An Early Look at a Regional MOM6 Pan-Arctic Domain

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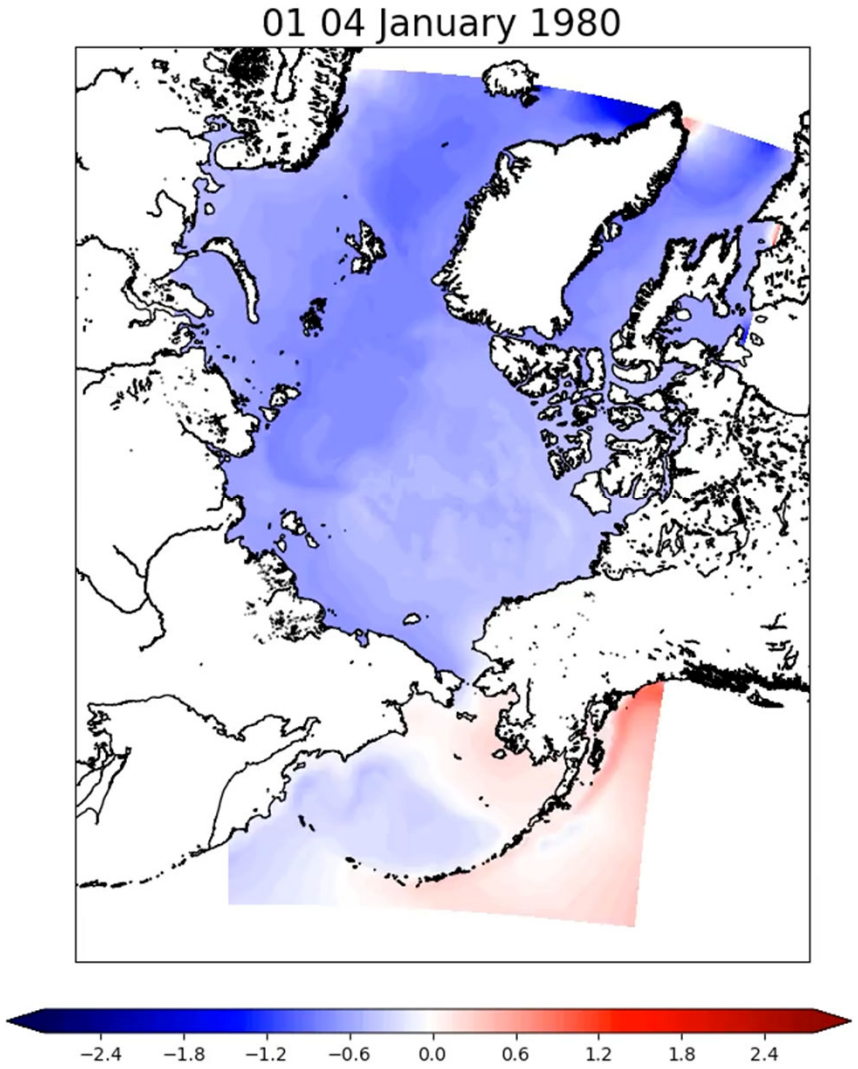
with help from many others

CESM Ocean Model Working Group Meeting

Status Report

- Last spring the status was “it’s blowing up and I don’t know why”.
- After many improvements (and help from Bob Hallberg), the ice-ocean model runs for a year and more.
- Using tides from Andrew Ross.
- Switched from 50 to 75 levels for more surface resolution.
- Copied Brandon Reichl’s tuning of surface boundary layer code.
- Configuration at: https://github.com/ESMG/Arctic5
- Ini/BC files by Liz Drenkard.
- Still a few things to do before a 40-year long run.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−1.2
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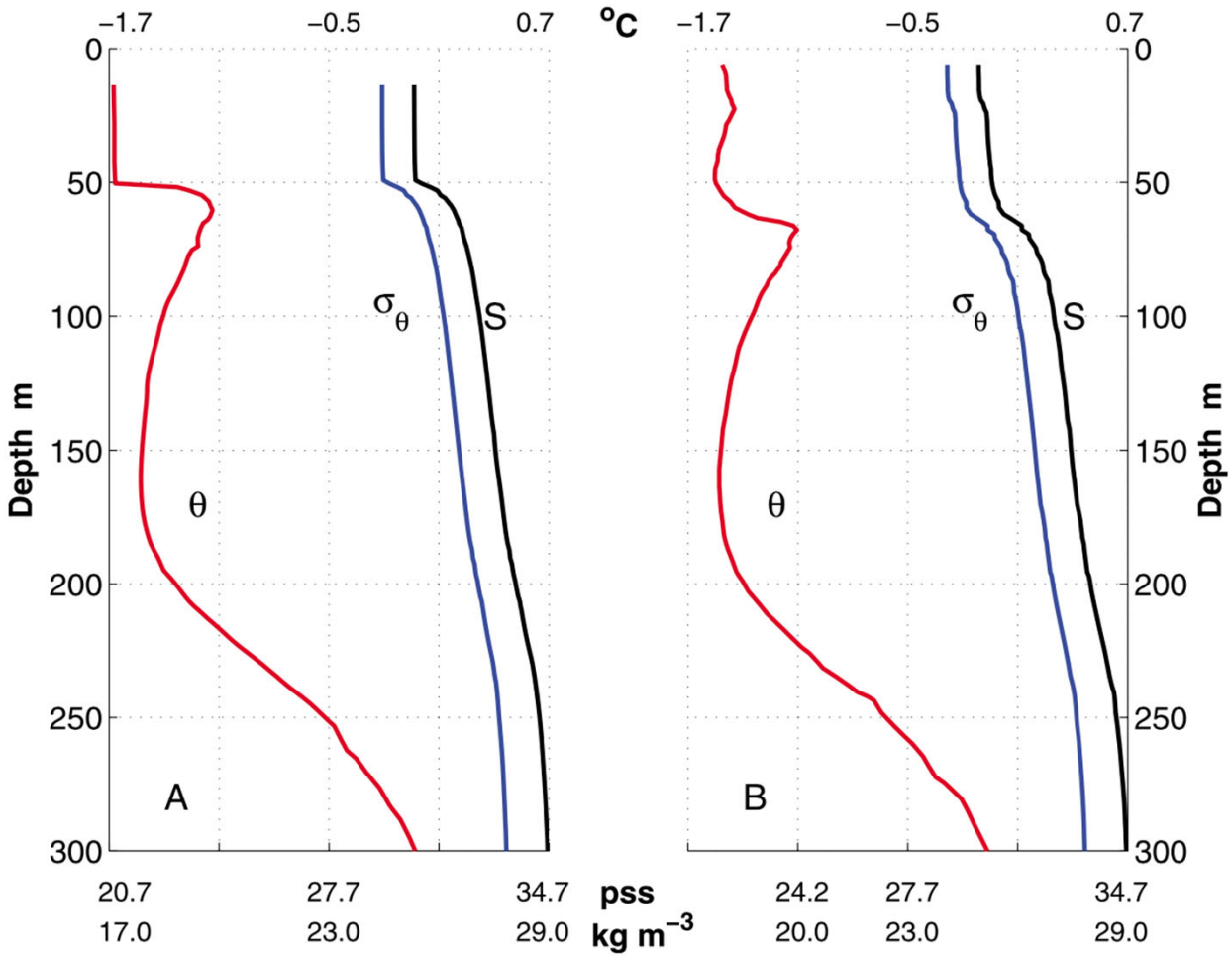
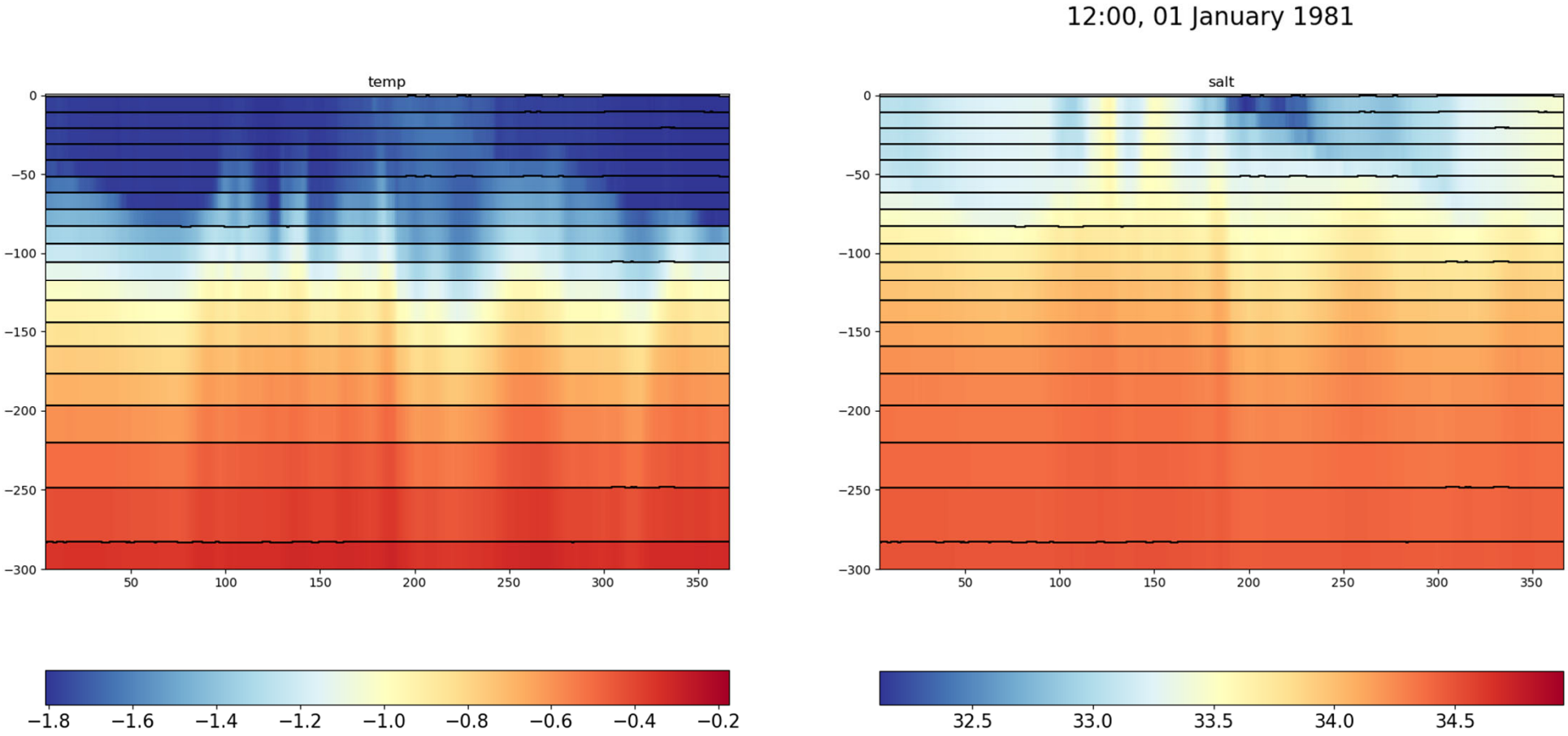


From J. Toole et al., 2010

Figure 3. Winter and summer temperature, salinity, and density profile data from the Canada Basin acquired in 1975 during AIDJEX (on the same scales as Figure 2). (a) Station data taken on 28 April at 76°25′N, 144°20′W (94 km from the nominal site of the profiles in Figure 2). (b) Station taken on 23 July at 75°42′N, 145°7′W (141 km from the Figure 2 site).

Timeseries of T and S at 76.4 N, 140.75 W, 50 vertical levels



Timeseries of T and S at 76.4 N, 140.75 W, 75 vertical levels

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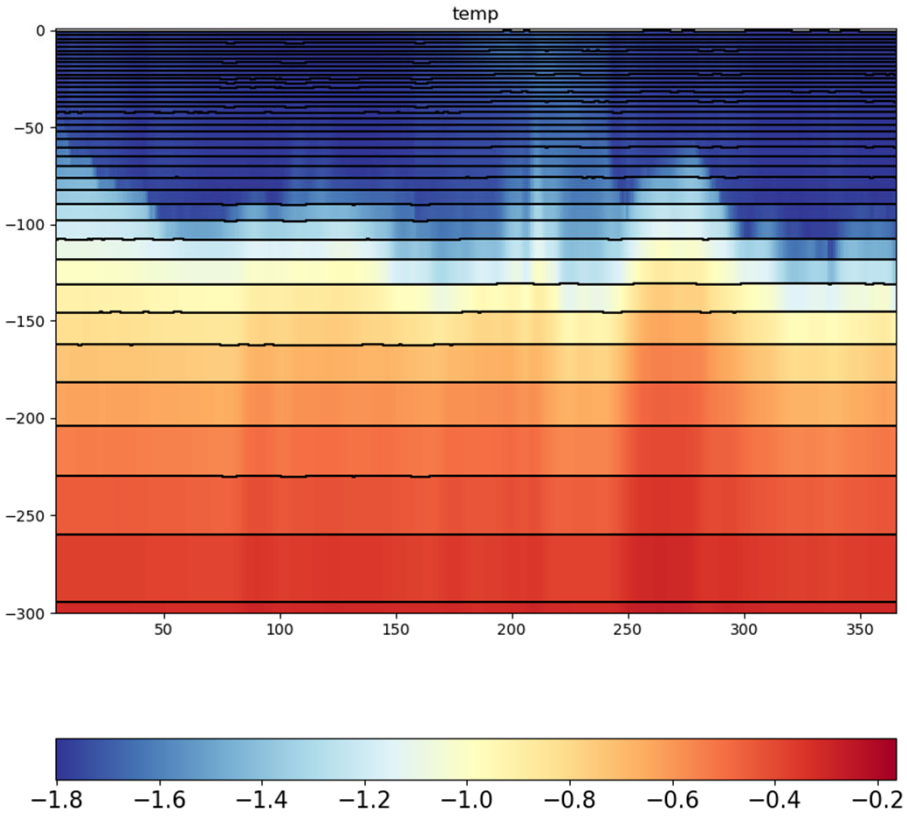

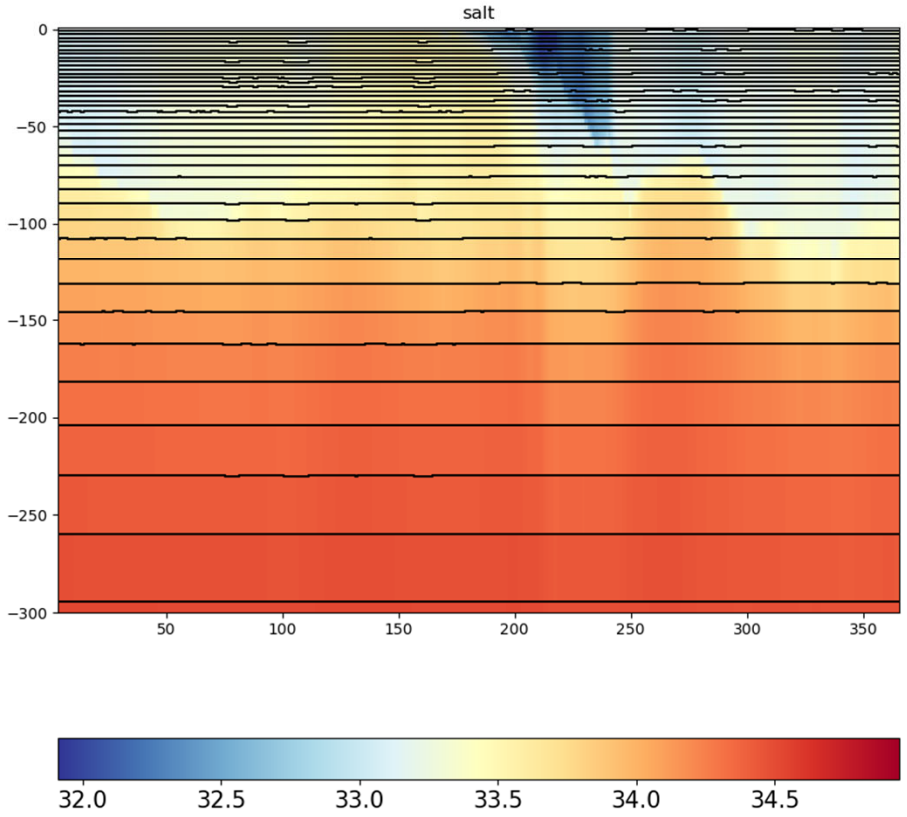

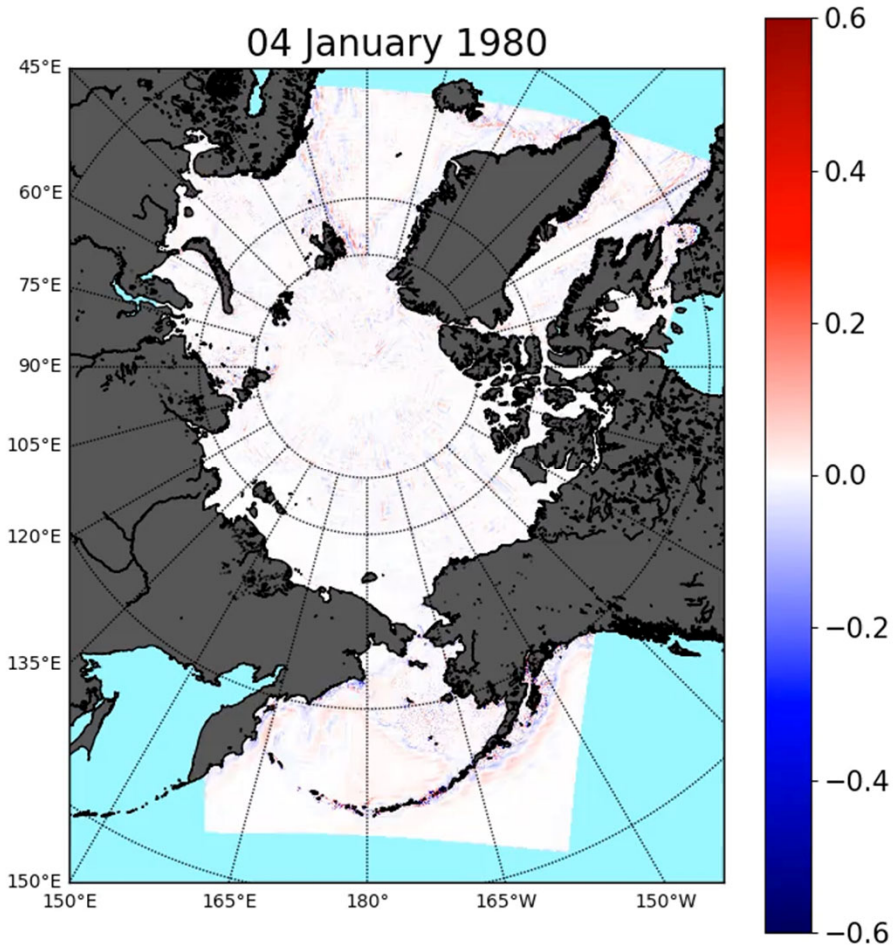
04 January 1980
45°E
60°E
75°E
90°E
105°E
120°E
135°E
150°E
150°E
165°E
180°
165°W
150°W
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0.4
0.2
0.0
−0.2
−0.4
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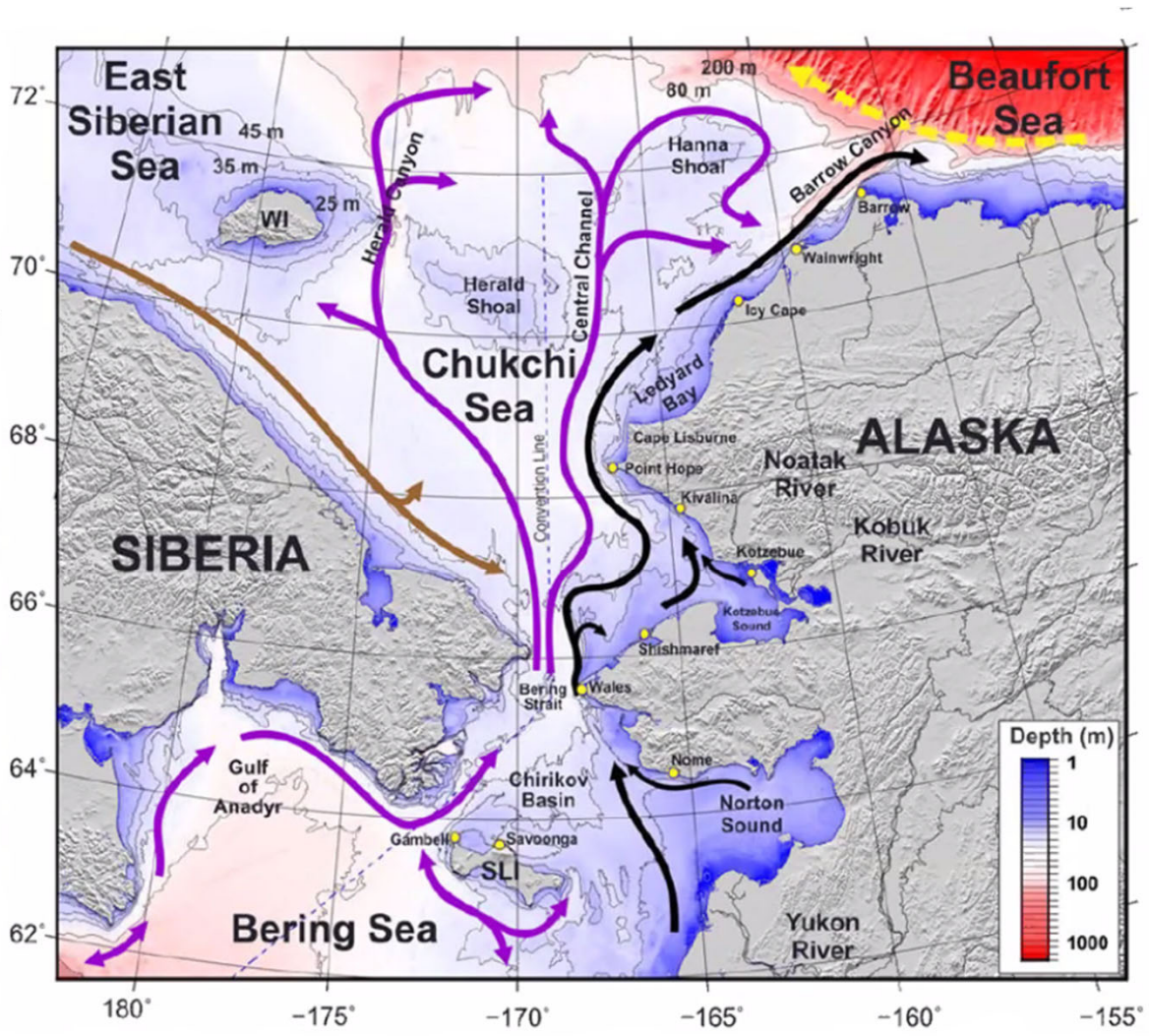
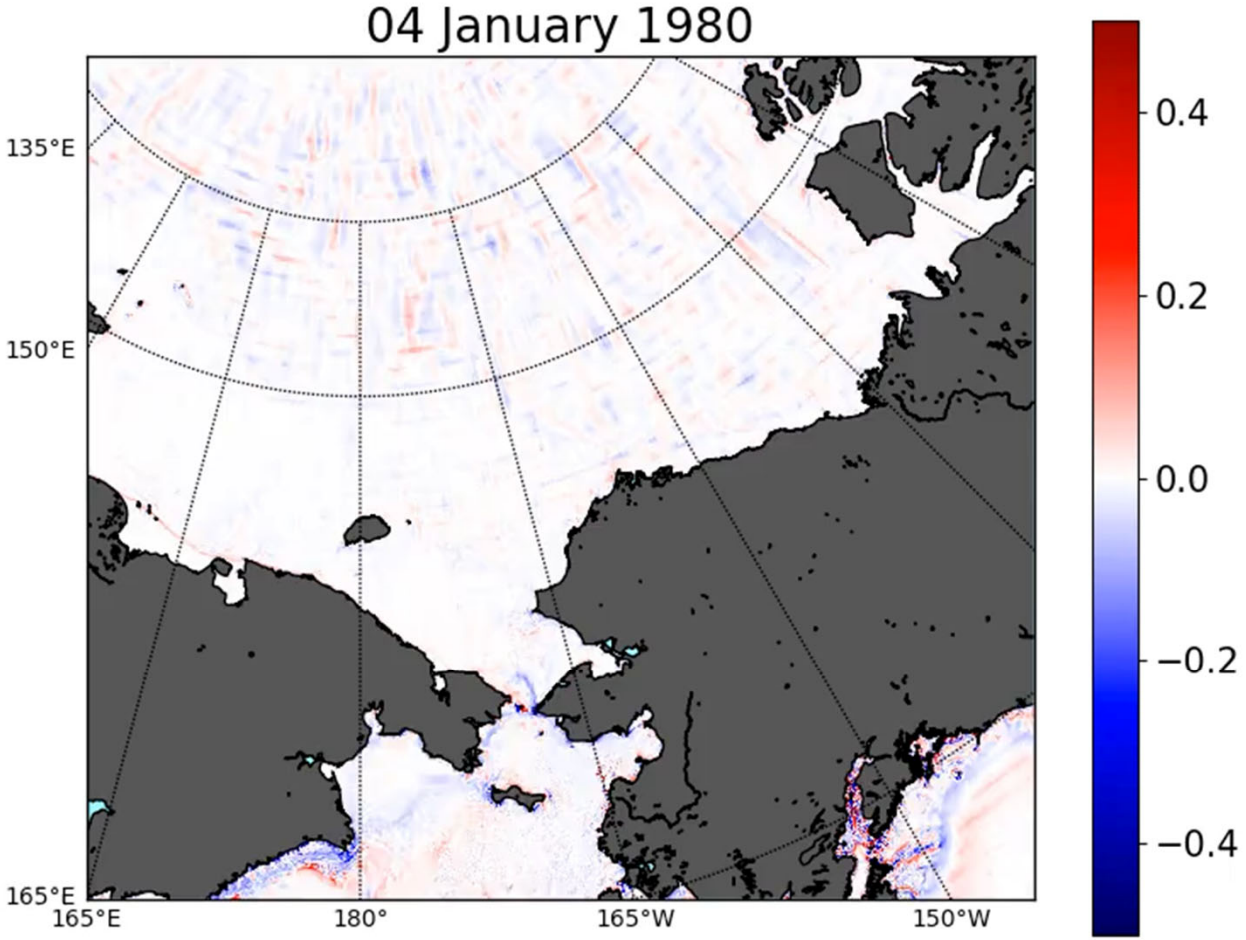


S. Danielson et al., 2017


04 January 1980
135°E
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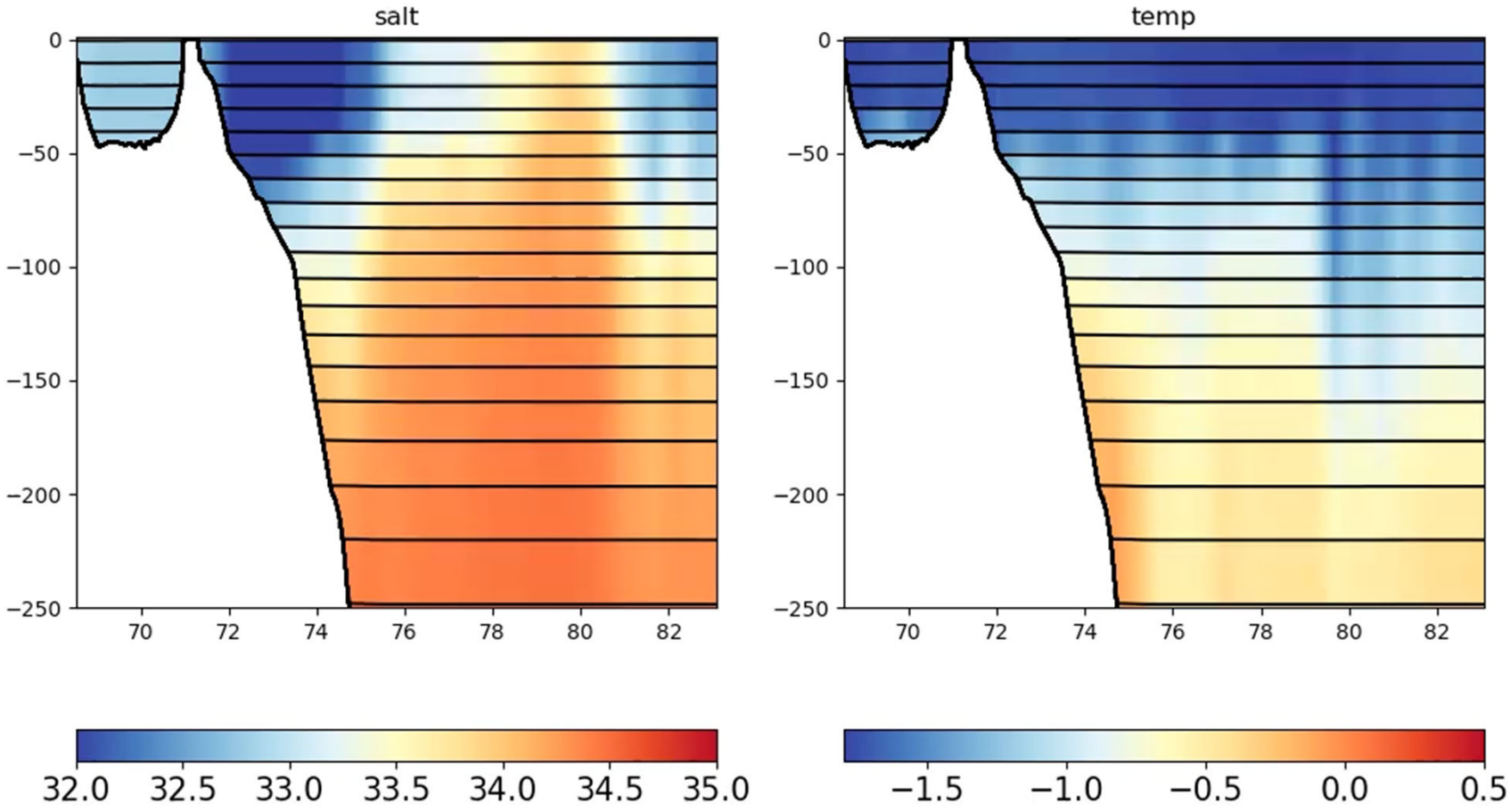
12:00, 05 January 1980
salt
temp
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−100
−150
−200
−250
70
72
74
76
78
80
82
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32.5
33.0
33.5
34.0
34.5
35.0
−1.5
−1.0
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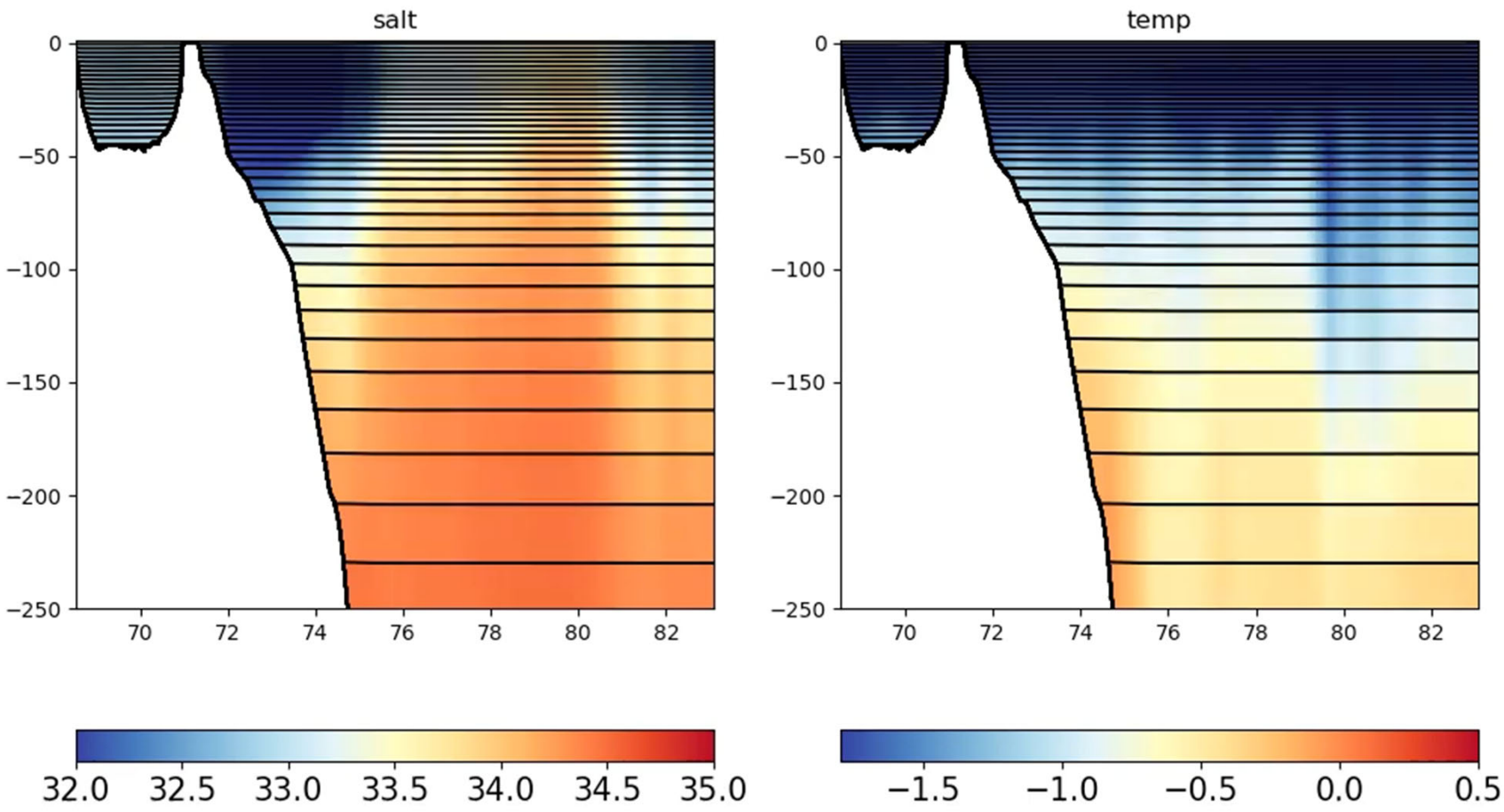
12:00, 04 January 1980
salt
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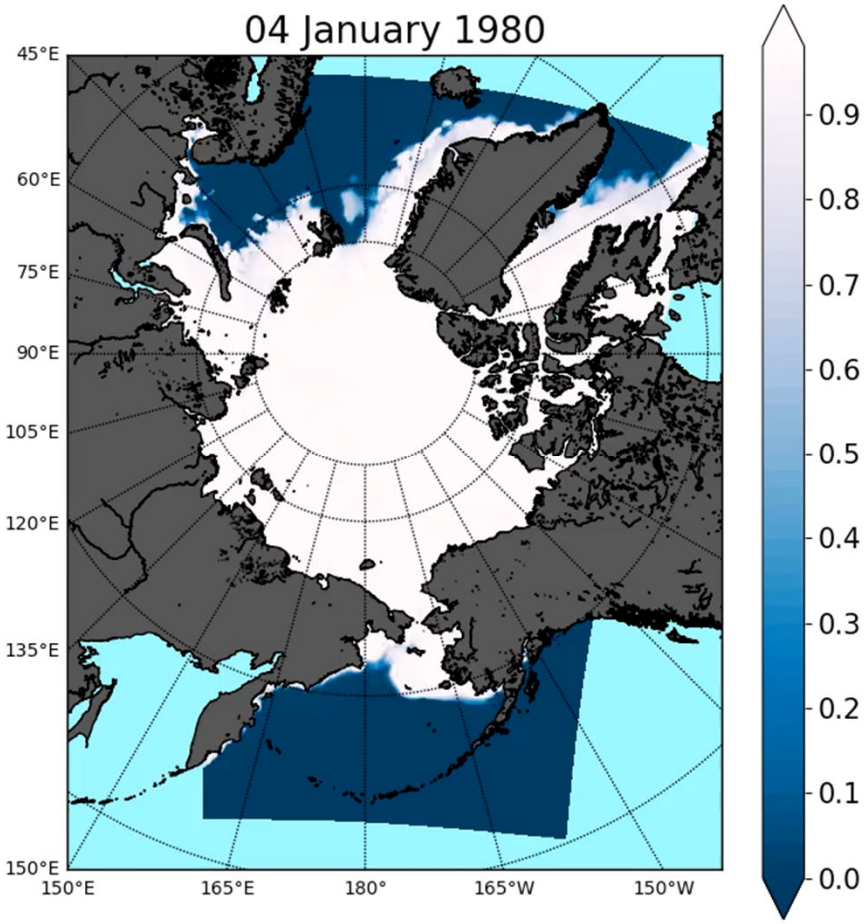
04 January 1980
45°E
60°E
75°E
90°E
105°E
120°E
135°E
150°E
150°E
165°E
180°
165°W
150°W
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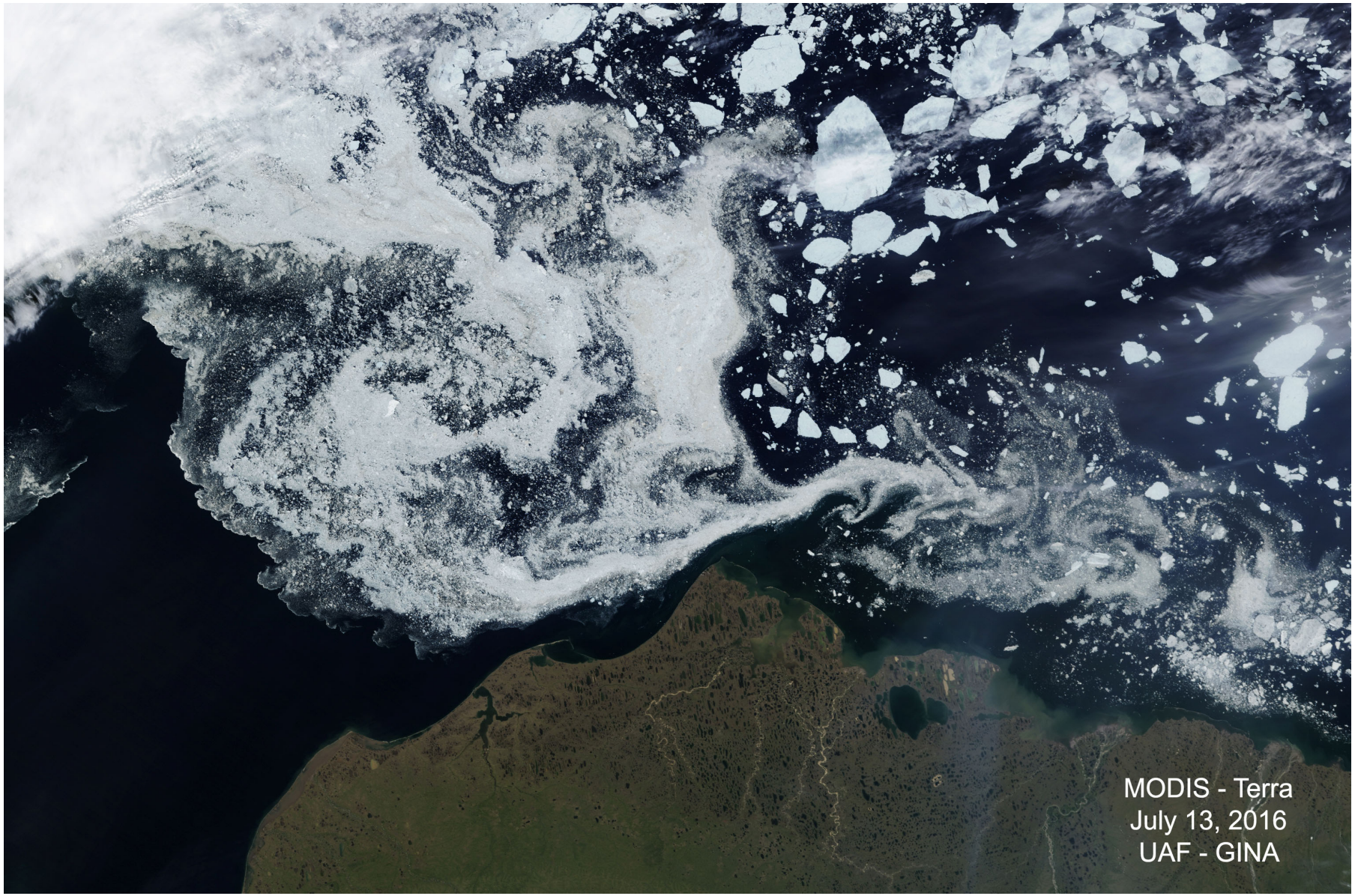
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0


MODIS - Terra
July 13, 2016
UAF - GINA

Computers and Codes

- I am running MOM6-SIS2 on chinook. CESM with MOM6-CICE-nuopc runs on cheyenne, but I don't have a large allocation there for running these Arctic runs.
  - There's a ticket in with UAF's RCS for them to see why it doesn't run on chinook.
- Plan is to port the Lemieux landfast ice parameterization into SIS2. This would allow me to continue with MOM6-SIS2 on chinook.

Other plans

- Sponges to see if they clean up the boundaries.
- Still have shortwave/longwave issue at 180 degrees longitude, plan to discuss with GFDL's FMS team.
- SIS2 doesn't have leads until late spring – ice redistribution fills them in. Matt Harrison is working on the ice ridging scheme to see if that fixes the problem.
- More comparisons to data. Seth Danielson has been collecting data and Matlab scripts… see Danielson et al., 2020. Frontiers in Marine Science.