

# CISL Proposal: Cut Down the Arctic

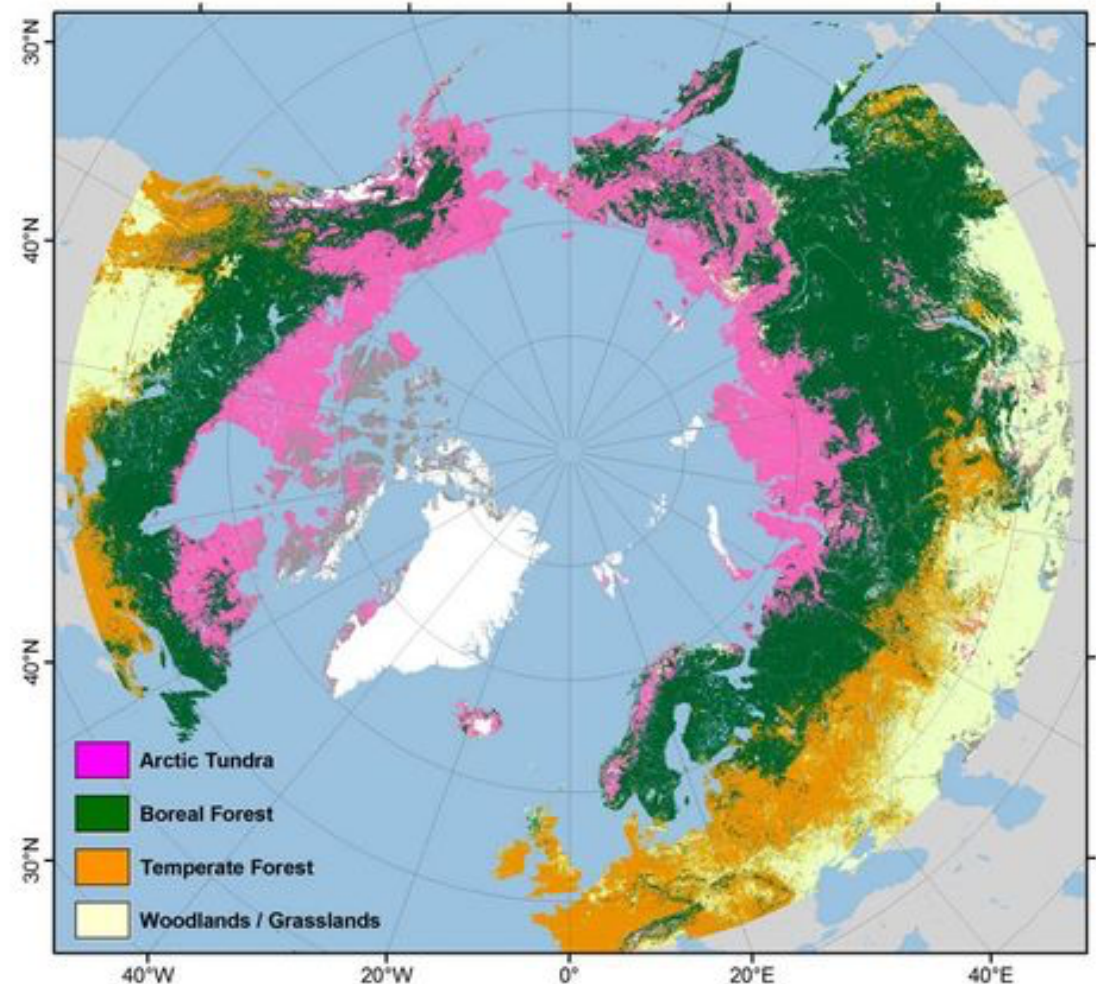
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Glorious Modeling Revolution  
William of Orange, residing mascot



# Science Objectives

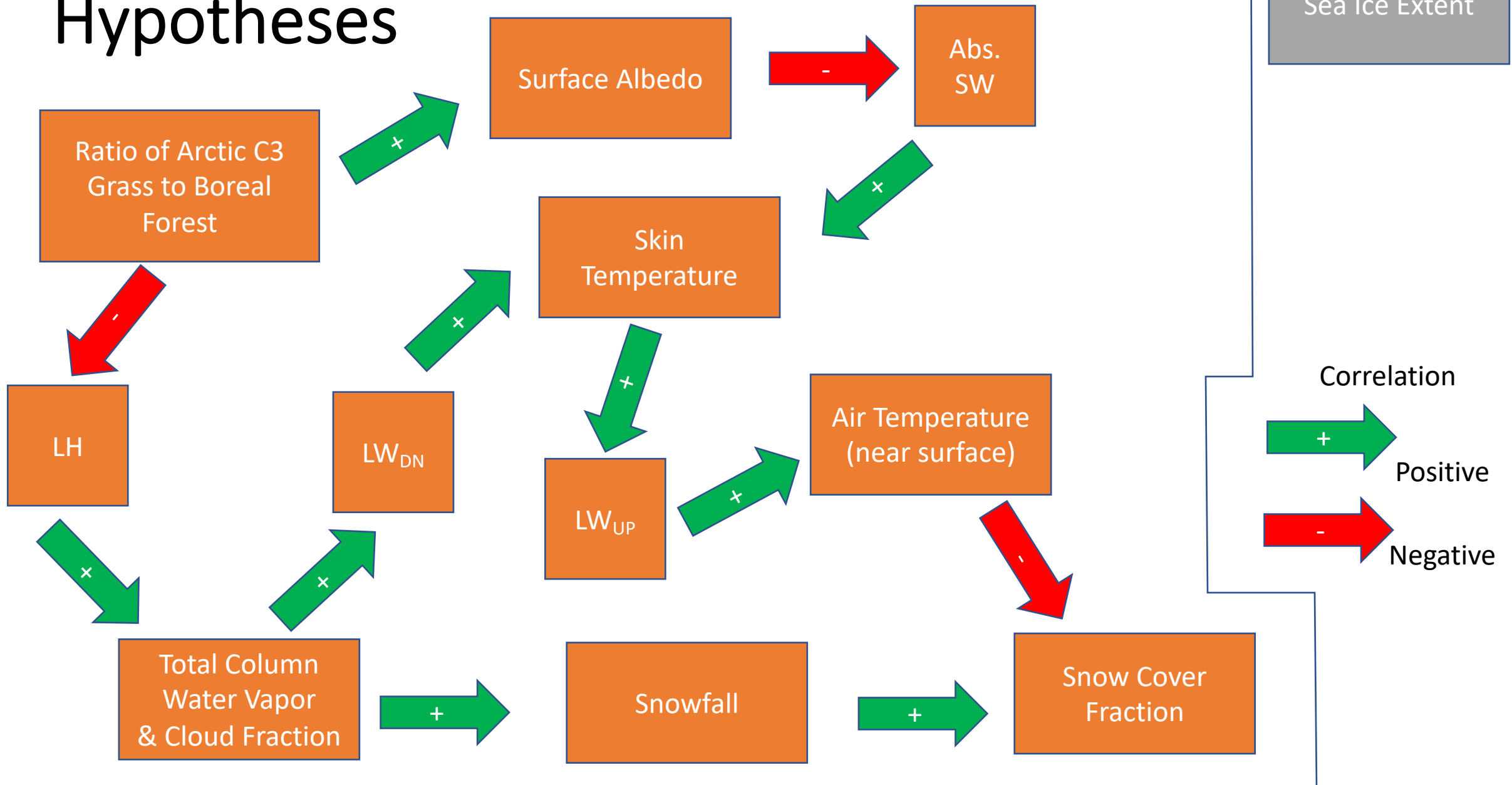
- **Theoretical:** What is the response of the Arctic climate to widescale burning/denuding of the boreal forest?
- **Practical:**
  - What is the short-term (decadal) response of the Arctic climate to replacing boreal forest with Arctic C3 grass?
  - What is the influence of boreal forest on the Arctic climate?



# Experiment Overview

- Replace 0%, 30%, or 100% of boreal forest patches in the land surface PFT file with Arctic C3 Grass
- Interested in short-term (decadal) NH impacts
  - Surface energy balance
  - Atmospheric circulation
  - Snow cover
  - Sea ice extent

# Hypotheses





# Computational Experiments

## Ocean Model

		Slab Ocean	Full Ocean
% of boreal forest replaced by Arctic C3 Grass	0% (Control)	S0	F0
	30% Replacement	S30	F30
	100% Replacement	S100	F100

- **COMPSET**

- Slab Ocean Runs:

- 1850\_CAM60\_CLM50%SP\_CICE\_DOCN%SOM\_MOSART\_SGLC\_SWAV

- Full Ocean Runs:

- 1850\_CAM60\_CLM50%SP\_CICE\_POP2\_MOSART\_SGLC\_SWAV

- RES: f09\_g17

# Resource Requirements

- Branching from B1850 run
- Total Processing Years: 825 years
- Processing:
  - Full Ocean:  $\approx 1,000,000$  PE-hrs (3500 PE-hrs/yr)
  - Slab Ocean:  $\approx 2,000,000$  PE-hrs (3000 PE-hrs/yr)
- Storage: 525 GB (825 years of monthly output)

	Slab Ocean	Full Ocean
0% (Control)	15 yr/case 10 cases 150 years	15 yr/case 5 cases 75 years
30% Replacement	20 yr/case 10 cases 200 years	20 yr/case 5 cases 100 years
100% Replacement	20 yr/case 10 cases 200 years	20 yr/case 5 cases 100 years

