

An aerial photograph of sea ice, showing a complex network of dark, irregular melt ponds of various sizes separated by lighter-colored ice floes. The ice floes vary in size and shape, with some being large and relatively flat, while others are smaller and more fragmented. The overall appearance is that of a highly textured and porous surface.

# PHYTOPLANKTON COMMUNITY STRUCTURE AND SATELLITE-BASED SEA ICE MELT POND OBSERVATIONS ACROSS THE DISTRIBUTED BIOLOGICAL OBSERVATORY (DBO)

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# Quantifying Melt Pond Fraction on Arctic Sea Ice from MODIS 500m Satellite Imagery

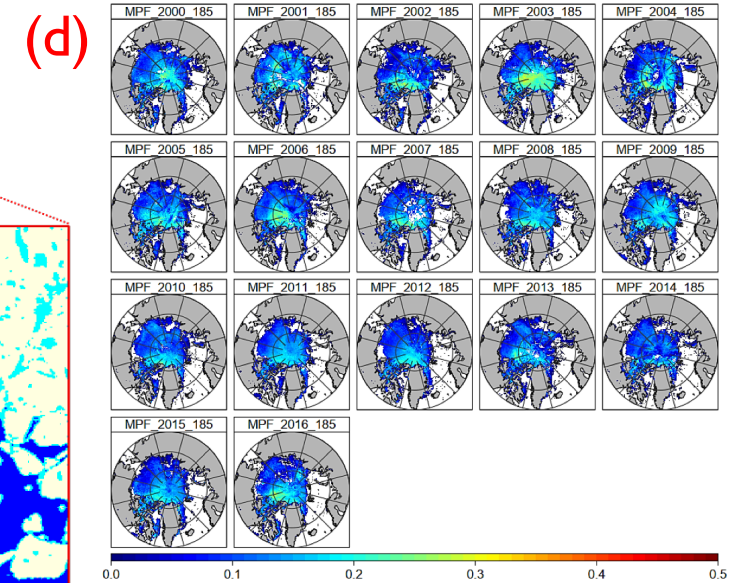
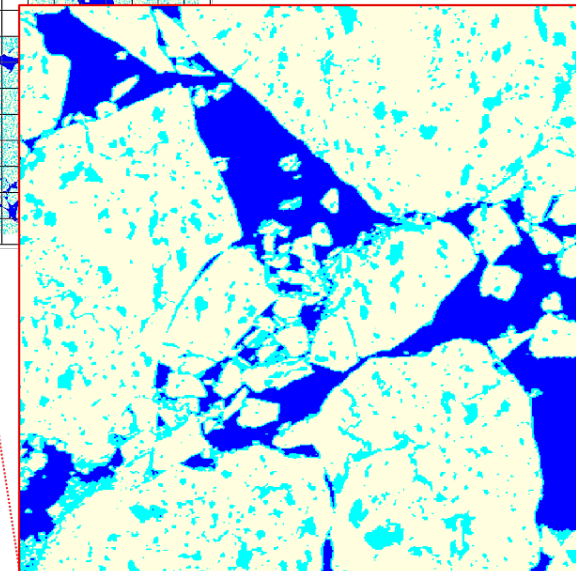
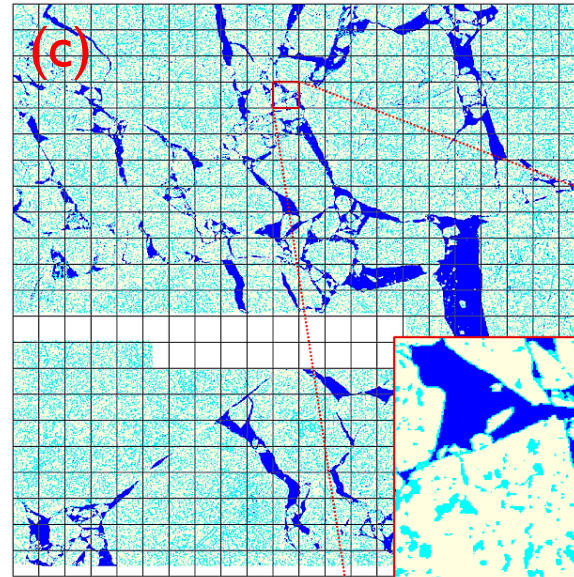
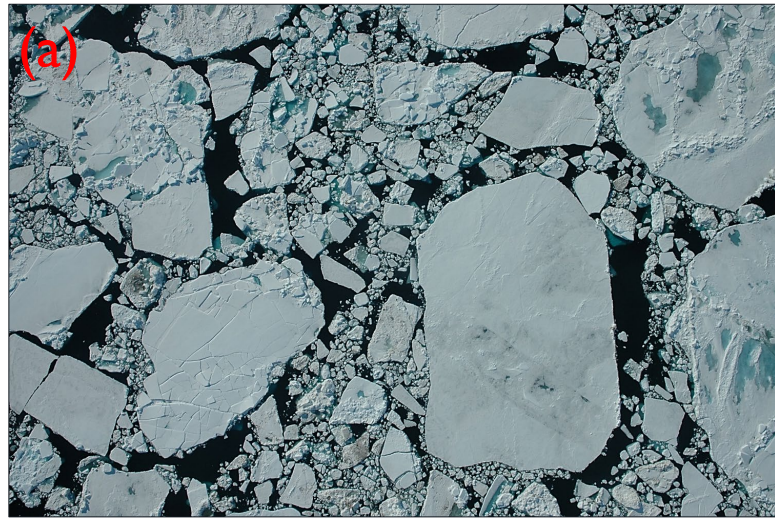
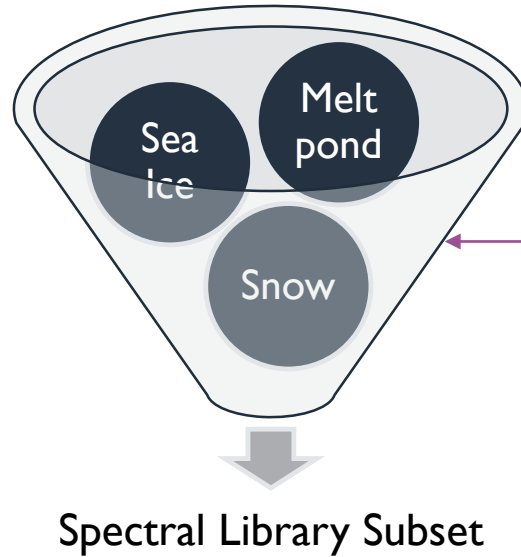
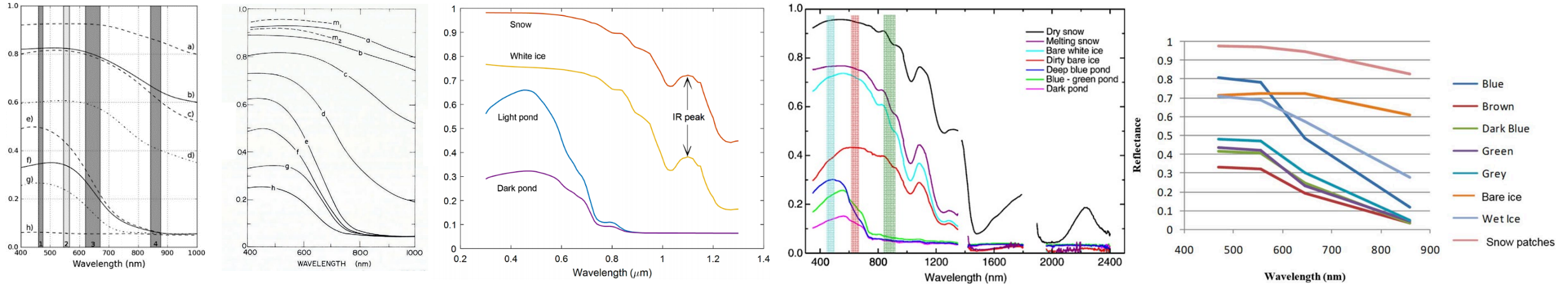


Figure 1: (a) and (b) World View Imagery, (c) NSIDC (Fetterer, F., S. Wilds, and J. Sloan. 2008) 1m classified data with MODIS 500 m (grey grid) and (d) Melt pond fraction time series using MESMA algorithm for July 04 2000-2016.

# Approach



**Optimization Algorithms**  
 CoB  
 EAR  
 MASA  
 Iterative Endmember Selection (IES)

Figure 2: Reflectance properties for various melt pond types, snow and ice endmembers. The optimization algorithms identifies the most ‘representative’ endmembers per class (that also reduces inter class confusion) which is applied to a Multiple Endmember Spectral Mixture Analysis.

# Accuracy Assessment

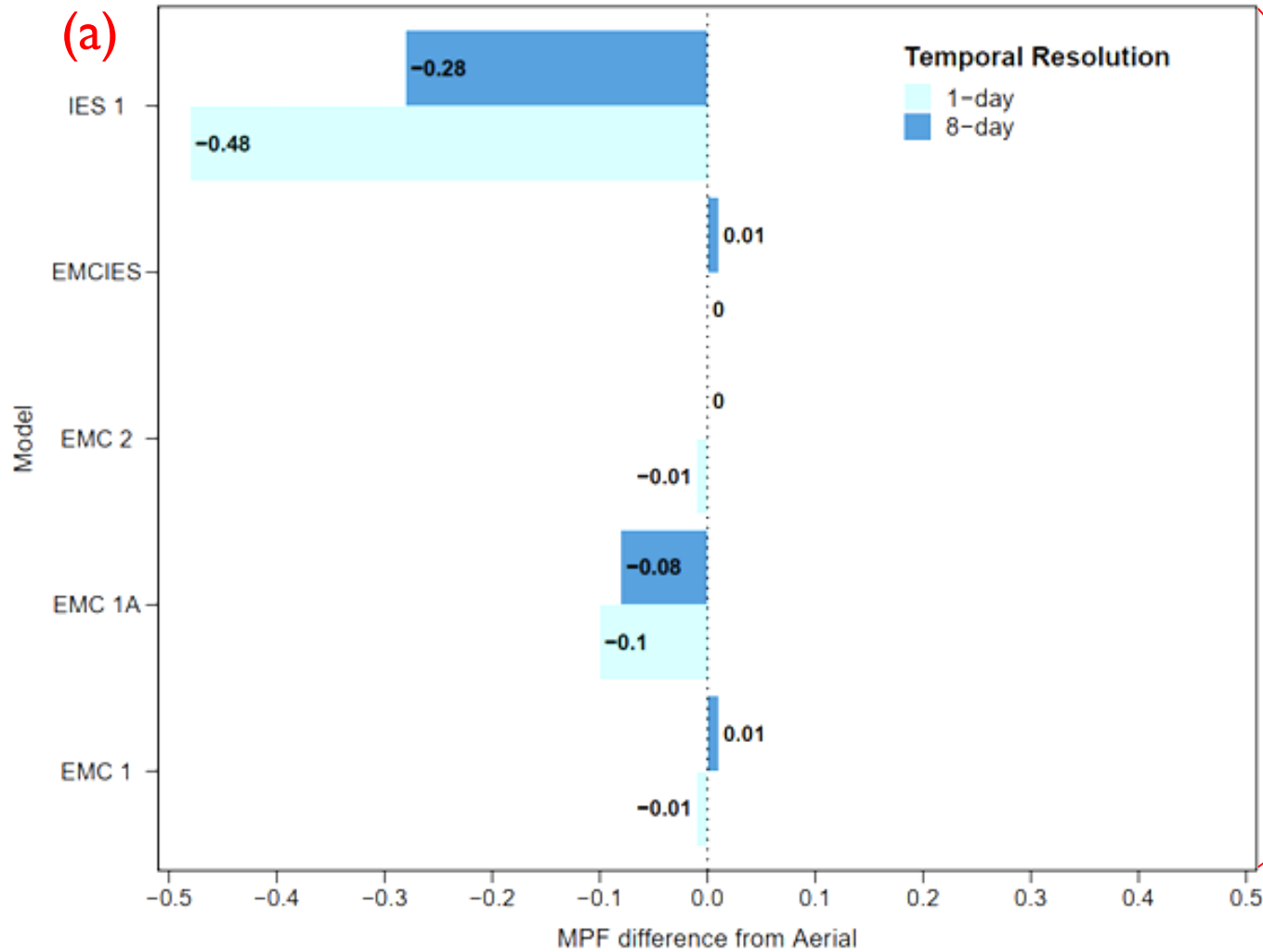
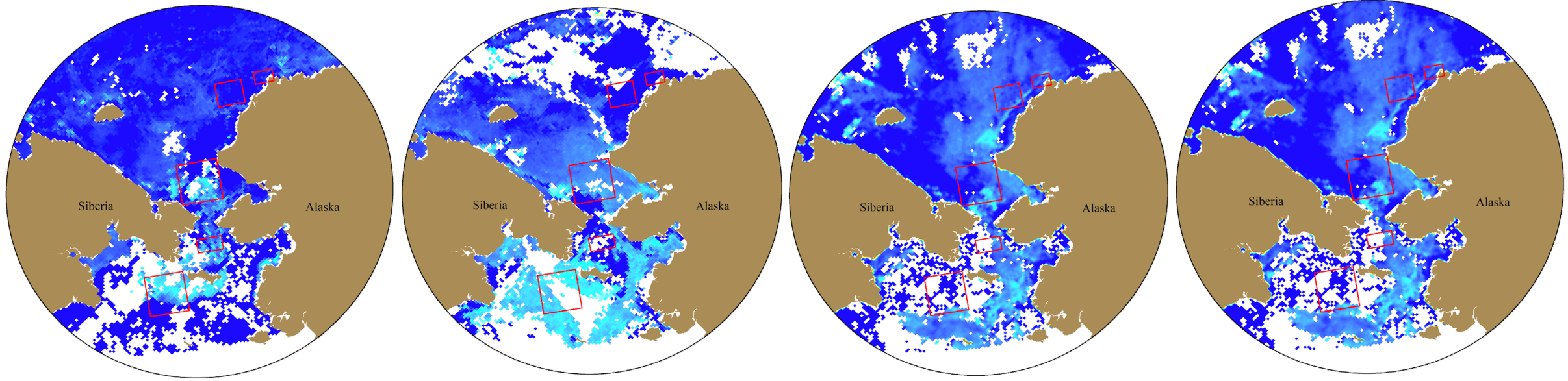


Figure 4: (a) Comparison of MESMA model results to NSIDC (Fetterer, F., S. Wilds, and classified data for July 04, 2001 and (b) Location of NSIDC aerial imagery.



2000

2019



May | Sept | at every 8-day time step

**Missing Data??**

# Overview

## Phytoplankton Community Structure across the Distributed Biological Observatory (DBO)

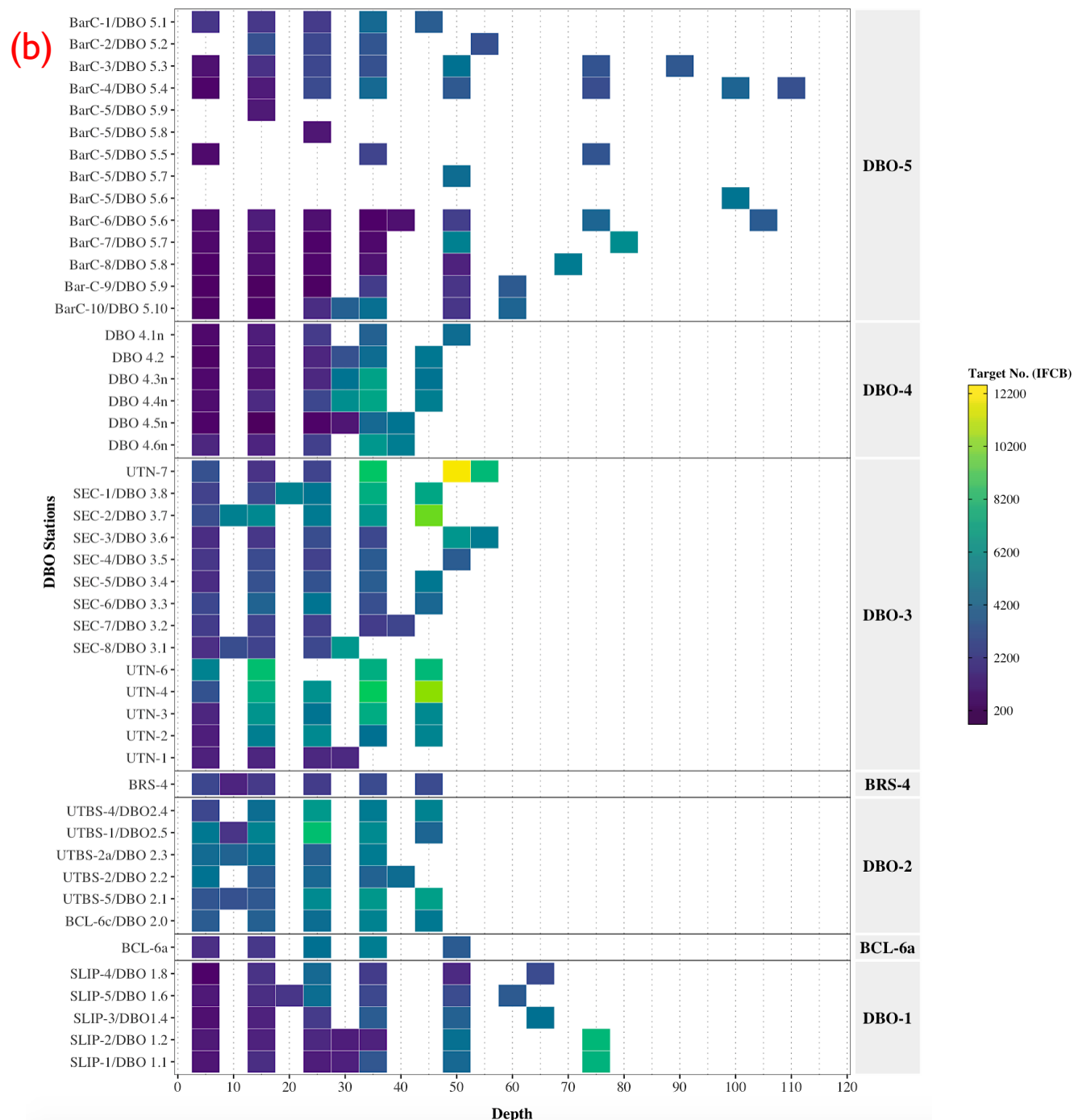
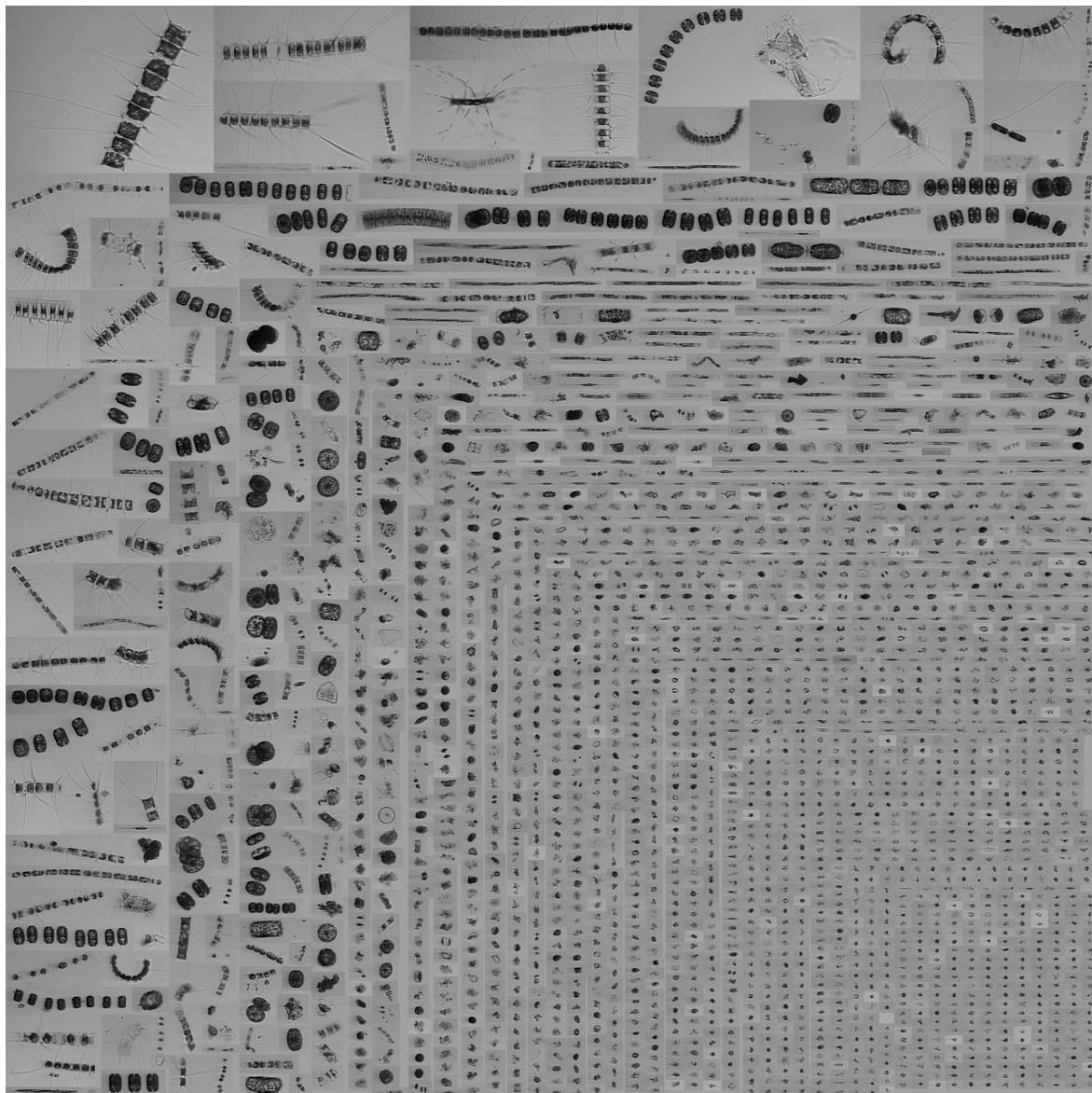
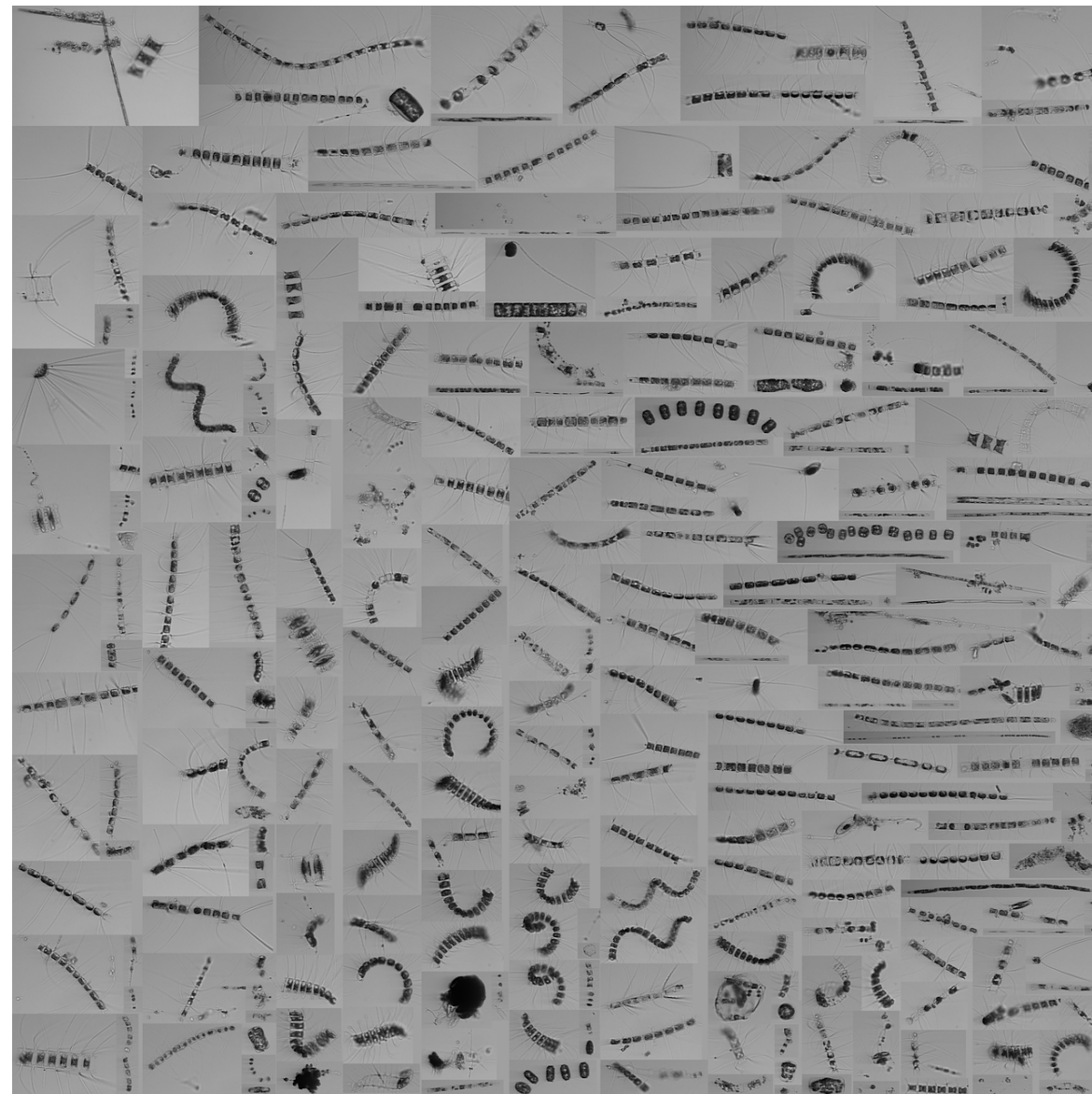


Figure 4: (a) Map of DBO sites and (b) The number of images captured in a 5 ml sample using the Imaging Flow Cytobot (IFCB).

# IFCB composite Images



D20190909T184742\_IFCB122 | UTN3 at 15m depth



D20190909T205823\_IFCB122 | UTN2 at 15 m depth

## Identification

Example plankton from the 2019 Arctic DBO lines visualized with the Imaging Flow Cytobot (IFCB). Samples were preserved in Lugol's solution and stored for approximately 6 weeks prior to analysis. Scale bar for each image = 10 microns.

(a) *Corethron* sp., (b) *Pseudo-nitzschia* sp. (HAB: causes amnesic shellfish poisoning), (c) *Thalassiosira* sp., (d) *Chaetoceros concavicornis* or *convolutes* (non-toxic HAB: can clog gills of salmon), (e) *Chaetoceros debilis* (HAB status uncertain), (f) Ciliate (note size) (microzooplankton), (g) Gonyaulacid dinoflagellate, possibly *Alexandrium* sp. (HAB: causes paralytic shellfish poisoning), (h) *Dinophysis* sp. (HAB: causes diarrhetic shellfish poisoning).

