

The Alaska Integrated Climate Change Modeling Project (ACLIM)

Identifying **impacts** and management **solutions** for Eastern Bering Sea fisheries

Kirstin Holsman
NOAA Fisheries AFSC
Seattle, WA, USA
kirstin.holsman@noaa.gov

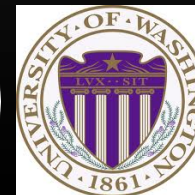
5/2/2017

ACLIM PIs:

Anne Hollowed, Kirstin Holsman,
Alan Haynie, Stephen Kasperski, Jim
Ianelli, Kerim Aydin, Wei Cheng, Al
Hermann, Trond Kristiansen, Andre Punt



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The ACLIM team



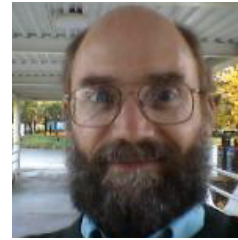
Anne Hollowed



Kirstin Holsman



Alan Haynie



Albert Hermann



Wei Cheng



Andre Punt



Darren Pilcher



Kerim Aydin



Jim Ianelli



Andy Whitehouse



Stephen Kasperski



Cody Szuwalski



Amanda Faig



Jonathan Reum



Michael Dalton



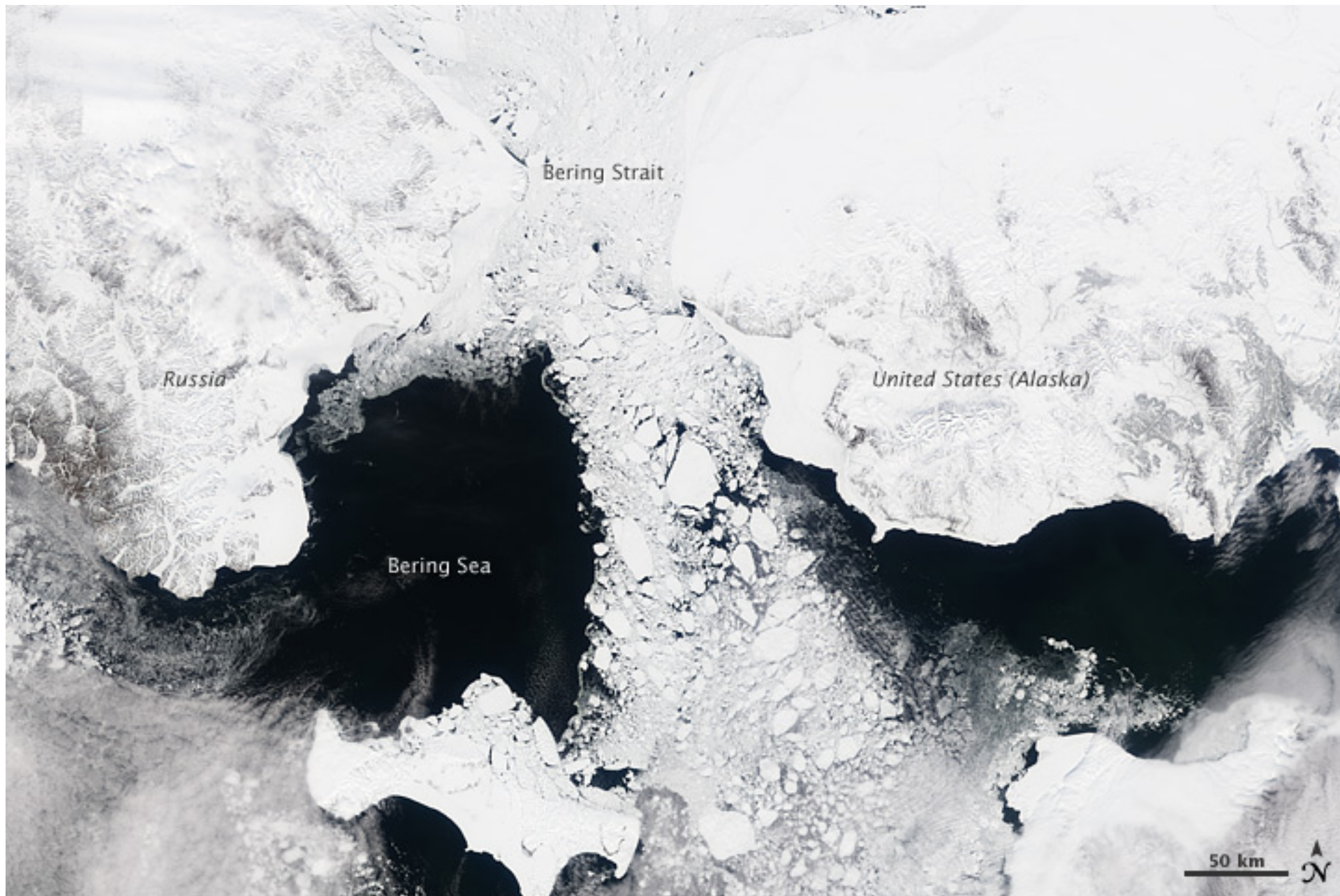
Paul Spencer



Tom Wilderbuer



William Stockhausen



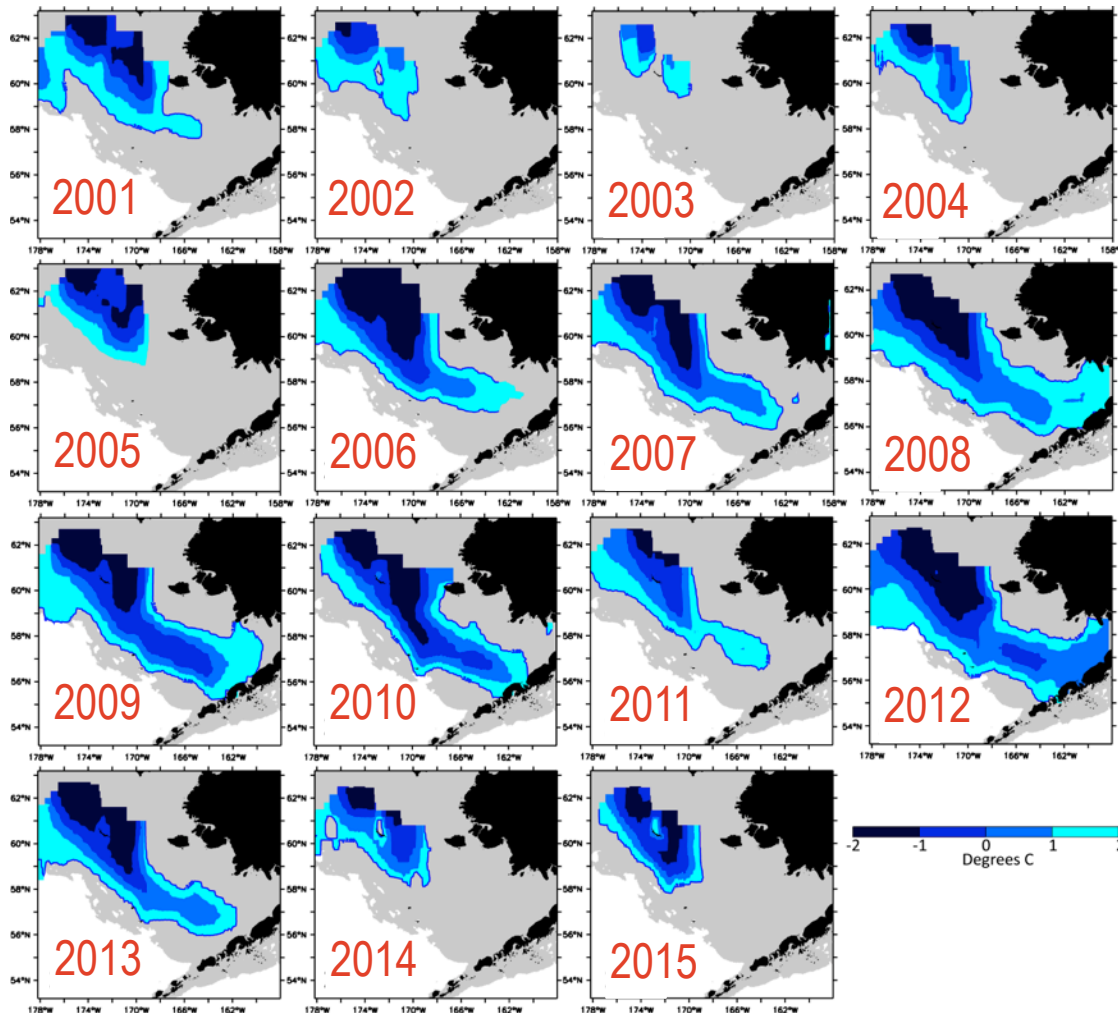
NASA MODIS image by Jesse Allen



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Bering Sea & Climate variability

Bering Sea “Cold Pool” 2001-2015



Graphic: J. Overland, P. Stabeno, M. Wang, C. Ladd, N. Bond, and S. Salo, PMEL/NOAA

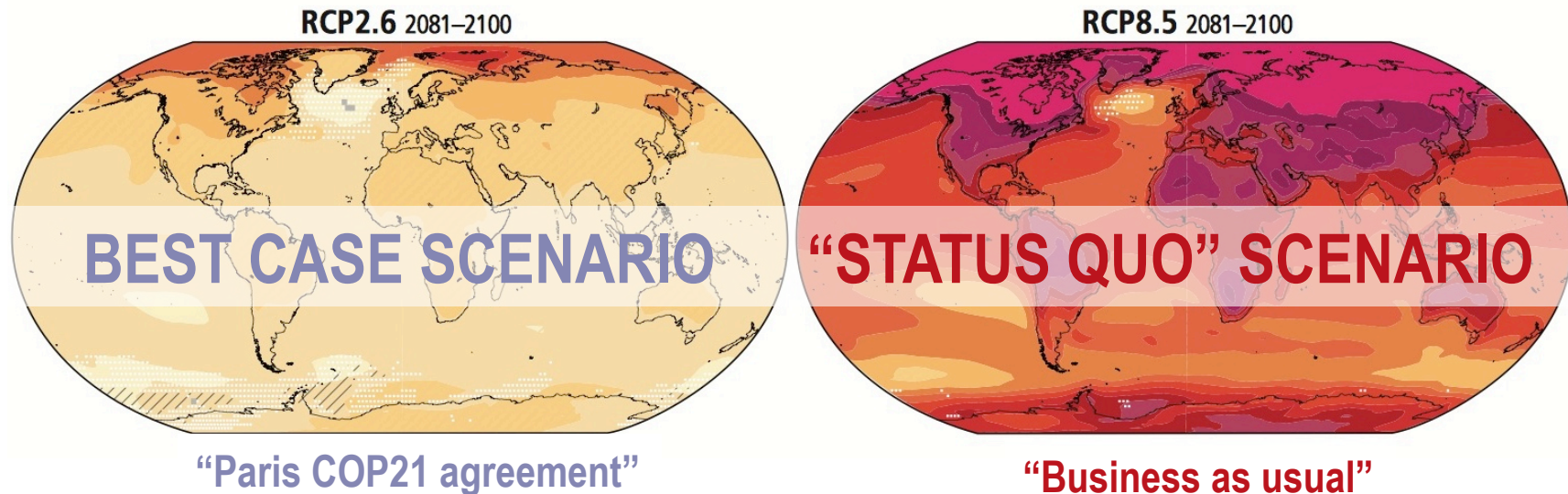
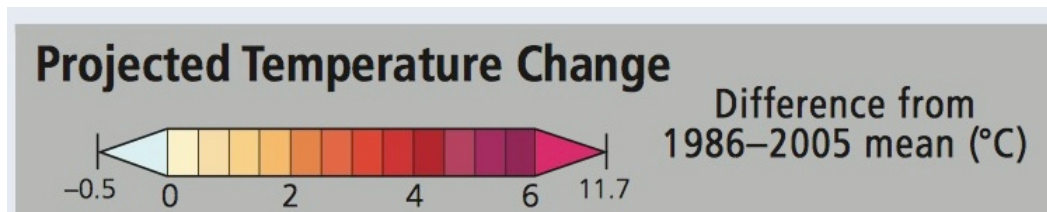
MORE ICE

MORE FOOD

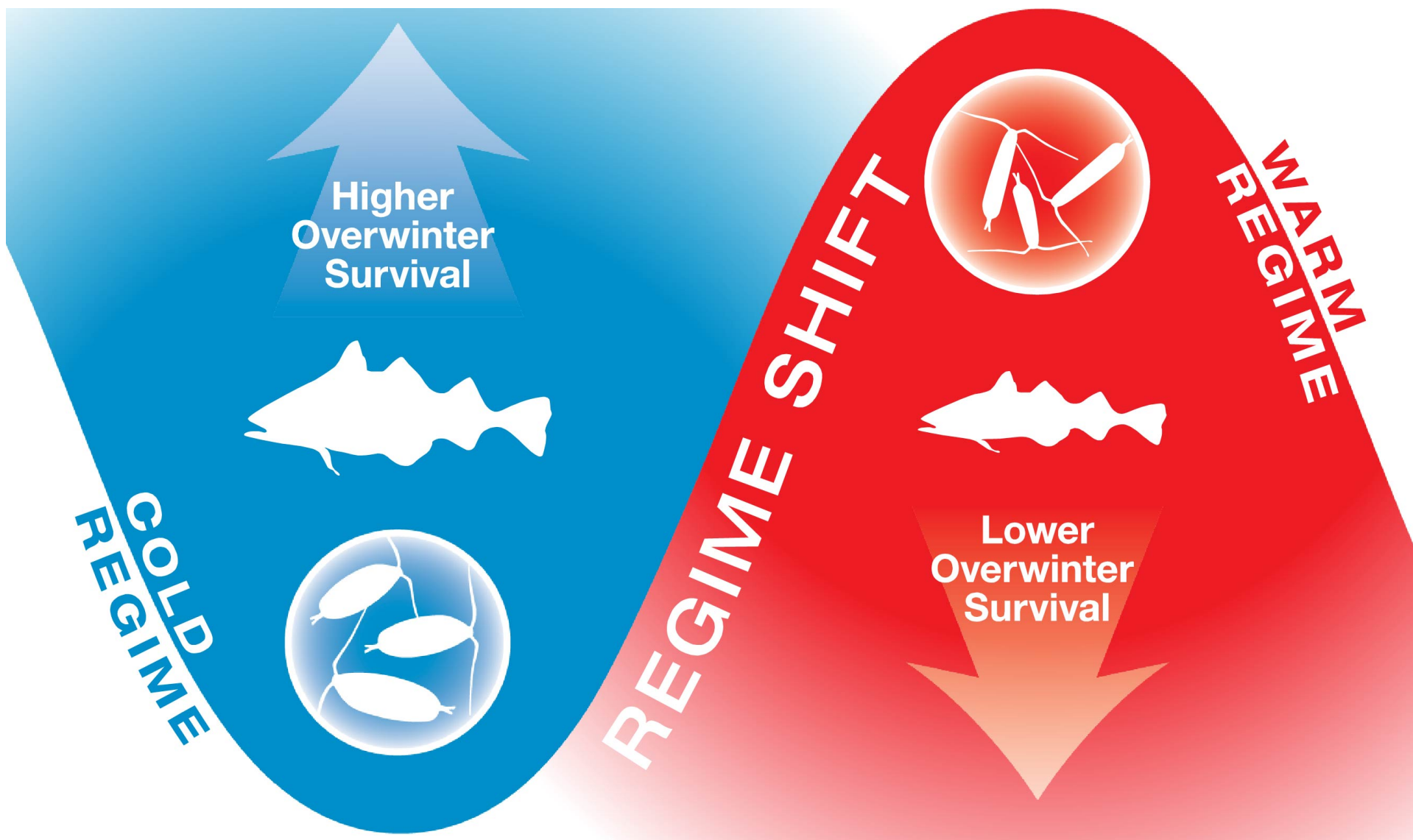
MORE FISH

HIGHER CATCH

Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report



<https://www.ipcc.ch/report/ar5/>



Slide courtesy of J. Duffy-Anderson



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Climate change: an unprecedented challenge

global issue with local impacts....

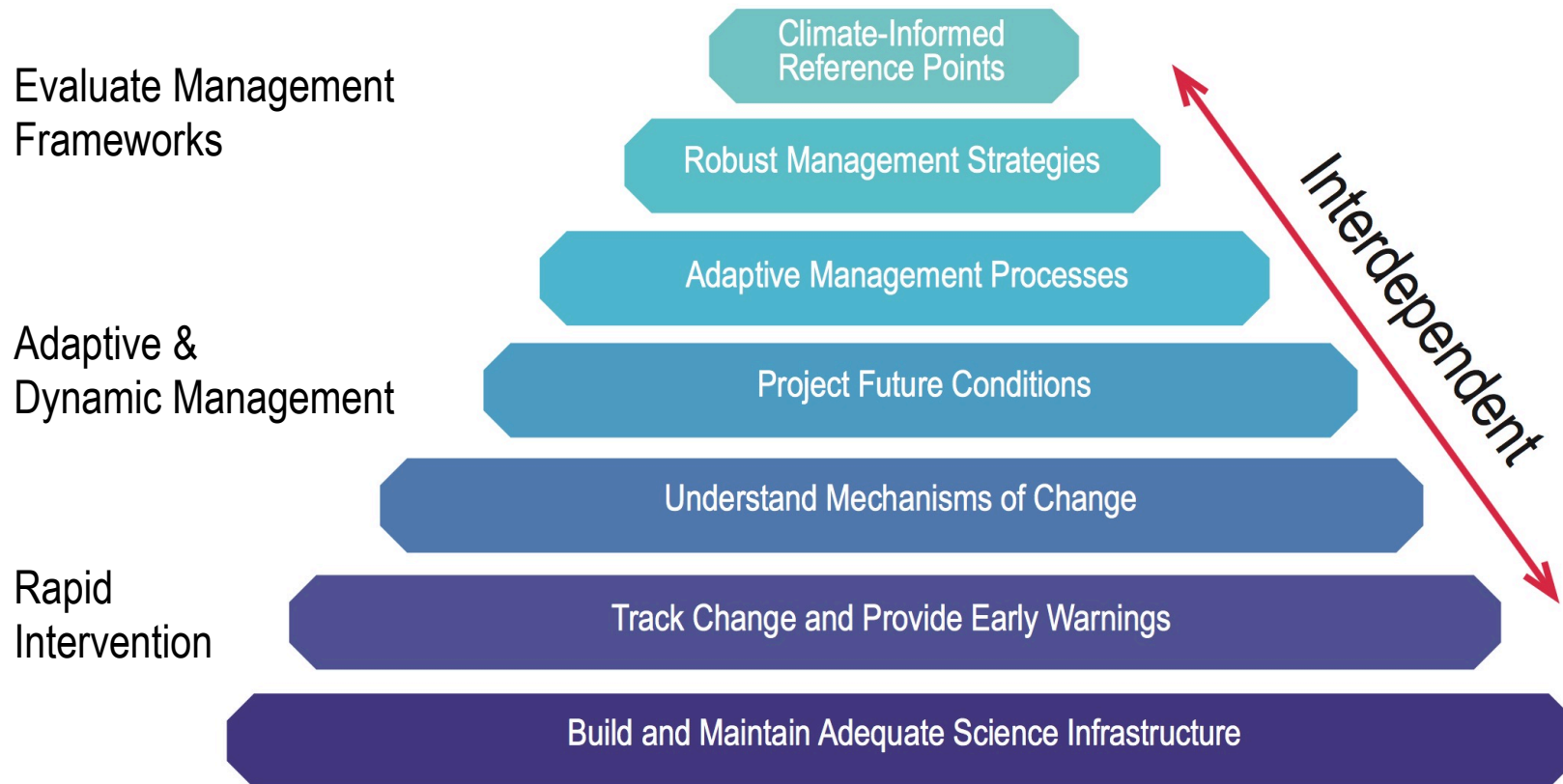
requires, global solutions

but depends on local adaptation measures



Photo: Mark Holsman

Climate Science Strategy Objectives



Link et al. 2015. NOAA Fisheries Climate Science Strategy. U.S. Dept. of Commerce, NOAA Technical Memorandum NMFS-F/SPO-155, 70p.

ACLIM objectives:

How and when will the Bering Sea change?

Physical, biological, & socioeconomic change; 5 – 100 years

Can management adapt & minimize impacts of change?

Gradual change & sudden shocks; test existing & new tools; estimates of probability

Can we disentangle sources of uncertainty?



Photo: Mark Holsman



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Alaska Climate Integrated Modeling Project

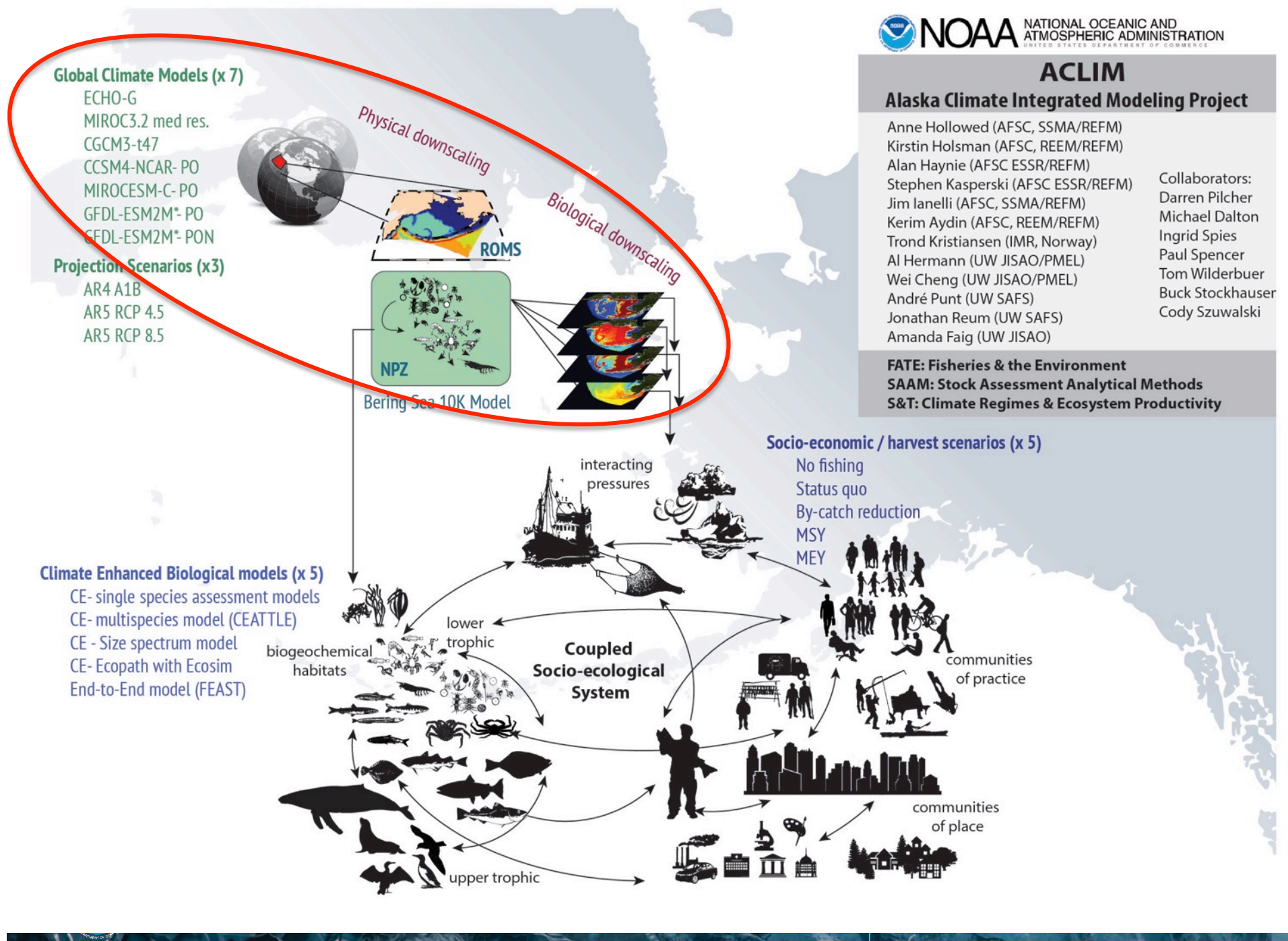
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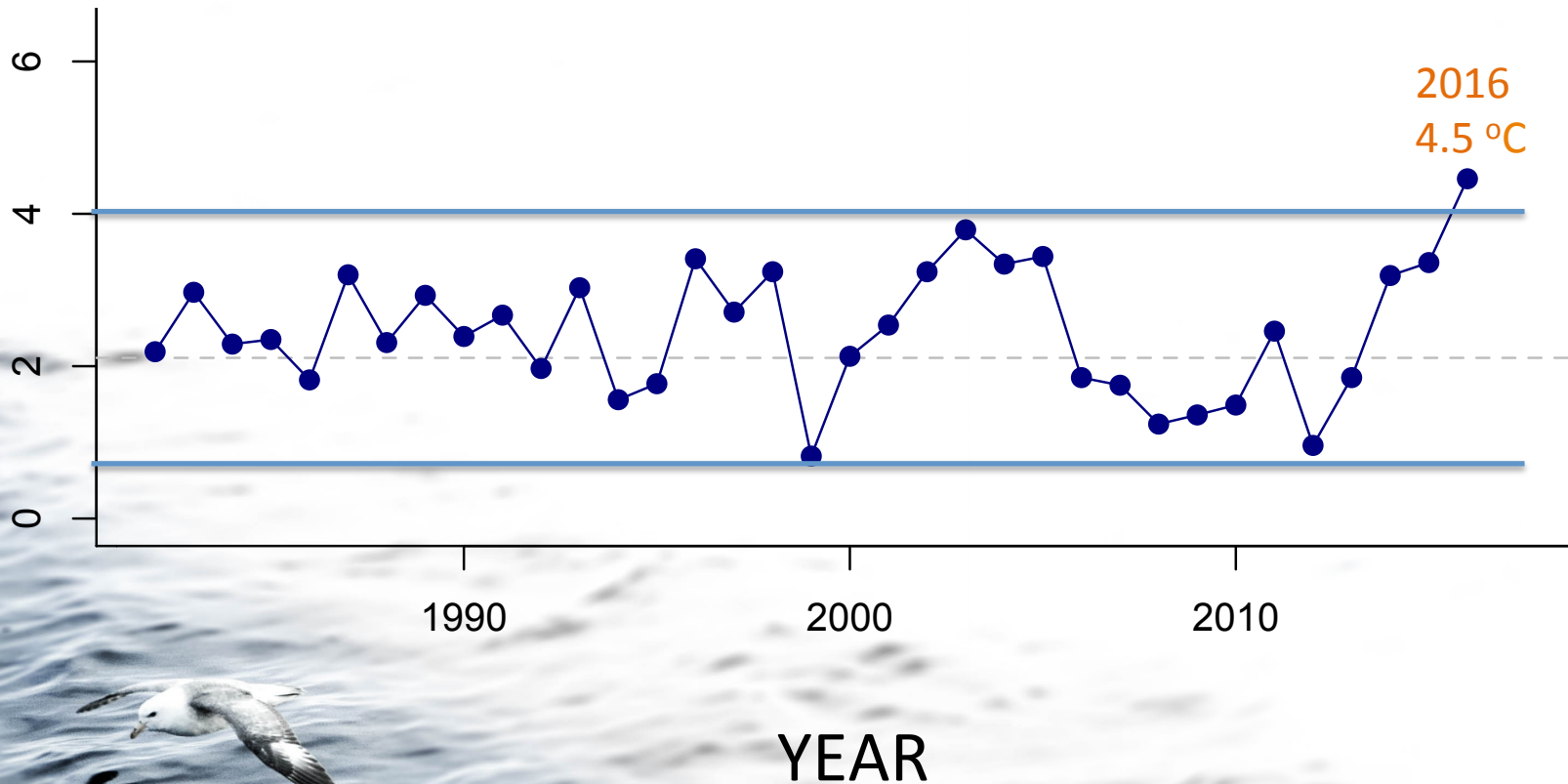
FATE: Fisheries & the Environment

SAAM: Stock Assessment Analytical Methods

S&T: Climate Regimes & Ecosystem Productivity

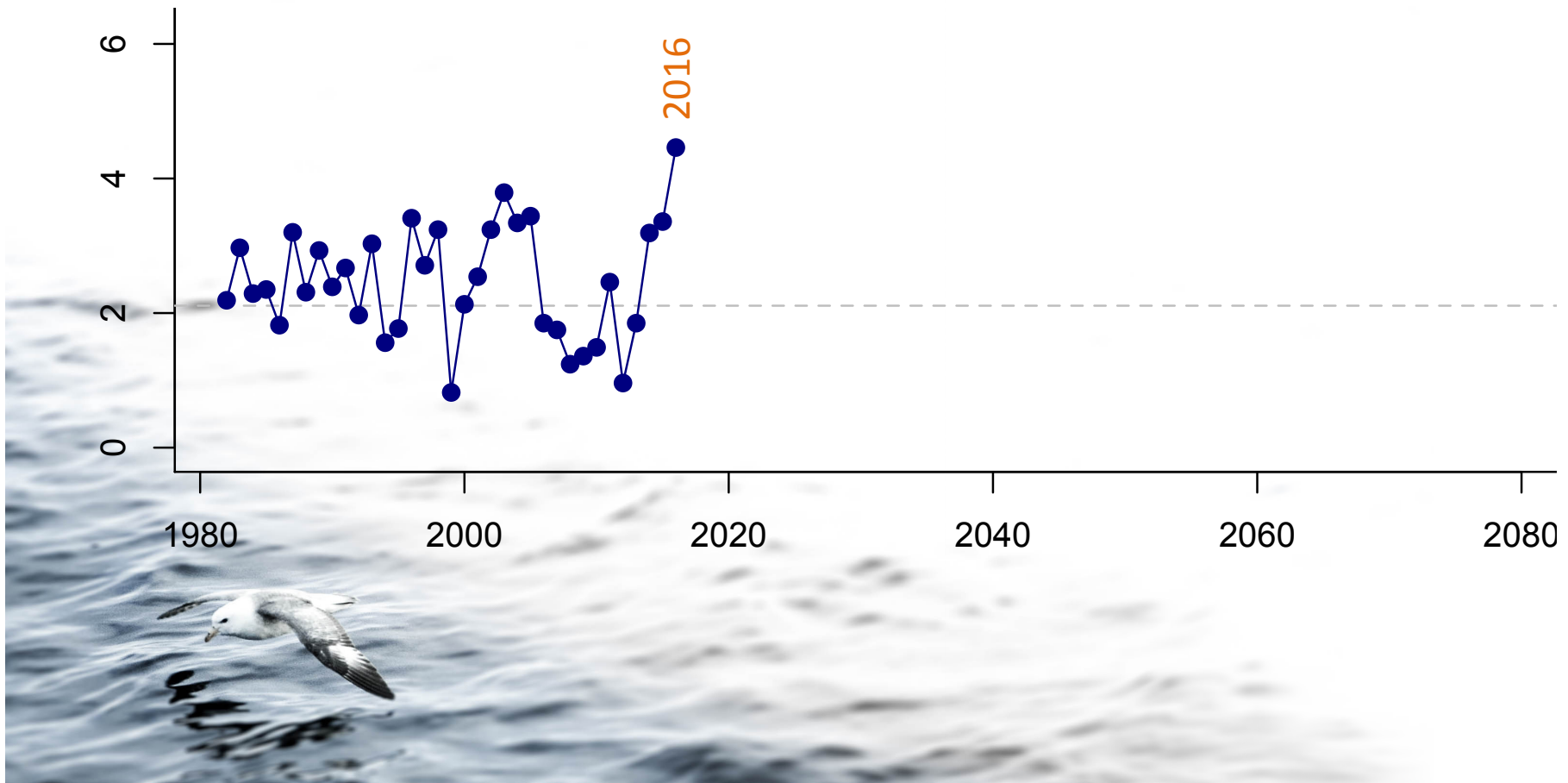


Summer Bottom Temperature (°C) OBSERVED

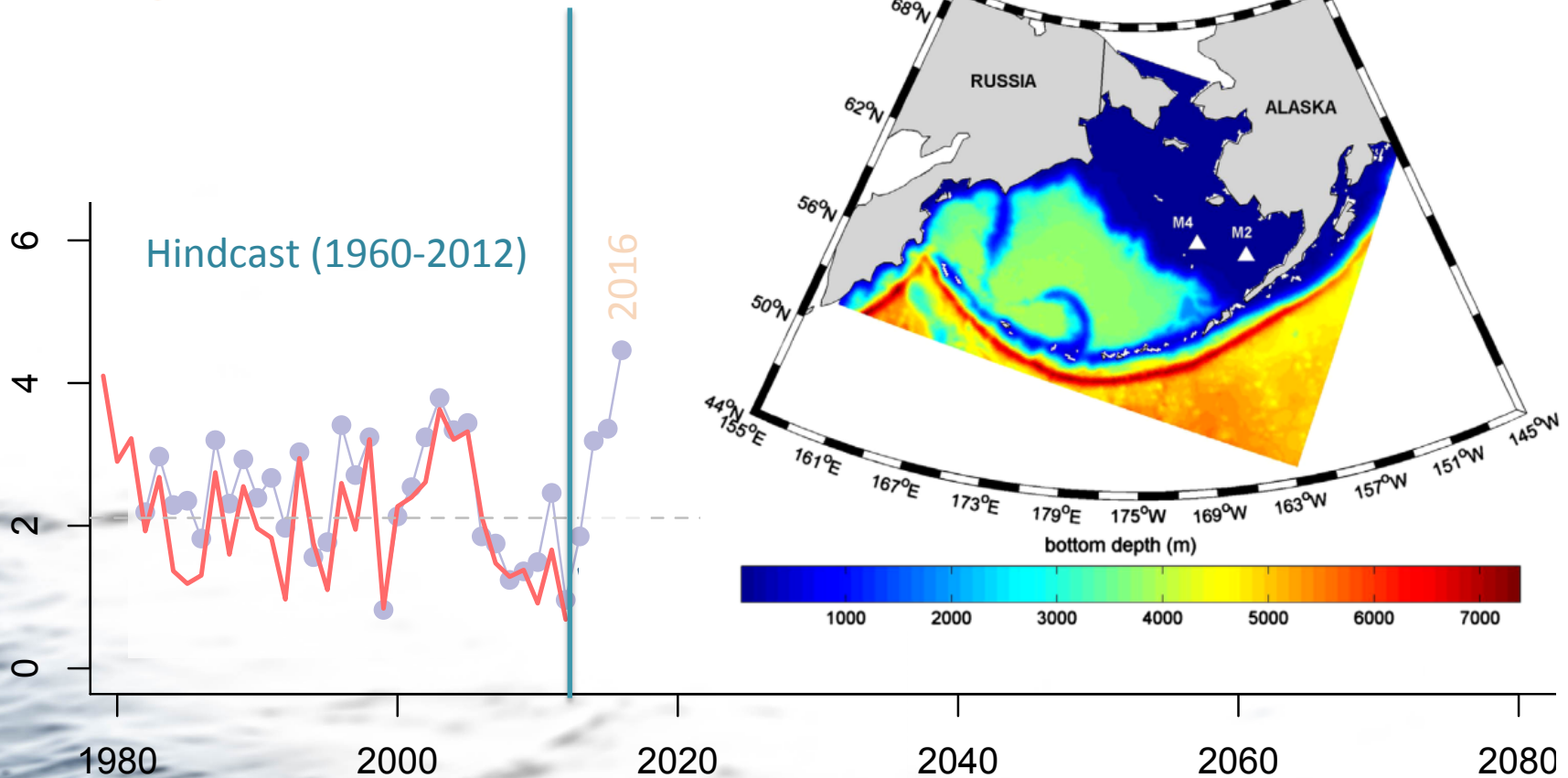


Summer Bottom Temperature (°C)

OBSERVED

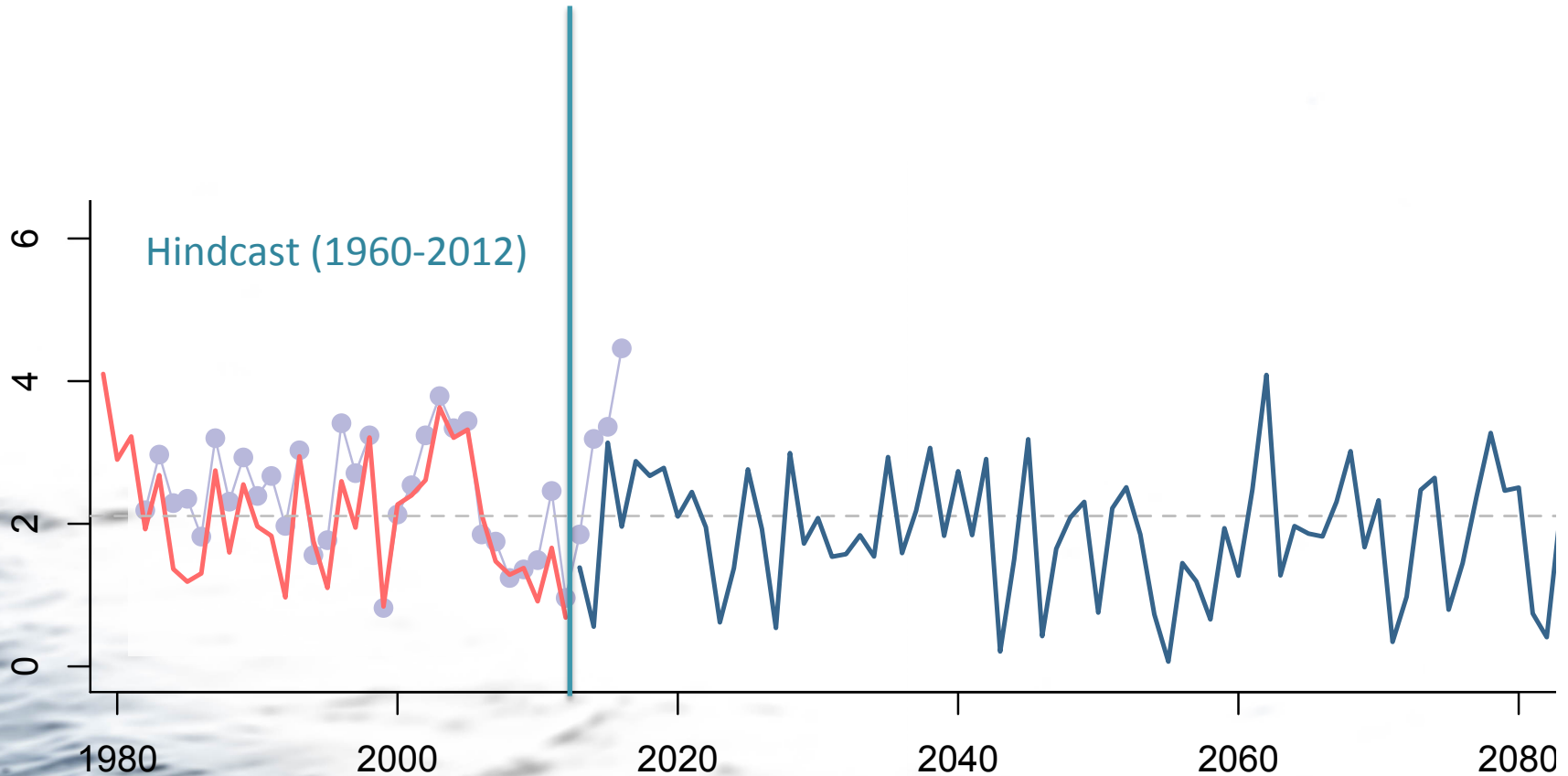


Summer Bottom Temperature ($^{\circ}\text{C}$) MODEL



Summer Bottom Temperature (°C) MODEL

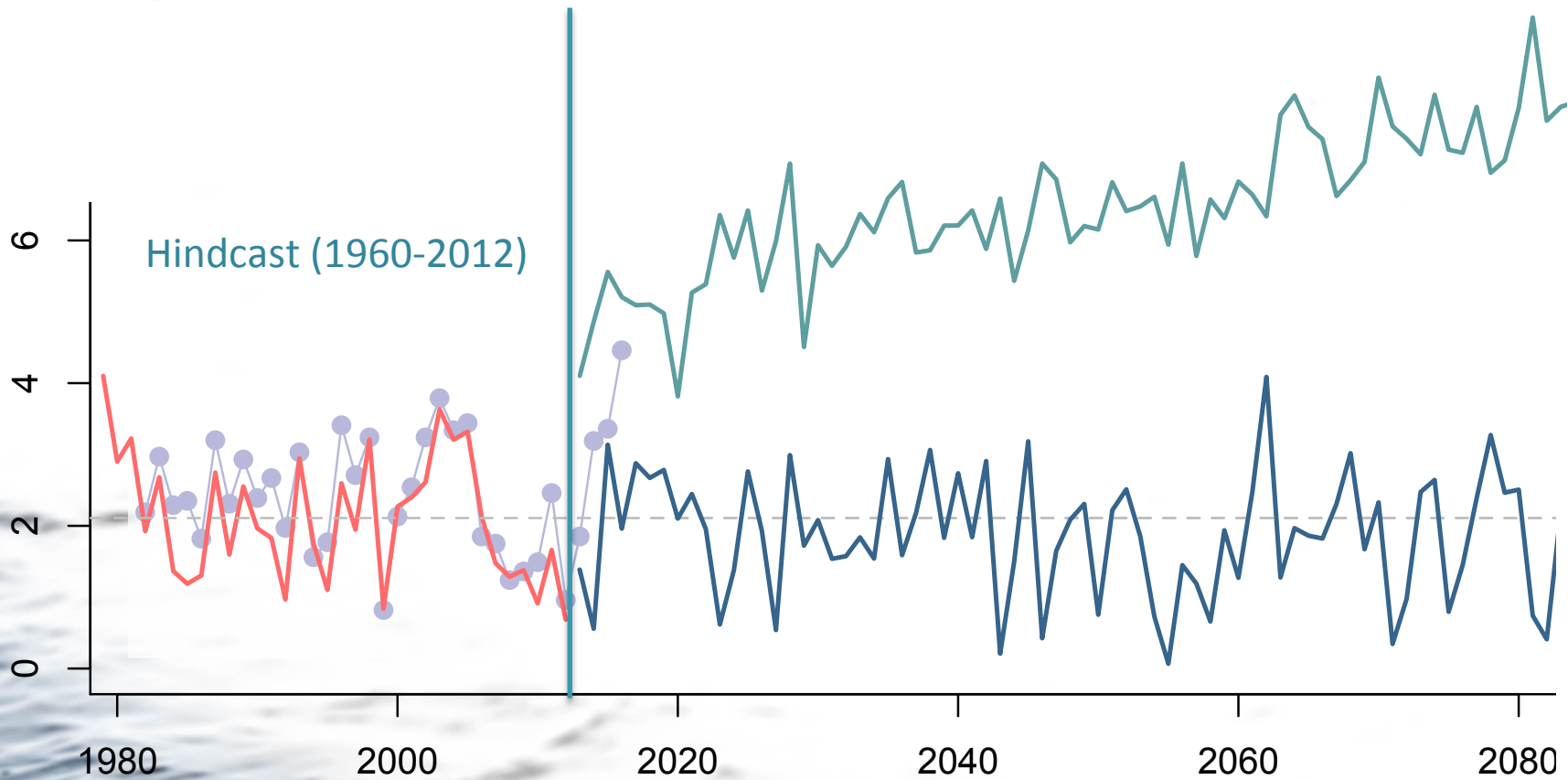
Draft results; please do not reproduce



Summer Bottom Temperature (°C)

MODEL

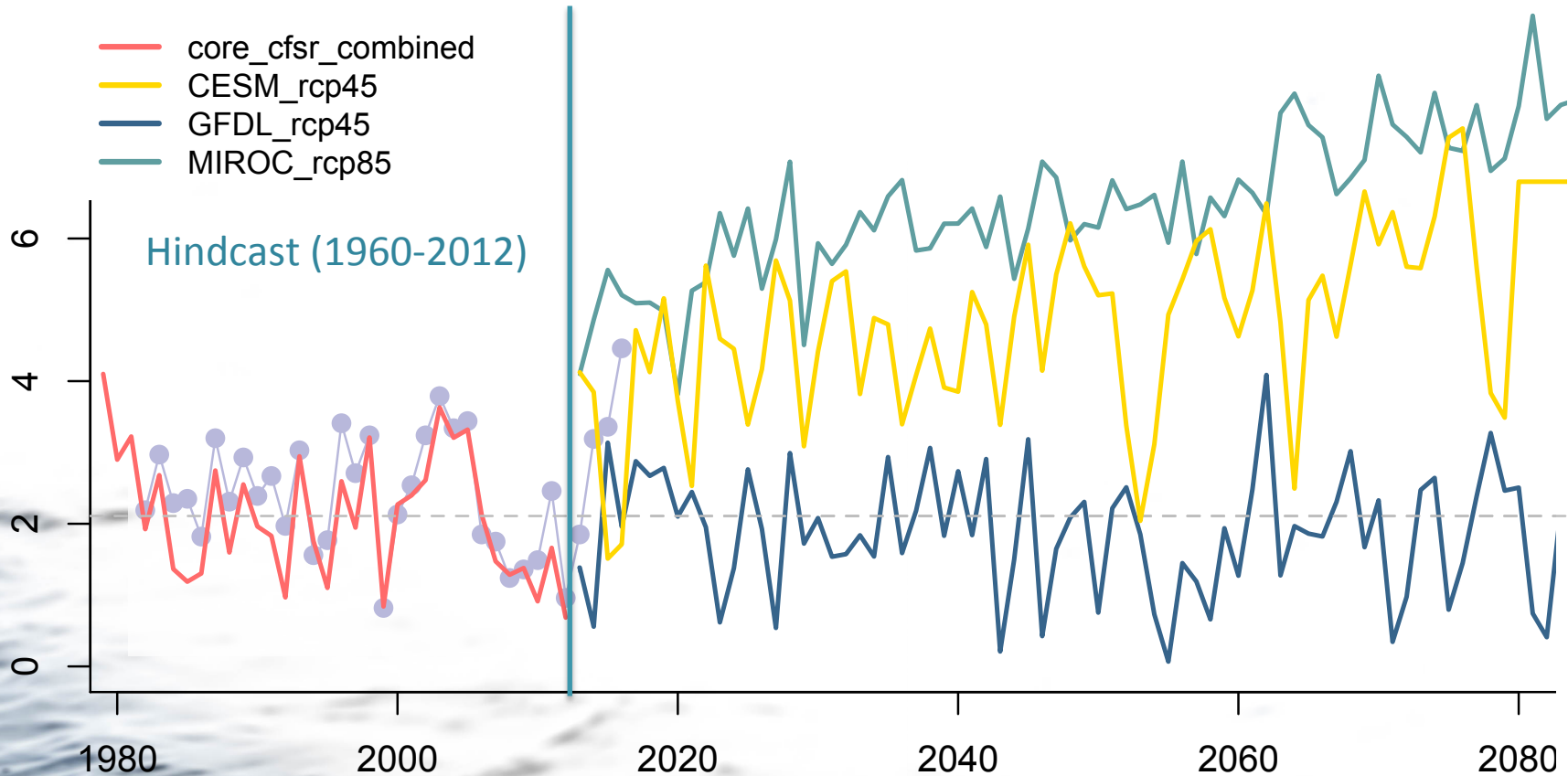
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Summer Bottom Temperature (°C)

MODEL

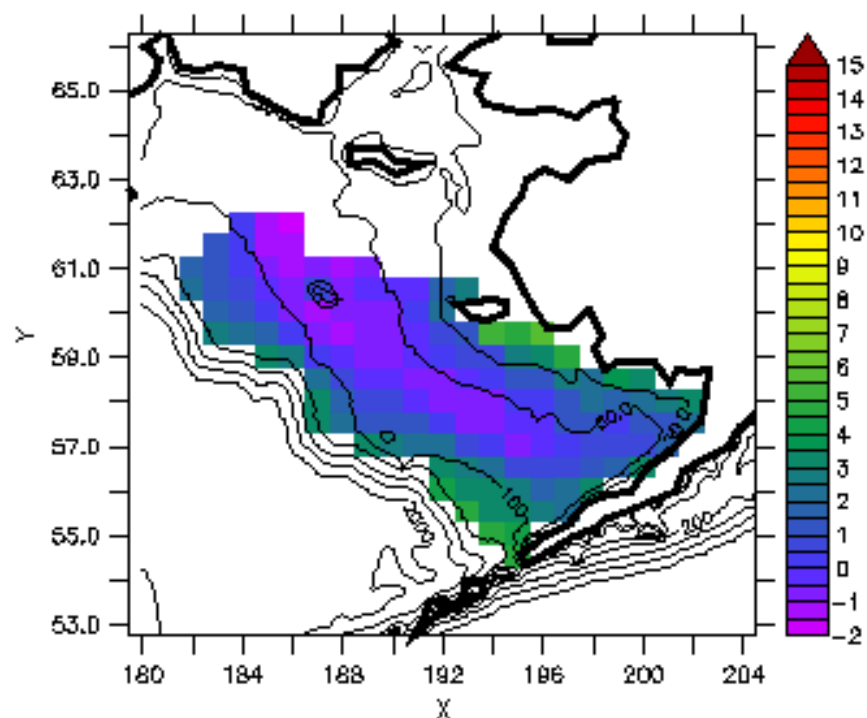
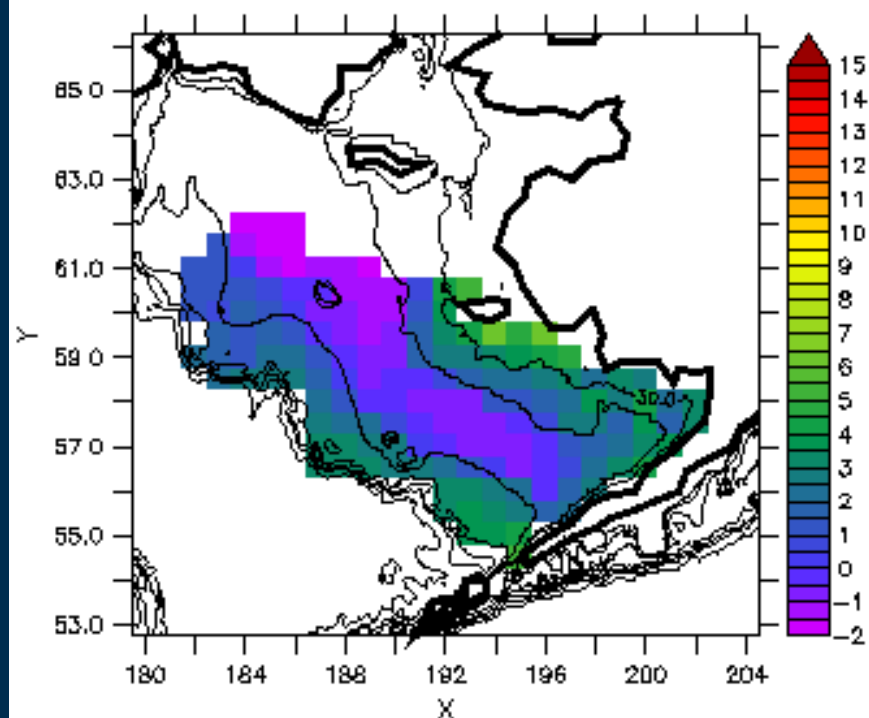
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Bering10K validation: Bottom T. (°C) summer 2009

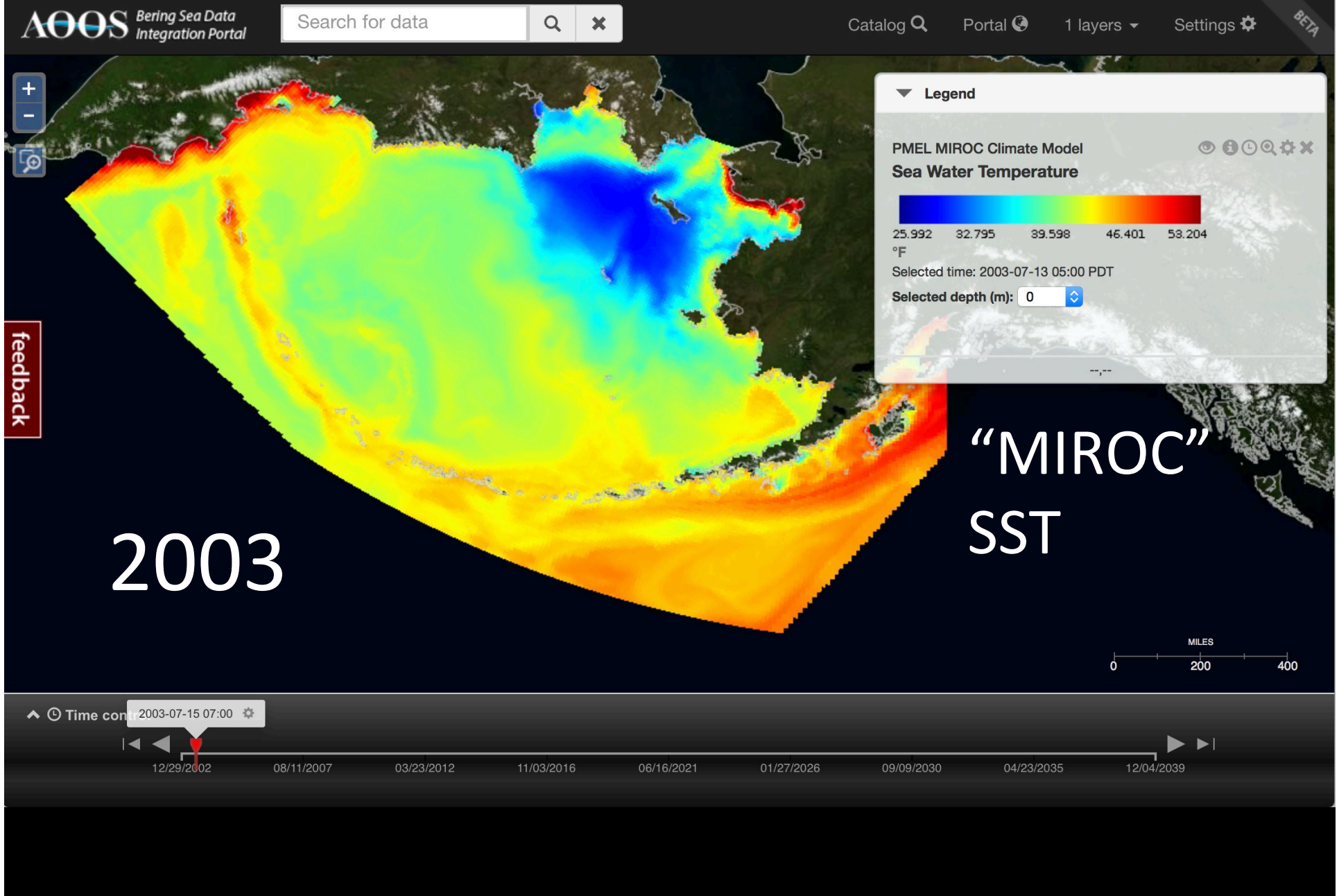
DATA

MODEL

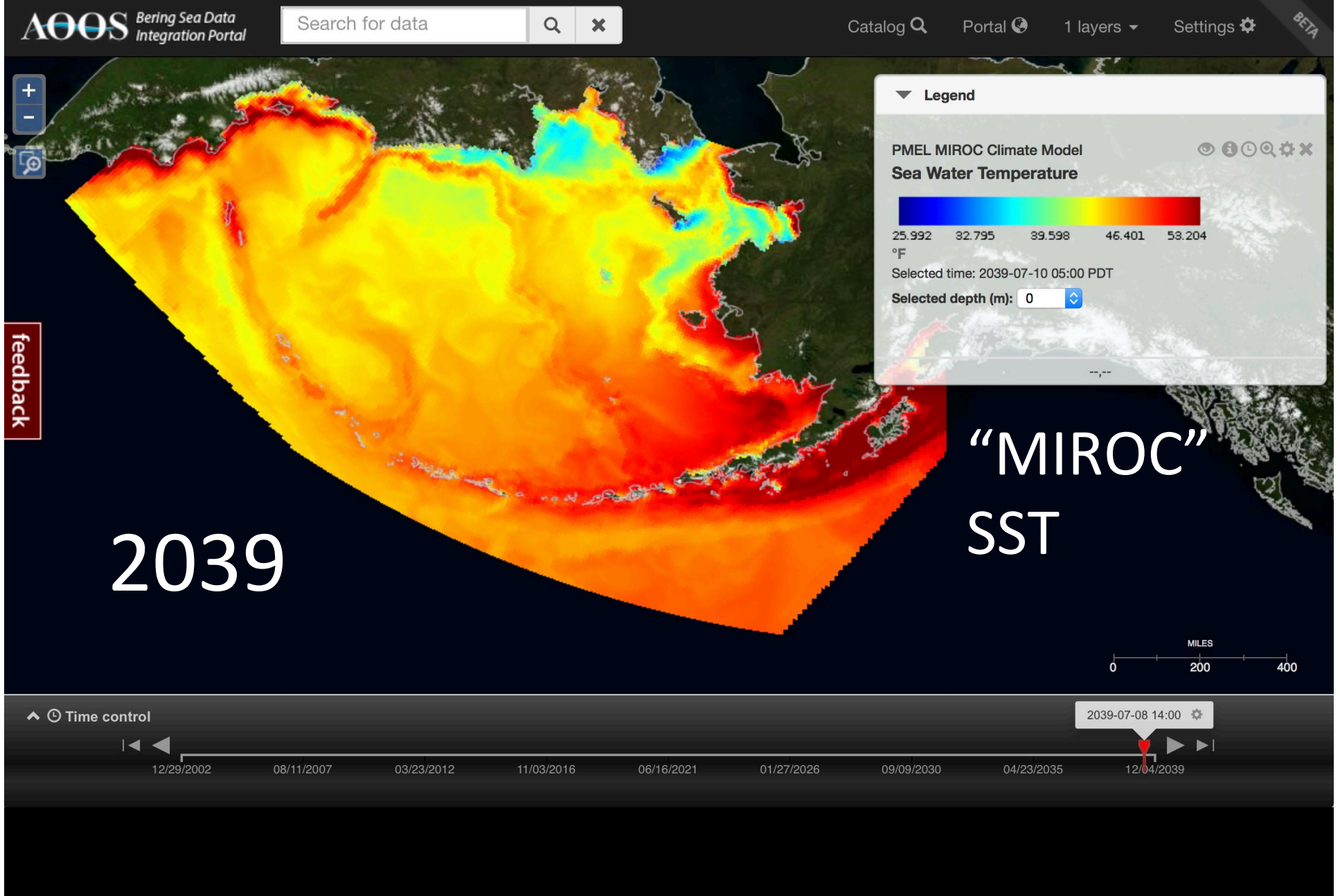


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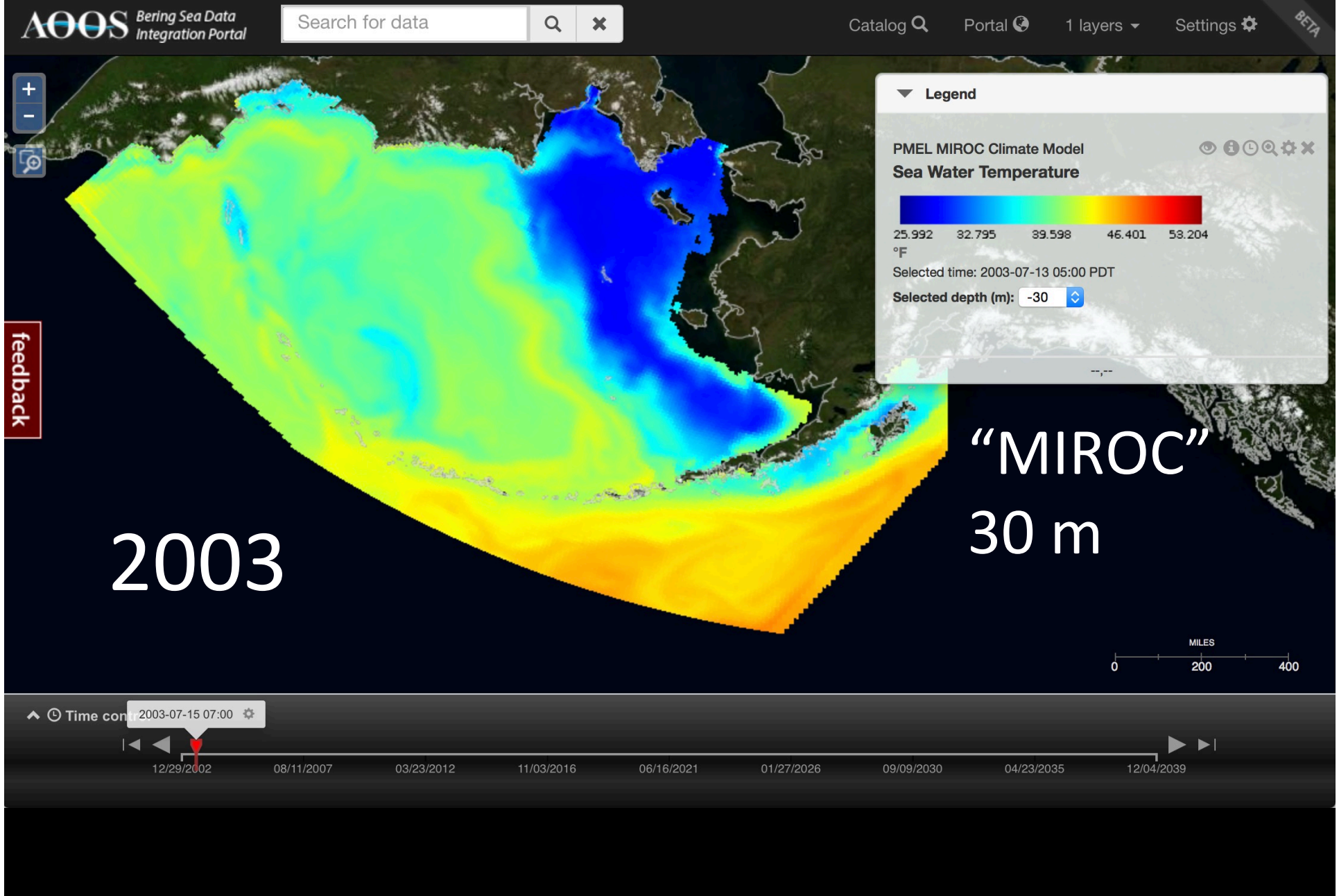
<http://portal.aaos.org/bering-sea.php>



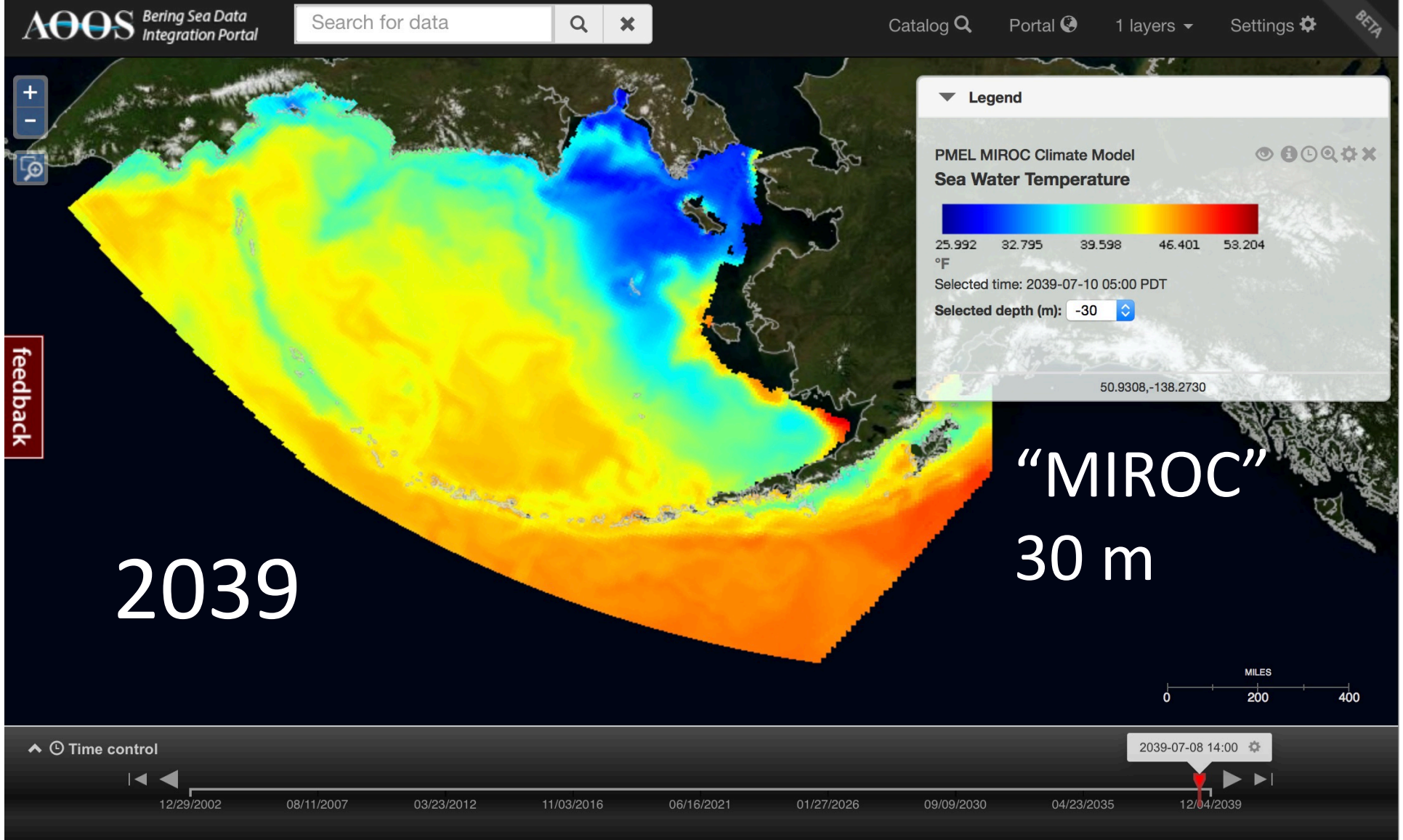
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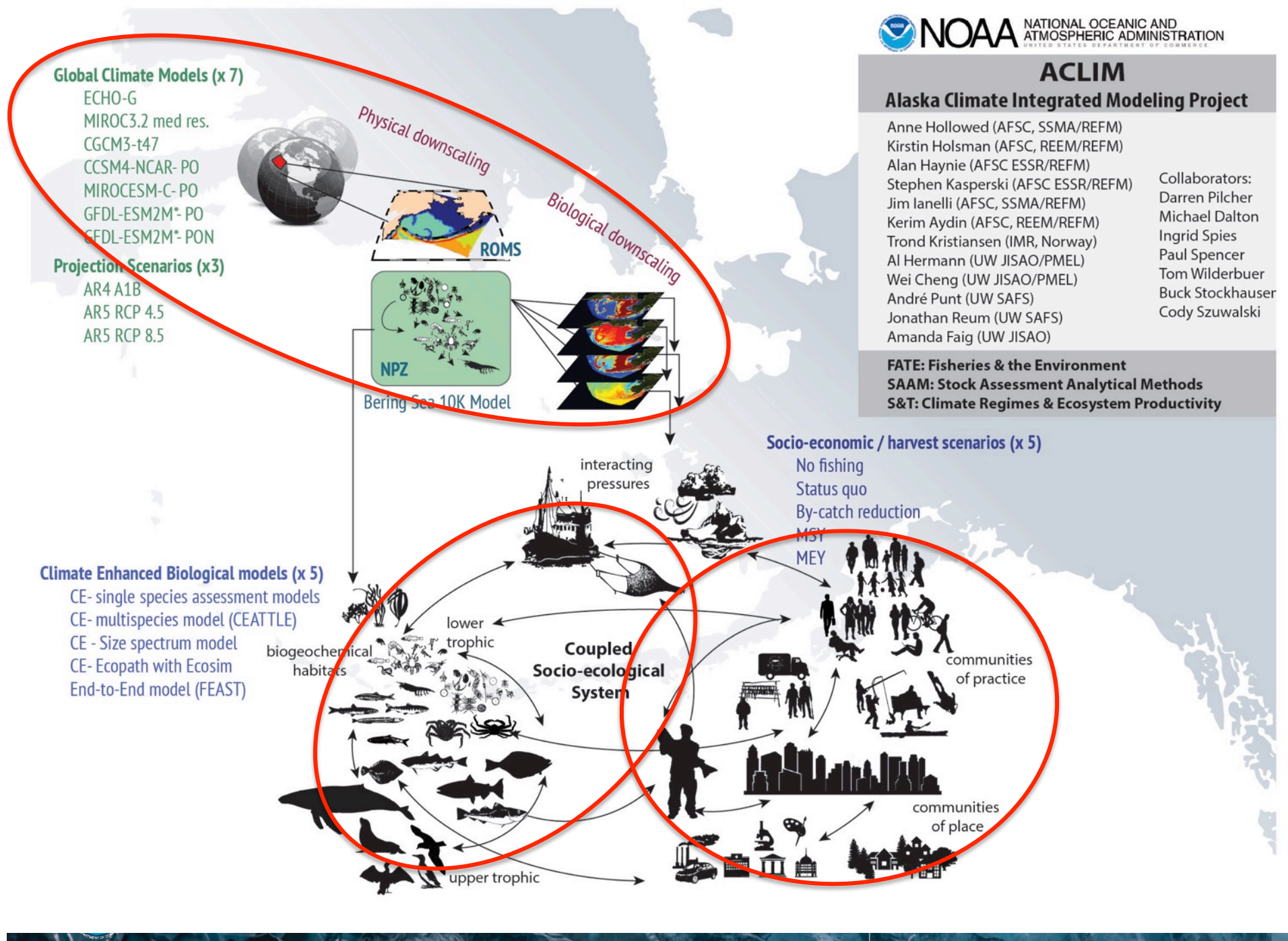
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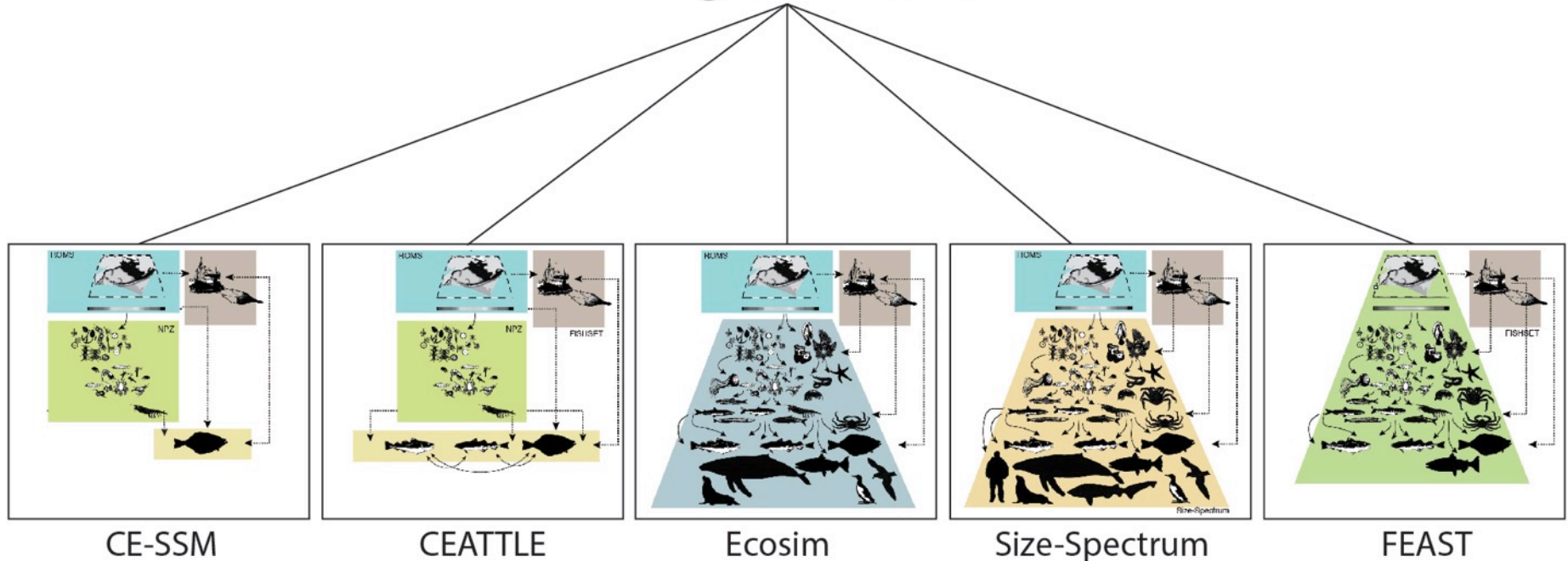
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Bering Sea Models



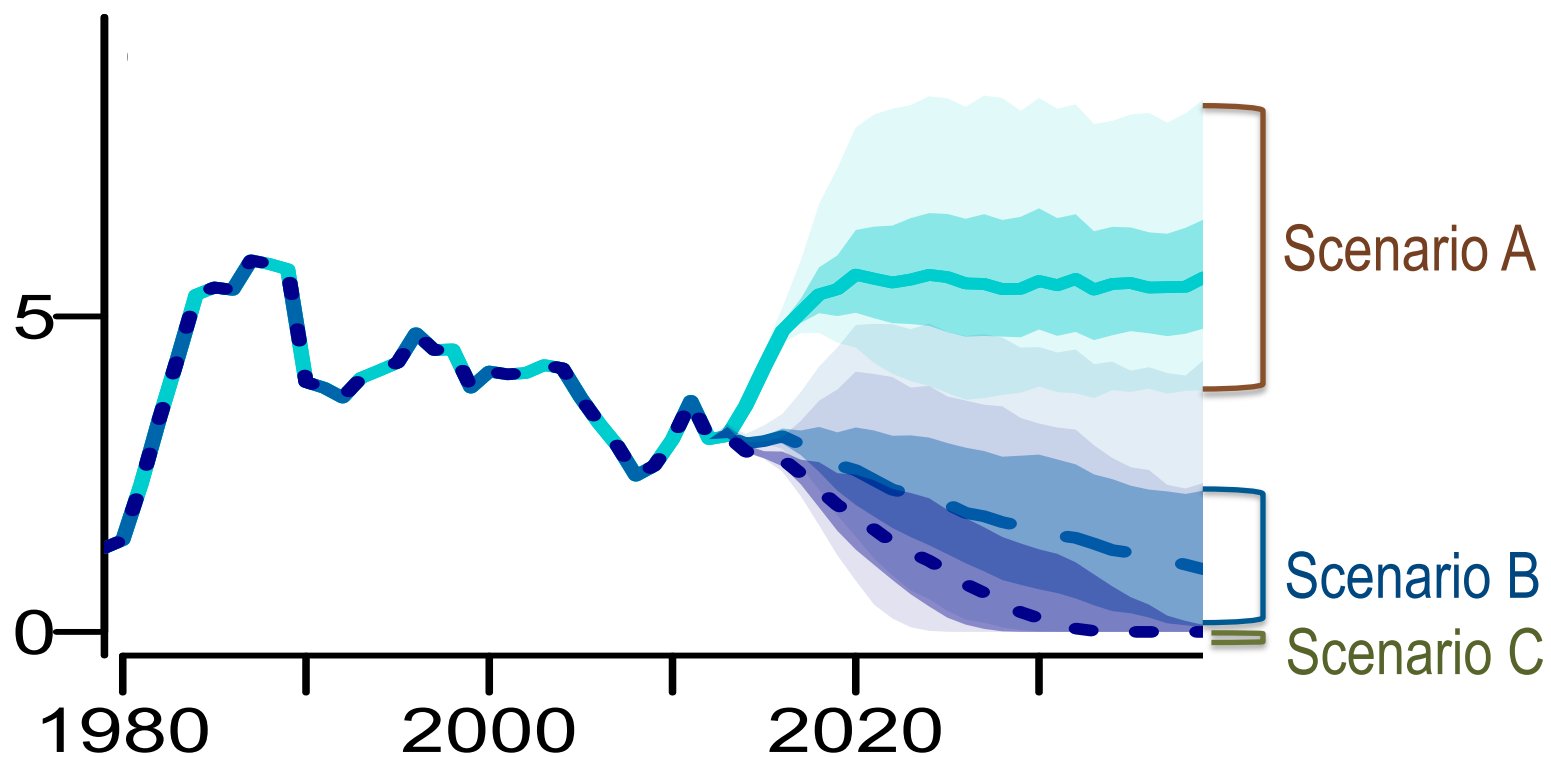
Additive Pressures

Multiple Interacting (non-linear) Pressures

Increasing model complexity

Faster

Hypothetical Biomass



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Thanks!

Mark Holzman

NPRB & BSIERP Team
ACLIM Team
NOAA IEA Program

*“Behind these numbers lies, of course, an infinity
of movements and of destinies.”*

— von Bertalanffy 1938

...and of people!

FATE: Fisheries & the Environment
SAAM: Stock Assessment Analytical Methods
S&T: Climate Regimes & Ecosystem Productivity



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