



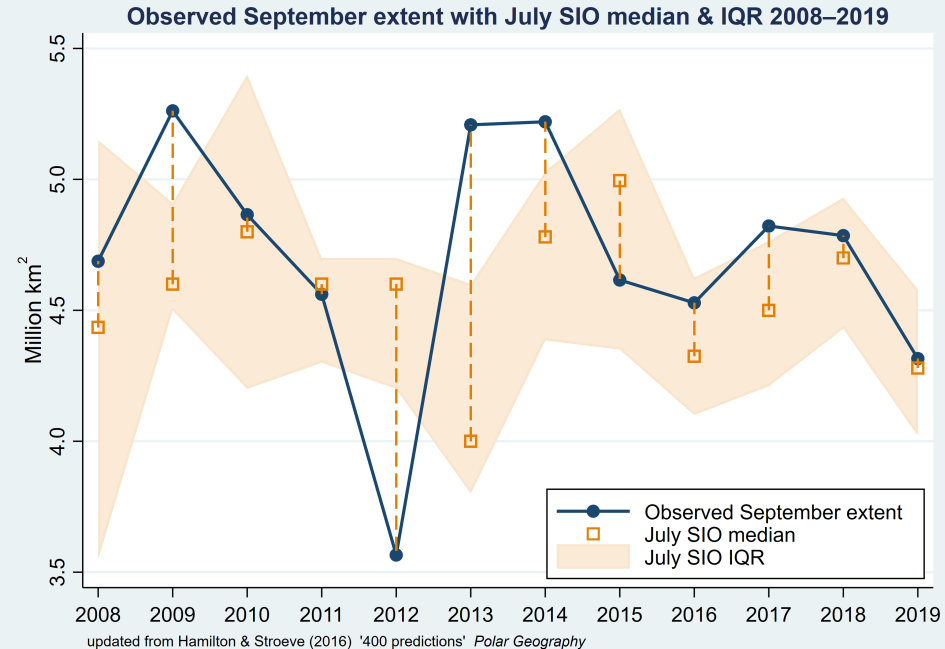
# SIPN2 AGU Meeting 2019: Community Round-Robin

1-slide, 1-minute summary

1	Hamilton, Larry	Univ. New Hampshire	Sea Ice Outlook meta-analysis
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3	Bushuk, Mitchell	NOAA/GFDL	Seasonal Sea Ice Prediction Efforts at the NOAA Geophysical Fluid Dynamics Laboratory (GFDL)
4	Cullather, Richard	NASA/GSFC/U.Maryland	NASA GMAO S2S
5	Horvath, Sean	UC Boulder	Understanding the spatial and temporal variability and predictability of Arctic sea ice attributes through statistical modeling.
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7	DuVivier, Alice	UCAR	The CICE Consortium
8	Ding, Qinghua	UCSB	A mechanism coupling sea ice, ocean and atmosphere in Arctic summer
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12	Lee, Olivia	UAF	Northern Bering/ Chukchi Sea Food Security & Sea Ice
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14	Katelyn Hertel	Citizen Scientist	Unicode Unicorns – a Hackathon Team

## Sea Ice Outlook meta-analysis

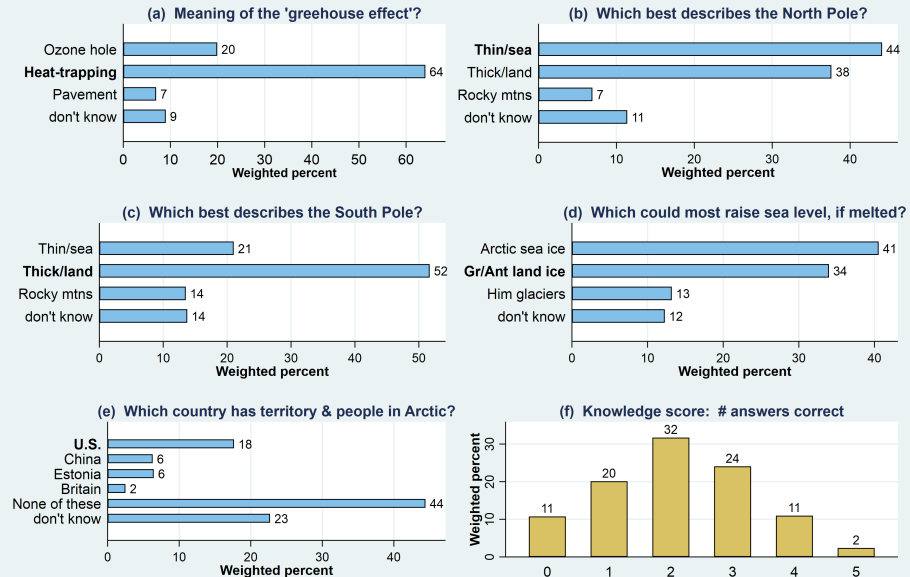
- From 2008 through 2019 the Sea Ice Outlook (SIO) gathered >900 predictions of September sea ice extent.
- Ensemble predictions are good in some years, poor in others— patterns of success & failure are informative.
- New, improved prediction methods tested each year.
- 3+ articles; contact [Lawrence.Hamilton@unh.edu](mailto:Lawrence.Hamilton@unh.edu)



## Public knowledge & perceptions about the Arctic

- Surveys test general-public knowledge & perceptions.
- >10,000 interviews 2006–2019 find 2 kinds of knowledge:
  - Questions answered based on beliefs about global warming
  - Others just physical-world knowledge
- Important for science communication & knowledge assessment.
- 7+ articles; contact [Lawrence.Hamilton@unh.edu](mailto:Lawrence.Hamilton@unh.edu)

Figure 2: Basic knowledge questions

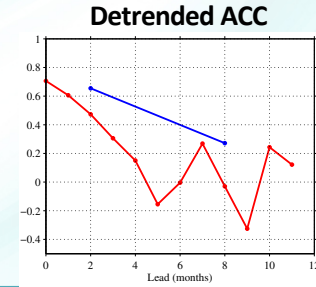
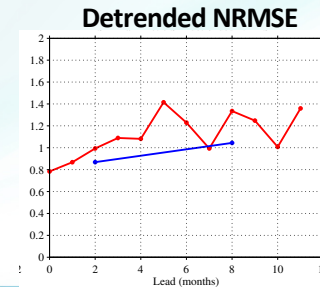
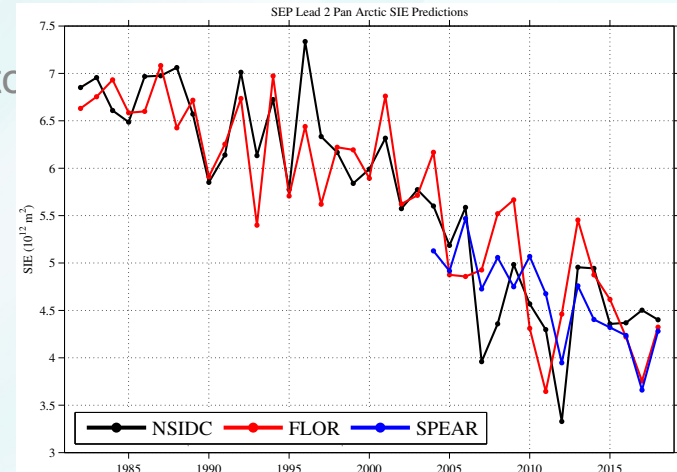


L Hamilton (2018) 'Self-assessed understanding of climate change'

- **1-slide, 1-minute summary**

## Seasonal Sea Ice Prediction Efforts at the NOAA Geophysical Fluid Dynamics Laboratory (GFDL)

- Producing seasonal sea-ice predictions on the first of each month with GFDL-FLOR. Submitting predictions each month to the SIPN2 portal as well as the September Sea Ice Outlook.
- Current research focus on:
  - Sea ice data assimilation (Yongfei Zhang, Tues 16:00-18:00pm, Moscone South Poster Hall, C23D-1571)
  - Inherent regional sea ice predictability (Mitch Bushuk, Tues 10:20-10:35, Moscone West 2003 L2, C22B-01)
  - Development of new GFDL-SPEAR seasonal prediction system (Feiyu Lu, Tues 8:00-12:20, Moscone South Poster Hall, A21H-2733)
- We are interested in doing detailed comparisons with other prediction systems! E-mail: [mitchell.bushuk@noaa.gov](mailto:mitchell.bushuk@noaa.gov)



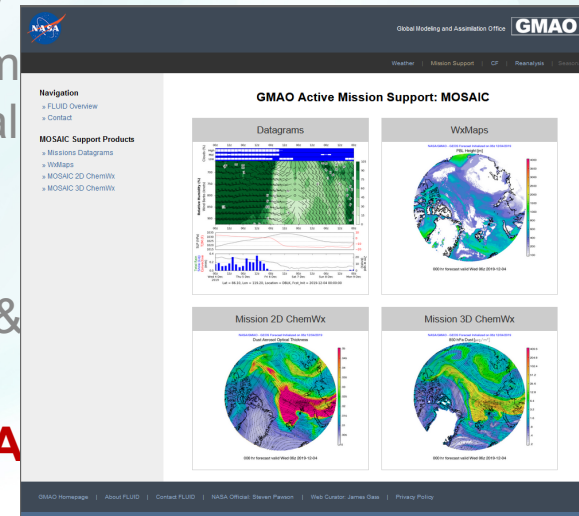
### NASA GMAO S2S

- Over last ~3 yr, experimental SIO forecasts incorporating CryoSat2-derived ice thickness. This year we used a prototype for new model – good results.
- Development of Version 3 model & LETKF ODAS for 2020: GEOS Icarus (“I”), MOM-5 @  $\frac{1}{4}^\circ$  ocn &  $\frac{1}{2}^\circ$  atm 40 ensemble members to 2 months, then proportional cluster sampling yields 10 members out to 9 months.

→ GEOS NWP model page provides weather, aerosol & chemistry forecasts for the MOSAiC location.

[https://fluid.nccs.nasa.gov/missions/mission\\_MOSA](https://fluid.nccs.nasa.gov/missions/mission_MOSA)

<https://gmao.gsfc.nasa.gov/>

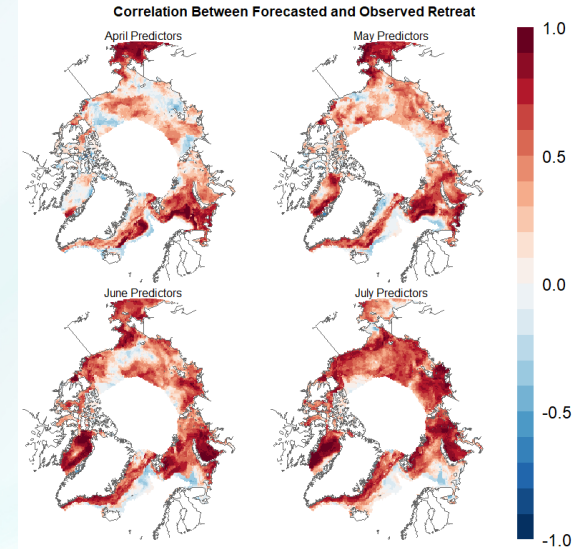




## Understanding the spatial and temporal variability and predictability of Arctic sea ice attributes through statistical modeling.

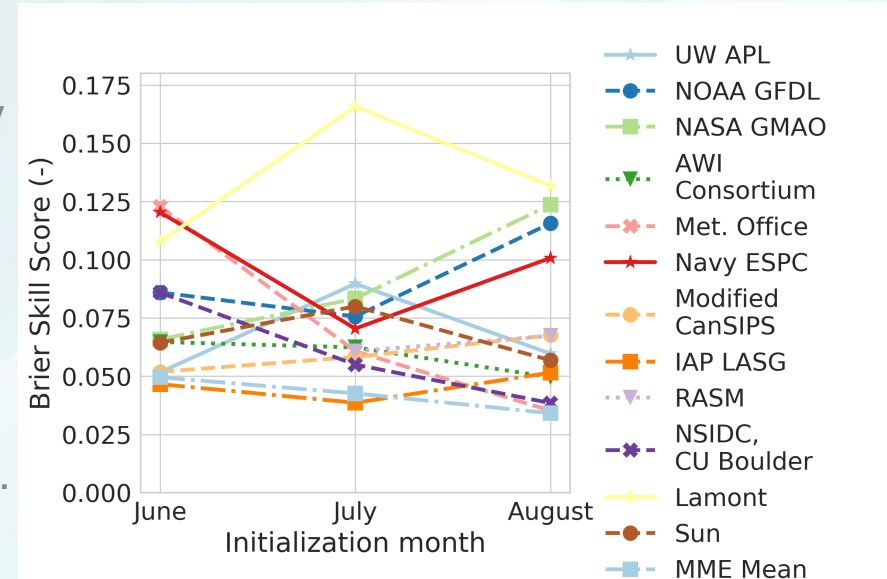
Sean Horvath, PhD Candidate, CU Boulder/NSIDC

- Use statistical models to better understand how attributes of sea ice (e.g. melt onset, date of retreat/freeze-up, etc.) are changing across space and time.
- A seasonal forecast model for predicting the timing of sea ice retreat across the marginal ice zone.
- Defending this spring, looking for a post-doc position...
- [sean.horvath@colorado.edu](mailto:sean.horvath@colorado.edu)



## Assesing SIO regional skill (Bitz & BW)

- What is skill of regional forecasts in SIO? We use the forecasts of **Sea Ice Probability (SIP)** and their skill (quantified with the Brier skill score) to answer this question
- In 2019, regional forecast skill is highly variable across different models, only modest at best improvement from June to August, even deterioration in some models.
- More in post-season report, SIPN portal (<https://atmos.washington.edu/sipn/>) and Wayand et al, 2019





# The CICE Consortium

Alice DuVivier, National Center for Atmospheric Research – duvivier@ucar.edu

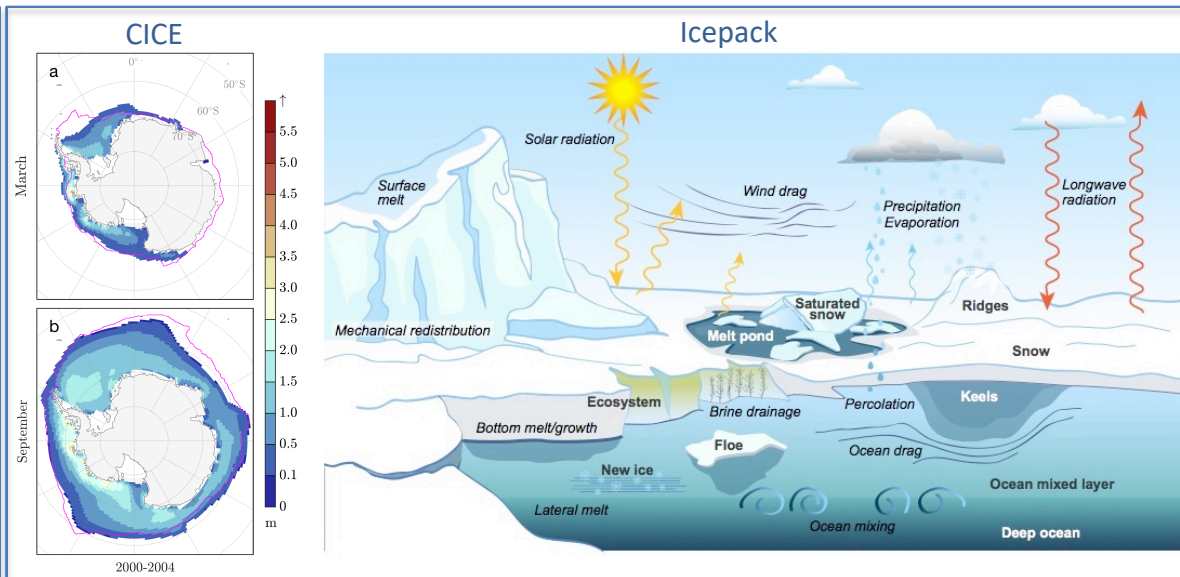
Available on GitHub at <https://github.com/CICE-Consortium>

## What's new?

Landfast ice new in CICE V6.0

Floe size distribution CICE V6.1

Radiation code is being updated in 2020 using measurements from MOSAiC this coming summer





## A mechanism coupling sea ice, ocean and atmosphere in Arctic summer

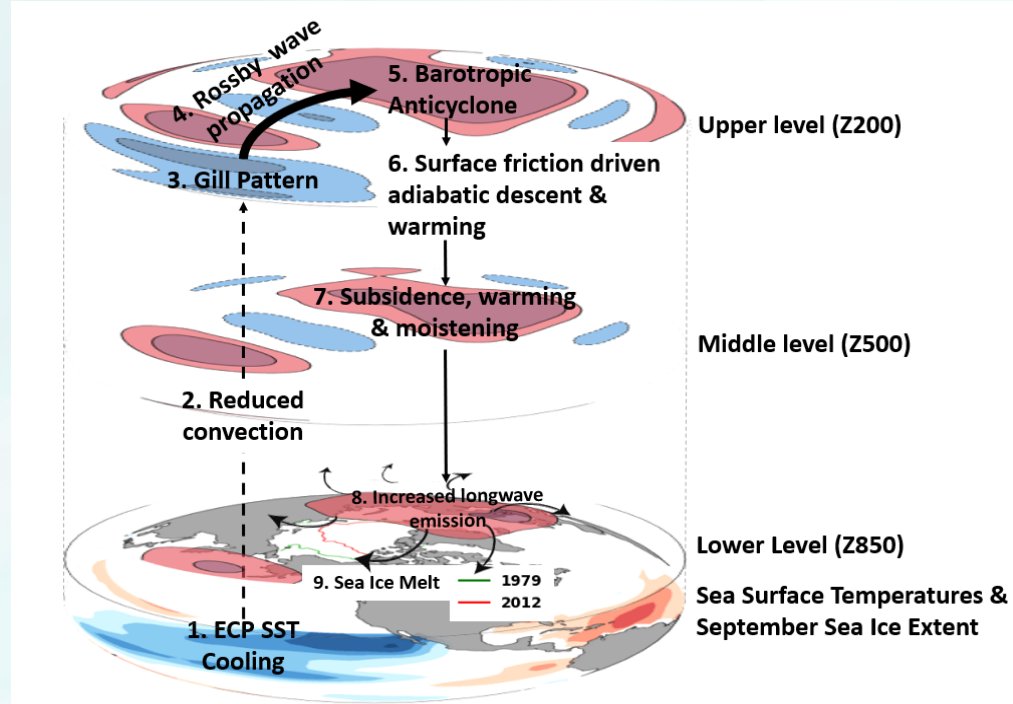
Qinghua Ding @UCSB

Teleconnections between Arctic circulation with remote drivers: why observations disagree on this and models seem to be inconsistent in reproducing observed patterns

local atmosphere-sea ice relationship in JJA: How to understand its causality? How well do models replicate this relationship?

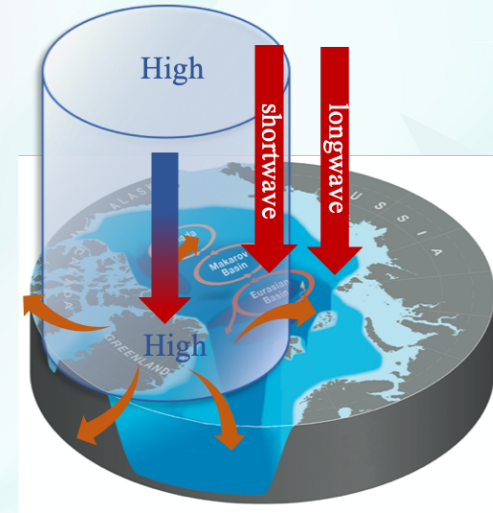
Roles of clouds and their interactions with other systems (atmosphere, sea ice, sea state, boundary layer, precipitation, energy fluxes etc.)

Feedbacks of Arctic warming to the lower latitudes in summer and winter: how to tease apart factors and outcomes?



## [Arctic atmosphere – sea ice – ocean interaction]

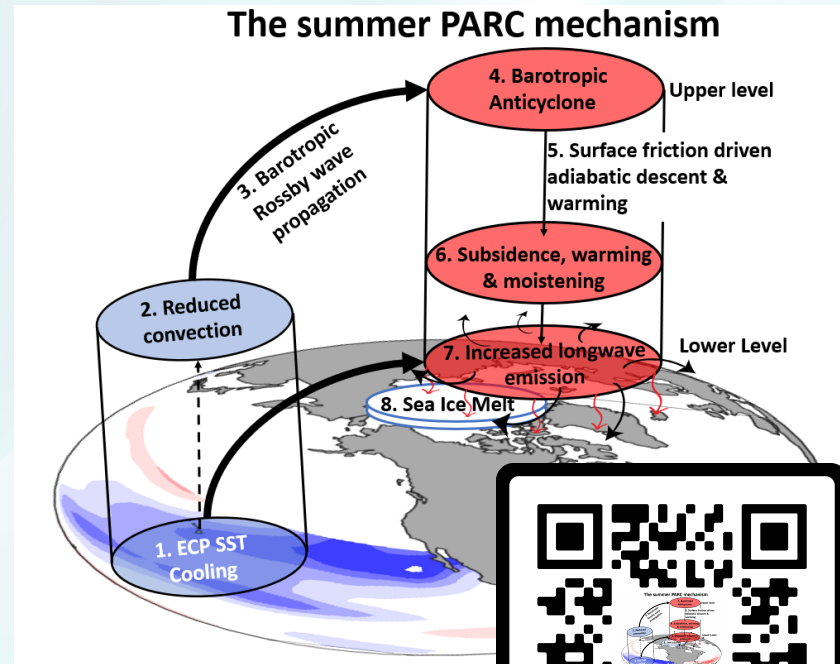
- Link the sea ice and upper ocean heat content change with atmospheric internal circulation in the Arctic
- The atmosphere-drive ocean heat content largely influence sea ice area and thickness and delay the melting season
- I'm also interested in exploring whether different large ensemble models can capture atmosphere – sea ice – ocean coupled physical processes well, and why?
- Email: zhe\_li@ucsb.edu



## How tropical Pacific surface cooling contributed to accelerated sea ice melt from 2007 to 2012 as ice is thinned by anthropogenic forcing

**Ian Baxter (UCSB)**

- My research has focused on the influence of tropical-Arctic teleconnections on September Arctic sea-ice decline.
- I'm currently looking at the relationship between clouds, circulation, and sea ice
- I'm interested in discussing more about polar clouds and radiation, so if there is anyone that would like to chat let me know!
- Email: [itbaxter@ucsb.edu](mailto:itbaxter@ucsb.edu)



Scan for link to our recent Journal of Climate paper and my poster/contact info



## Alaska Arctic Observatory and Knowledge Hub

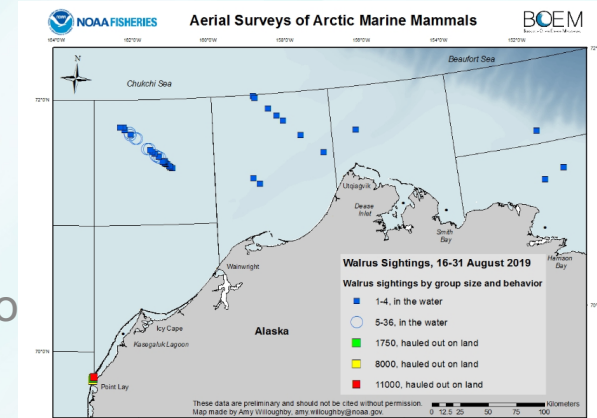
- Local, Indigenous Experts make environmental, oceanographic, and wildlife observations and comment on the conditions
- Unique perspective on Arctic change at the community scale from community members
- The database of observations contribute to other studies in the Alaska Arctic coast area with local observations
- <https://arctic-aok.org> Contact: Josh Jones – [jmjones8@Alaska.edu](mailto:jmjones8@Alaska.edu)





## Northern Bering/ Chukchi Sea Food Security & Sea Ice

- How is changing sea ice affecting marine mammal habitat, behavior, distributions? (also birds/ harmful algal blooms)
- Difficult to predict scales of marine mammal responses
  - Walrus moving farther east; bowhead whales hard to find in Fall 2019 hunt
- Interest in sub-seasonal scale ice predictions & nearshore ice conditions
  - Olivia Lee [oalee@alaska.edu](mailto:oalee@alaska.edu) (936) 333-7239





### On the importance of Arctic pelagic phytoplankton blooms beneath a thinning sea ice regime

- Quantifying the primary production beneath sea ice
- 63% of primary production in the Central Arctic is found beneath sea ice that is  $\geq 50\%$  concentration in our model results
- We would like to collaborate with people looking at melt pond optics and observations of under ice production.
- Jackie Clement Kinney: [jlcclemen@nps.edu](mailto:jlcclemen@nps.edu)



# Unicode Unicorns – a Hackathon Team

Project: For Your Ice Only  
Katelyn Hertel and Kelby Stockstill

# Project Overview

- **For Your Ice Only** attempts to accurately calculate Sea Ice area in the Arctic Ocean. Microwave sensed concentration values can't differentiate between open water and surface melt, by pulling in weather data we correct that.



# Overview Continued

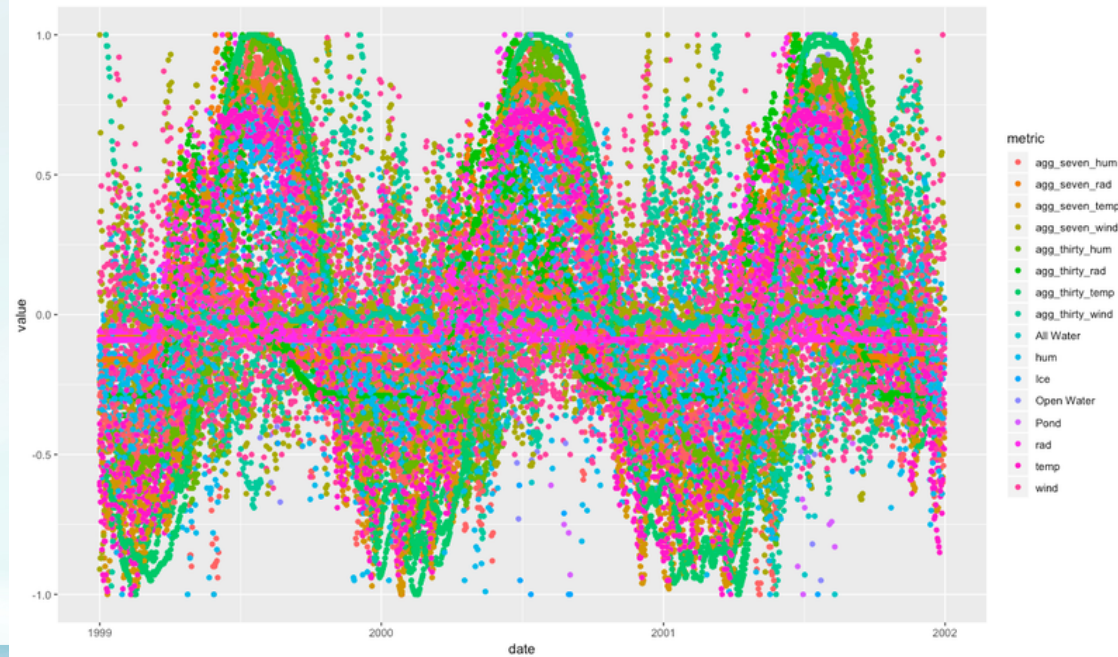
- We gathered weather data from the weather api Meteomatics and paired it with processed high resolution images from the GFL/USGS that were available from the NSIDC and we calculated various aggregations of that weather data and then evaluated it's performance in predicting open water using step-wise linear regressions.
- We aimed to predict the open water in the Arctic Ocean at any given time in history.
- We ended up with a model that used the measurement of all water from what the NSIDC published, plus the 7 day aggregate of temperature and the 30 day aggregate of humidity that could predict what amount was actual open water with an R squared value of 0.892 (1 is perfect).

[https://www.youtube.com/watch?time\\_continue=30&v=1Z7JiH1QPyw&feature=emb\\_title](https://www.youtube.com/watch?time_continue=30&v=1Z7JiH1QPyw&feature=emb_title)



# 30 Second Video and Visualization of Weather Data in aggregate form

[https://www.youtube.com/watch?time\\_continue=30&v=1Z7JiH1QPyw&feature=emb\\_title](https://www.youtube.com/watch?time_continue=30&v=1Z7JiH1QPyw&feature=emb_title)





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