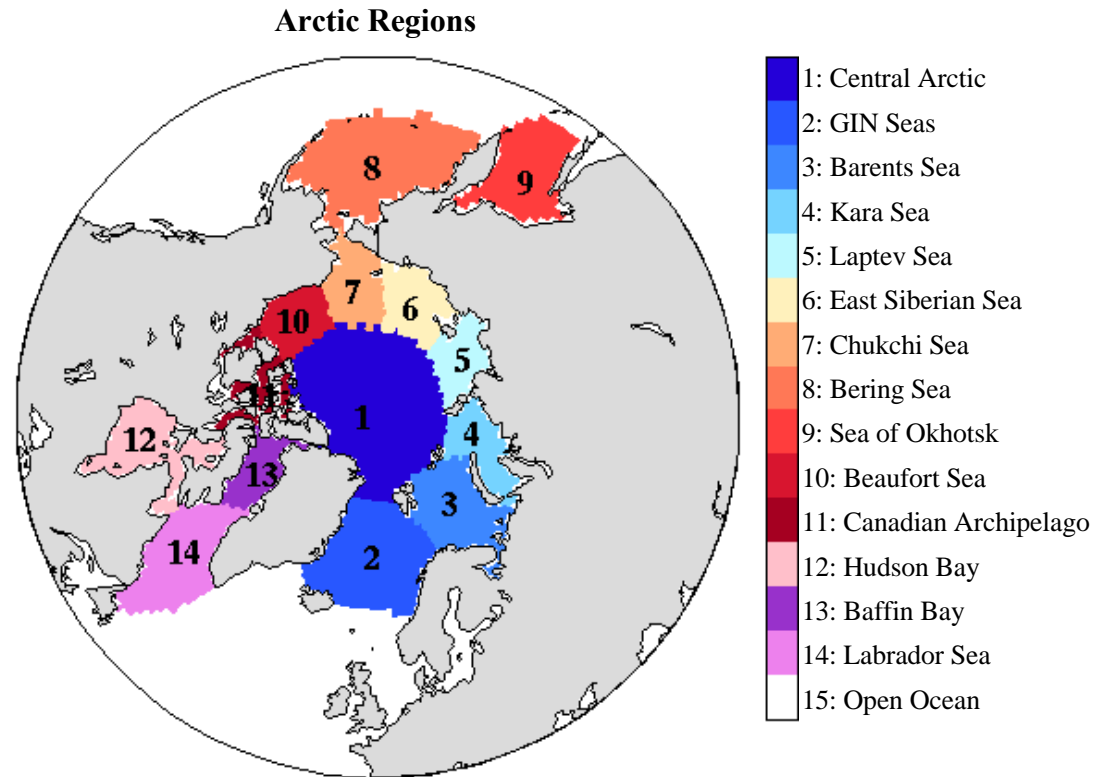


Arctic Sea-Ice Prediction in the GFDL Forecast System

Mitch Bushuk
Princeton University and GFDL

With contributions from:
Rym Msadek, Michael Winton,
Gabriel Vecchi, Anthony Rosati,
Xiaosong Yang, Rich Gudgel

JPSS/STAR/CPO Meeting
March 29, 2017



The Dynamical Forecast Model

GFDL-FLOR¹: **F**orecast-oriented **L**ow **O**cean **R**esolution

- Fully-coupled global model
- Atmosphere and Land (50km)
- Ocean and Sea Ice (1°)

Initialization Procedure

ECDA²: **E**nsemble Kalman Filter **C**oupled **D**ata **A**ssimilation

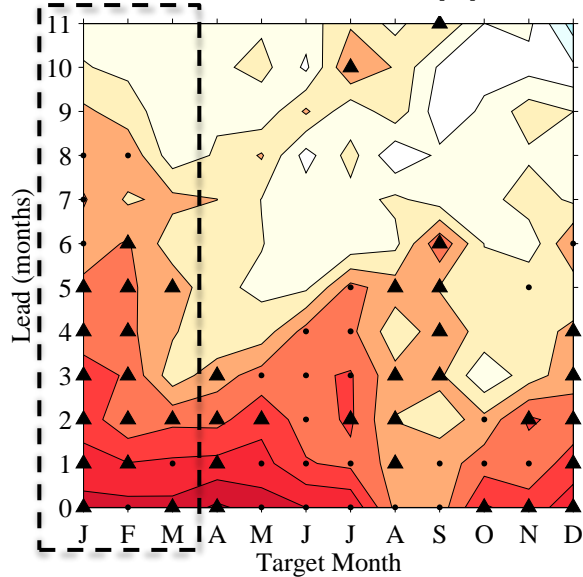
- Atmosphere assimilates NCEP reanalysis
- Ocean assimilates satellite SST, ARGO, CTD, XBT
- No assimilation of sea ice data. Plan to incorporate SIC and SIT assimilation in the future

Retrospective Forecast Experiments

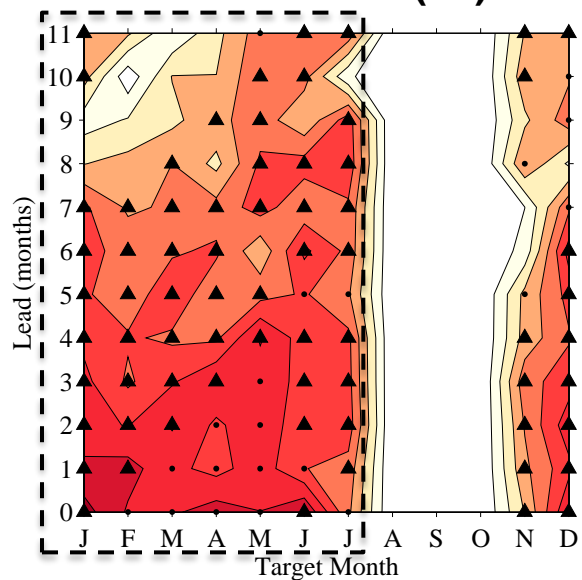
- Forecasts initialized on the first of each month; run for one year
- 12-member ensemble
- Retrospective forecasts spanning 1980-2016

Prediction Skill For Regional Arctic SIE (Region # in parentheses)

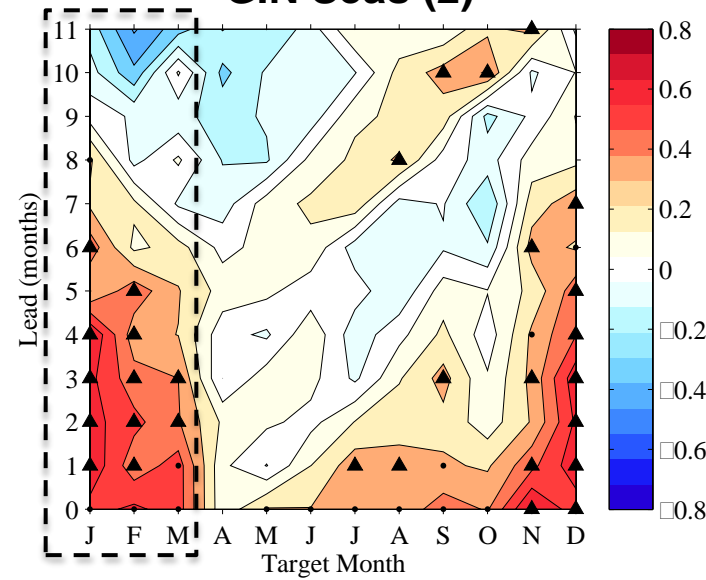
Barents Sea (3)



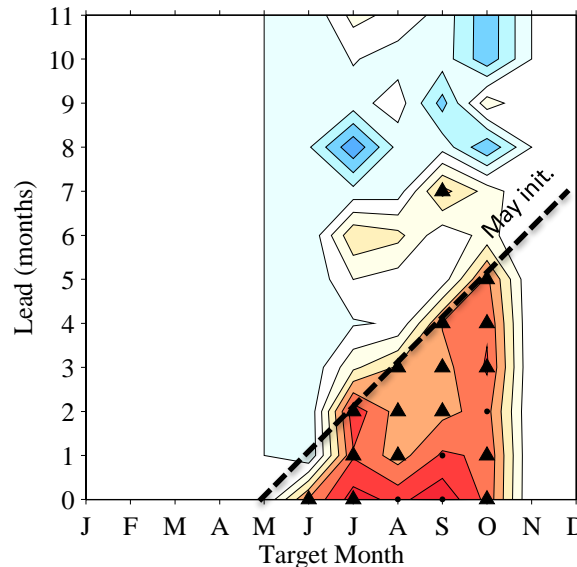
Labrador Sea (14)



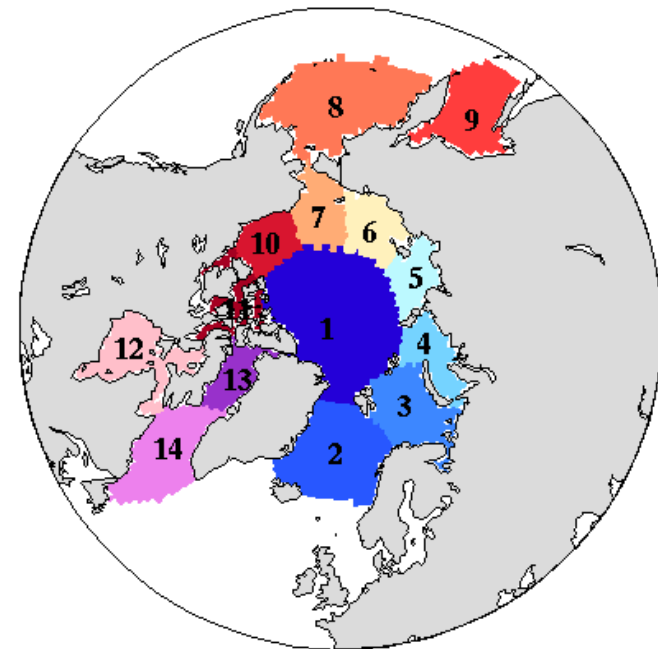
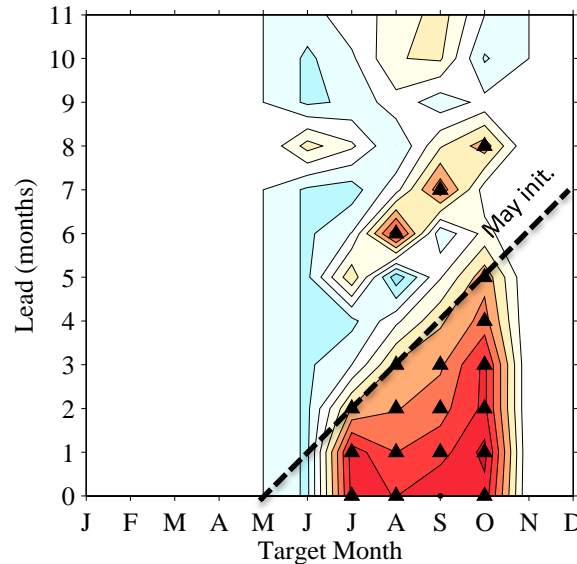
GIN Seas (2)



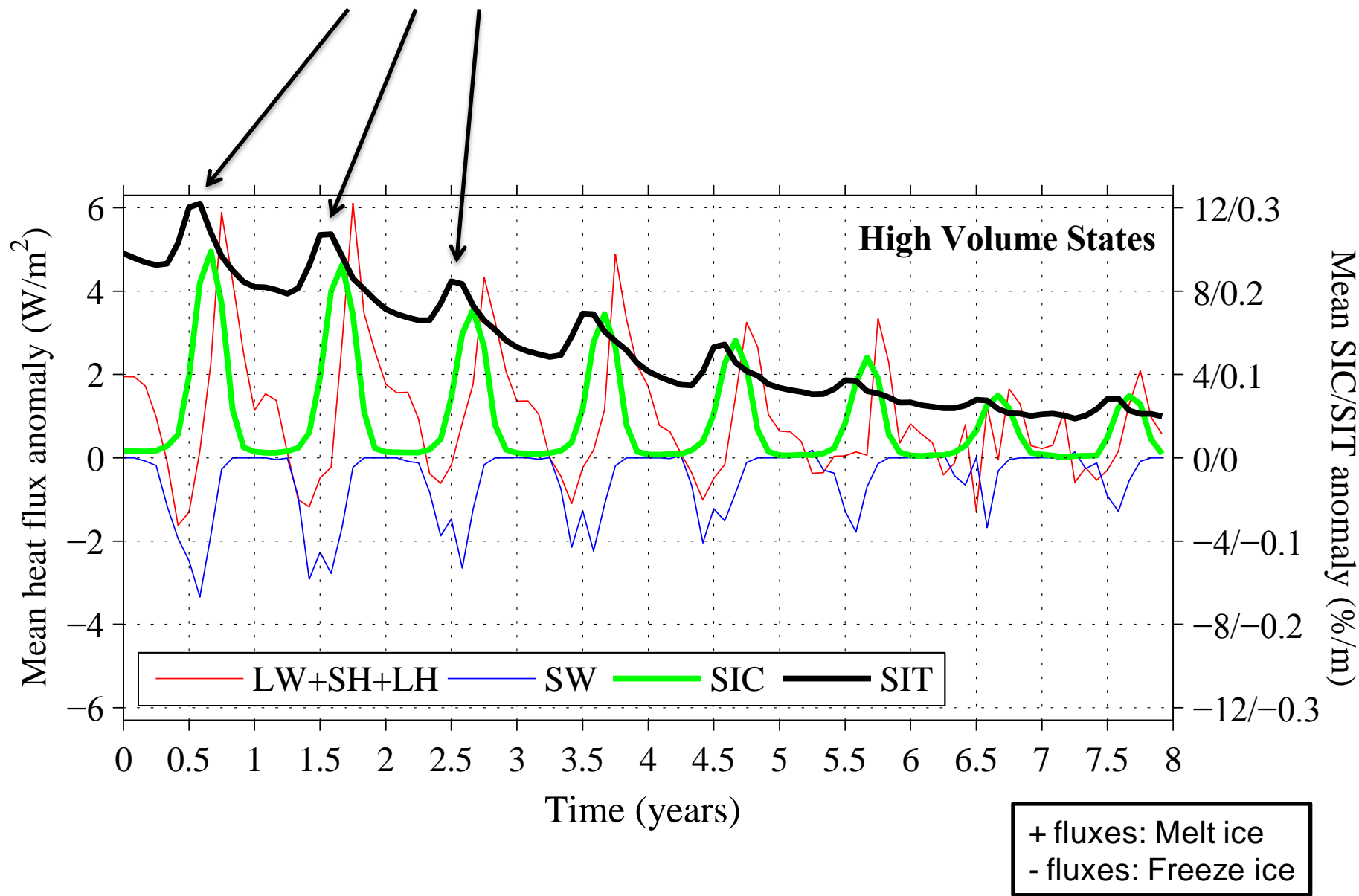
Laptev Sea (5)



East Siberian Sea (6)



Summer Enhancement of Arctic Sea-Ice Thickness Anomalies



Bushuk et al (2017), *J. Climate*.