

The Sea Ice Prediction Network

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What is the **Sea Ice Prediction Network (SIPN)**

<http://www.arcus.org/SIPN>

Network of scientists & stakeholders with the goal of advancing research on sea ice prediction and communicate and engage with key stakeholders. 13 lead scientists (both observationalists & modelers), plus 'friends of SIPN'.

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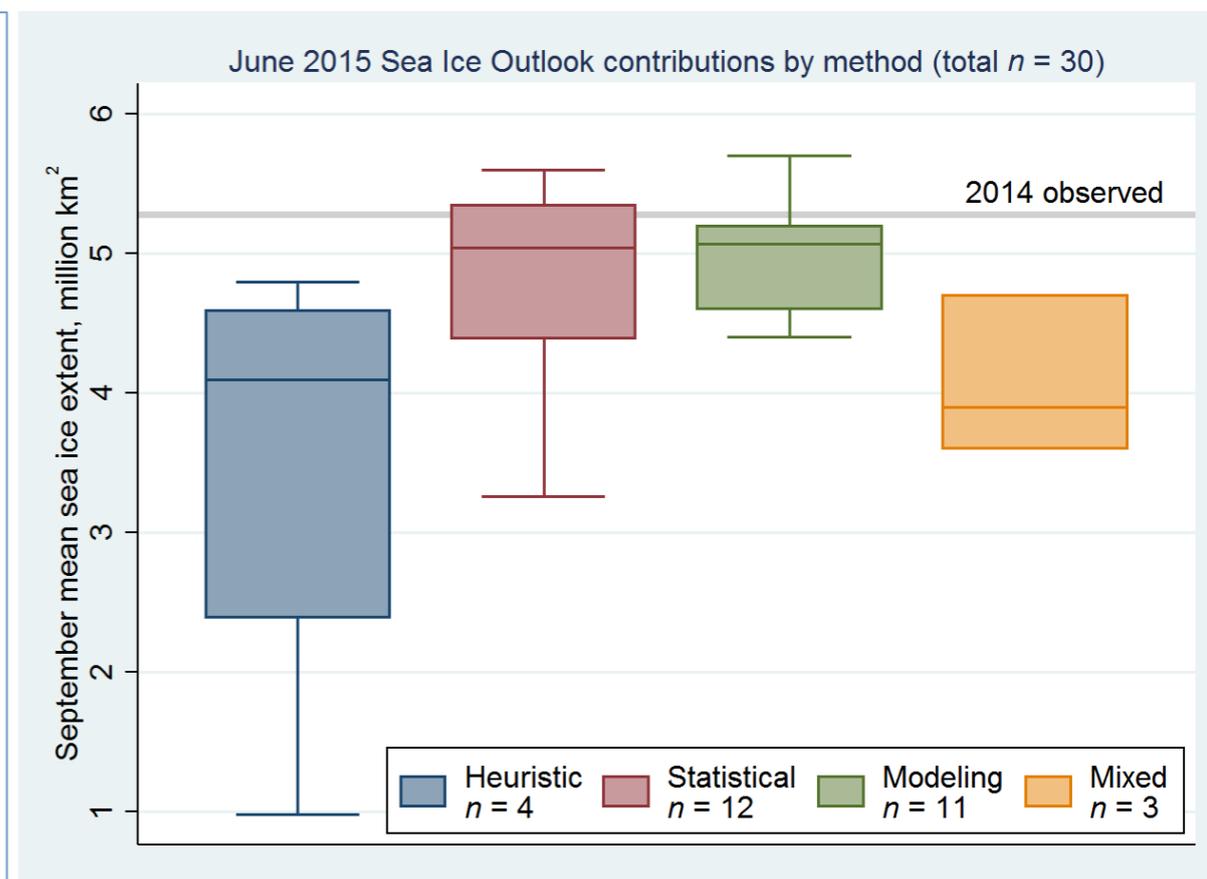
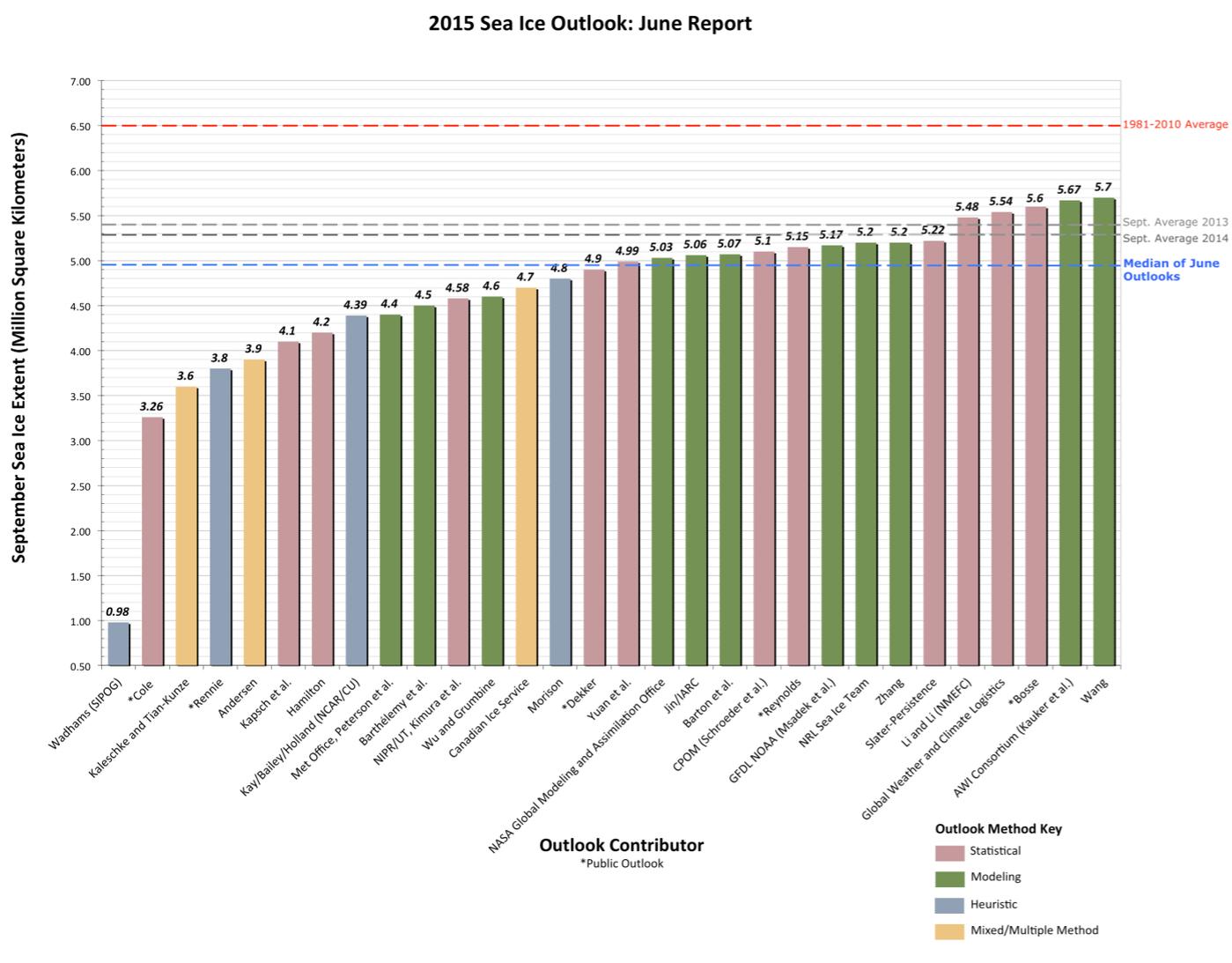
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Conducted 2 modeling experiments, with a goal to assess the origin of the spread in forecasts from different models (different initialization, different model physics?)

SIPN's Sea Ice Outlook (SIO):

September sea ice extent:

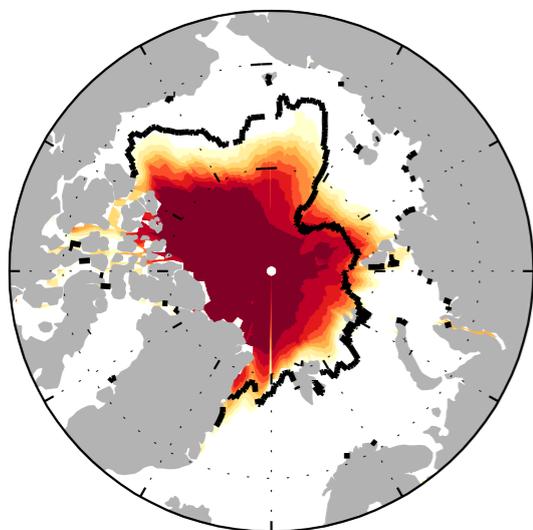


June 2015: Record number of participants ($n=32$)
 Spread narrowed among dynamical models

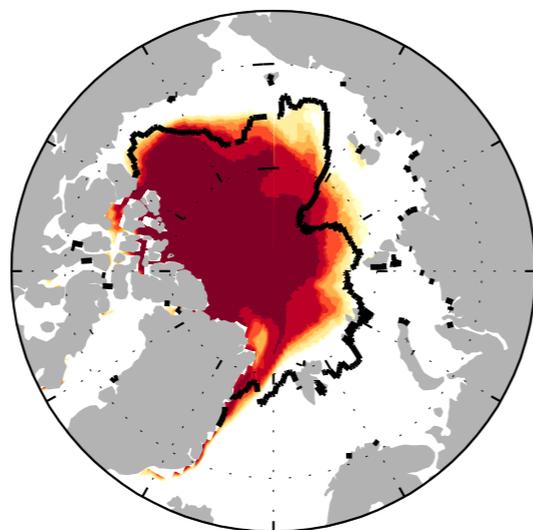
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Beginning in 2014, regional fields also included: e.g., **sea ice probability:**

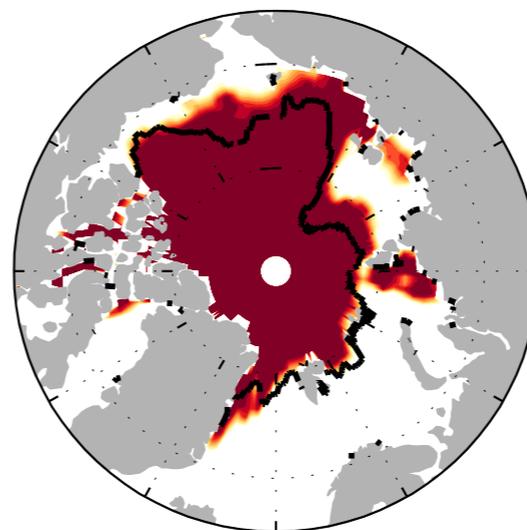
NCAR CESM (May)



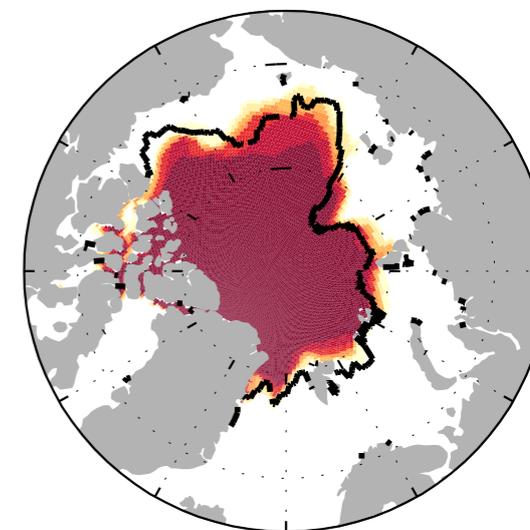
NASA GMAO (May)



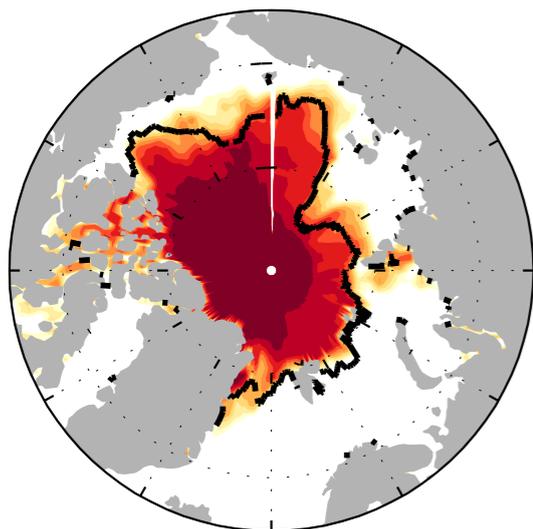
NOAA CFS (Aug)



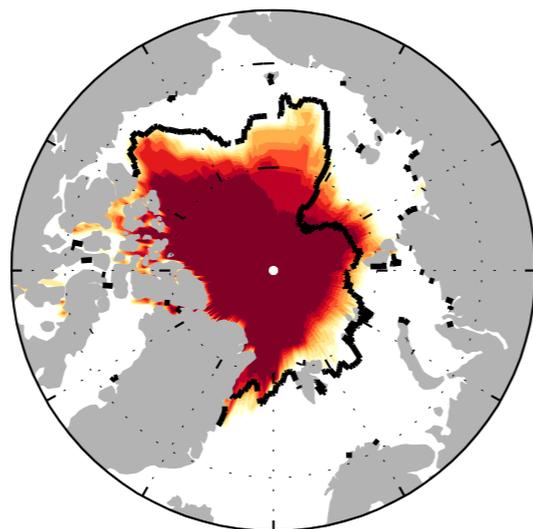
UW PIOMAS (Aug)



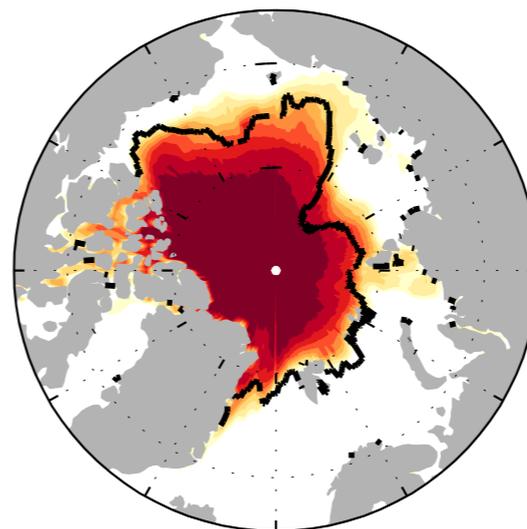
SLATER (Aug)



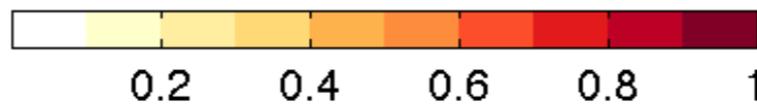
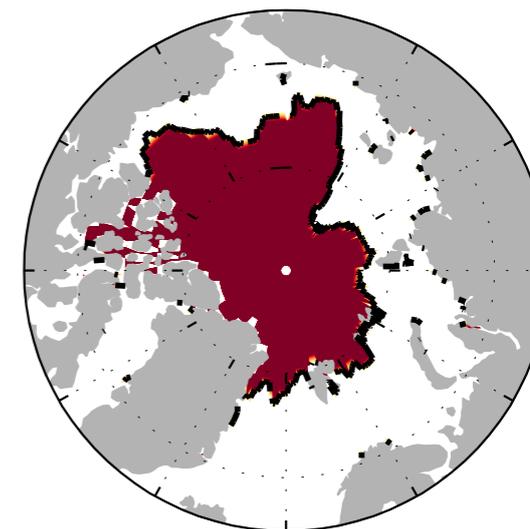
LINEAR TREND



MODEL MEAN



SEP 2014

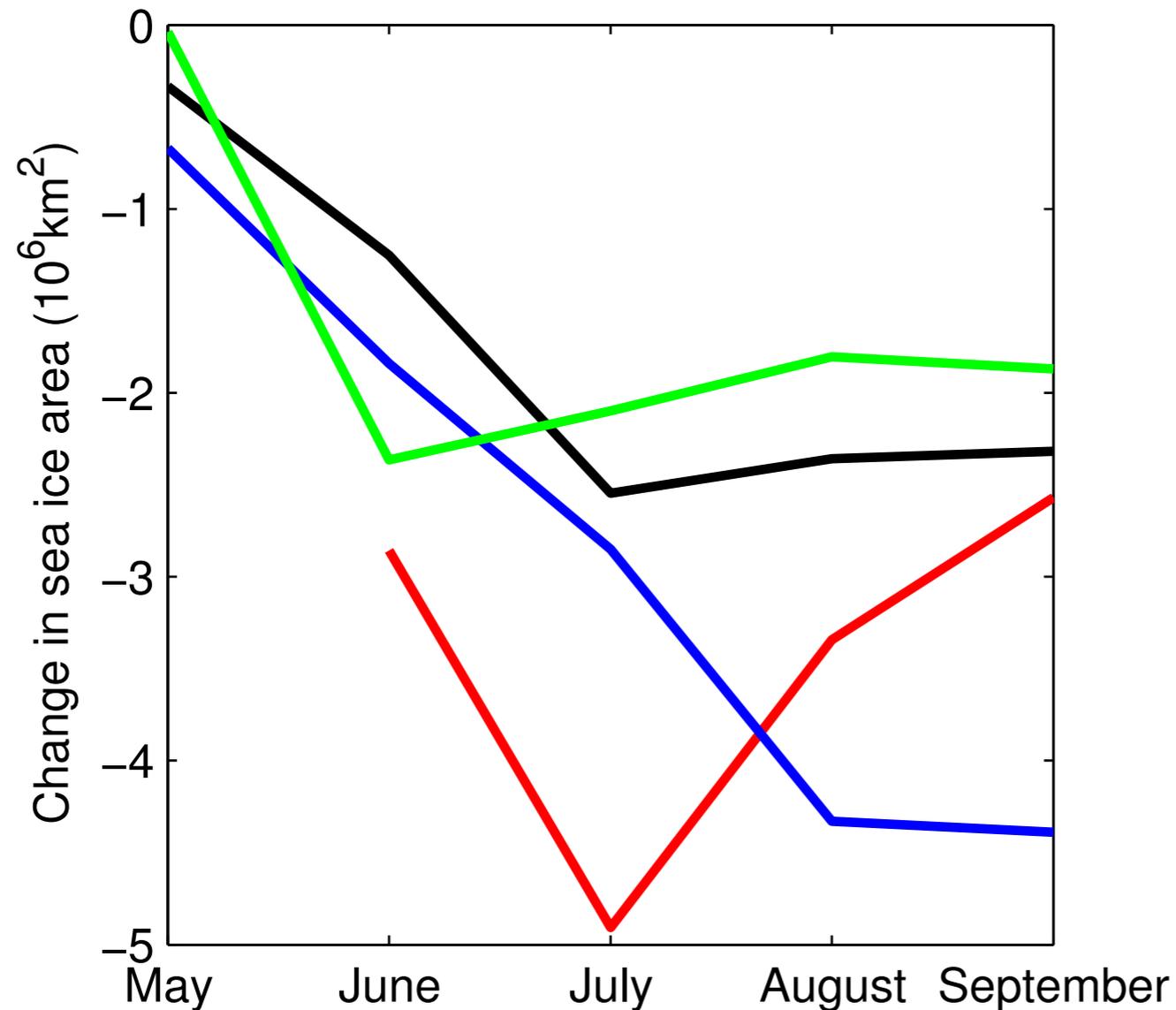


Lessons learned from the 2014 SIO modeling contributions

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- All groups run ensembles of simulations, most with more than 10 members
- Uncertainty associated with stochastic atmospheric forcing is well evaluated
- Some groups have started providing user-relevant diagnostics
- Uncertainty associated with initial conditions is not systematically evaluated
- Uncertainty associated with model parameters/physics is not evaluated
- Predictions become more confident (individually and as a group) over time

SIPN is also leading idealized model experiments to better understand sea ice predictions.

Arctic sea ice area response to identical initial condition perturbation (-1m thickness)



NCAR CESM

PIOMAS

NOAA CFSv2

NASA GMAO

All models have their own unique response, not only in September sea ice, but through summer season (relevant for ice-free dates) - BW et al, in review.

The future of **SIPN** and **how we can interact with YOPP**

Beyond September: forecast for other seasons (which will most likely bring different challenges: different predictors -> different necessary observations)

Beyond extent: spatial (e.g., sea ice probability) and temporal (ice-free dates, length of ice-free season, freeze-up dates) fields. Think about stakeholders: what's important? ice thickness? ice strength? lead orientation?

Beyond seasonal: ultimately, seamless prediction days/weeks to months/year?

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Improve our understanding of how forecast error depends on initial conditions and model physics. Which regions/variables/physics/parameterizations are critical?

What observations (&how many?) to measure and when.

At the same time, we hope that YOPP will be able to provide us with a 'next-generation' suite of observations to initialize forecasts with.

Modeling experiments: building up a body of knowledge at SIPN. Early co-ordination with YOPP for 2016 experiments?

Hindcasts! Put 2017/2019 in perspective.