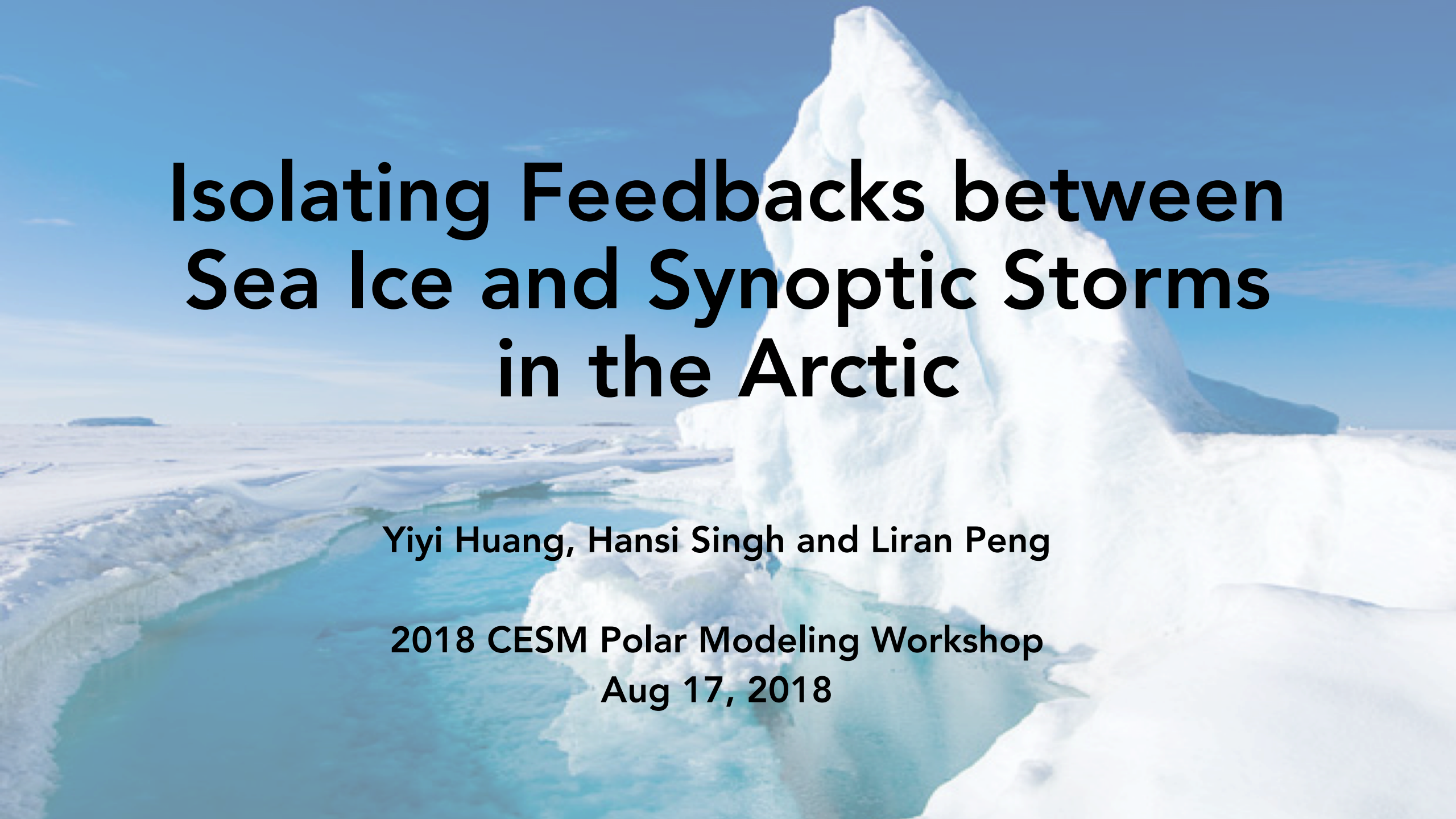

Isolating Feedbacks between Sea Ice and Synoptic Storms in the Arctic

Yiyi Huang, Hansi Singh and Liran Peng

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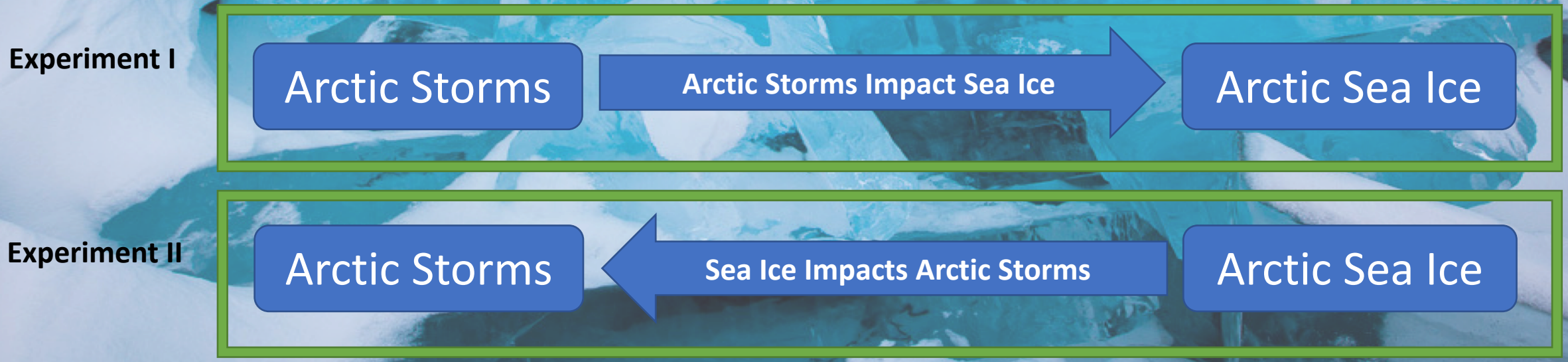
Science Objectives

- Arctic sea ice has experienced dramatic changes in recent decades.
- Changes in the strength and severity of local synoptic storms may be linked to these changes in sea ice.
- **Understanding potential feedback mechanisms between sea ice and storms is essential for improved prediction of Arctic climate change.**

A Feedback Mechanism?

A 'Sneaker-Net' Approach



Experimental Design

- **Experiment I: the sea ice response to synoptic storms**

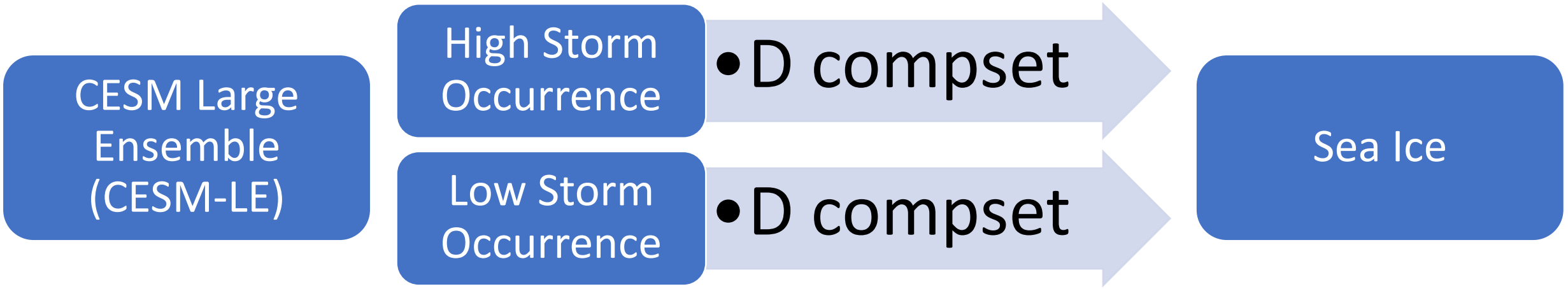
➢Cluster 10-yr chunks from the CESM-LE control:

- ➢ 10 chunks with high storm frequency
- ➢ 10 chunks with low storm frequency

➢Run 10-yr standalone sea ice active simulations (D compset) using prescribed atmospheric conditions from high-storm years (10 ensemble members) and low-storm years (10 ensemble members)

Experimental Design

- **Experiment I: the sea ice response to synoptic storms**



Experimental Design

- **Experiment II: the synoptic storm response to sea ice changes**

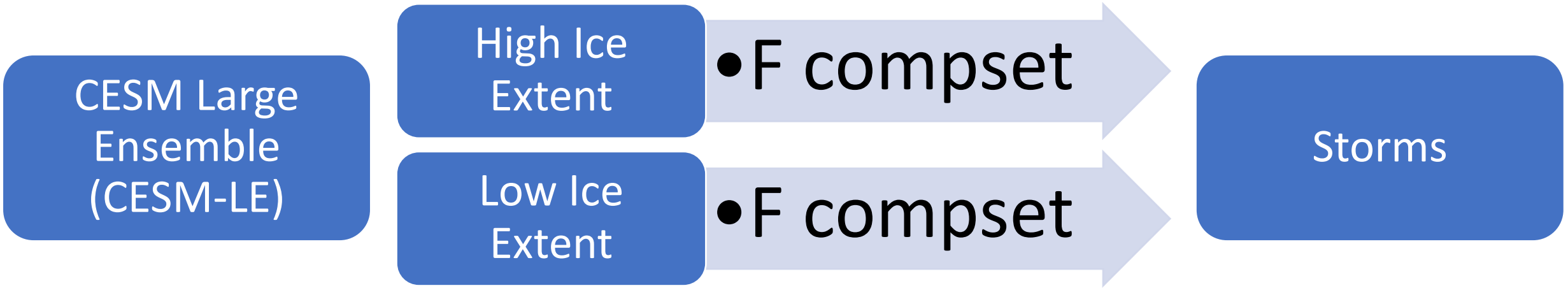
➢Cluster 2-yr chunks from the CESM-LE control:

- ➢ 10 chunks with high annual sea ice extent
- ➢ 10 chunks with low annual sea ice extent

➢Run 50-yr active atmosphere simulations (F compset) with prescribed high sea ice (10 ensemble members) and low sea ice (10 ensemble members); extra-Arctic SSTs are identical for all simulations

Experimental Design

- **Experiment II: the response of synoptic storms to variations in sea ice extent**



Tables for model runs

Experiment	Configuration	Resolution	Number of runs	Number of years per run	Cheyenne core-hours per simulated year	Total in thousands of Cheyenne core hours	Total data volume (Tb)	Details
D	2000_DATM%NYF_SLND_CICE_DOCN%SOM_DROF%NYF_SGLC_SWAV Components: datm,slnd,cice,docn,sglc	f09_g16	20	10	400	80	~3 (monthly, daily output)	Daily: ~43M/day Monthly: ~78M/day
FAMIPC5	Components: cam,clm,cice,docn,sglc	f09_f09	20	50	898	900	~22 (monthly, daily and 6-hourly; PW of 30N)	6-hourly: ~836M*49=40964M/yr Daily: ~2.12G/mon Monthly: ~2.78G/year

Thank you!
Questions?