NMME Sea Ice Reforecasts: An Update

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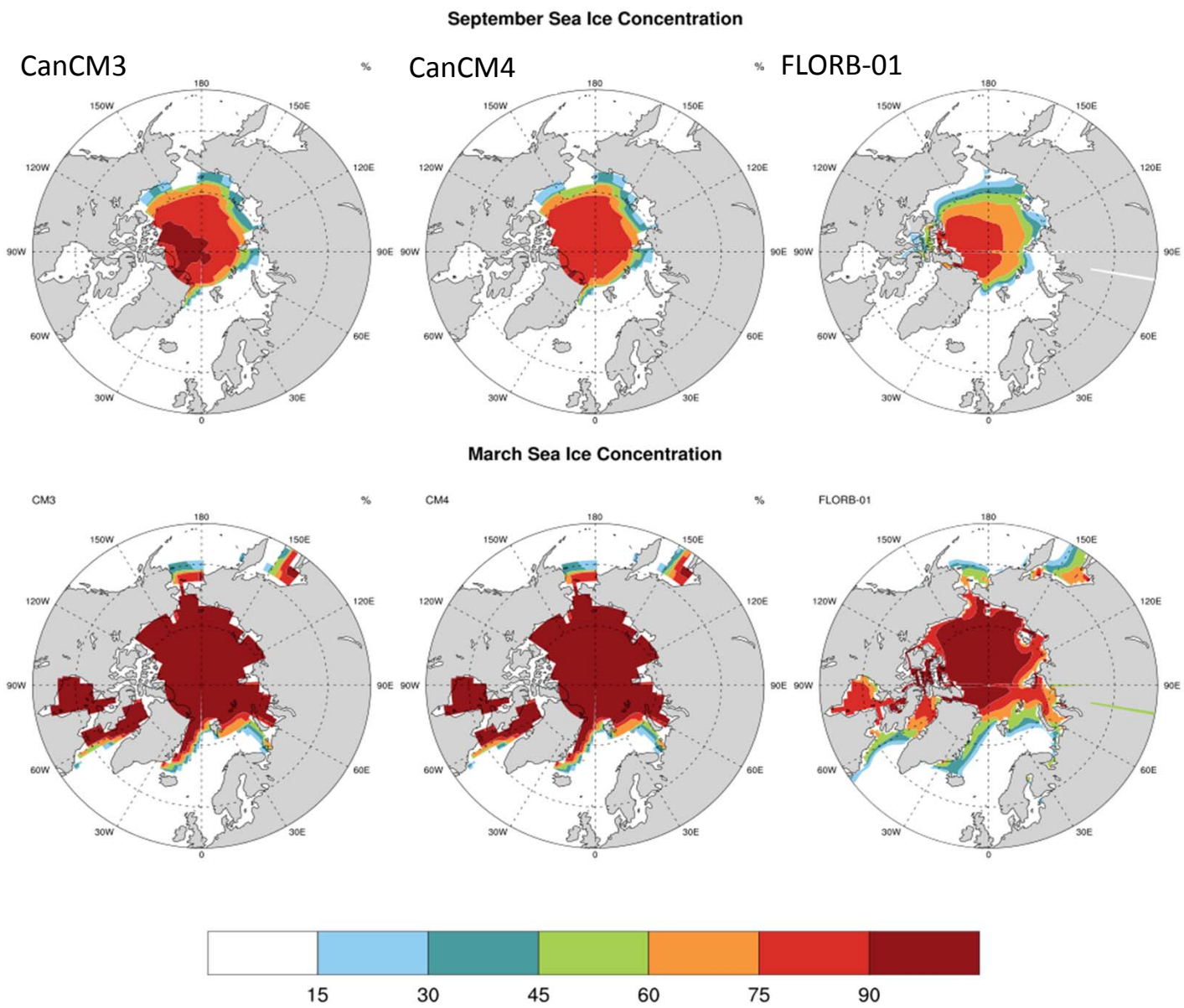
Last Time: Sea Ice Concentration

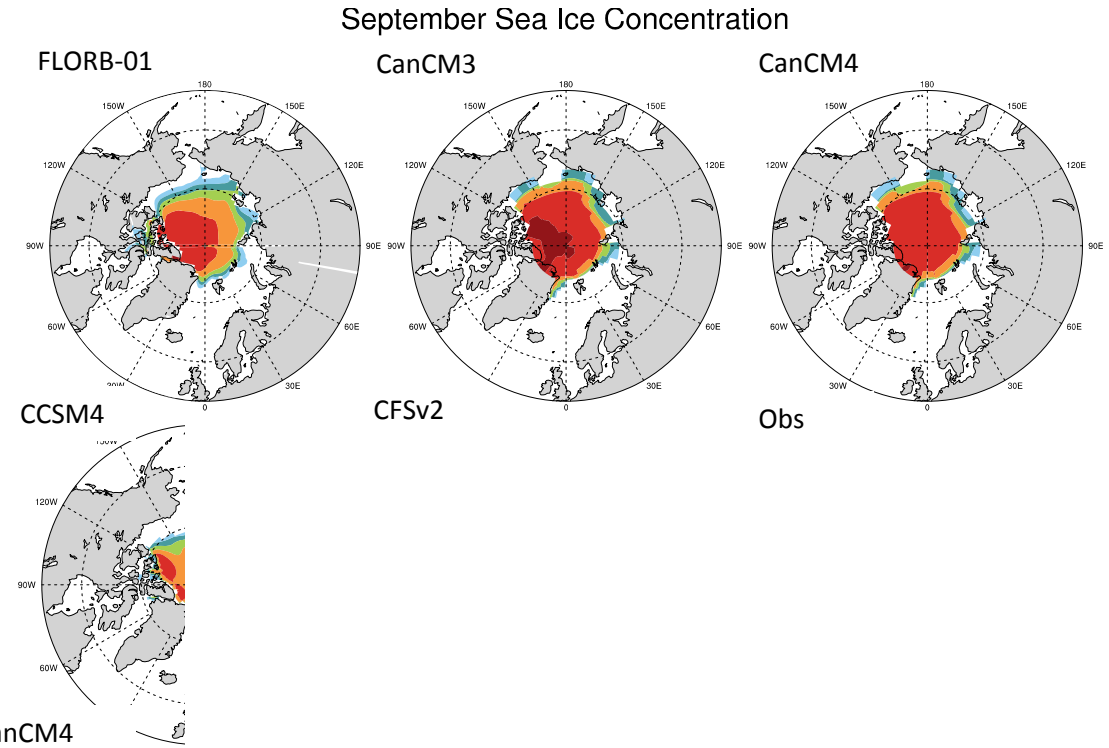


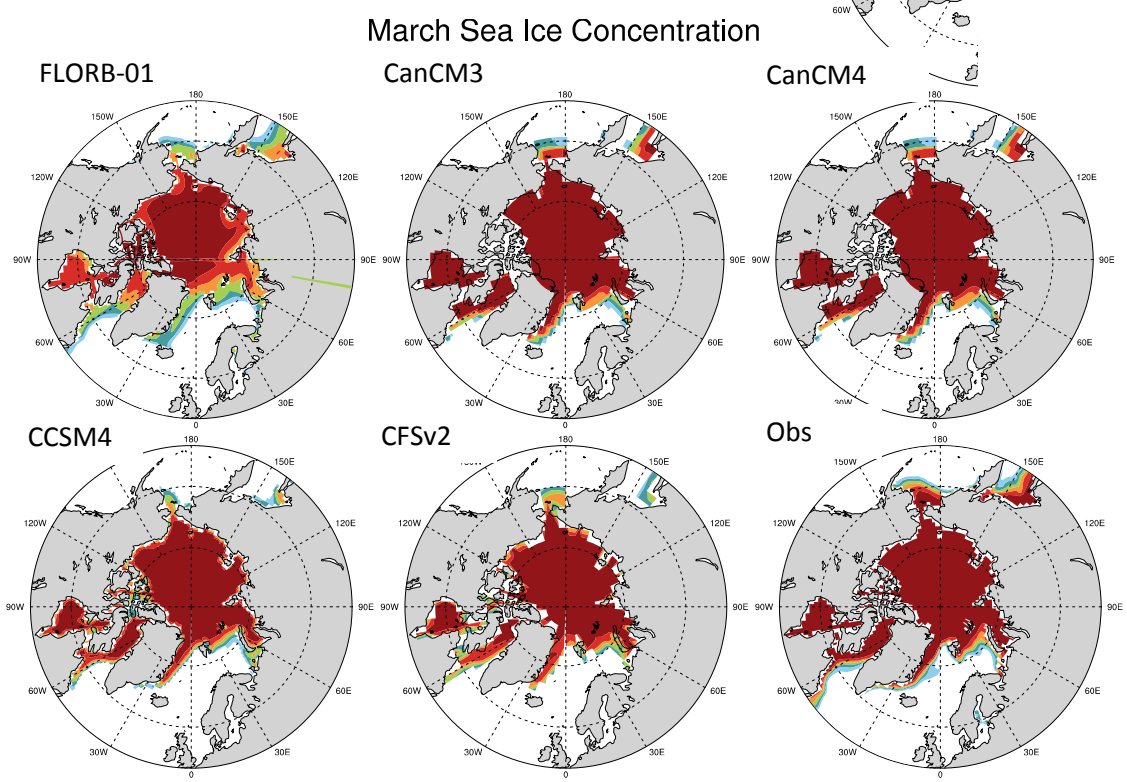
Current NMME Sea Ice Contributions

Model	Simulation Years	Resolution	Ensemble Members
CanCM3	1981-2013	1° x 1°	10
CanCM4	1981-2013	1° x 1°	10
FLORB-01	1981-2013	1° x 1°	12
CFSv2	1982-2011	2.5° x 2.5°	16★
CCSM4	1982-2015	1° x 1°	10

★only using 16 of the members following past CFSv2 sea ice publications

Now: Sea Ice Concentration





Observations: NASA Bootstrap Algorithm

Sea Ice Extent (SIE)

SIE = Total area ≥ 15% concentration

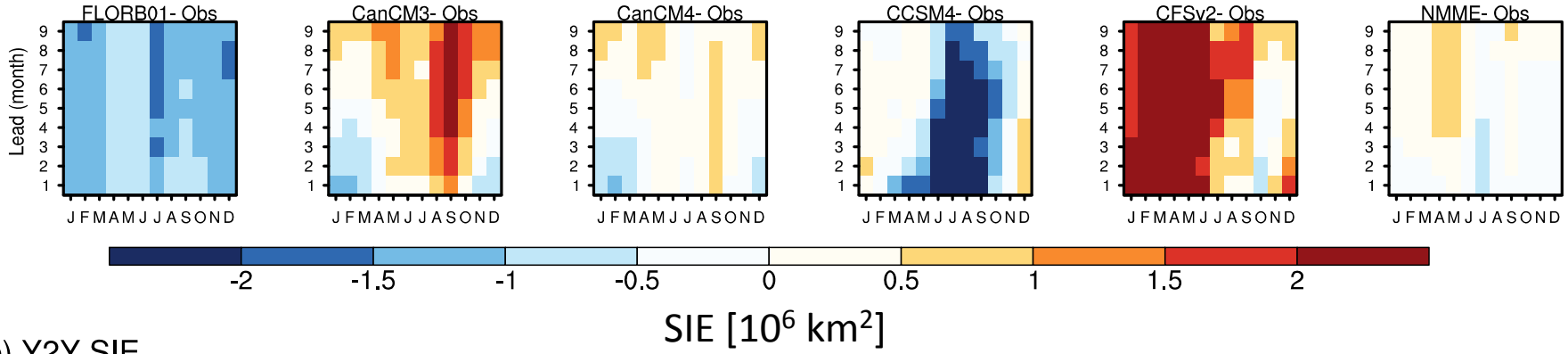
- Total SIE
- Year-to-Year Variability (Y2Y)

- Bias
- Anomaly Correlation (ACC)
- Root-Mean-Square (RMSE) Error

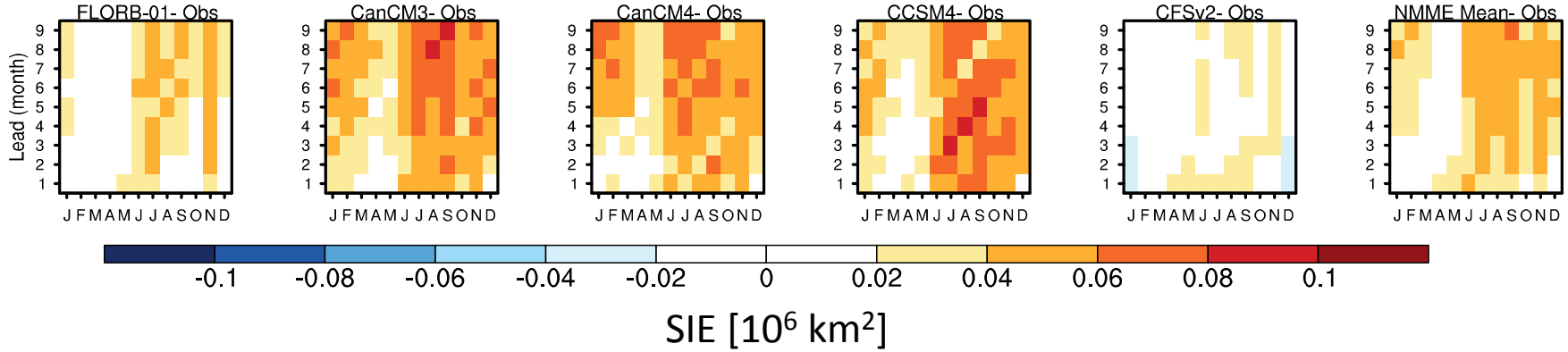
1982-2010 climatology, 1 to 9 month lead

SIE Model Bias

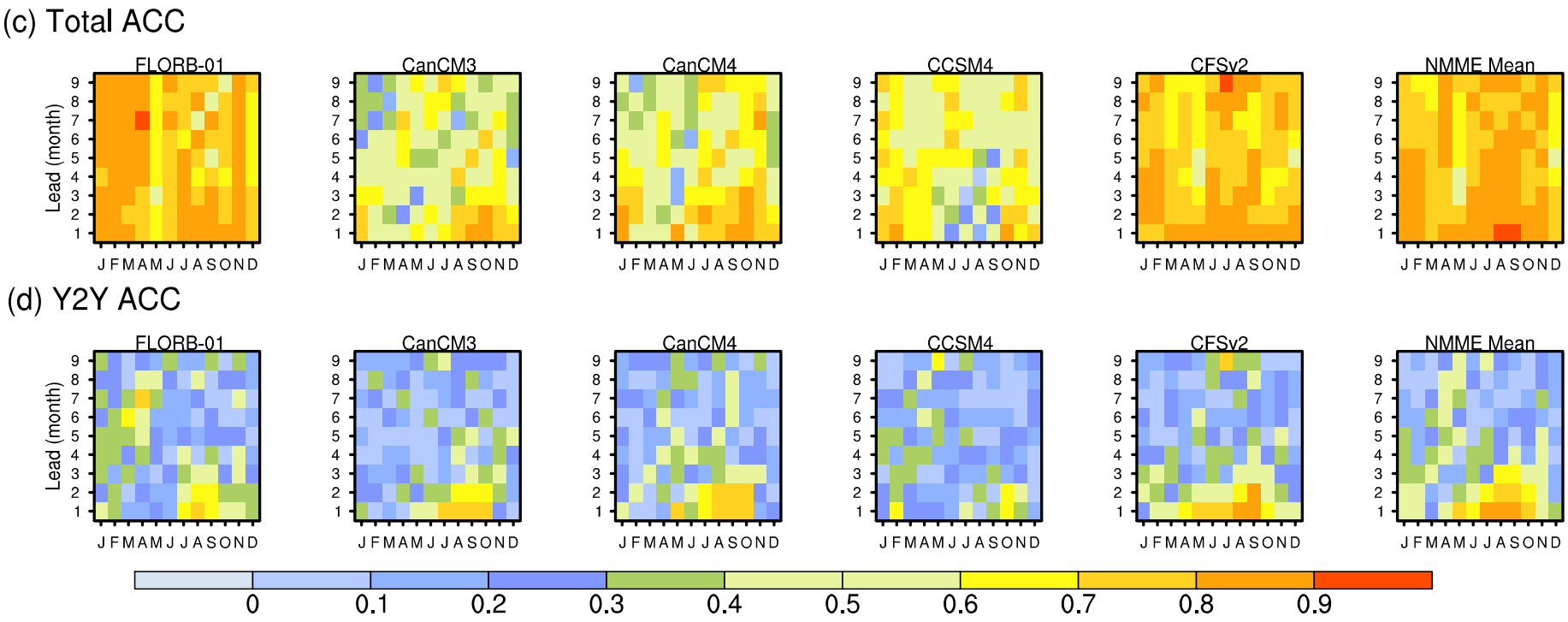
(a) Total SIE



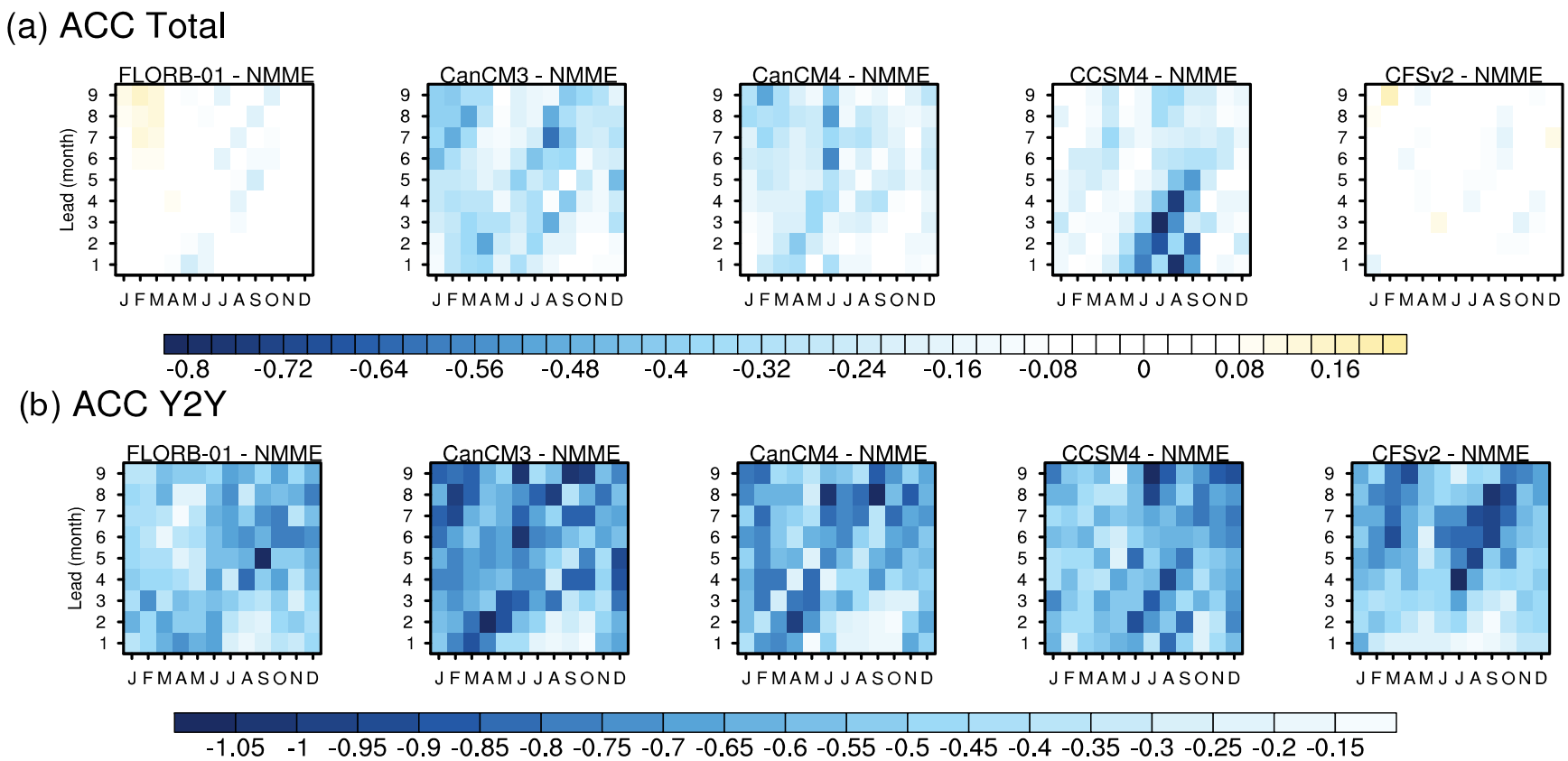
(b) Y2Y SIE



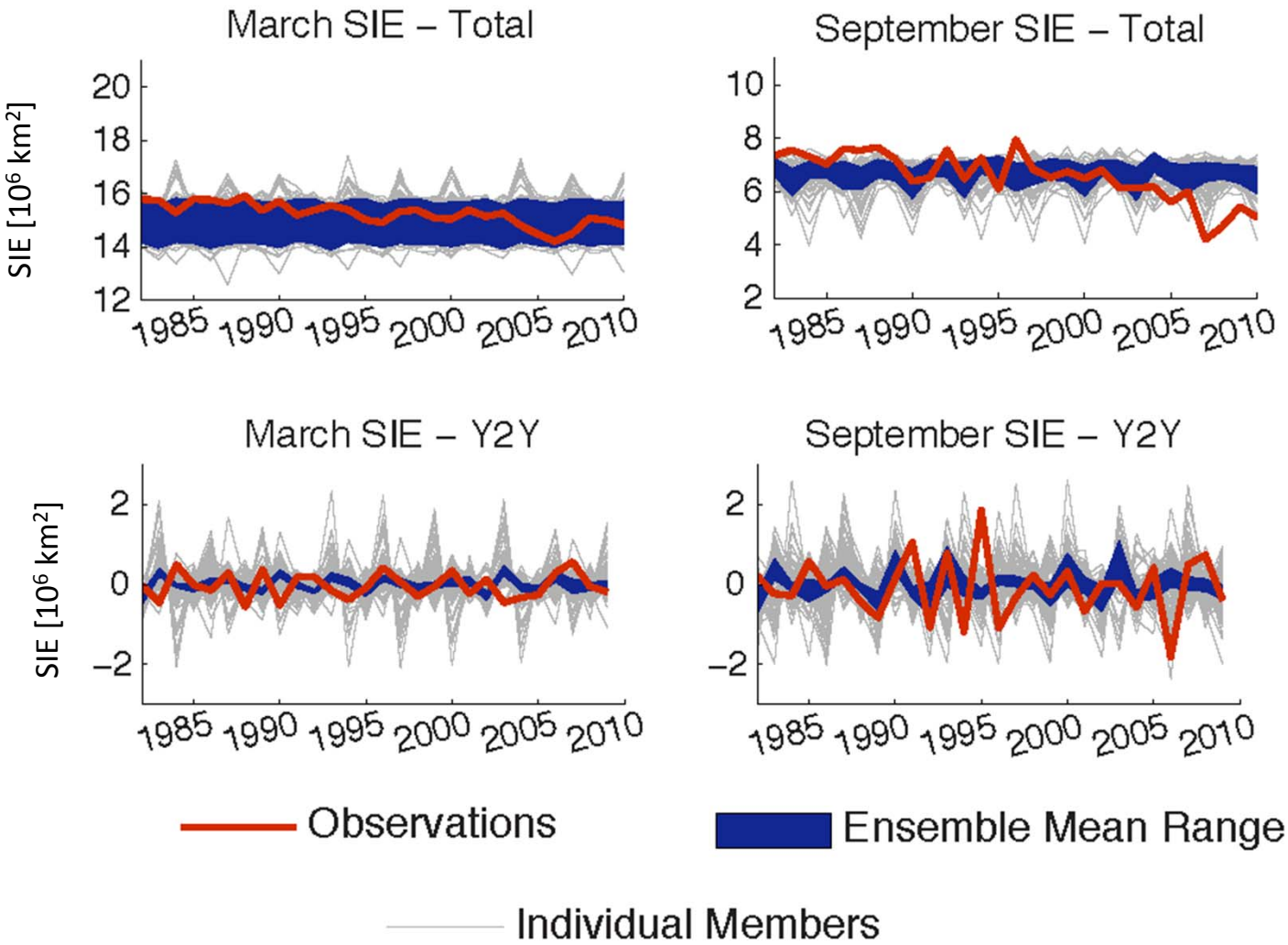
SIE ACC


(c) Total ACC
FLORB-01
CanCM3
CanCM4
CCSM4
CFSv2
NMME Mean
Lead (month)
J F M A M J J A S O N D
(d) Y2Y ACC
FLORB-01
CanCM3
CanCM4
CCSM4
CFSv2
NMME Mean
Lead (month)
J F M A M J J A S O N D
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9

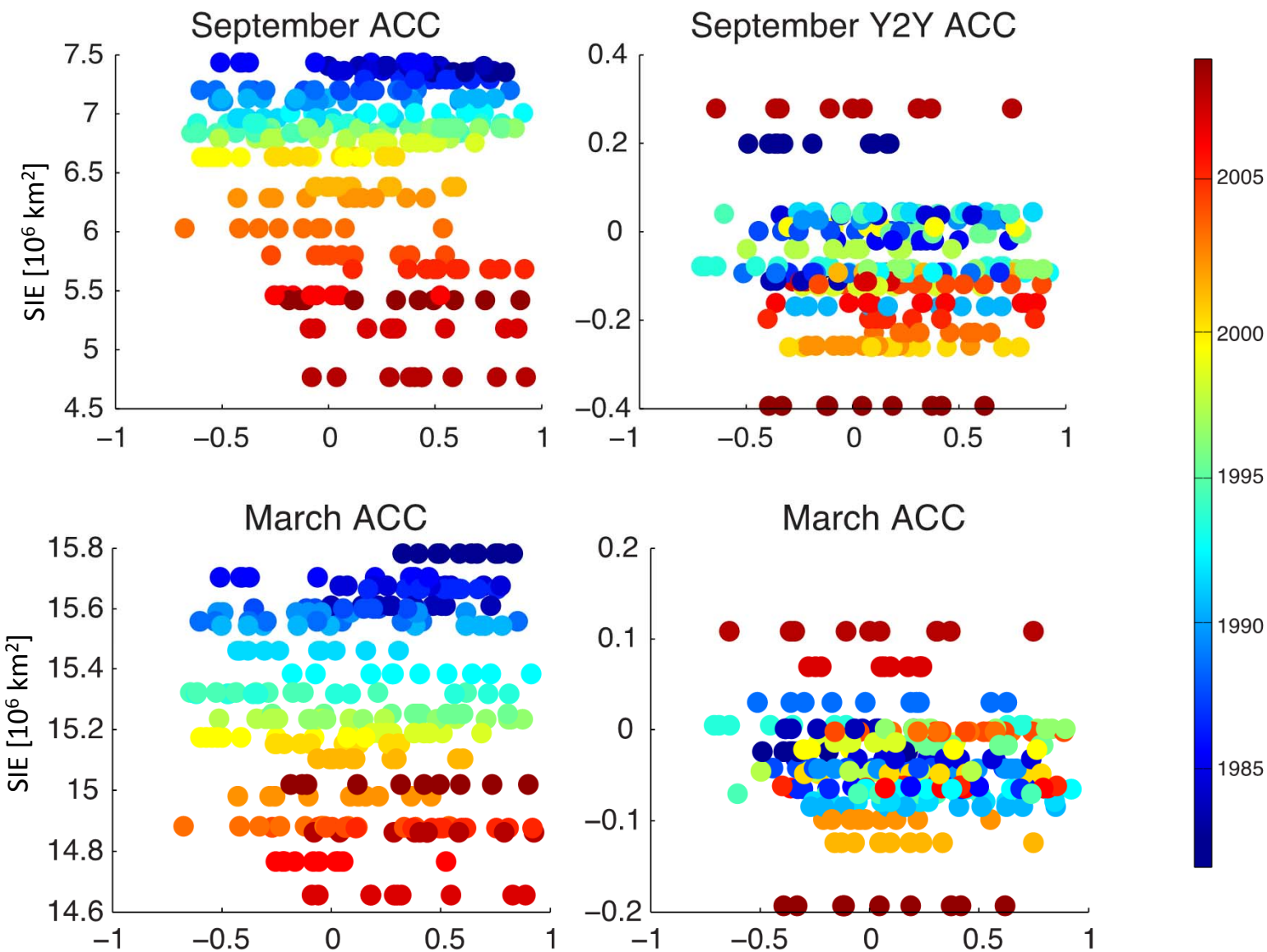
SIE ACC: NMME improvements



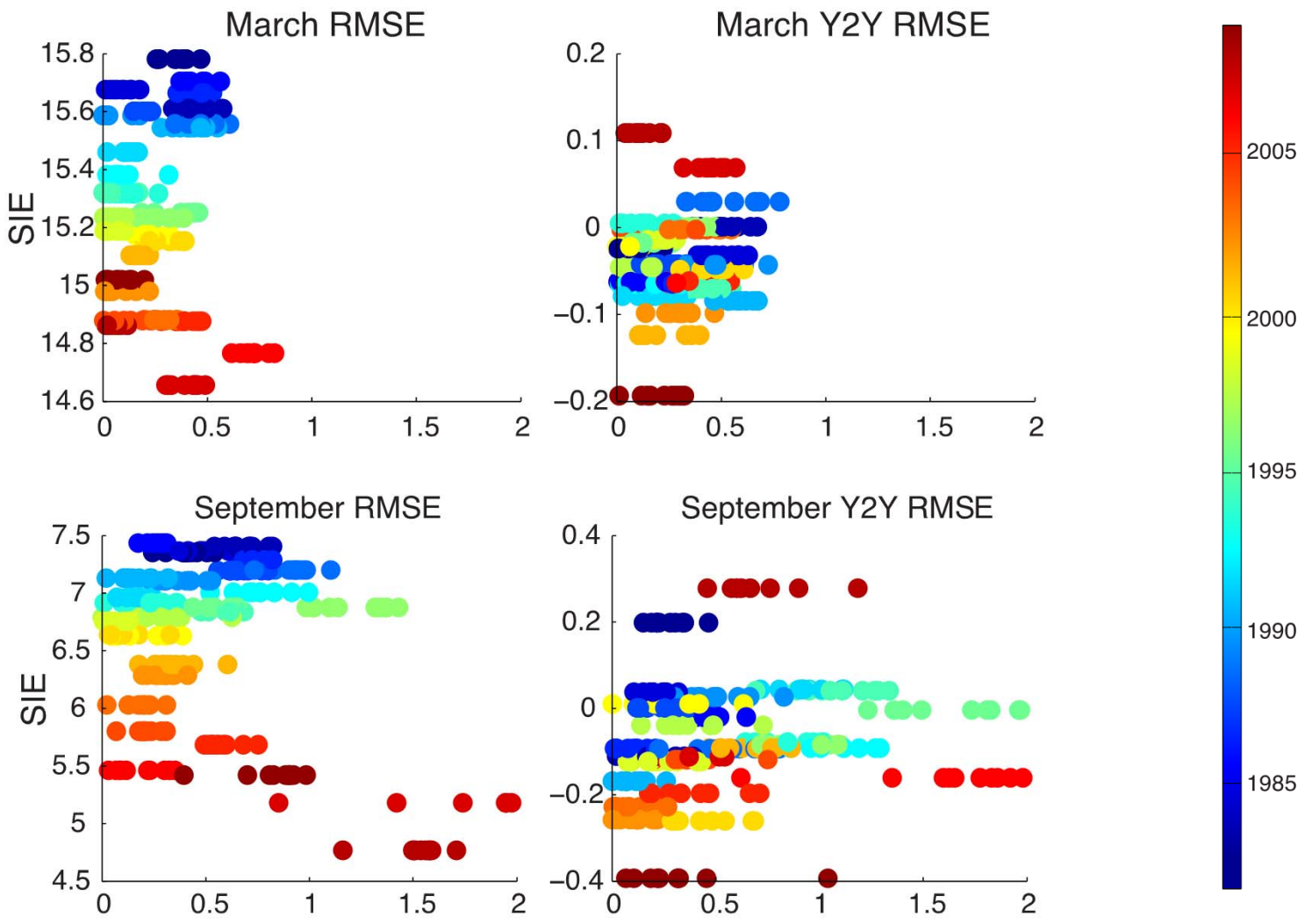
SIE Time Series



SIE Observations (smoothed) vs. Model ACC



SIE Observations (smoothed) vs. Model RMSE



Take home points

- Overall, NMME improvement over individual models
- NMME ensemble mean greatest improvement:
  - total bias
  - Y2Y ACC
- Time series
  - Total: March observations within spread, September falls out of range
  - Y2Y: March observations in line with ensemble mean, September magnitude captured in individual members
- Total error increasing since early 2000s