

Influence of the timing of winter snowfall events on Arctic sea ice conditions

2019 CESM Polar Modeling Workshop Group Project

Team Green:

Robbie Mallett, Zach Wolff and Patricia DeRepentigny

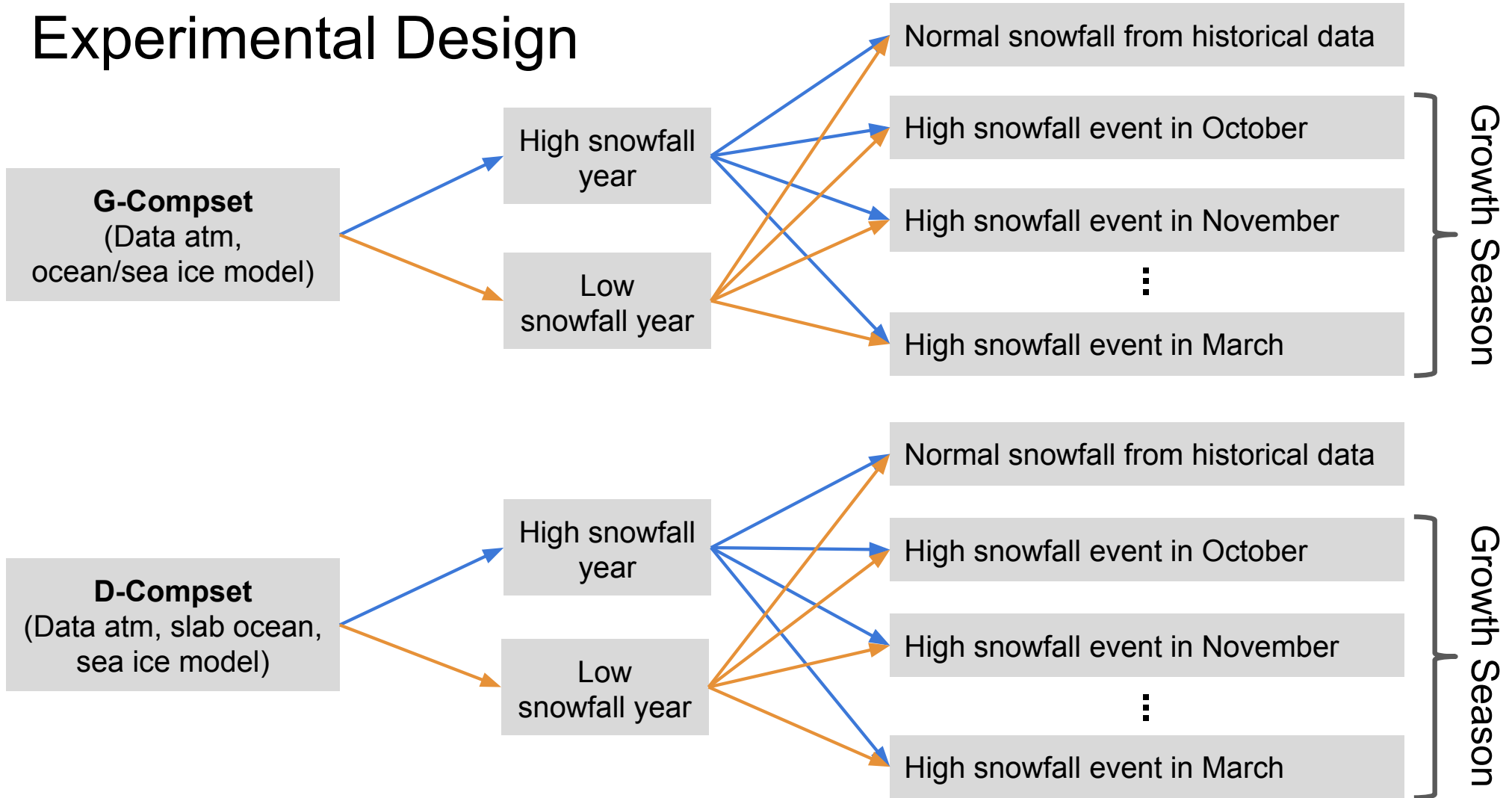
Background and Motivation

- Thin ice grows more quickly than thick ice as the base of the ice floe is more closely connected to low atmospheric temperatures
- Newly formed ice at the beginning of Arctic winter therefore grows very quickly
- But this rapid growth can be disrupted early-on by even a thin layer of snow
- Winter snowfall events can dramatically reduce thermodynamic growth - can the timing of these events be used to predict sea ice properties?

Science Questions

1. What is the effect of the timing of a winter snowfall event on the:
 - a. Maximum Arctic sea ice extent
 - b. Maximum Arctic sea ice thickness
 - c. Minimum Arctic sea ice extent
 - d. Minimum Arctic sea ice thickness
2. What is the influence of a dynamical ocean on this response?
3. How sensitive are those results to total winter snowfall?
 - a. High snowfall year
 - b. Low snowfall year

Experimental Design



Computing and Data Costs

	# Runs	# Years	Core hours/year	Total Core Hours Cost	Data Storage
D-Case Spin-up	1	2	50	100	116 MB
D-Case Experiments	14	2	50	1,400	1.848 GB
G-Case Spin-up	1	300	510	153,000	116 MB
G-Case Experiments	14	2	510	14,280	20.16 GB
Total	30	306	N/A	168,780	22.24 GB