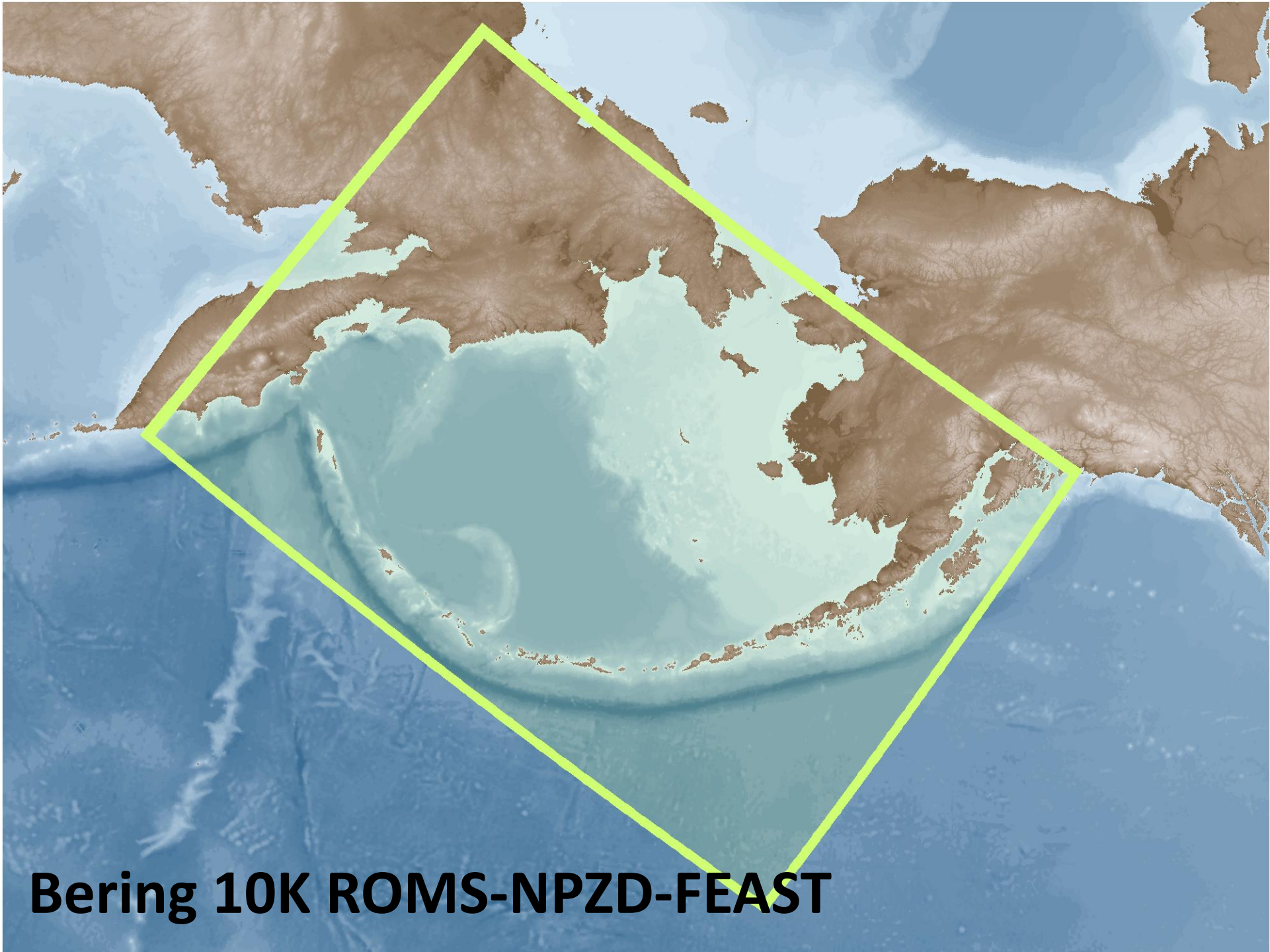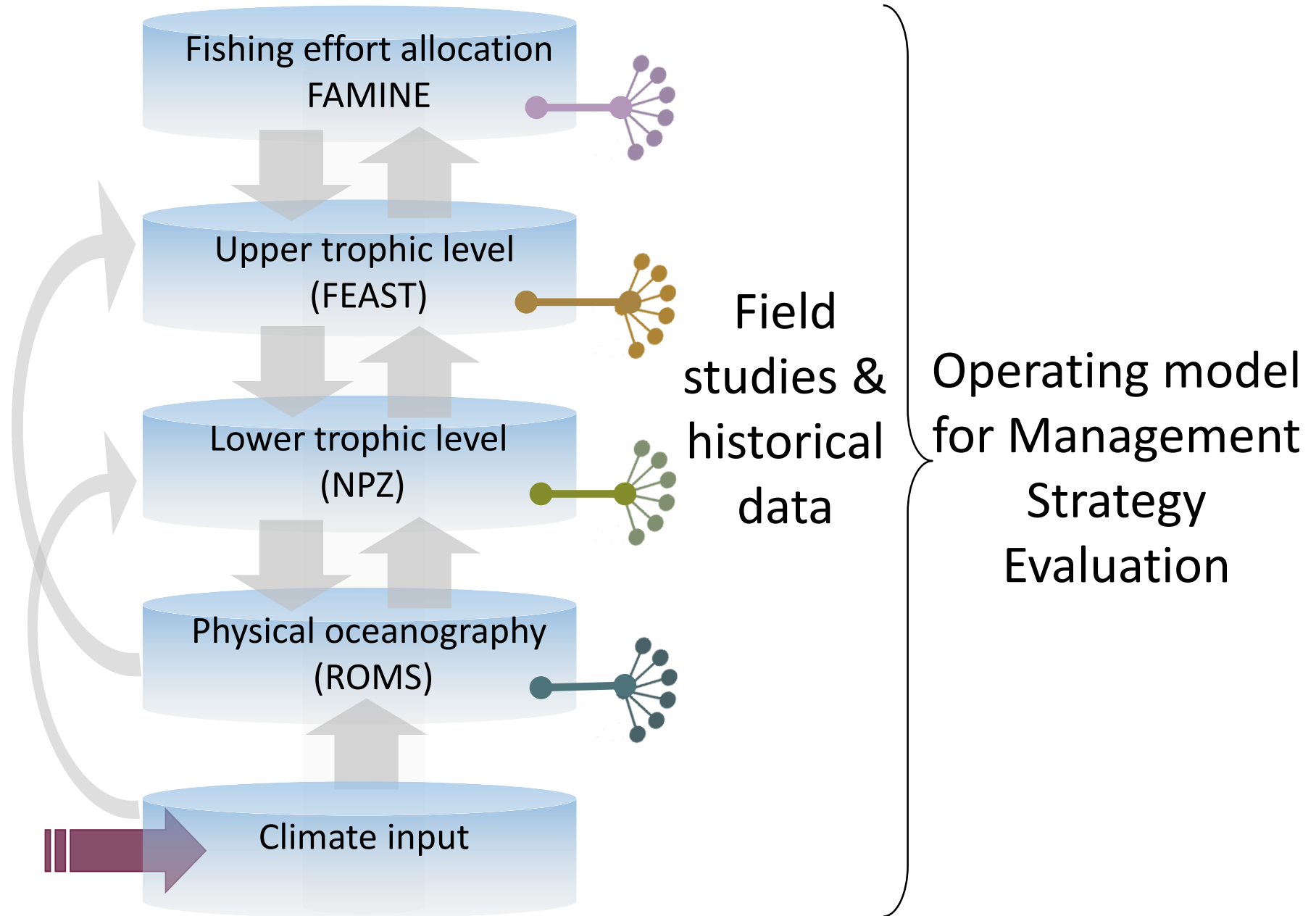# Spatial and Habitat Models:
ROMS-NPZ-FEAST & EFH
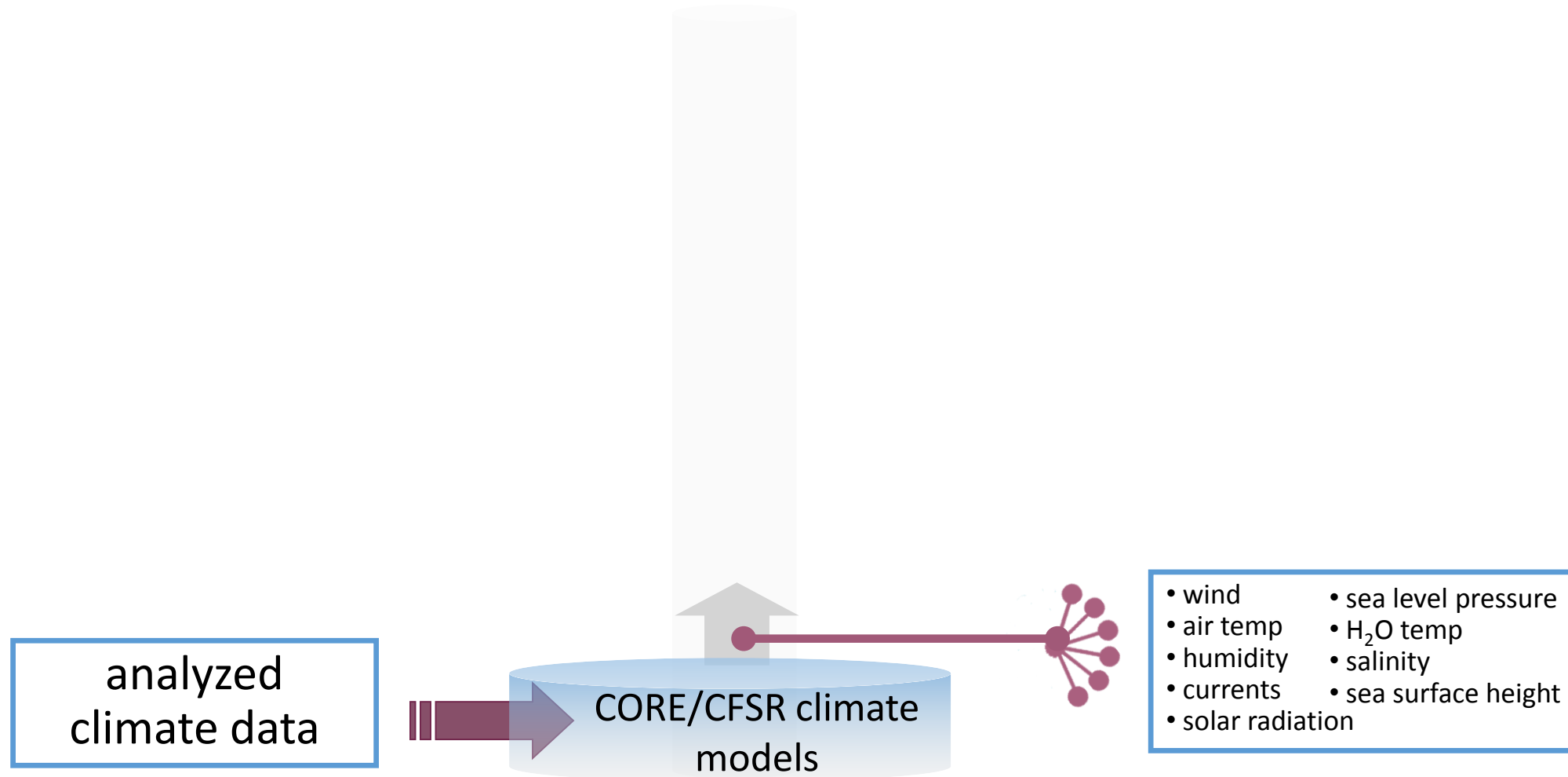
Bering 10K ROMS-NPZD-FEAST
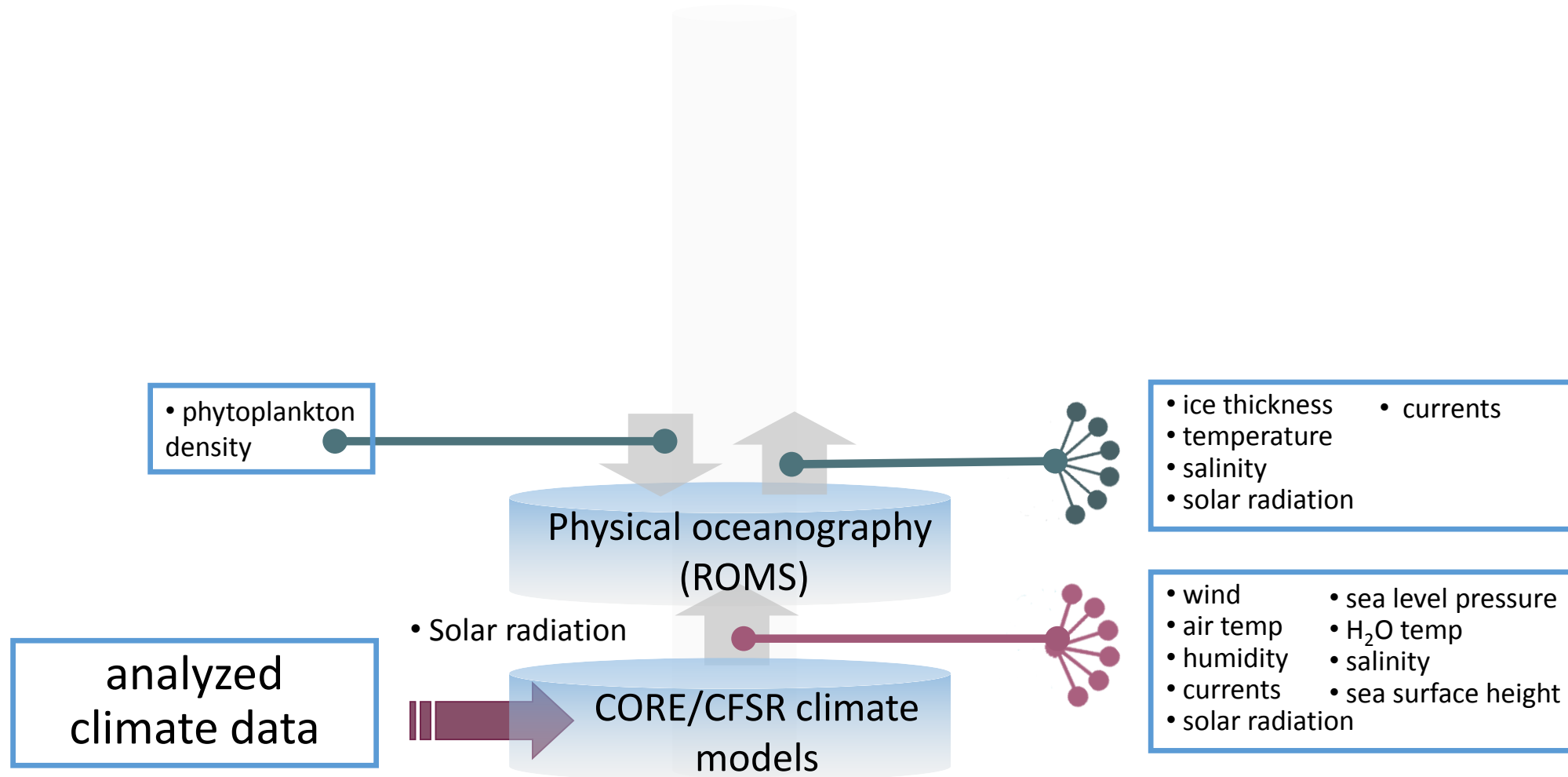
Models: Bering 10K ROMS-NPZD-FEAST

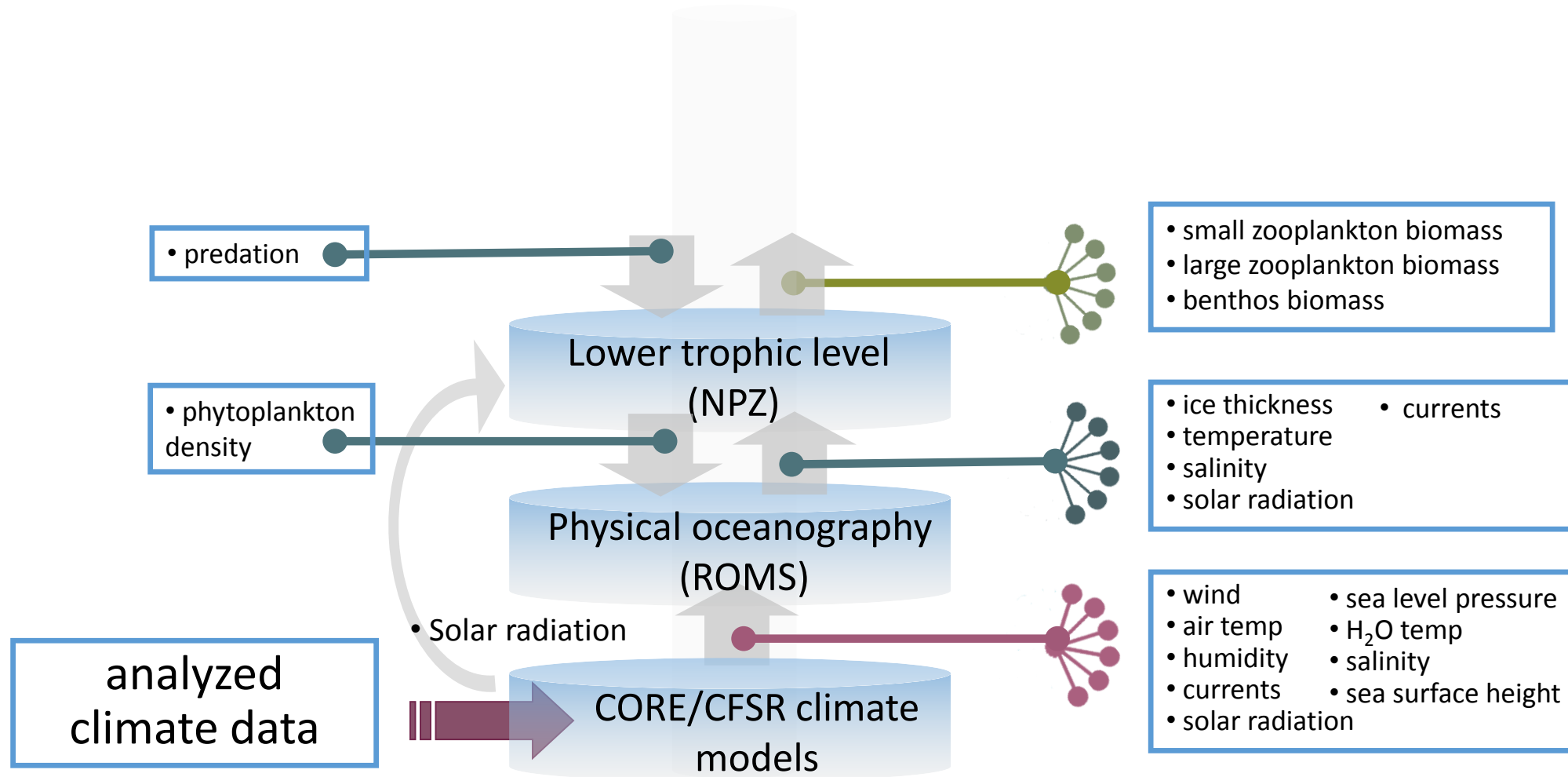# Models: Bering 10K ROMS-NPZD-FEAST Hindcast – *Data links*

analyzed climate data

CORE/CFSR climate models

- wind
- air temp
- humidity
- currents
- solar radiation
- sea level pressure
- H_2O temp
- salinity
- sea surface height

Models: Bering 10K ROMS-NPZD-FEAST Hindcast – *Data links*

- phytoplankton density

Physical oceanography (ROMS)

- ice thickness
- temperature
- salinity
- solar radiation
- currents

- Solar radiation

analyzed climate data

CORE/CFSR climate models

- wind
- air temp
- humidity
- currents
- solar radiation
- sea level pressure
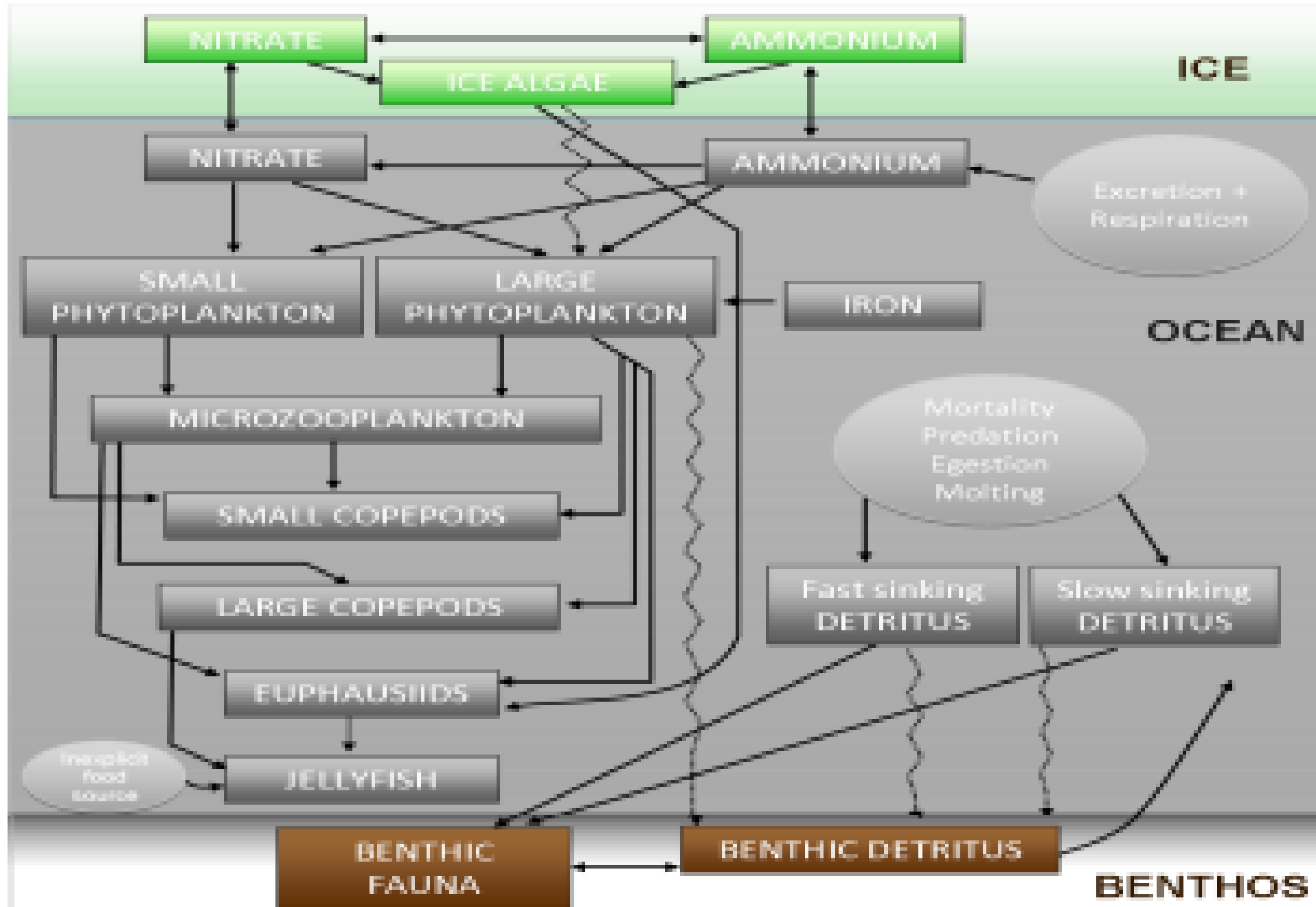- H_2O temp
- salinity
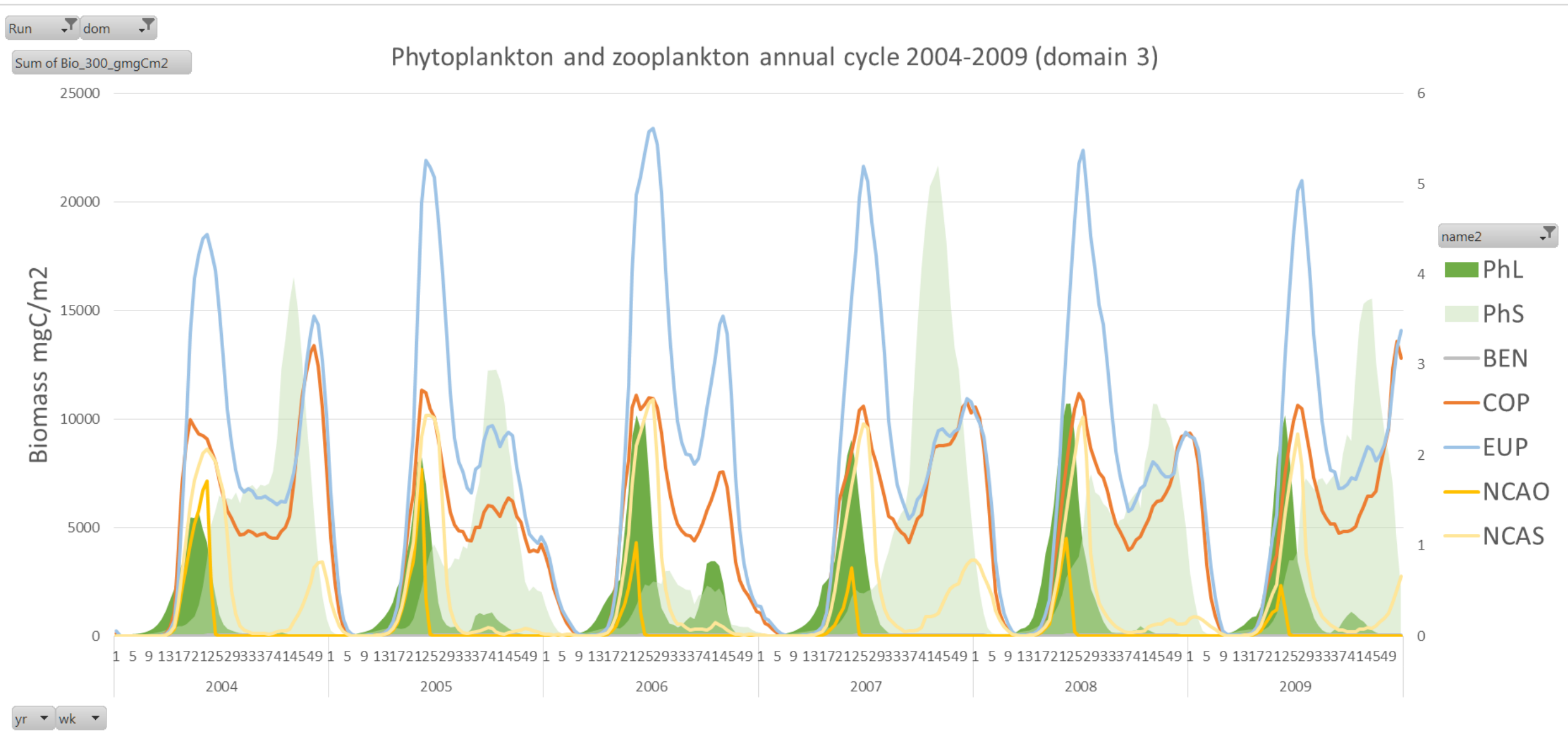- sea surface height

ROMS-NPZD

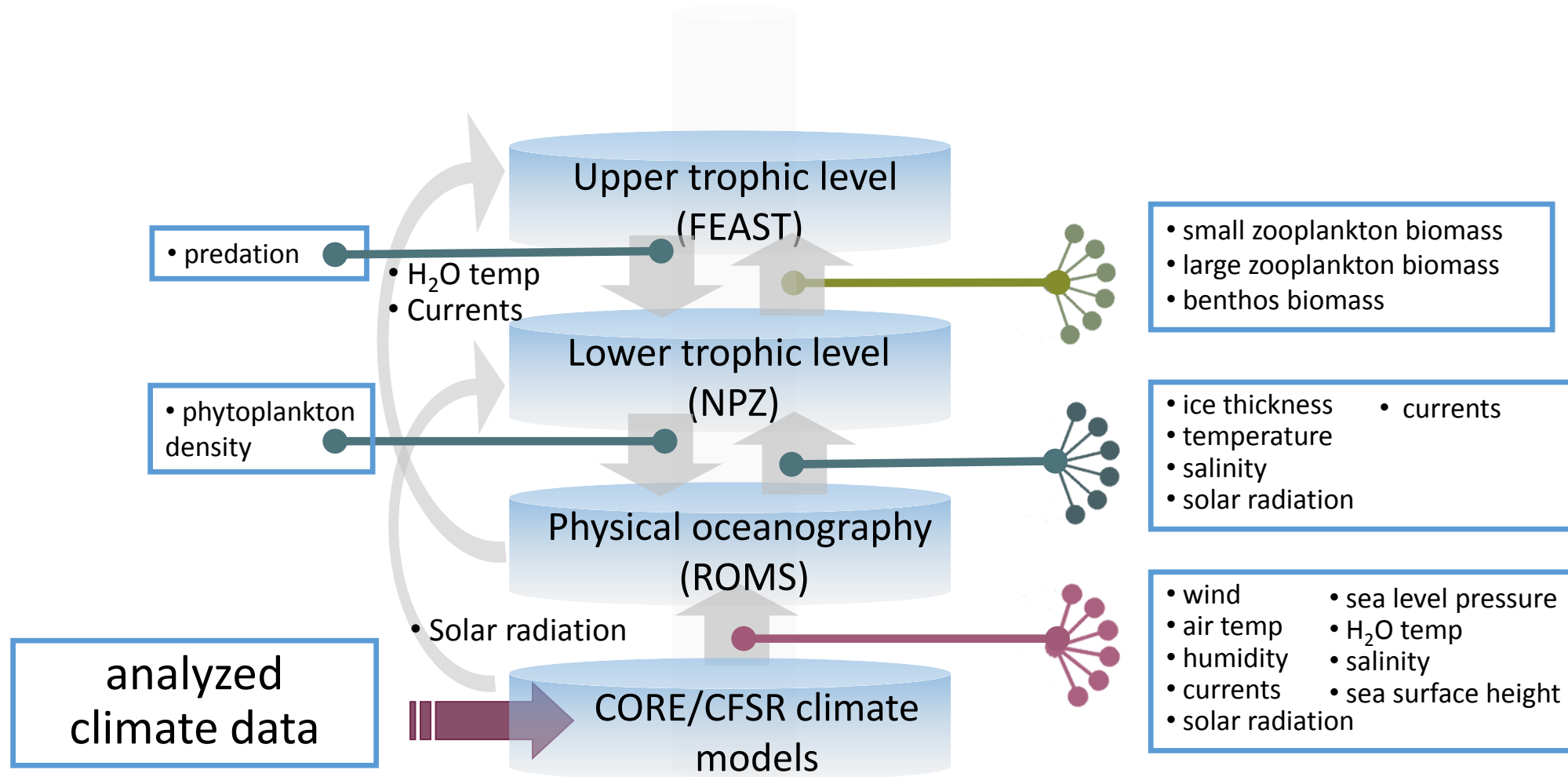# Models: Bering 10K ROMS-NPZD-FEAST Hindcast – *Data links*

NPZD: Nutrients Phytoplankton Zooplankton Detritus model

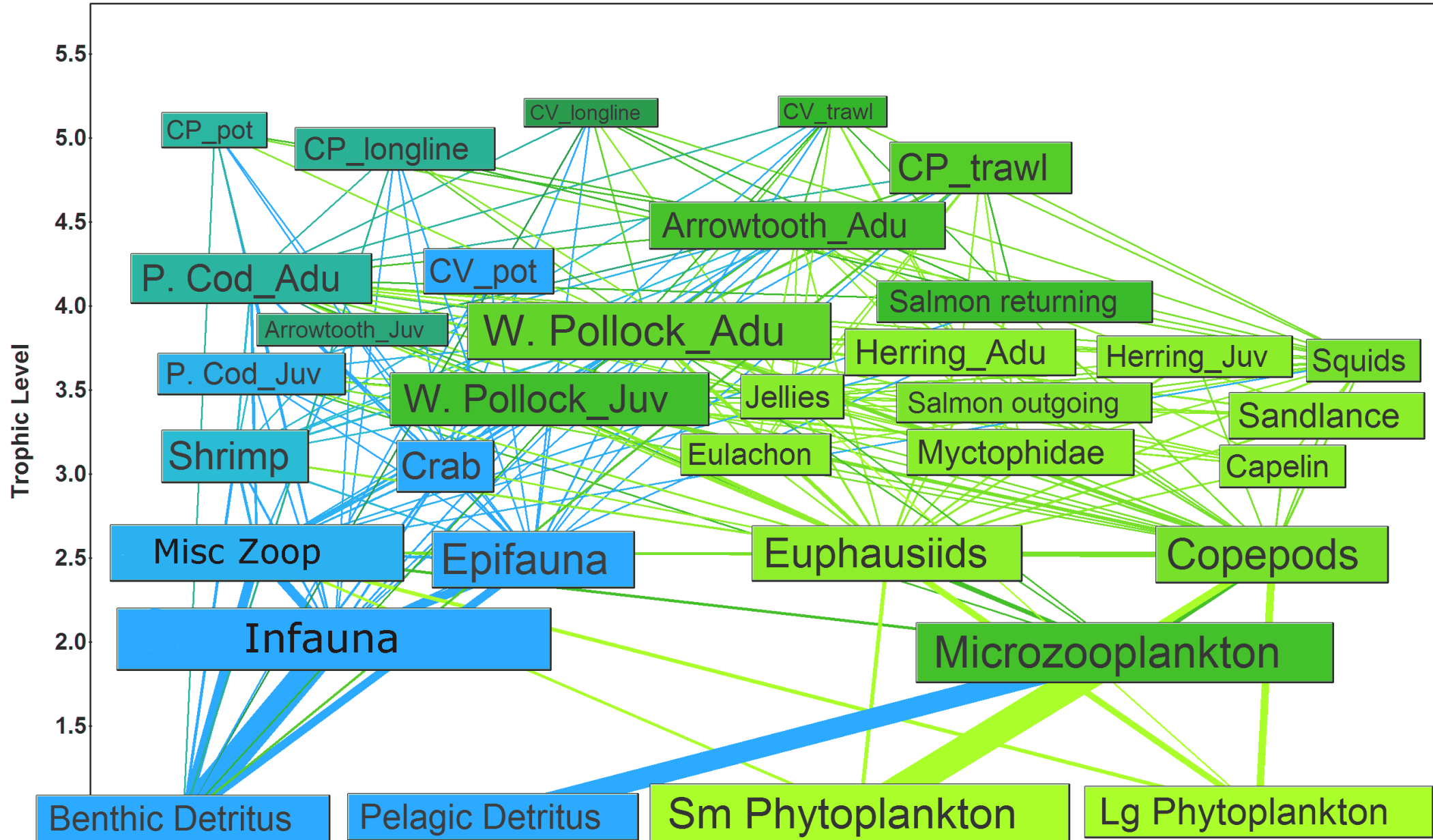# NPZ: Lower trophic levels dynamics, zooplankton as prey and indices of secondary productivity
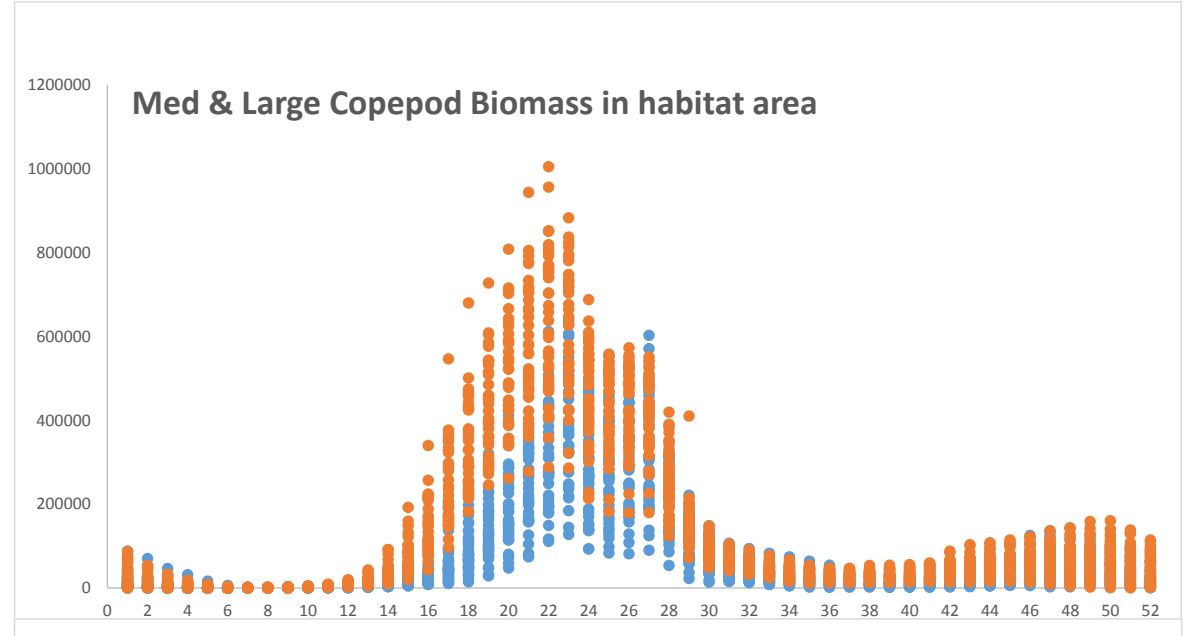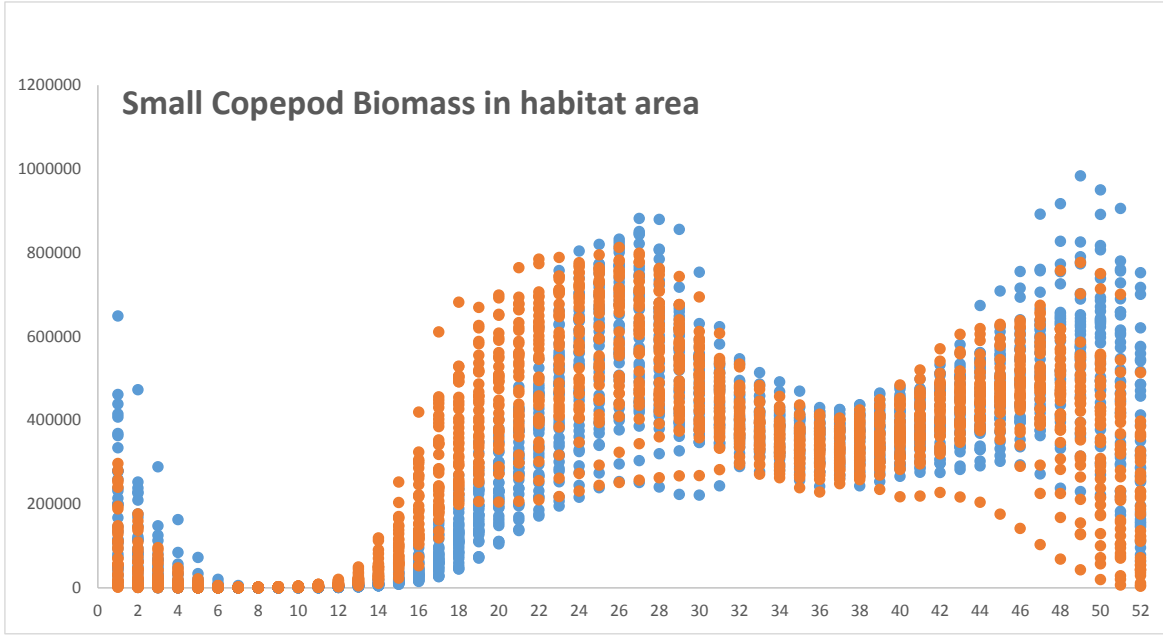

Phytoplankton and zooplankton annual cycle 2004-2009 (domain 3)

Models: Bering 10K ROMS-NPZD-FEAST Hindcast – *Data links*

NPZD-FEAST Food web

Does adding fish make any difference on zooplankton?

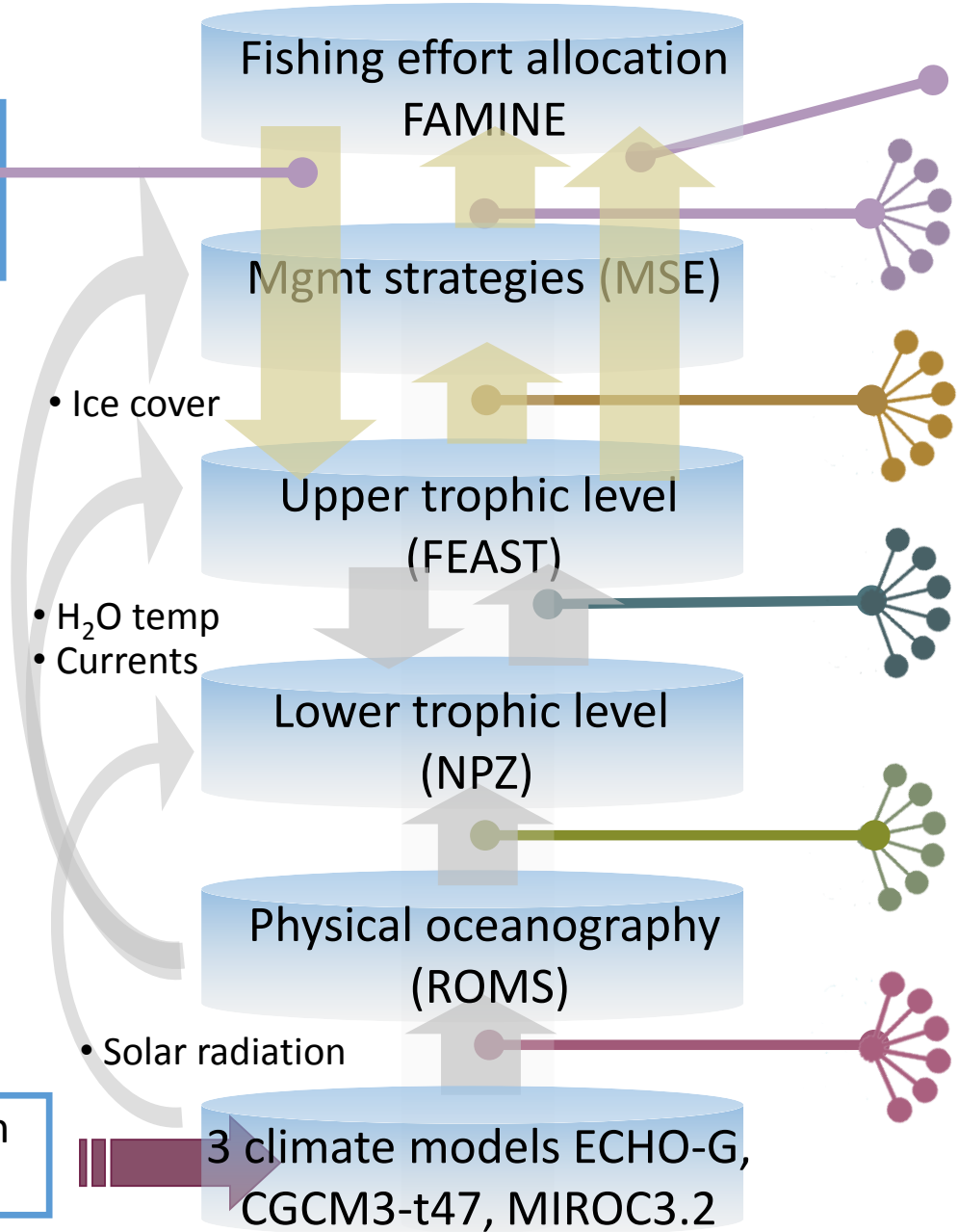Small Copepod Biomass in habitat area

Med & Large Copepod Biomass in habitat area

Euphausiid Biomass in habitat area

NPZ ——> Fish

NPZ <——> Fish
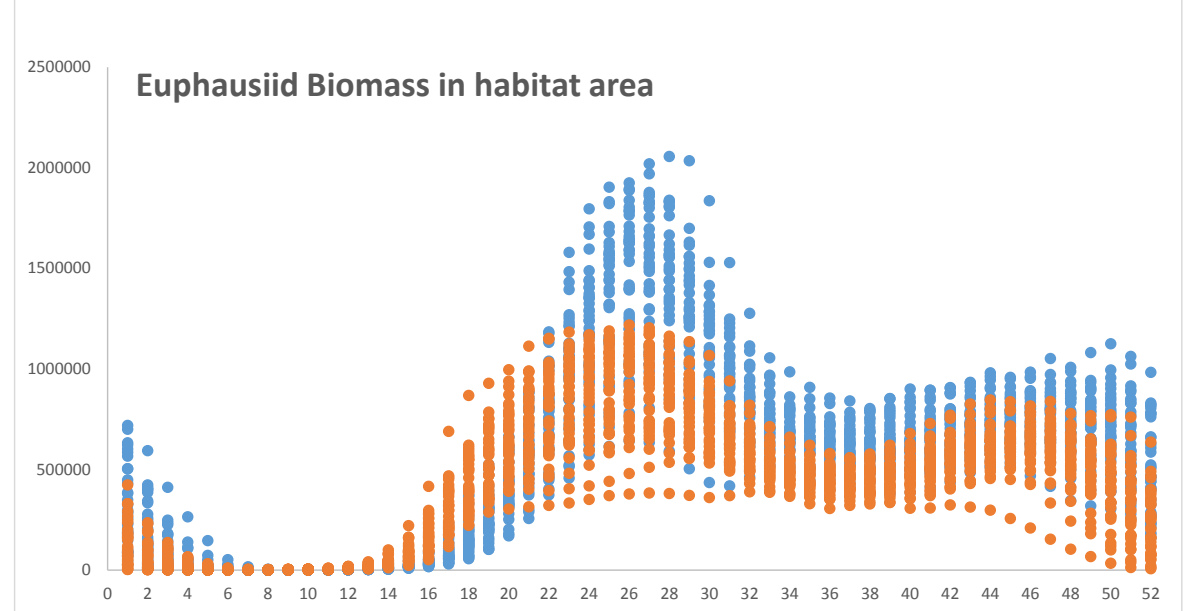
Models: Bering 10K ROMS-NPZD-FEAST Forecast
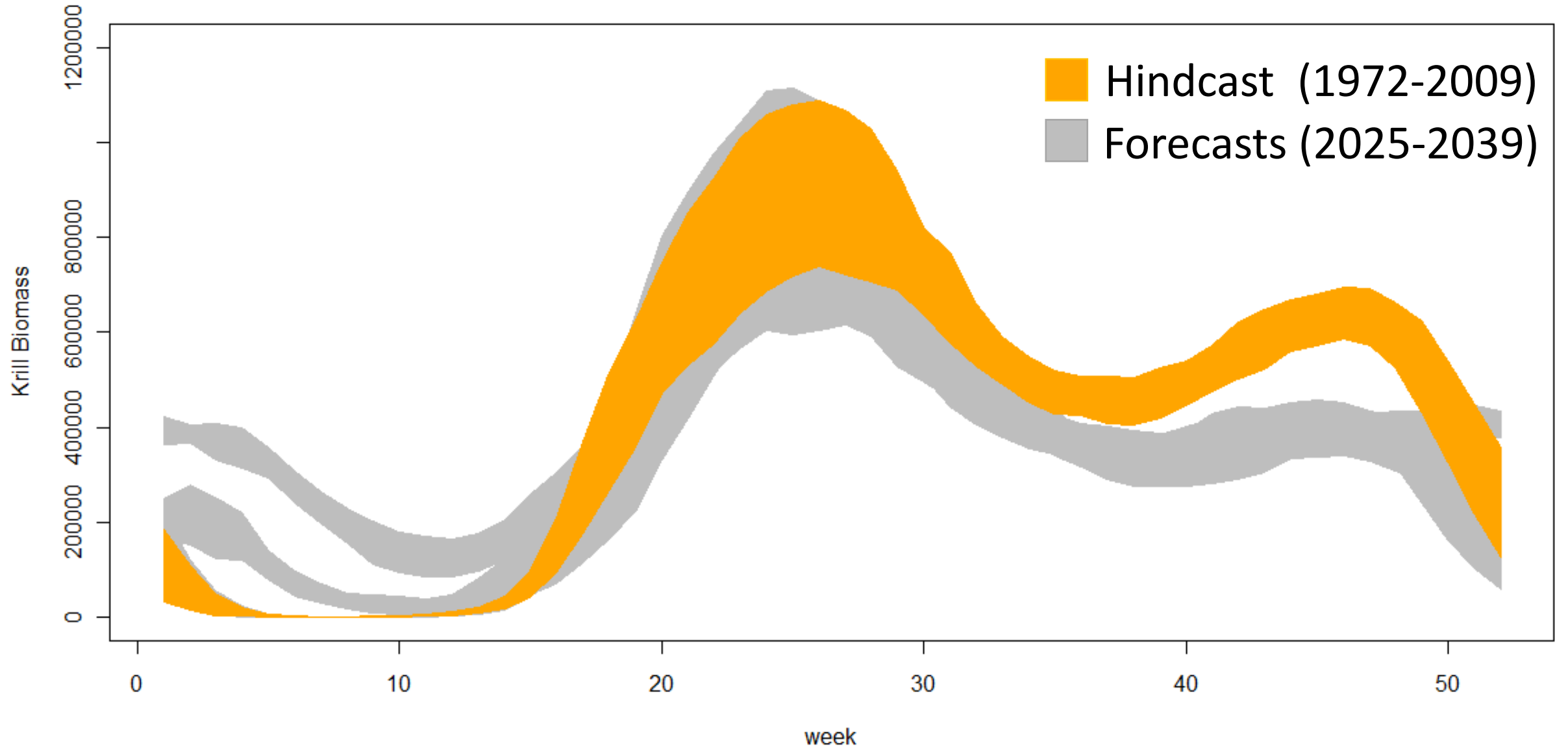
"Competing" methods for forecasting future conditions
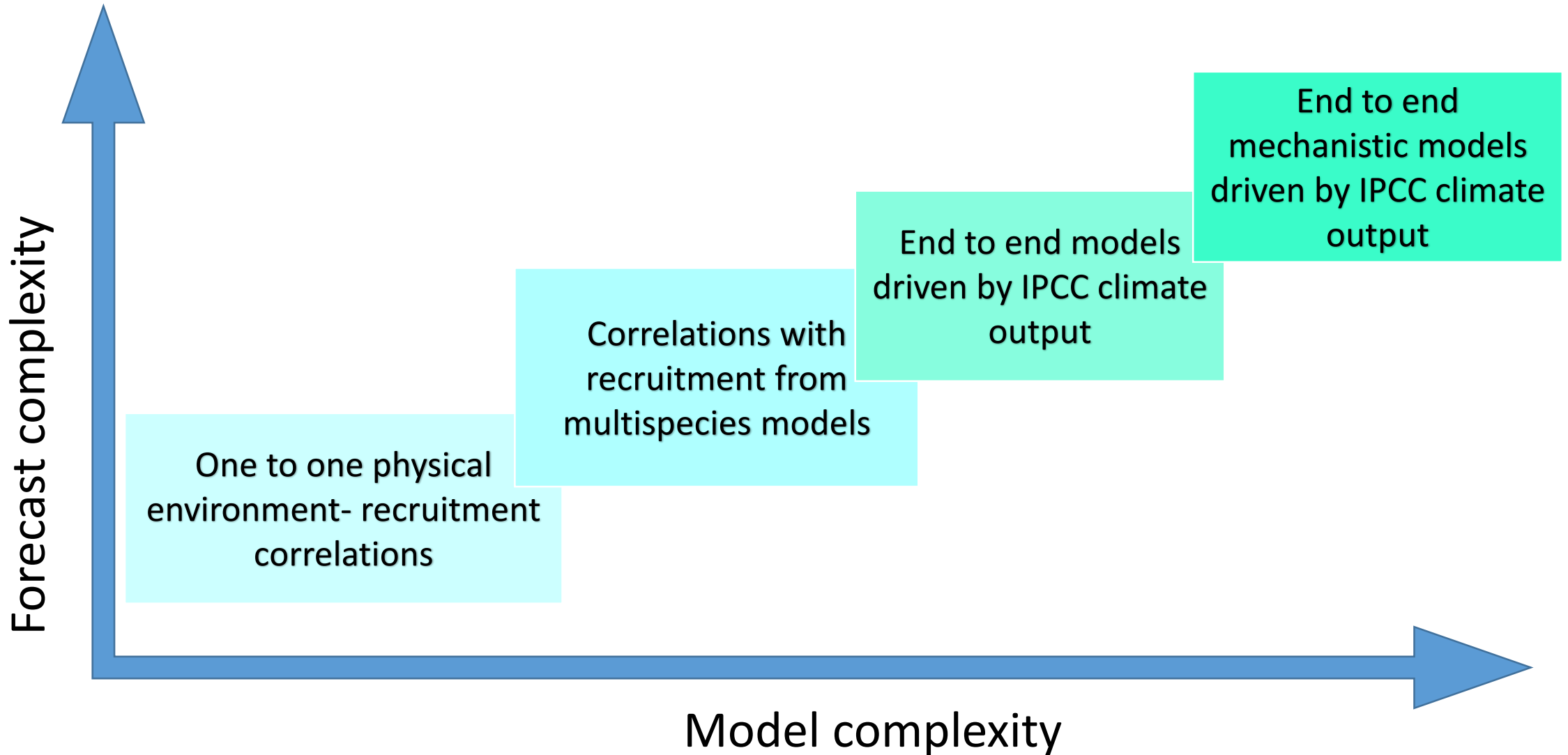
Long term Forecasts: Temperature at Mooring 2 in the Bering Sea

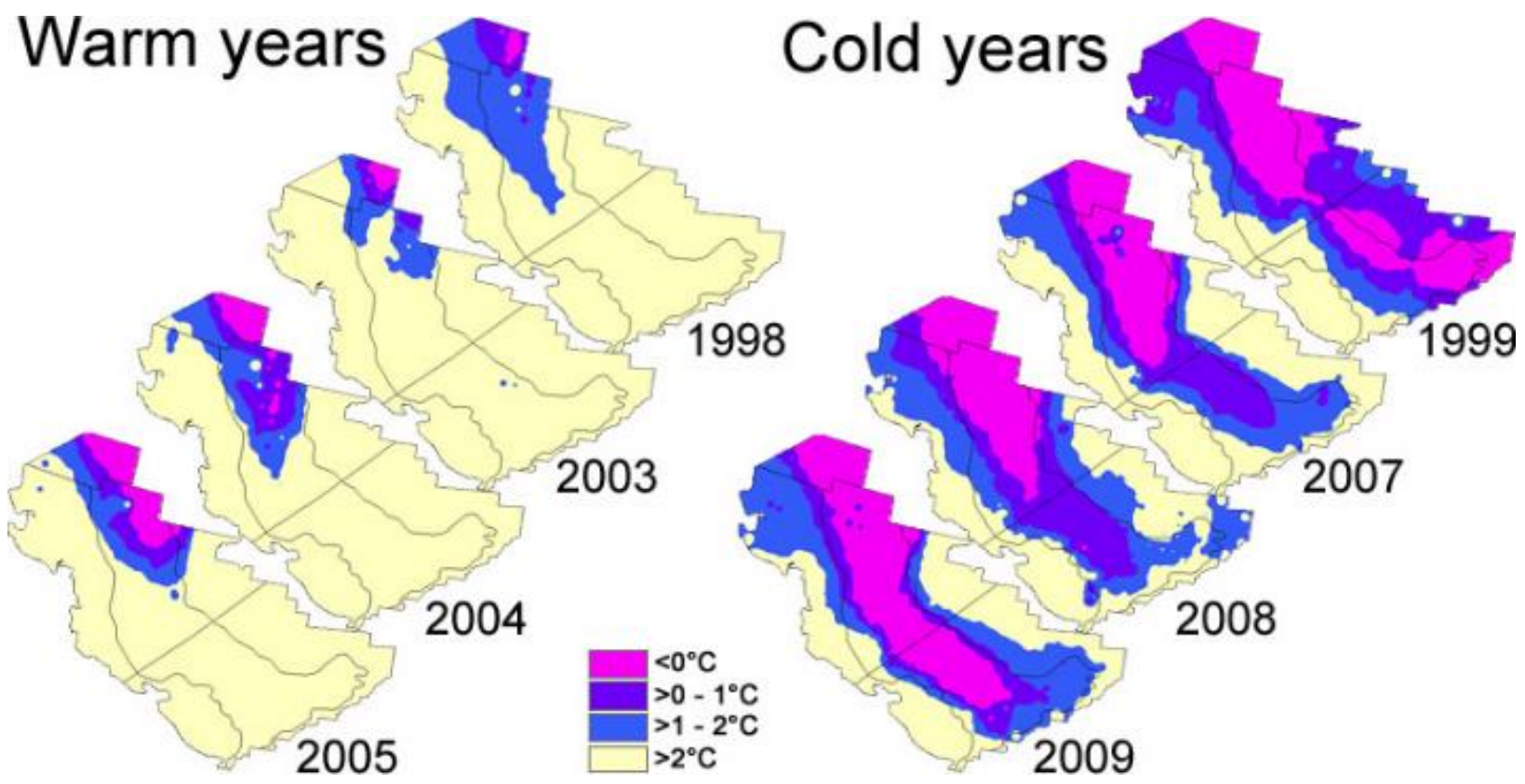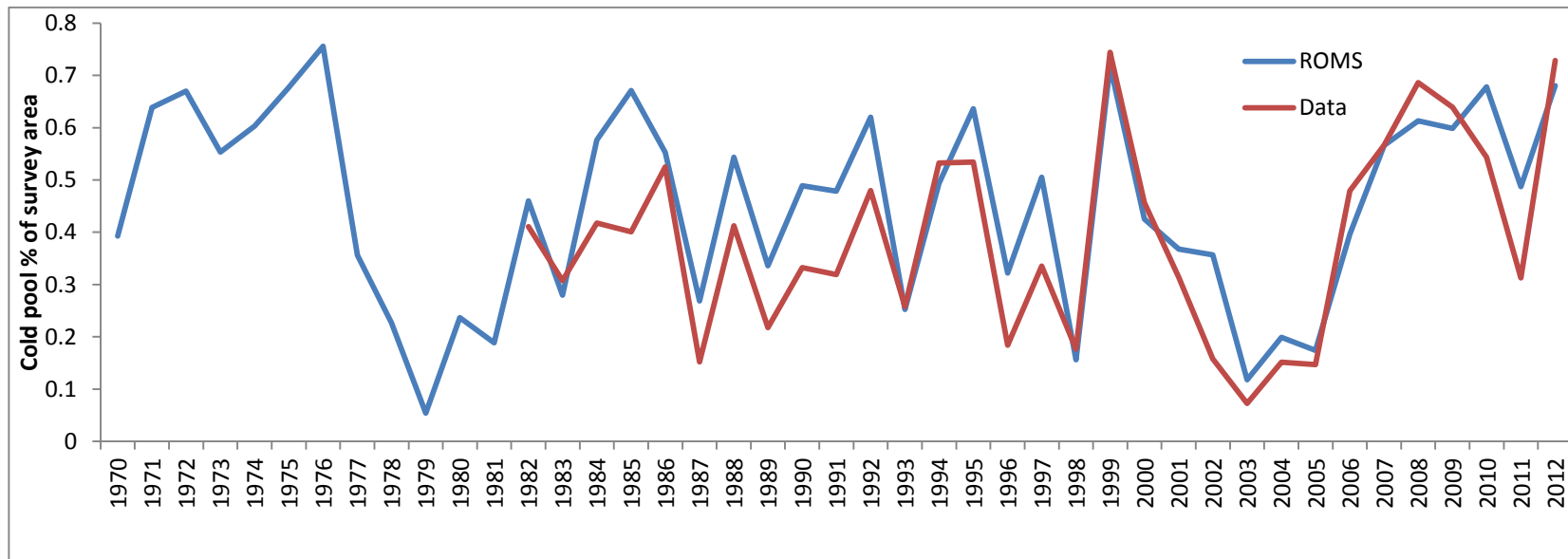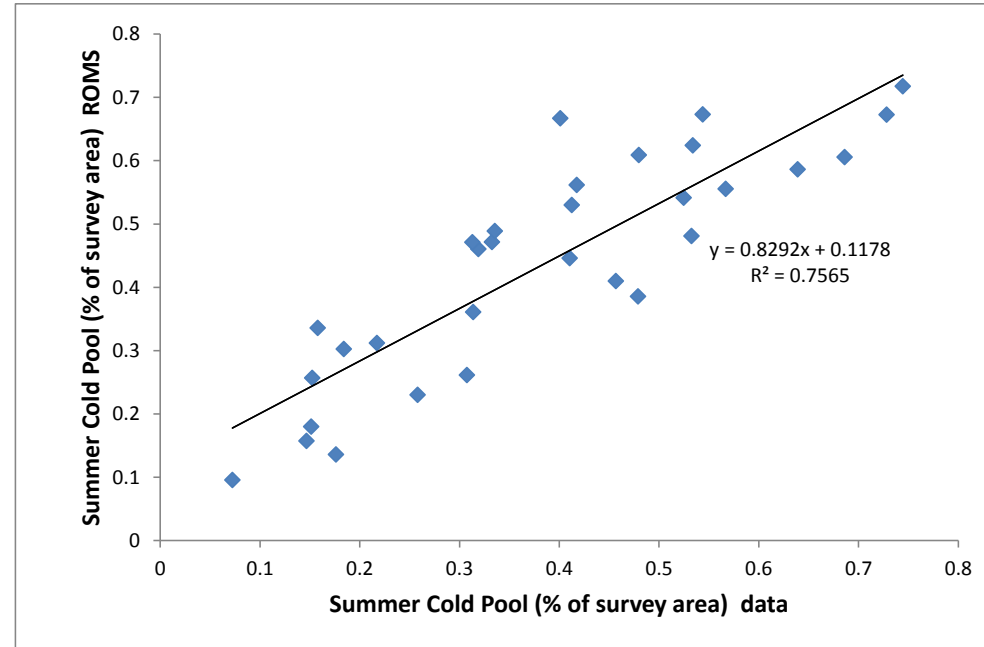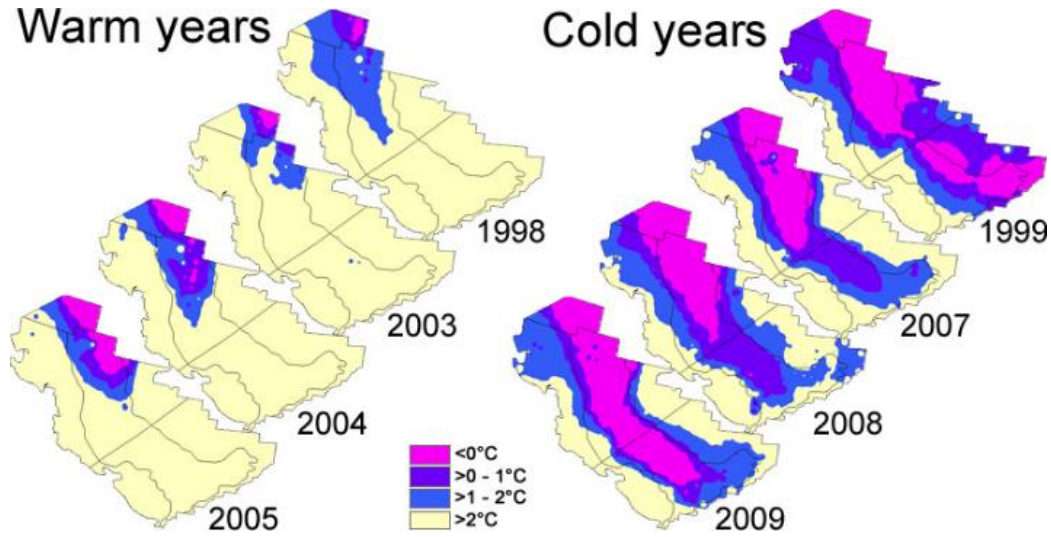**Forecasts: Temperature at Mooring 2 in the Bering Sea**

Warm years

1998

2003

2004

2005

Cold years

1999

2007

2008

2009

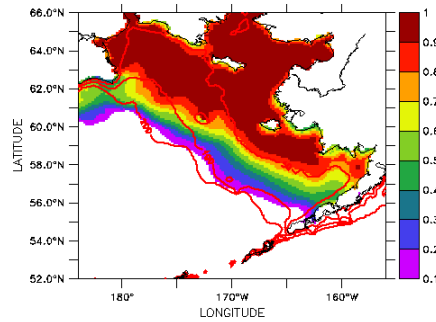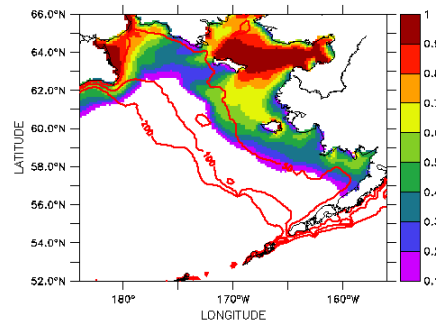|	
![pink]	<0°C
![purple]	>0 - 1°C
![blue]	>1 - 2°C
![yellow]	>2°C
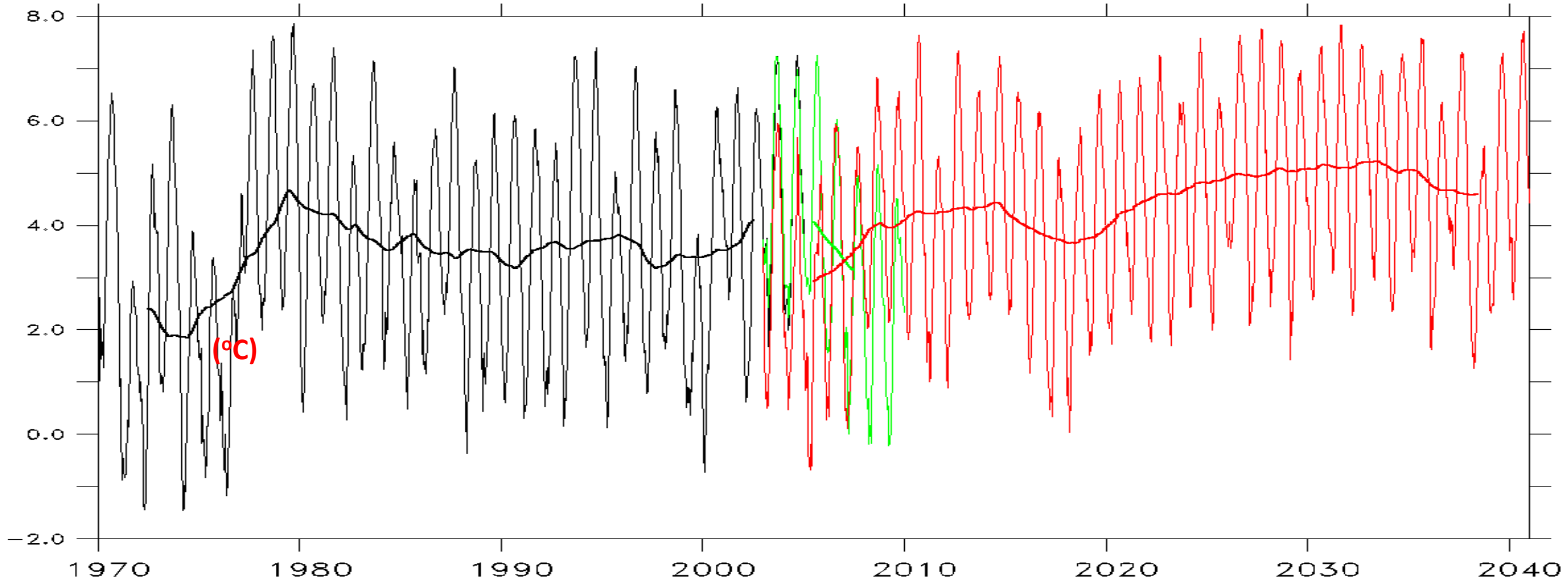
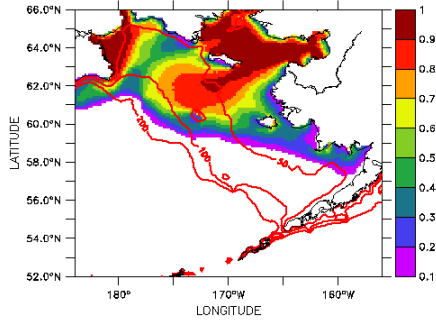# Modeling of cold pool – hindcast versus data

Nine-month forecast of Bering Ocean conditions – ROMS FEAST
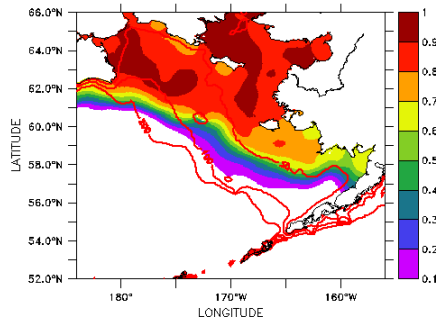

modeled Jan 2012

predicted Jan 2014
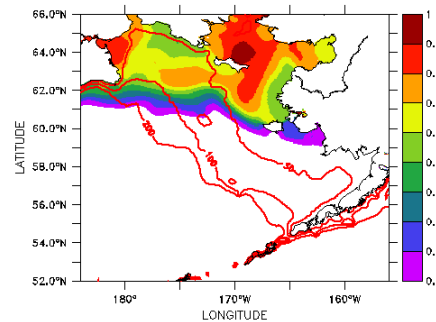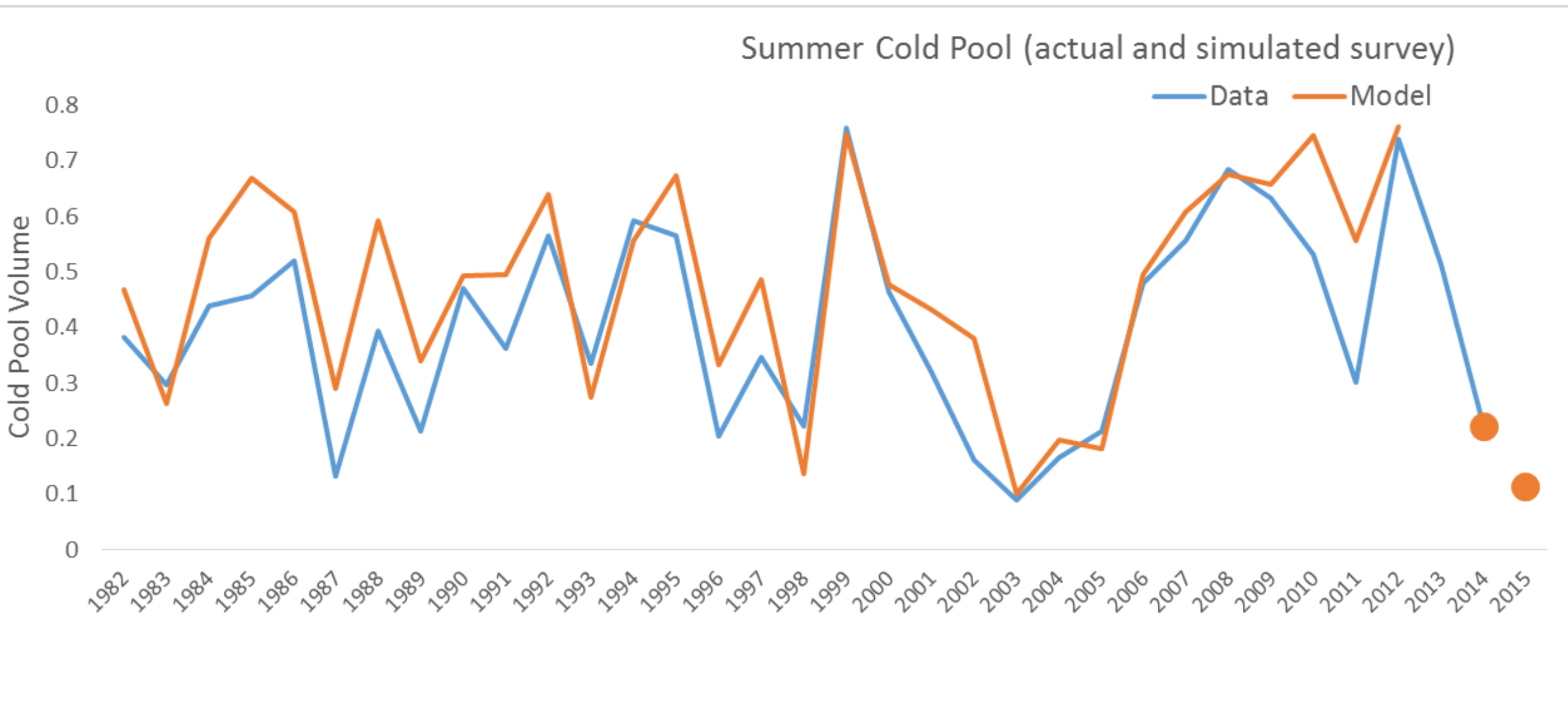
predicted Jan 2015

observed Jan 2012

observed Jan 2014

Summer 2015 prediction (single realization)

Summer Cold Pool (actual and simulated survey)

EFH + ROMS

EFH based on location, temperature, slope, tide, current

Use forecasted temperatures to get new distributions

Sponges

Probability of occurrence
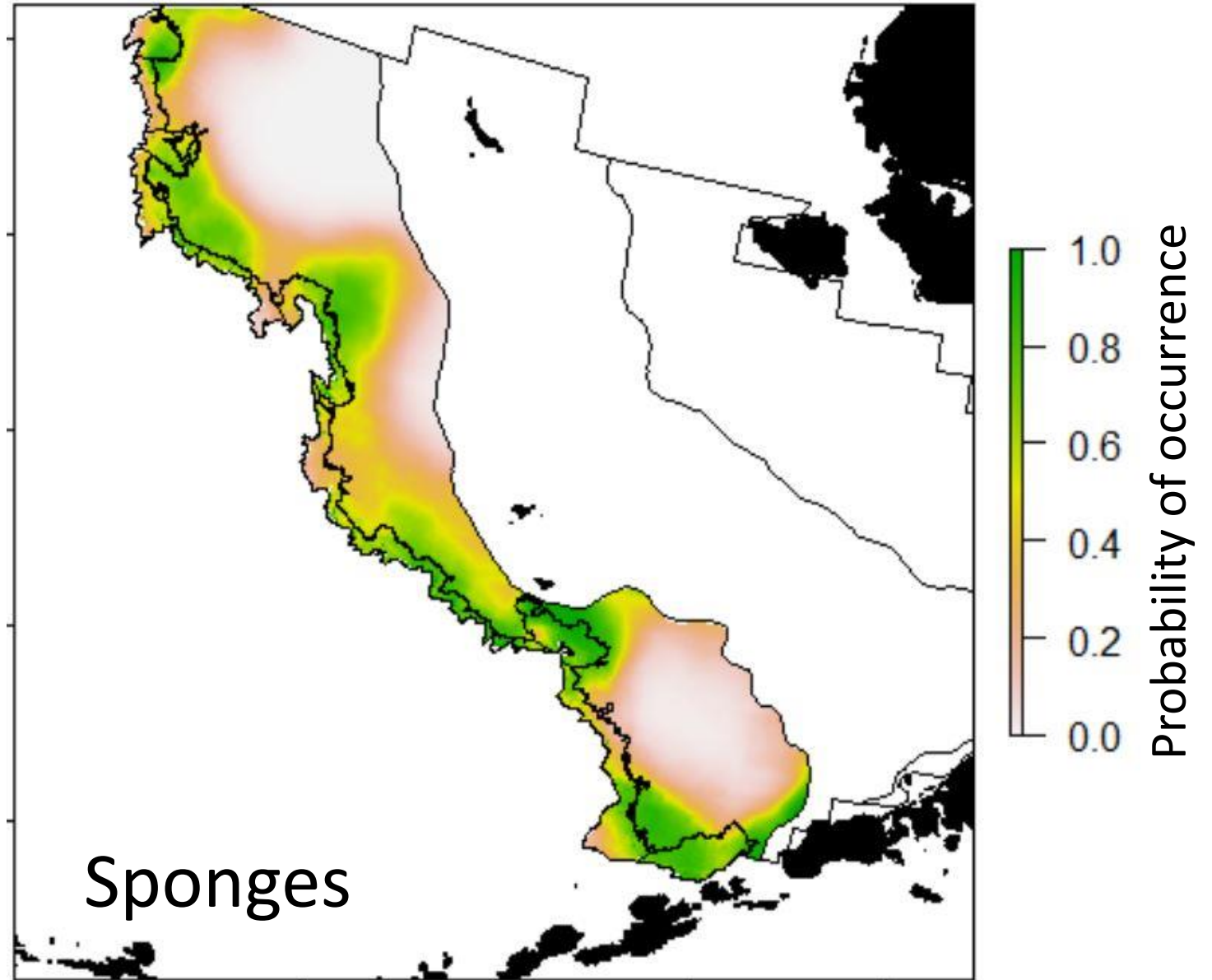
EFH + ROMS

EFH living substrates +ROMS

EFH groundfish +ROMS
32 FMP species:
pollock & Pacific cod, flatfish, crab, rockfish, skates

Sablefish