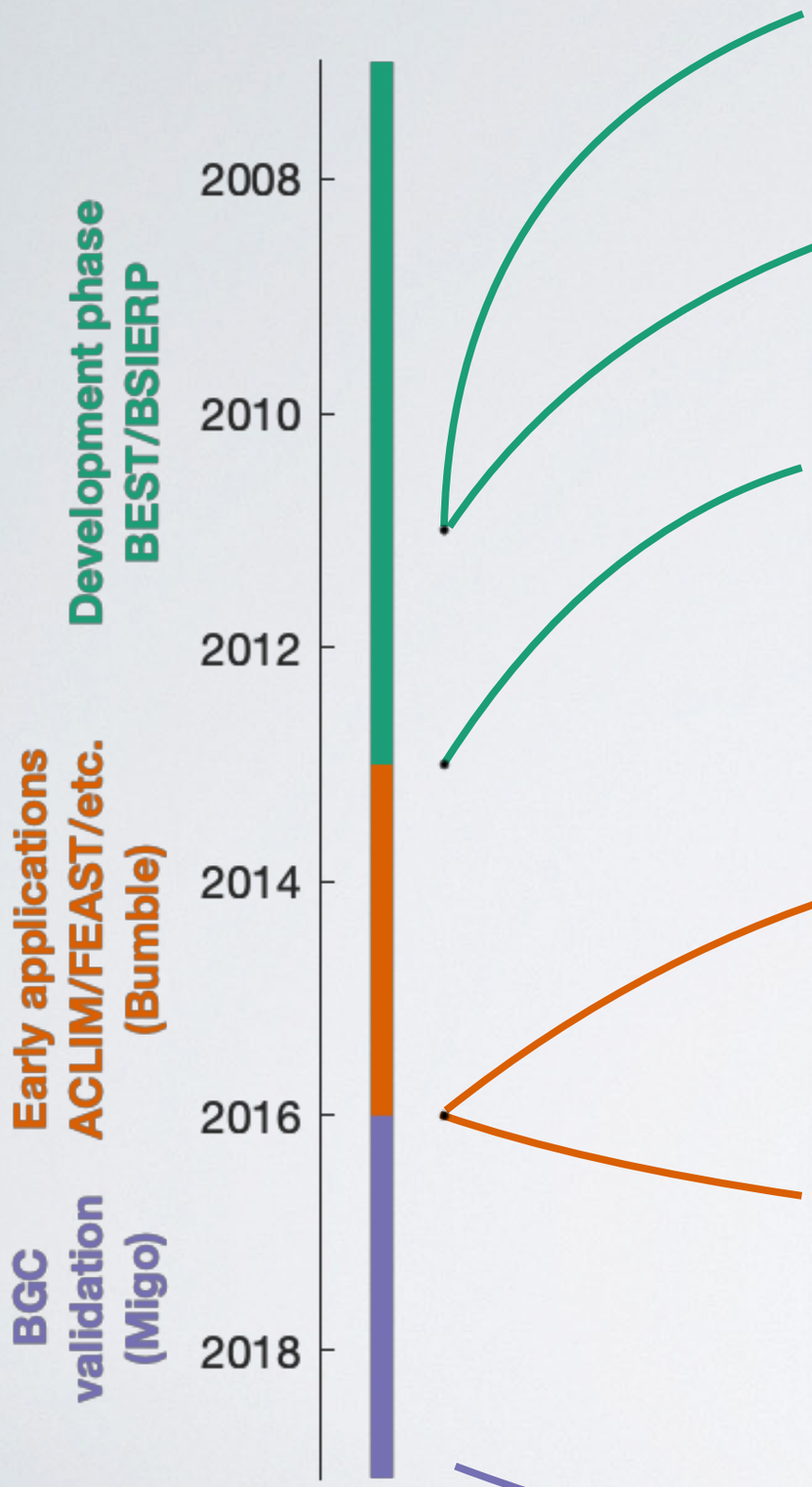
Biophysical and biogeochemical validation of the Bering10K-BESTNPZ model

Kelly Kearney
University of Washington
JISAO
kelly.kearney@noaa.gov

BESTNPZ history



On ocean and sea ice modes of variability in the Bering Sea

Seth Danielson,[1] Enrique Curchitser,[2] Kate Hedstrom,[3] Thomas Weingartner,[1] and Phyllis Stabeno[4]

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Contents lists available at ScienceDirect

Journal of Marine Systems

journal homepage: www.elsevier.com/locate/jmarsys

Impacts of biological parameterization, initial conditions, and environmental forcing on parameter sensitivity and uncertainty in a marine ecosystem model for the Bering Sea

G.A. Gibson [a,*], Y.H. Spitz [b]

Contents lists available at SciVerse ScienceDirect

Deep-Sea Research II

journal homepage: www.elsevier.com/locate/dsr2

A multivariate analysis of observed and modeled biophysical variability on the Bering Sea shelf: Multidecadal hindcasts (1970–2009) and forecasts (2010–2040)

Albert J. Hermann [a,*], Georgina A. Gibson [b], Nicholas A. Bond [a], Enrique N. Curchitser [c], Kate Hedstrom [d], Wei Cheng [a], Muyin Wang [a], Phyllis J. Stabeno [e], Lisa Eisner [f], Kristin D. Cieciel [f]

Contents lists available at ScienceDirect

Deep-Sea Research II

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Regular article

Projected future biophysical states of the Bering Sea

Albert J. Hermann [a,e,*], Georgina A. Gibson [b], Nicholas A. Bond [a,e], Enrique N. Curchitser [c], Kate Hedstrom [d], Wei Cheng [a,e], Muyin Wang [a,e], Edward D. Cokelet [e], Phyllis J. Stabeno [e], Kerim Aydin [f]

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Regular article

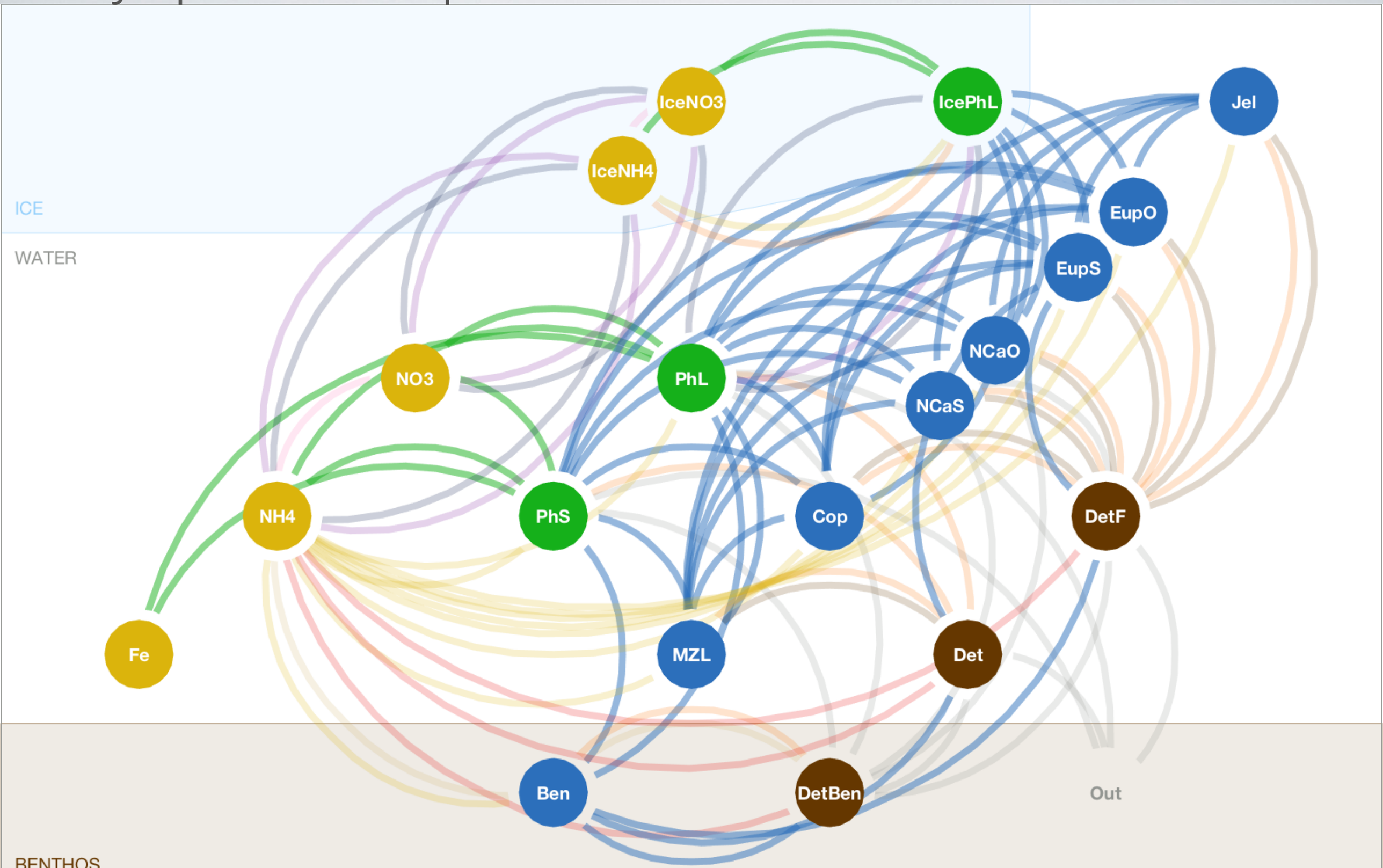
Climate to fish: Synthesizing field work, data and models in a 39-year retrospective analysis of seasonal processes on the eastern Bering Sea shelf and slope

Ivonne Ortiz [a,*], Kerim Aydin [b], Albert J. Hermann [a,j], Georgina A. Gibson [c], André E. Punt [d], Francis K. Wiese [e], Lisa B. Eisner [b], Nissa Ferm [b], Troy W. Buckley [b], Elizabeth A. Moffitt [f], James N. Ianelli [b], James Murphy [g], Michael Dalton [b], Wei Cheng [a,j], Muyin Wang [a,j], Kate Hedstrom [h], Nicholas A. Bond [a,j], Enrique N. Curchitser [i], Charlotte Boyd [d]

BEST_NPZ: A ROMS BIOLOGICAL MODULE FOR THE BERING SEA

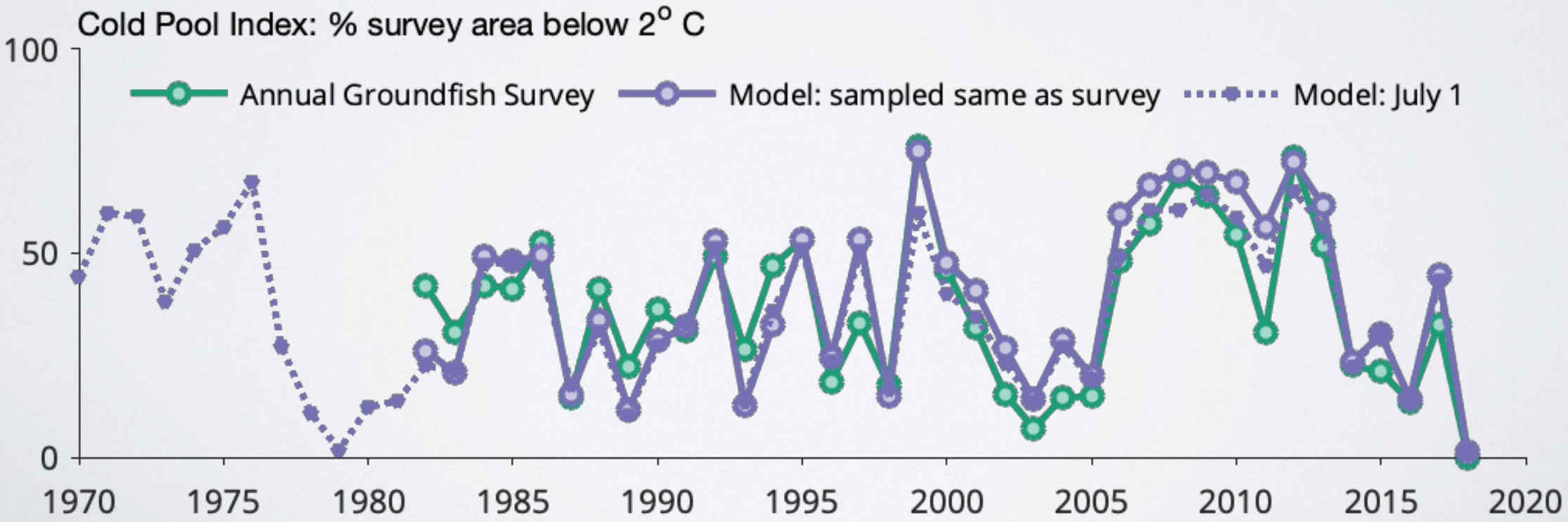
Kelly Kearney February 3, 2019

BESTNPZ: The **B**ering **E**cosystem **St**udy **N**utrient **P**hytoplankton **Z**ooplankton Model



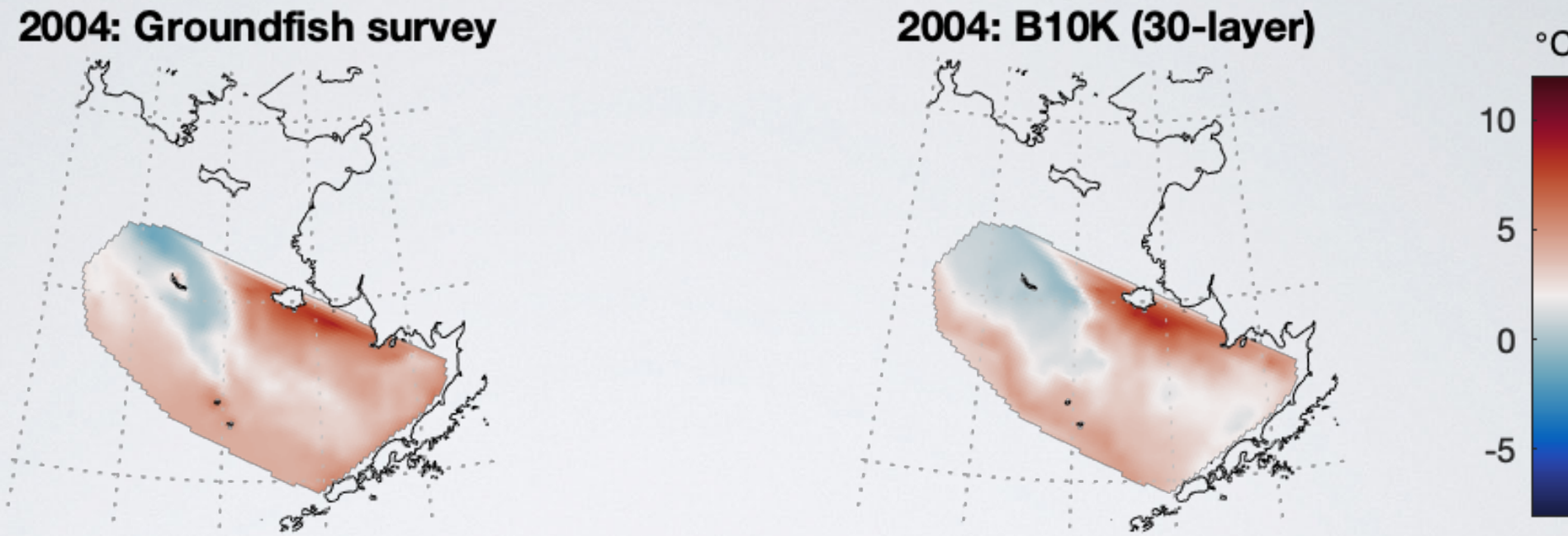
Cold pool validation

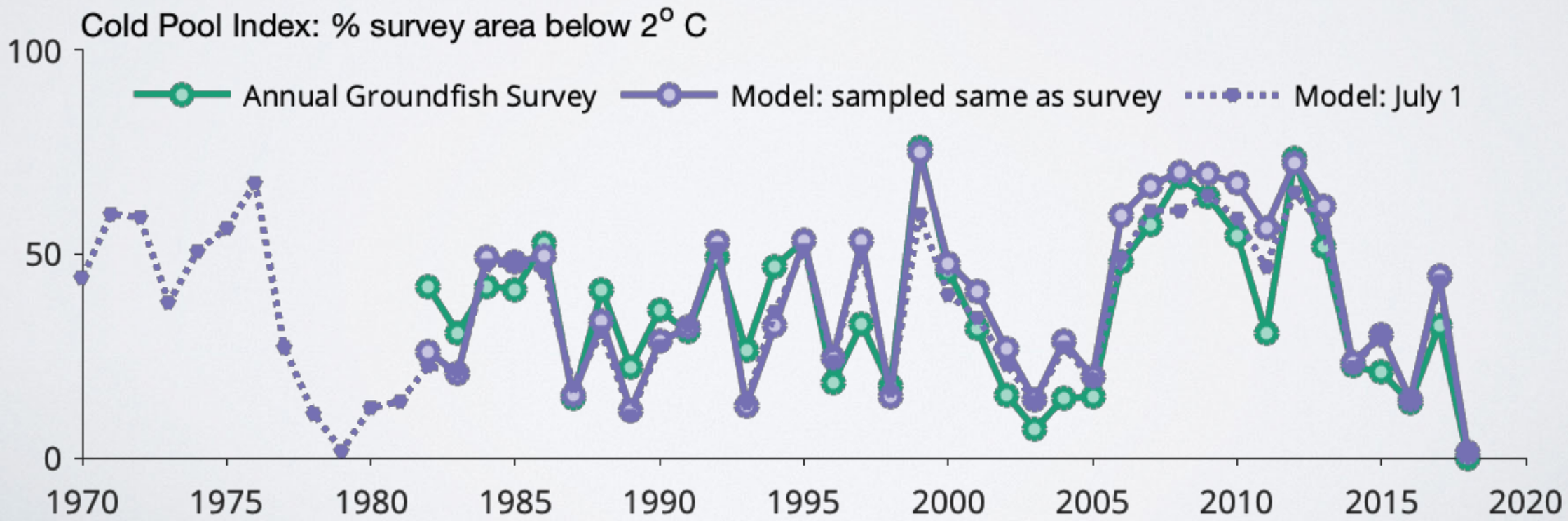
Correlation	RMSD	Bias	Model efficiency
0.891	9.7%	2.89%	0.735



Do not cite

Cold pool validation





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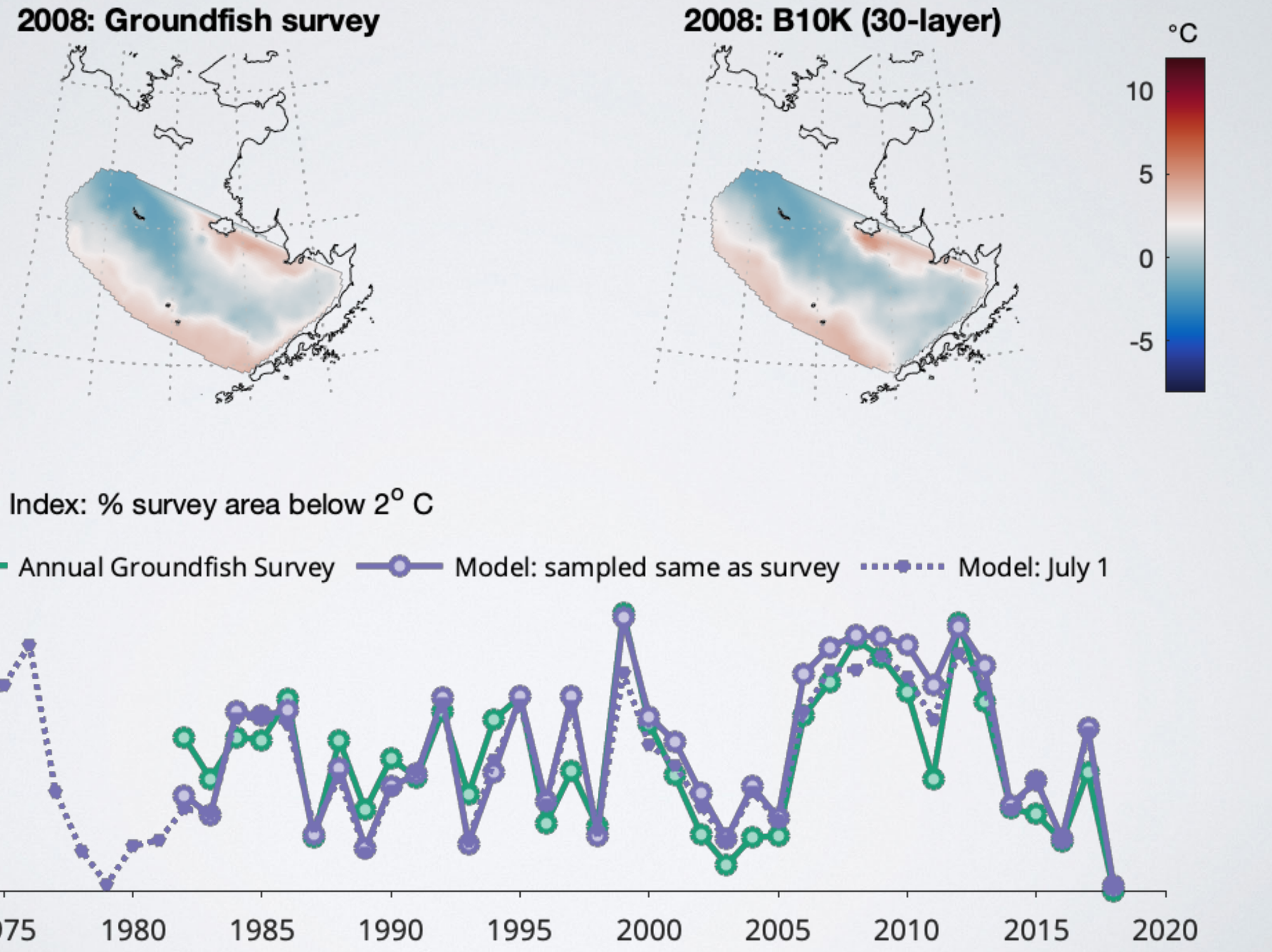
Cold pool validation



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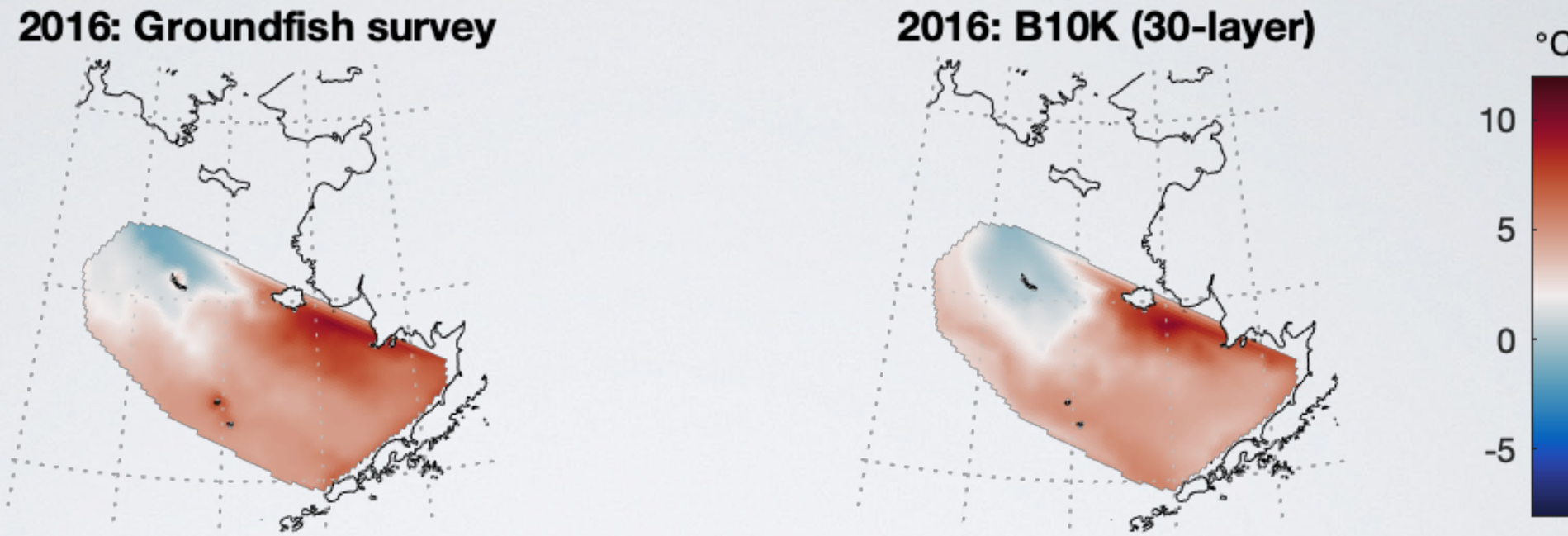

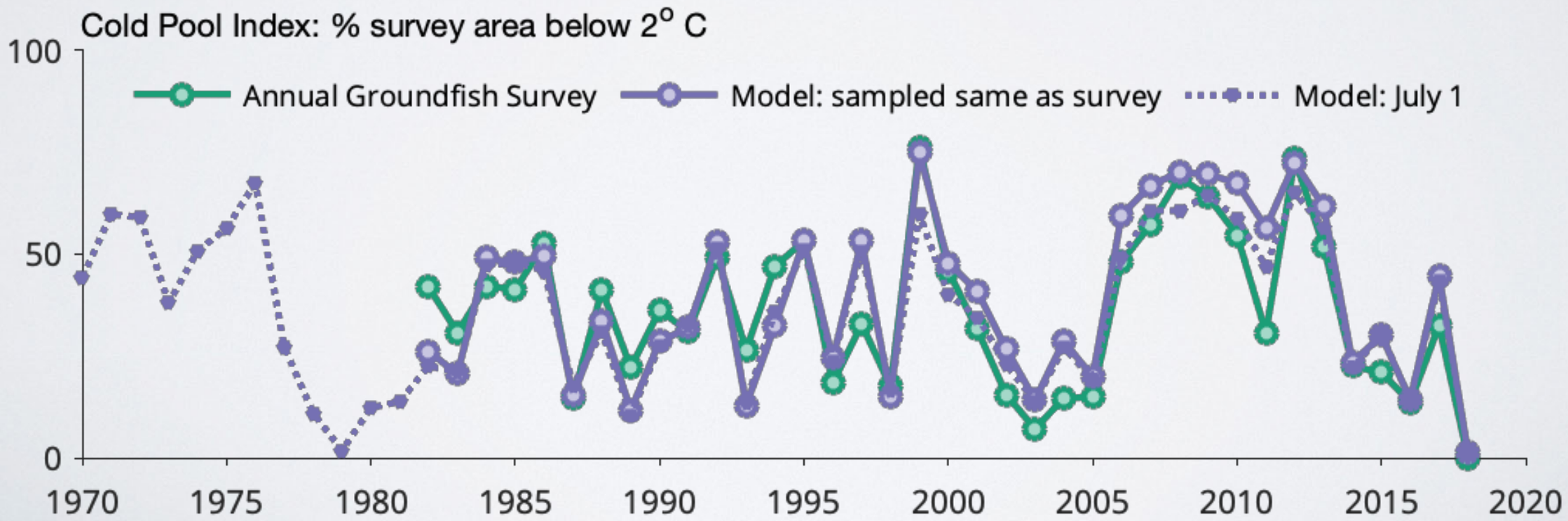

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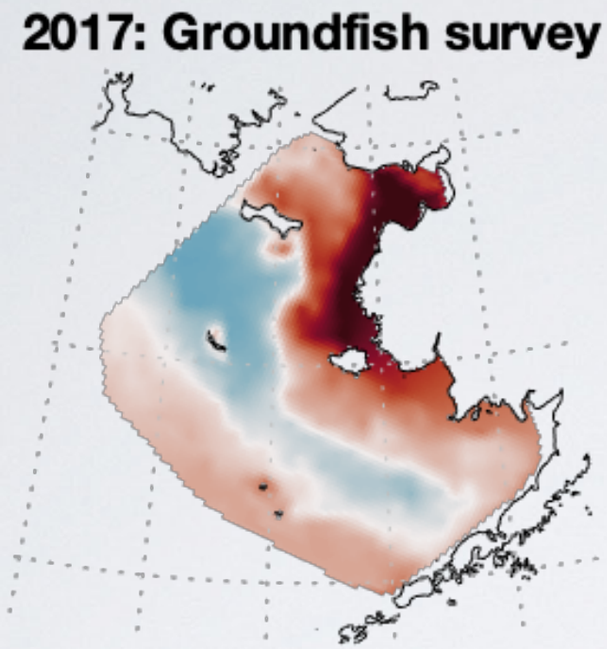
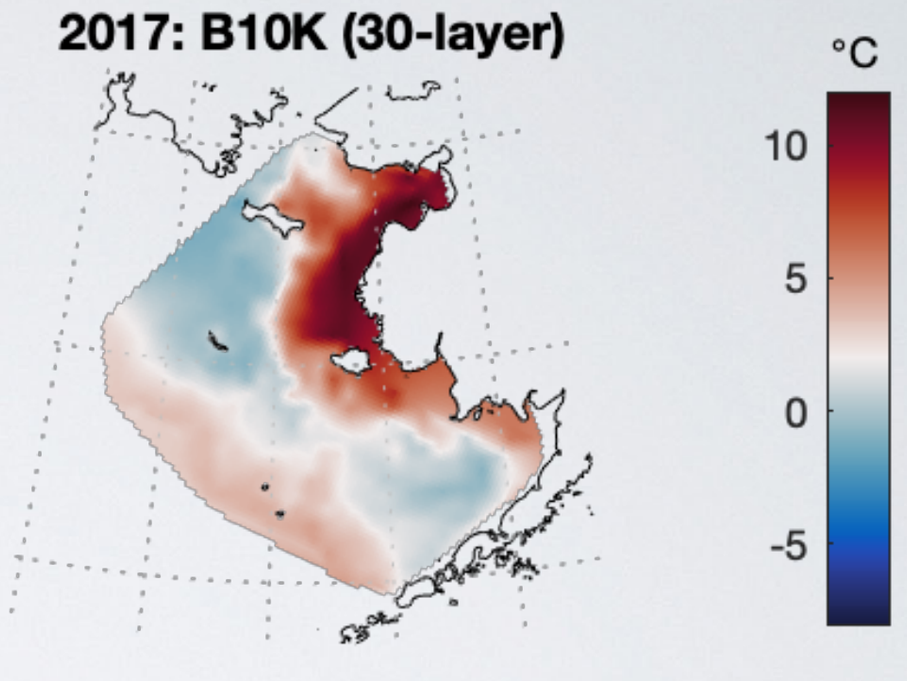
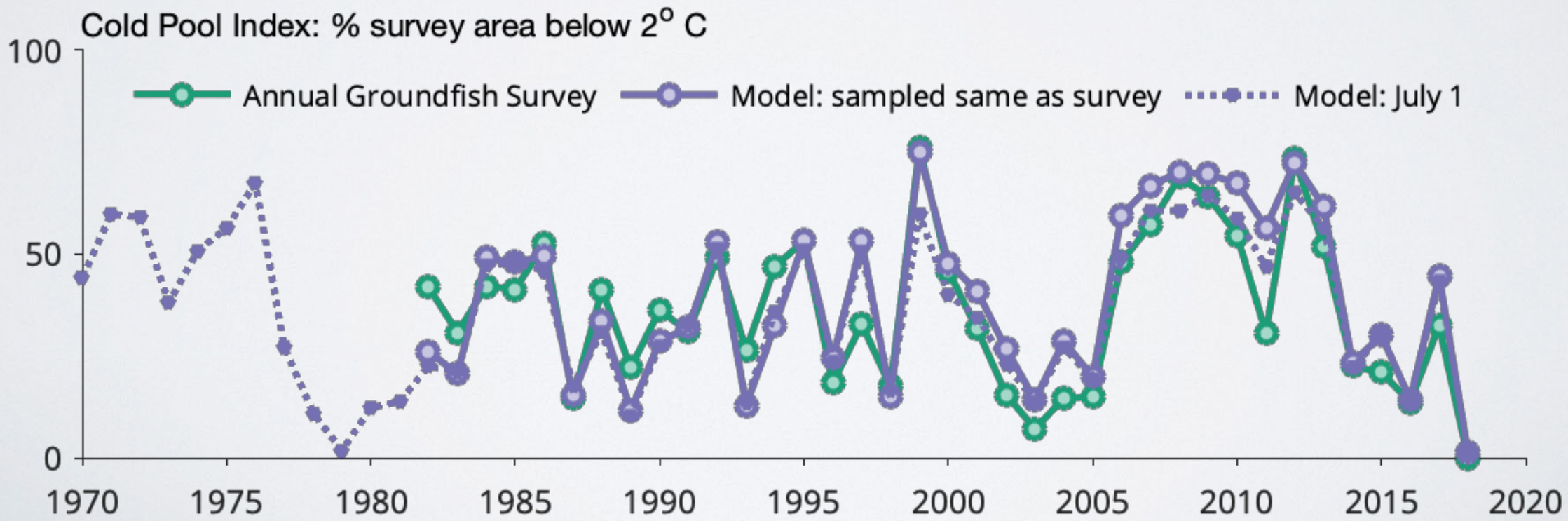
Cold pool validation







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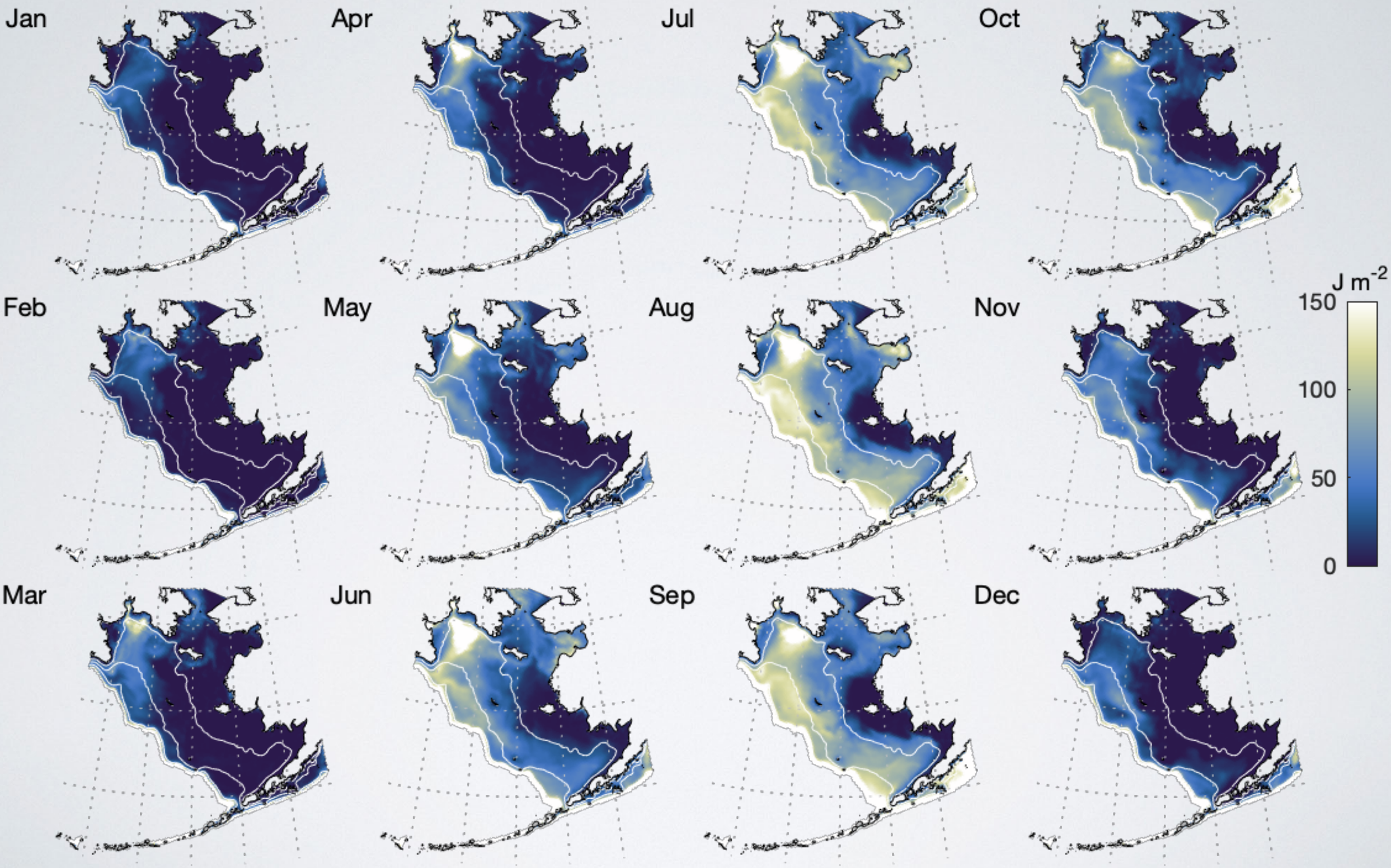
Vertical stratification



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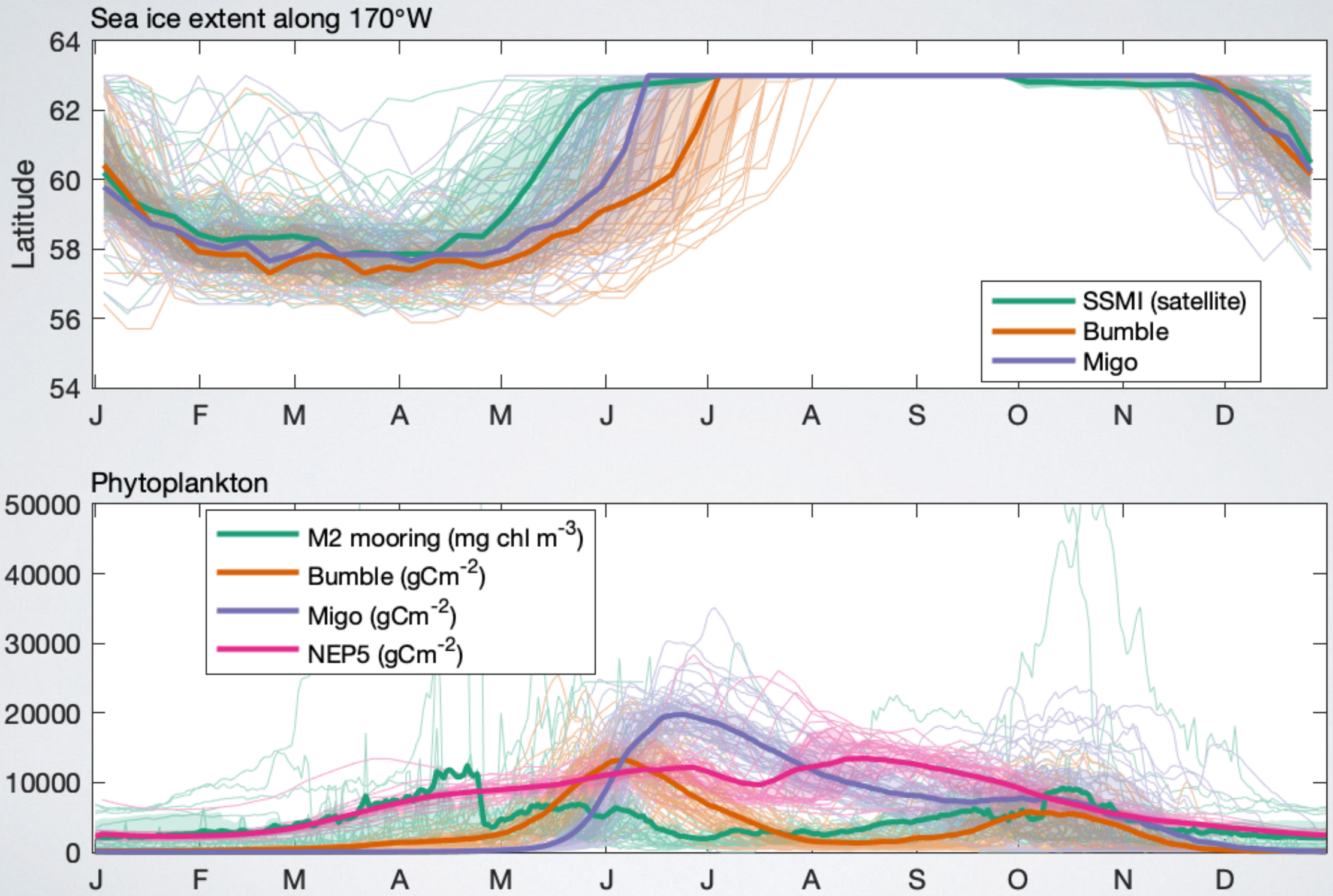
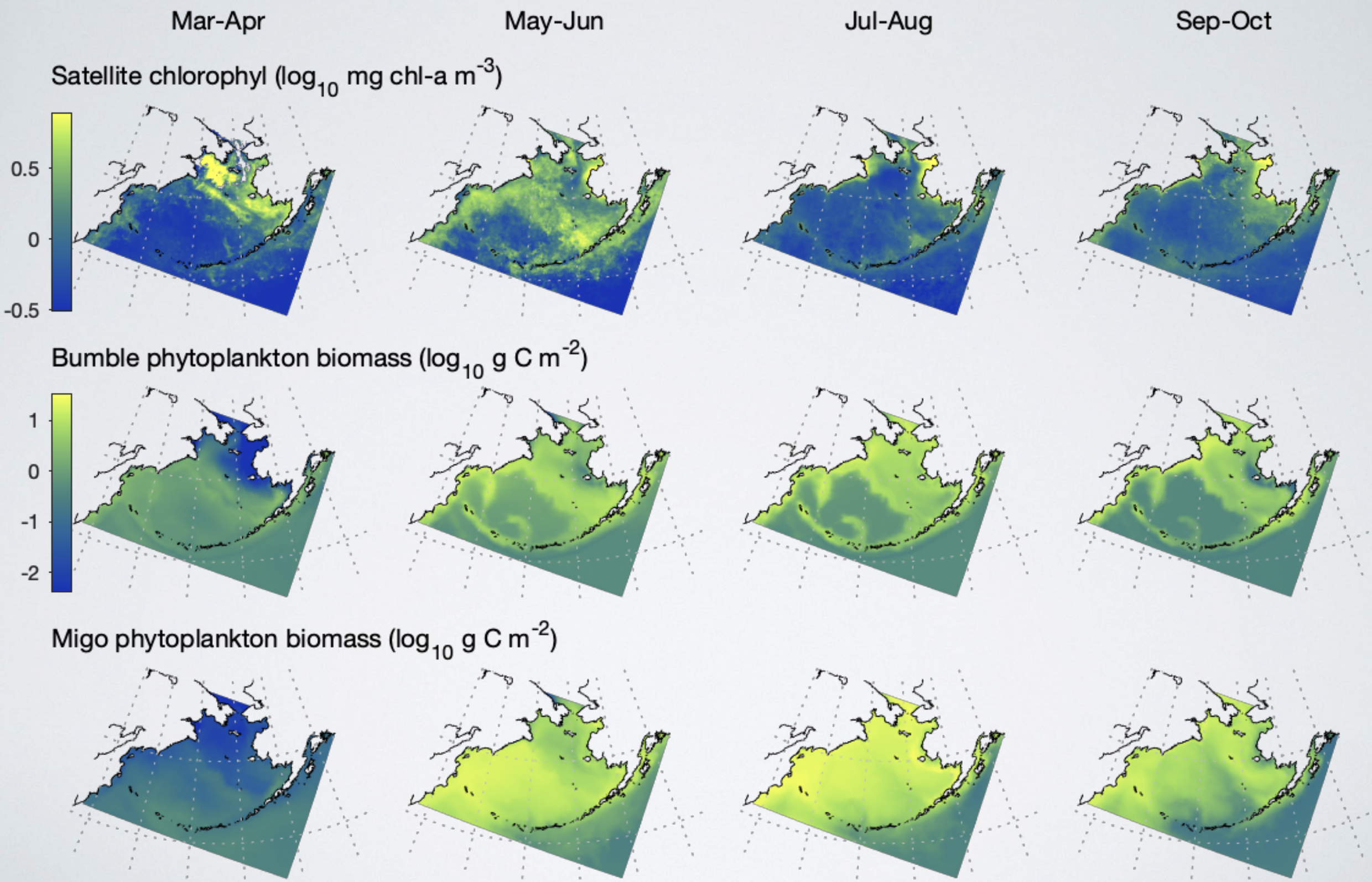
Sea ice retreat timing vs phytoplankton bloom onset



Do not cite

Phytoplankton spatial patterns



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Conclusions

- Physical dynamics show strong skill in reproducing physical features of importance to biology

- Biogeochemical model is still an area of active research

Extra slides

Bumble

Migo

NO3

NH4

PhS

PhL

Det

DetF

0
-20
-40
-60

20
10
0

5

400
200

100
50

5000

Ben
DetBen

Jan
Apr
Jul
Oct
Jan
2004

Bumble

Migo

NO3

NH4

PhS

PhL

Det

DetF

0
-20
-40
-60

20
10
0

5

400
200

100
50

Ben
DetBen

5000
0

Jan
Apr
Jul
Oct
Jan
2008