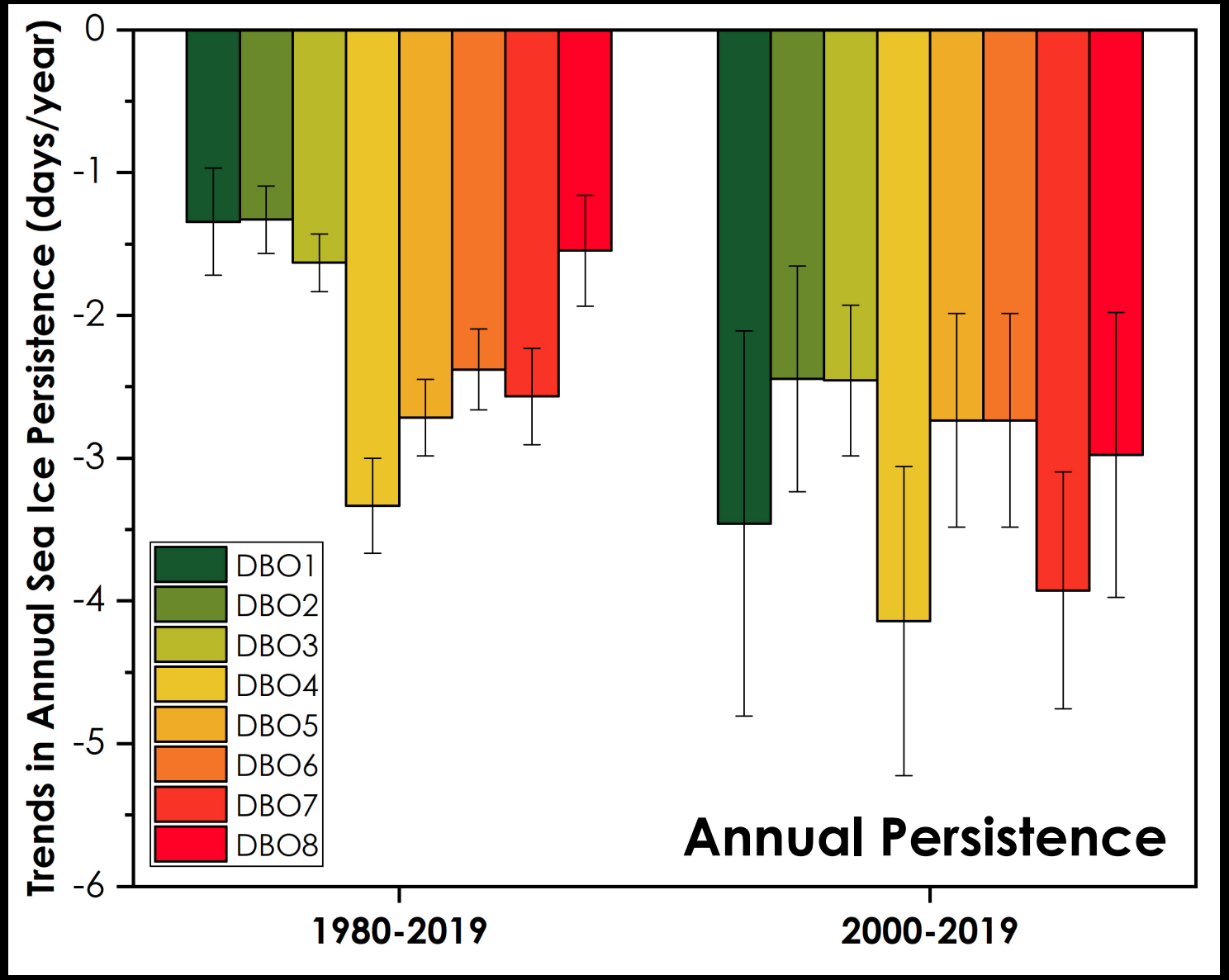
(5) Phytoplankton ID
- *Imaging FlowCytobot (IFCB)/Luisa Young*

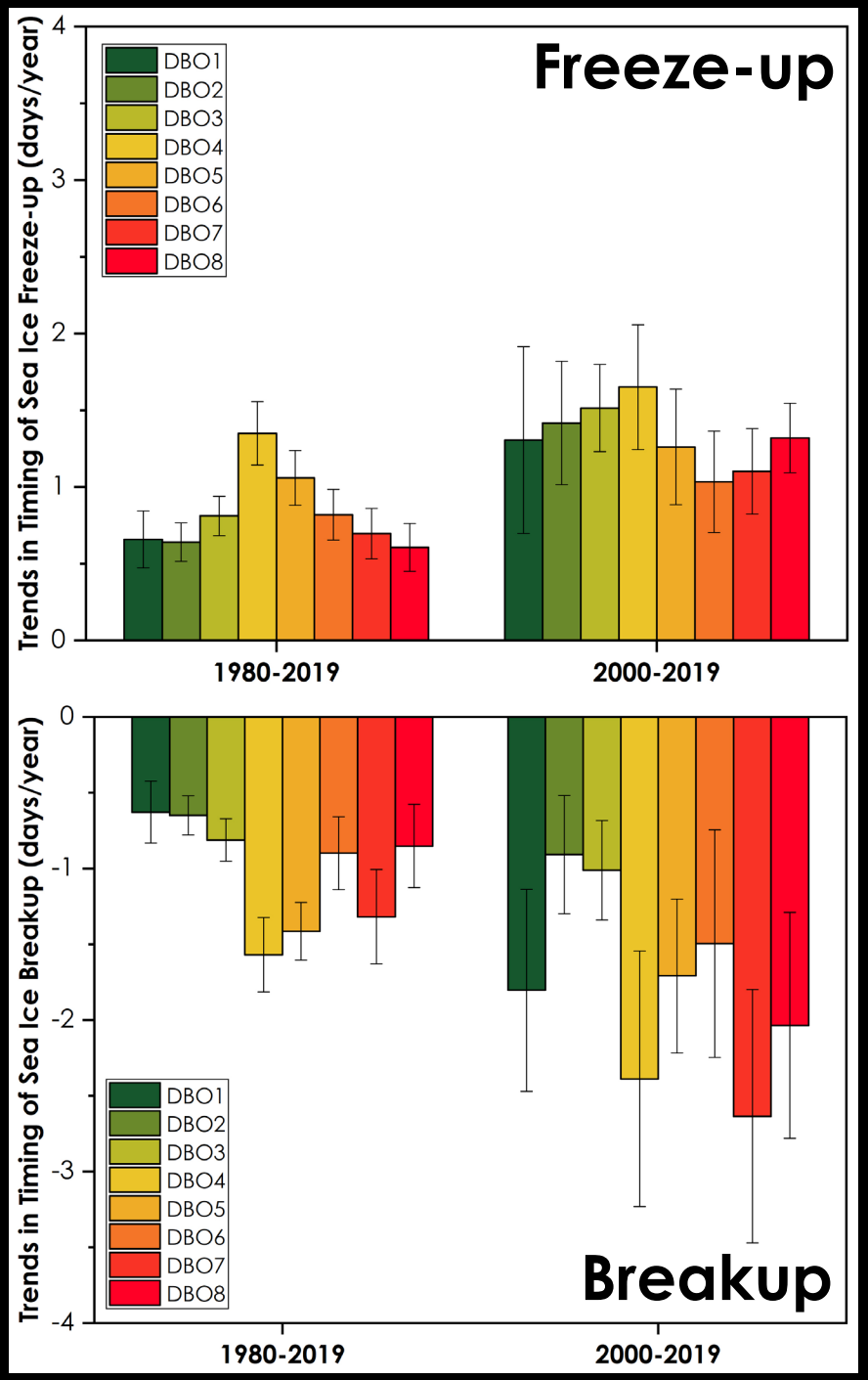
(6) Water Column Optical Profiles


1979–2018
2000–2018
Pacific Arctic:
Summer Loss of
Multiyear Sea Ice
Atlantic Arctic:
Winter Loss of
First-Year Sea Ice
135°E
135°W
45°E
45°W
East
Siberian
Sea
Laptev
Sea
Chukchi
Sea
Kara
Sea
Beaufort
Sea
Barents
Sea
Baffin
Bay
Greenland
Sea
Trends in Annual Sea Ice Persistence (days/year)
≤-10
-8
-6
-4
-2
0
2
4
6
8
≥10

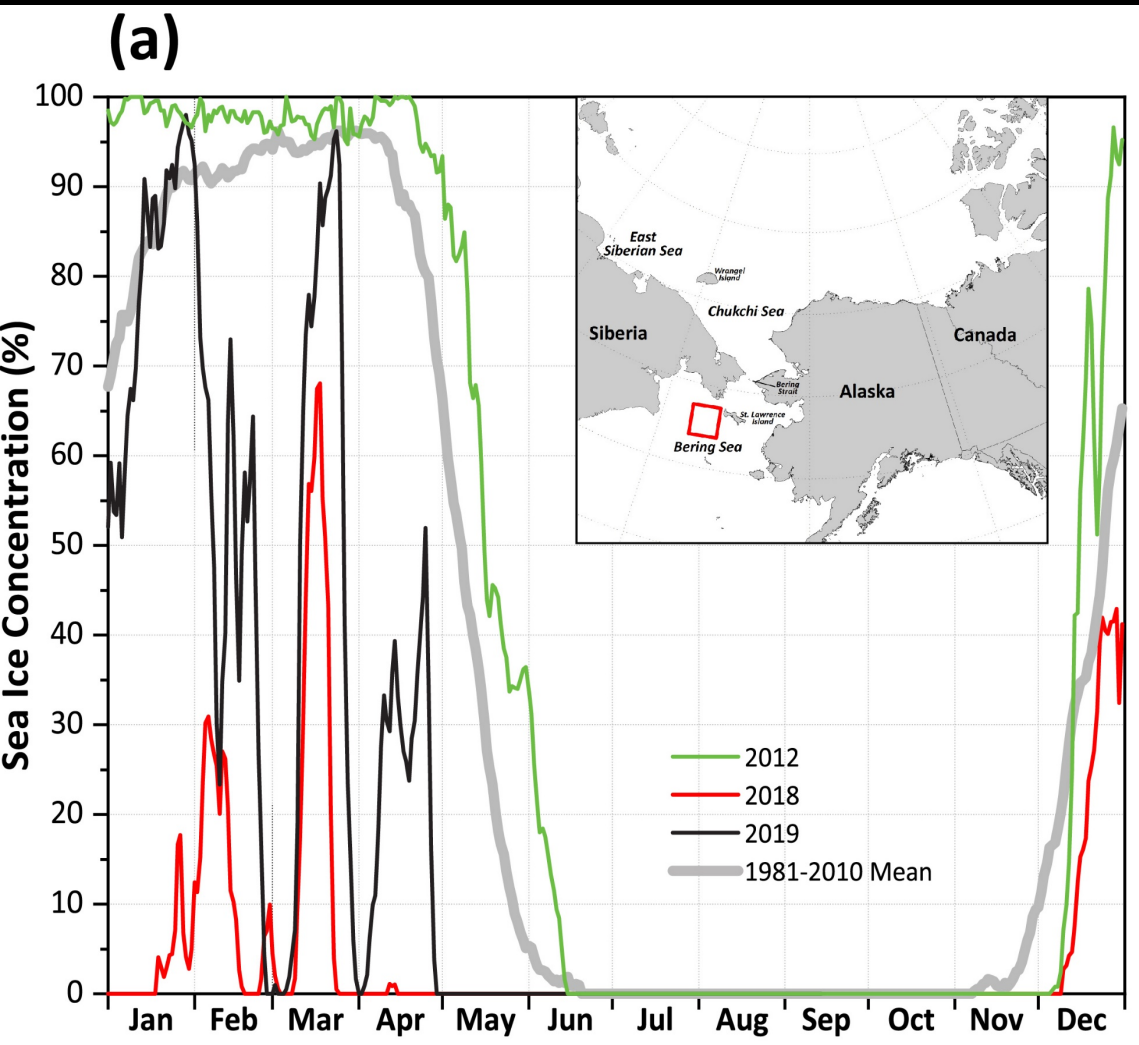

(a) 1979–2018
(b) 2000–2018
140°E
160°E
180°
160°W
140°W
120°W
100°W
75°N
70°N
65°N
60°N
55°N
East Siberian Sea
Wrangel Island
Beaufort Sea
Chukchi Sea
Siberia
Canada
Alaska
Bering Strait
St. Lawrence Island
Bering Sea
0
200
km
Trends in Annual Sea Ice Persistence (days/decade)
≤-50
-40
-30
-20
-10
0
10
20
30
40
≥50

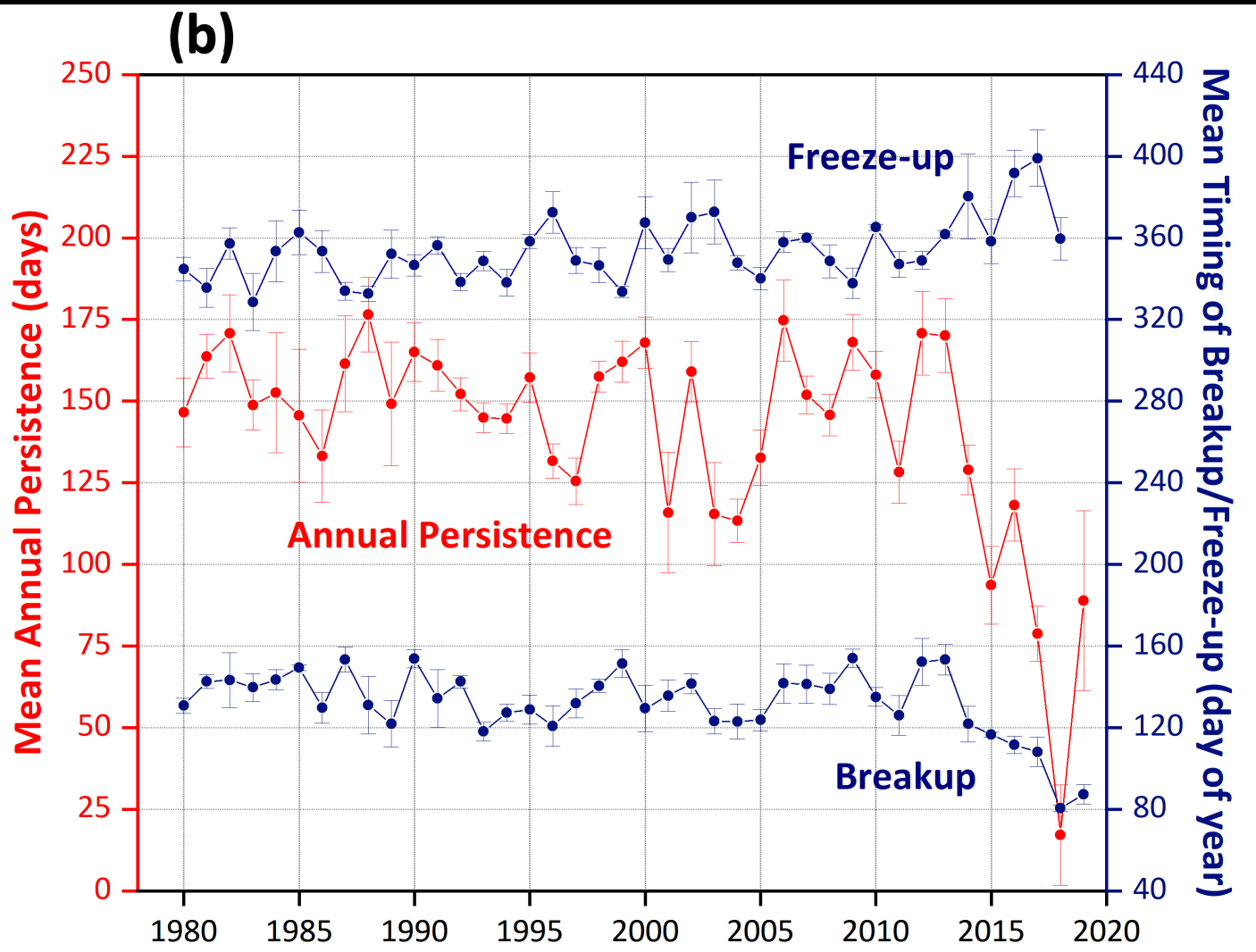
Trends in Sea Ice Cover



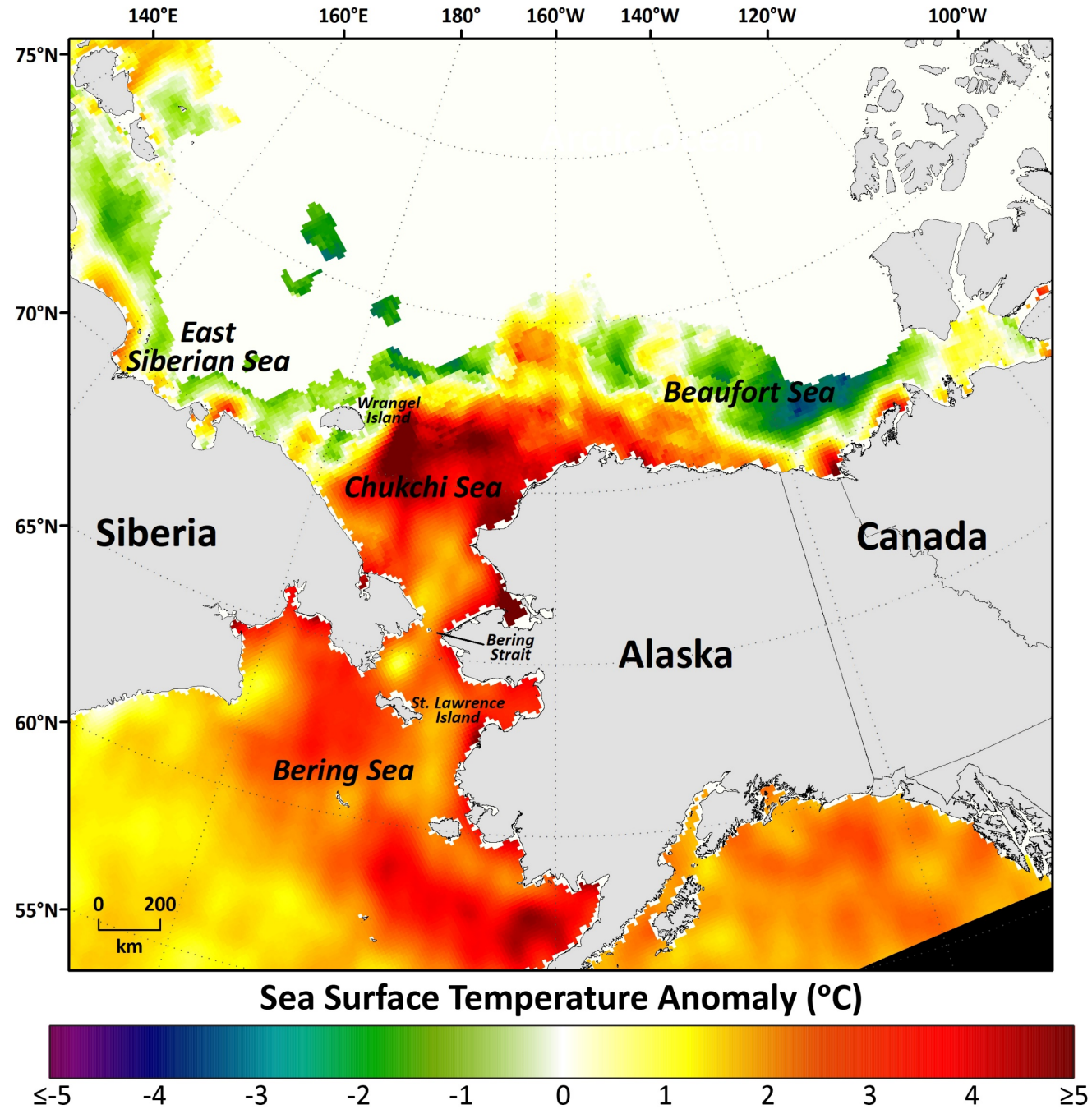


Sea Ice Cover at DBO1

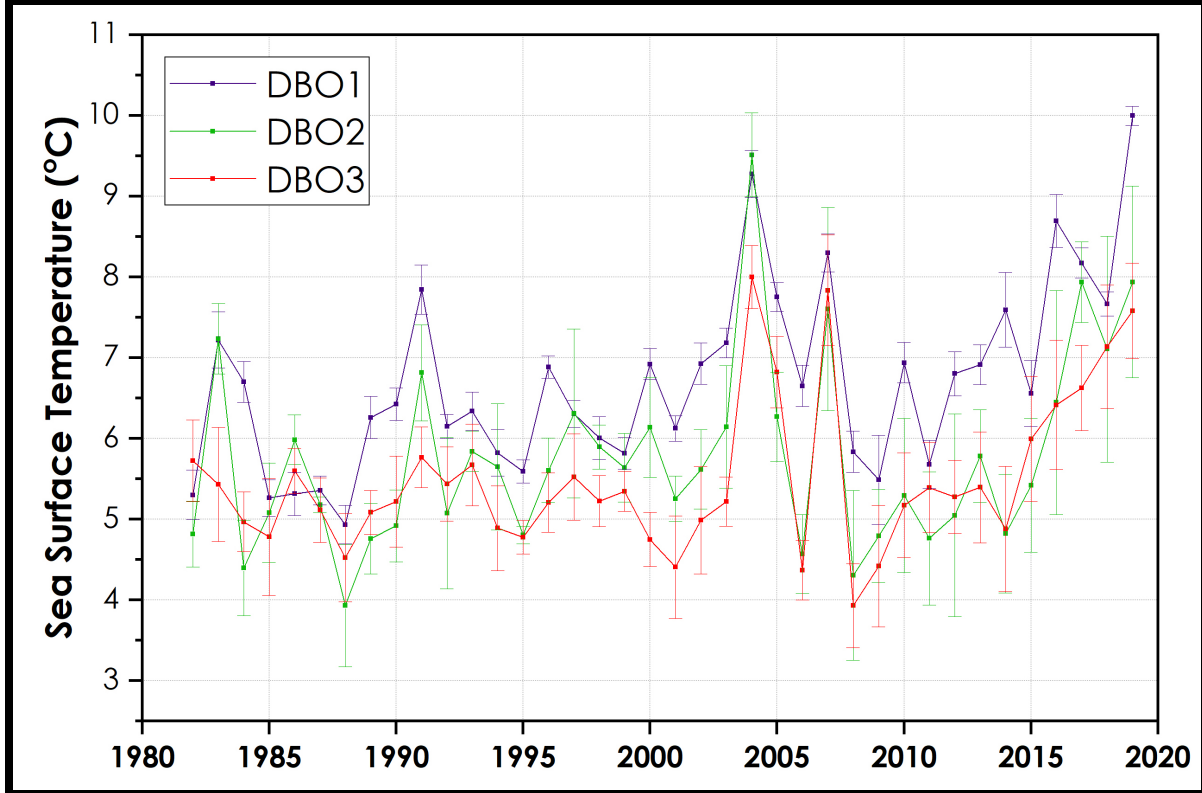




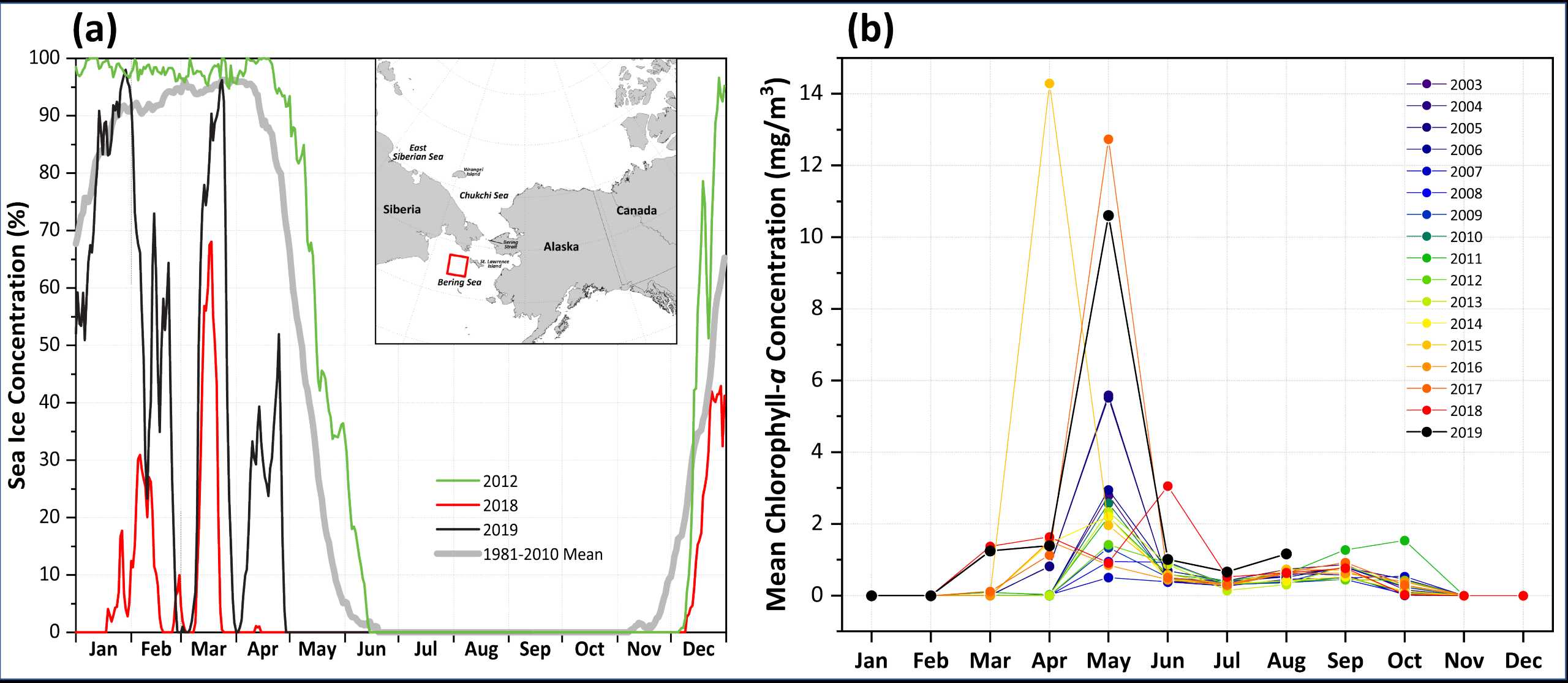
July 2019 SST Anomaly (1982-2010 reference period)



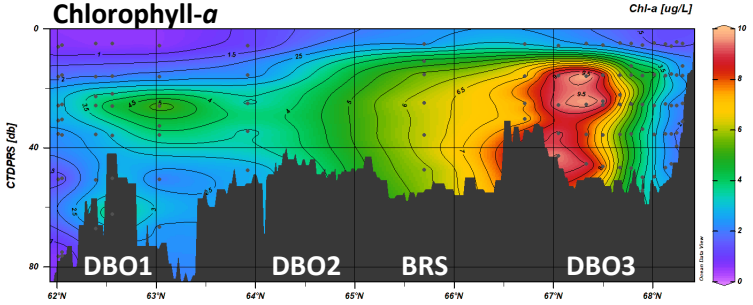
July Sea Surface Temperature

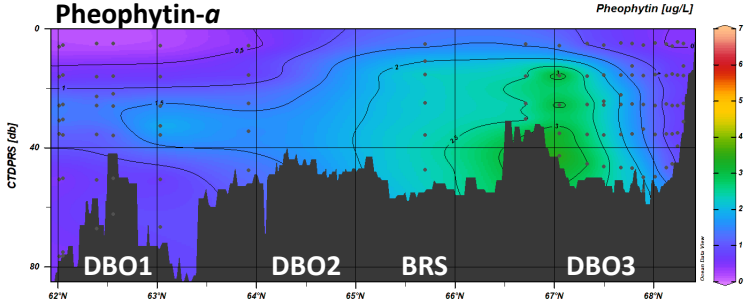


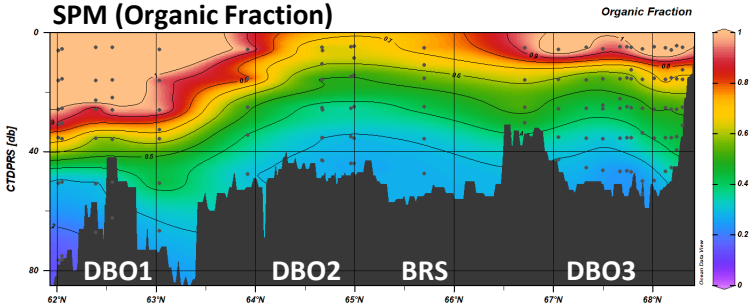
Satellite-Based Chlorophyll-*a*

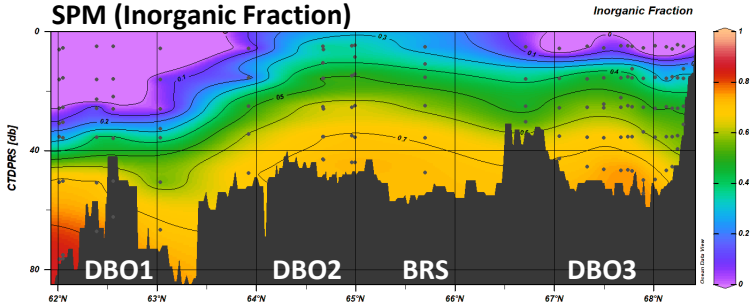


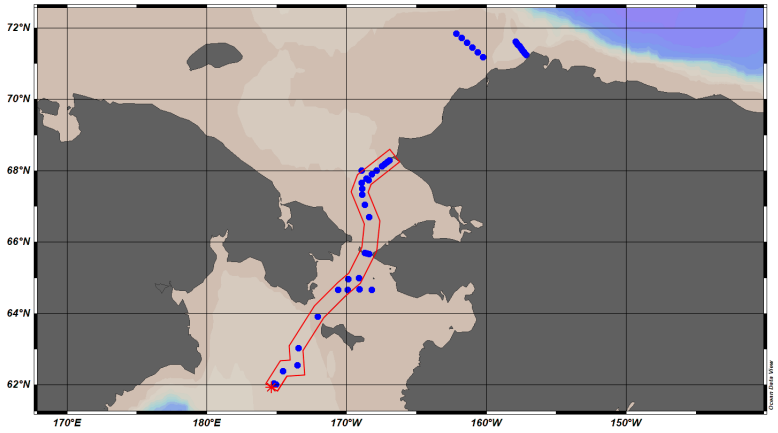
Chlorophyll, Pheophytin, SPM (2019)

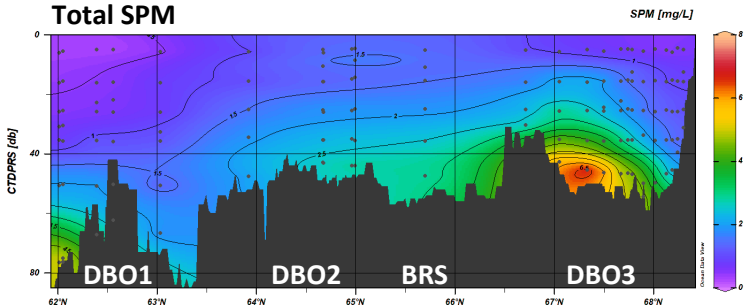






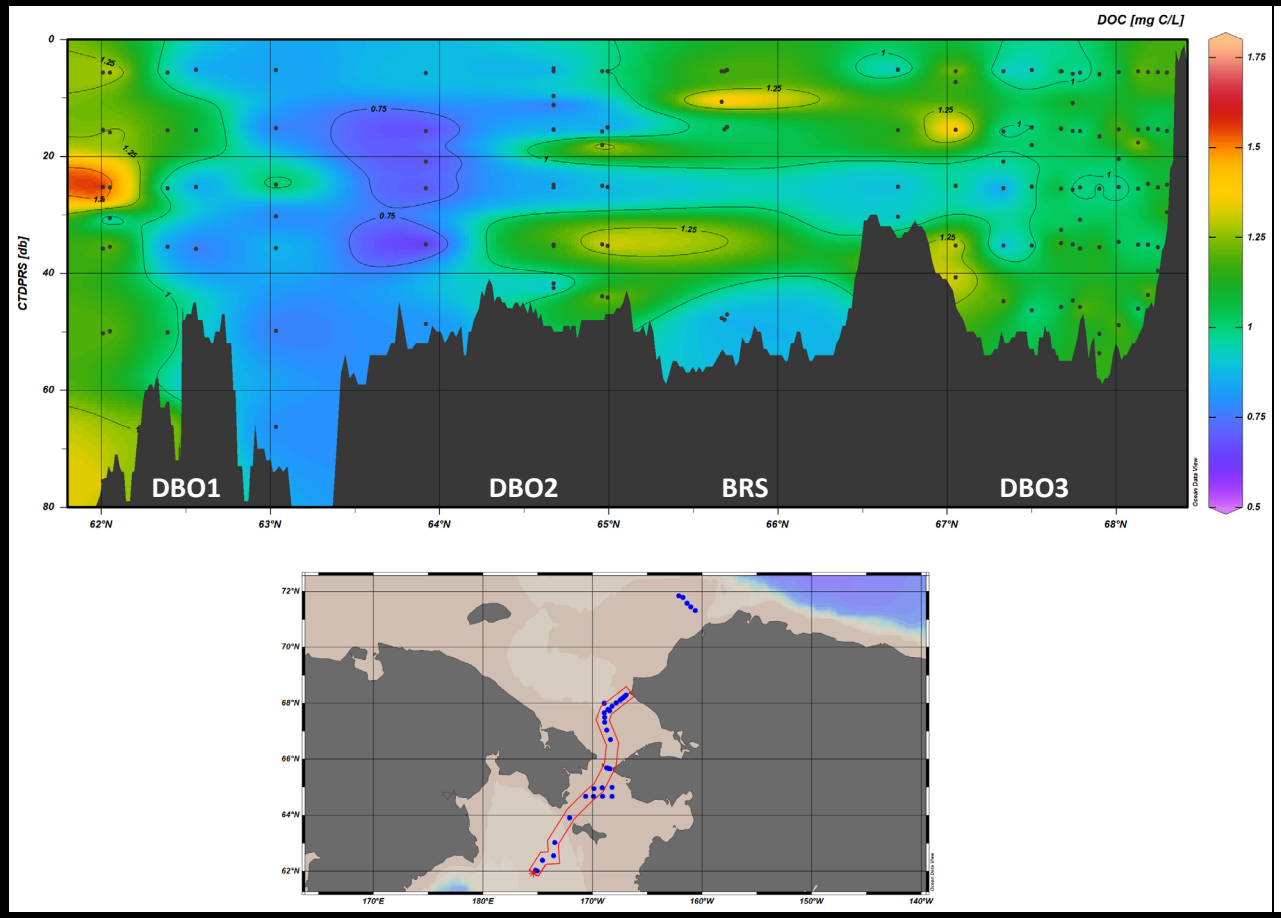




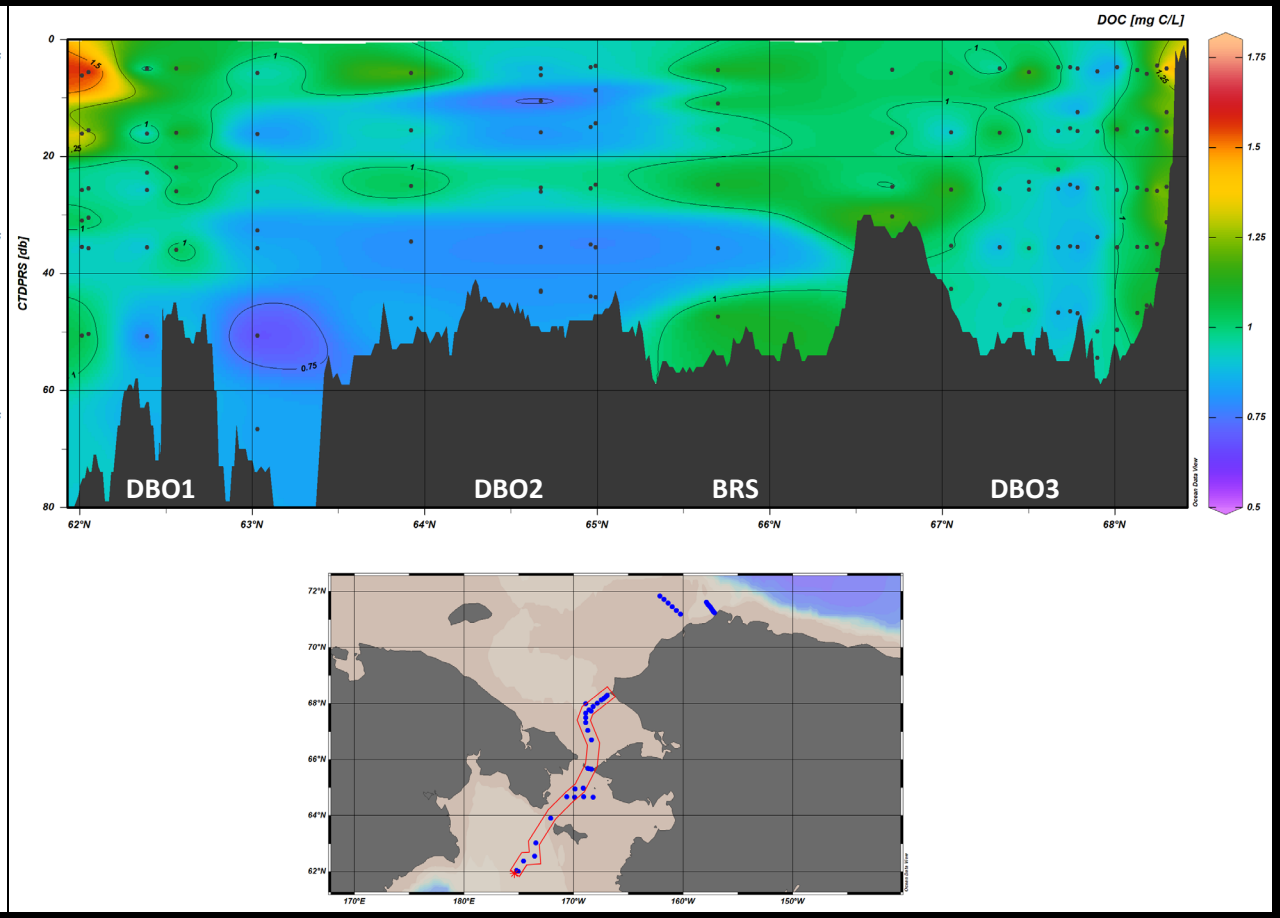


Dissolved Organic Carbon (DOC)

2018



2019



Compact-Optical Profiling System (C-OPS)

- *Light transmittance*
- *Heat calculations*
- *Photodegradation applications (UV+VIS)*
- *Normalized water leaving radiances*