

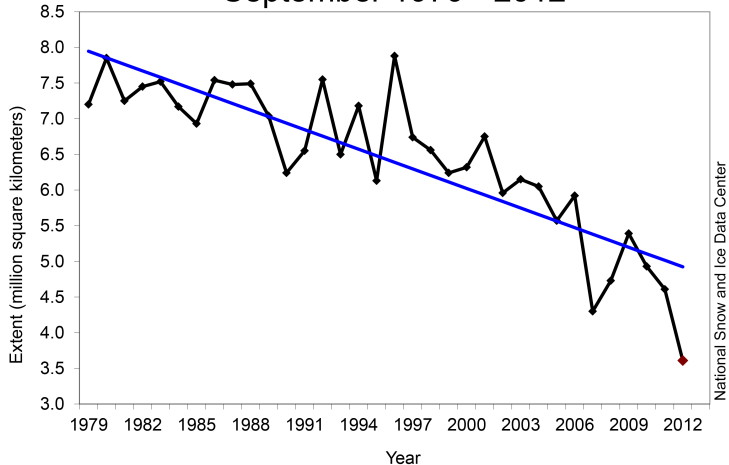
# The atmospheric response to Arctic sea ice loss in CAM: an ensemble approach

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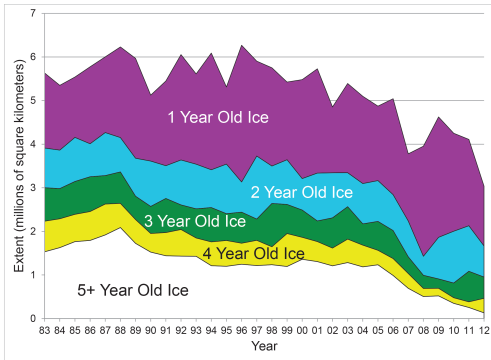
# Interest in Arctic sea ice

## Average Monthly Arctic Sea Ice Extent September 1979 - 2012

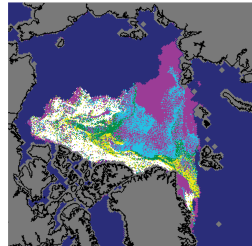


# Interest in Arctic sea ice

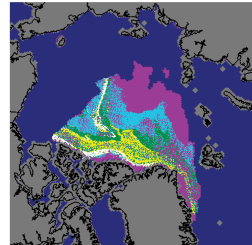
## Arctic Sea Ice Age



September 2007



September 2012



NSIDC courtesy M. Tschudi and J. Maslanik, University of Colorado Boulder

# What has been done?

**Ideal** - **Control** = **Response**

Case - Control = Response

Case - Control = Response

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- Local response in fall and winter:
  - Increased surface heat fluxes
  - Near-surface warming
  - Enhanced precipitation and evaporation
  - Anomalous low SLP
- Remote response in fall and winter:
  - Change in atmospheric circulation that projects on the negative NAO
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  - Slower propagating Rossby waves

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# What can we contribute?

Ice case 1

Ice case 2

...

Ice case n



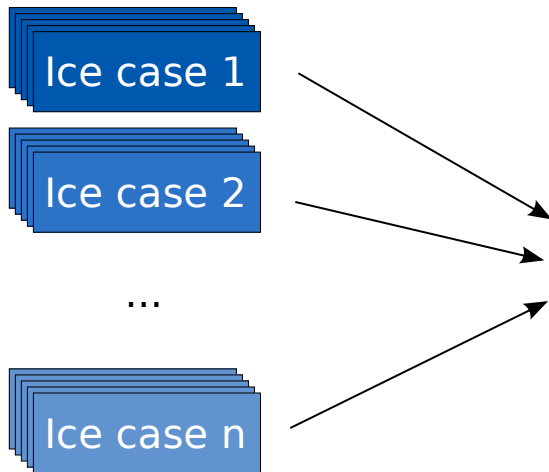
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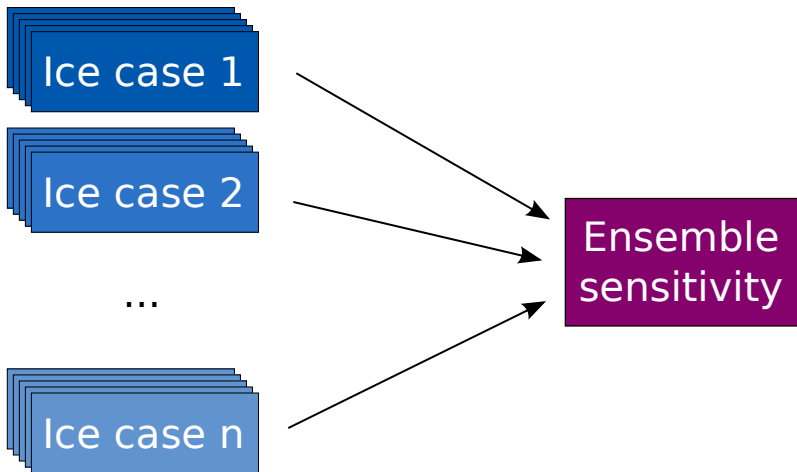
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# What can we contribute?



# What can we contribute?





# Objective

- To investigate how the atmospheric response to declining Arctic sea ice changes with varying ice extent anomalies on seasonal time scales

# Model

- NCAR Community Atmosphere Model 5.3 (CAM)
- Active land model (CLM)
- Prescribed monthly SST and sea ice, linearly interpolated to daily values
- First run with low resolution, then do high-resolution runs

# Initial conditions

Climatology



# Initial conditions

Climatology



Spin up



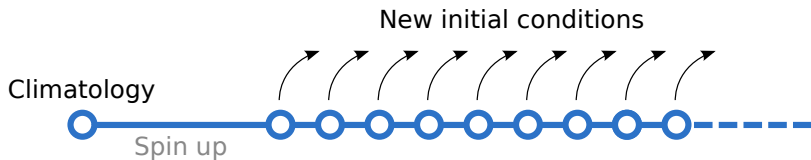


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Climatology



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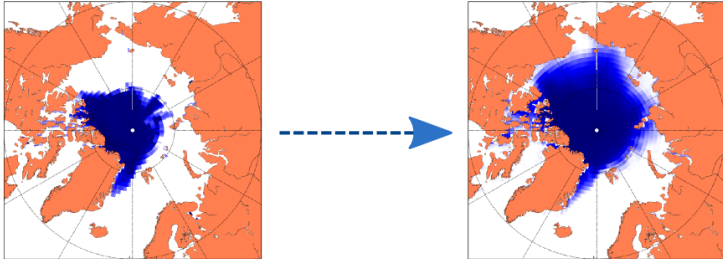


# Sea ice ensemble members



- Grow: Minimum 2012 → September → March
- Melt: March → September → Minimum 2012

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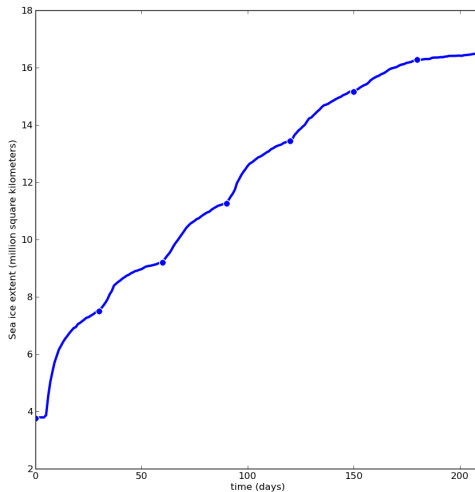
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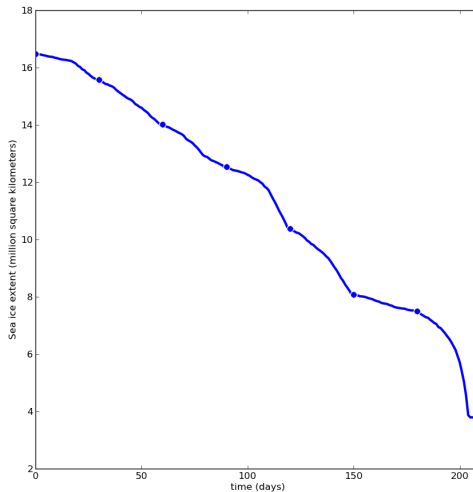
## Grow season





# Sea ice ensemble members

## Melt season





# Conclusions

- The declining Arctic sea ice has received a lot of attention recently
- Reduced sea ice cover may have a large impact on mid-latitude weather and climate
- We will use an ensemble sensitivity approach to examine the atmospheric response to reduced Arctic sea ice

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